

Committee of the Whole (Working Session) Report

DATE: Wednesday, June 5, 2024

WARD(S): ALL

TITLE: MUNICIPAL NON-CONVENTIONAL STORMWATER
MANAGEMENT FACILITIES POLICY AND ACCEPTANCE
PROCEDURE

FROM:

Vince Musacchio, Deputy City Manager, Infrastructure Development

ACTION: DECISION

Purpose

To seek Council approval of the City's Policy and Acceptance Procedure for Non-Conventional Stormwater Management Facilities (SWMFs).

Report Highlights

- The City retained Resilient Consulting Corporation (Resilient Consulting) to develop a Municipal Non-Conventional Stormwater Management Facilities (SWMFs) Policy and Acceptance Procedure.
- The Policy and Acceptance Procedure outline the City's process for reviewing and accepting Non-Conventional stormwater infrastructure including the approved locations and uses above a Non-Conventional SWMF and the associated financial contribution required to offset the City's inspection/monitoring and routine maintenance costs of the new infrastructure.
- An extensive internal and external stakeholder consultation process was developed and undertaken to facilitate the development of the Policy, Acceptance Procedure and Engineering Design Criteria & Standard Drawings documents.

Recommendations

1. THAT the City's Policy and Acceptance Procedure for Non-Conventional Stormwater Management Facilities be APPROVED;
2. THAT the City's Non-Conventional Stormwater Management Facility Engineering Design Criteria & Standard Drawings be RECEIVED;
3. THAT staff be authorized to collect an Offset Fee to cover the long-term increased inspection/monitoring and routine maintenance costs associated with a Non-Conventional Stormwater Management Facility when compared to a traditional Stormwater Management Pond;
4. THAT staff be authorized to create a new reserve under the City's Consolidated Reserve and Reserve Fund Policy to collect and manage the Offset Fees for an accepted Non-Conventional Stormwater Management Facility; and
5. THAT staff continue to consult with manufacturers and the development industry on new and emerging Non-Conventional Stormwater technologies and bring forth updates to the Acceptance Procedure and/or the Engineering Design Criteria & Standard Drawings for approval through the City's Products and Standards Review Committee, as required.

Background

Traditional Stormwater Management Facilities (SWMFs), such as stormwater management ponds, have been in existence since the early 1980s. The City currently owns and operates 148 of these traditional SWMFs, commonly referred to as Conventional SWMFs.

The increased demand for housing along with the limited availability and value of land has resulted in a push to explore alternative stormwater management options to optimize land usage for new developments. An example of this would be the implementation of an underground stormwater tank (UGST) under a park or right-of-way. Although UGSTs have been used for many years on private properties to provide stormwater management controls, they are a relatively new concept for municipalities as the operation and maintenance activities can be more complicated and inherently carry a higher lifecycle cost than a Conventional SWMF. However, there is an evolving shift towards acceptance of publicly owned stormwater management facility alternatives, also referred to as Non-Conventional SWMFs, such as UGSTs. The challenges that municipalities are faced with in accepting and implementing Non-Conventional SWMFs is ensuring that proposed dual uses are unencumbered as much as possible; operation, inspection and maintenance of facilities are reasonable; and associated inspection, operation, and maintenance costs as well as end of service life replacement are accounted for.

On June 8, 2022, Council adopted a staff report presented at the Committee of Whole Working Session for an Interim Approach for accepting Non-Conventional SWMFs. One of the recommendations of the report was for staff to retain a consultant to complete a formal policy and procedure for accepting Non-Conventional SWMFs. In December 2022, Resilient Consulting Corporation (Resilient Consulting) was retained through a competitive procurement process to produce a Policy, Acceptance Procedure, and Design Criteria & Standard Drawings for Municipal Non-Conventional SWMFs.

Previous Reports/Authority

Committee of The Whole (Working Session), June 8, 2022, Item 5 (1):

[City Approach on Non-Conventional Stormwater Management Infrastructure](#)

Analysis and Options

The objectives of the Policy and Acceptance Procedure are to provide guidance on where Non-Conventional SWMFs can be accepted by the City; to streamline the evaluation and acceptance process for Non-Conventional SWMFs; to provide a list of allowable stormwater management technologies/facility configurations; and to provide a cost-recovery formula to establish an offset fee for the anticipated increased operation, maintenance, and lifecycle costs of Non-Conventional SWMFs.

It is anticipated that through the implementation of this new Policy and Acceptance Procedure, there will be a clear and transparent decision-making framework for the evaluation, acceptance, and implementation of Non-Conventional SWMFs. This will result in a thorough comprehensive review and technical assessment of Non-Conventional stormwater technologies; increased land use optimization; and a more efficient use of staff and external consulting resources to facilitate development planning application approvals. The process for the development of the Policy and Acceptance Procedure is summarized below.

Research and Background Report

Resilient Consulting reviewed various existing policies, procedures, guidance documents, and established criteria for the approval of stormwater management facilities including those from the Ministry of the Environment, Conservation, and Parks (MECP), the Toronto Regional Conservation Authority (TRCA), and from the City of Vaughan. They also reviewed the City's Interim Approach for Accepting Non-Conventional SWMFs that was approved by Council in June 2022; the existing Non-Conventional SWMFs already implemented at sites in Vaughan; and undertook a jurisdictional scan of Non-Conventional SWMFs practices in neighbouring southern Ontario municipalities. With the exception of the City of Markham, no municipalities have any formal policies or guidelines in place to address the acceptance of Non-

Conventional SWMFs. The findings of the research and background along with a detailed evaluation of common Non-Conventional SWMFs technologies are summarized in Resilient Consulting's Background Report, included as Attachment 1.

Public and Stakeholder Engagement

As part of the project scope of work, Resilient Consulting prepared an engagement and communication plan which identified internal and external stakeholders and outlined a schedule for ensuring materials were distributed and meetings were undertaken with the appropriate parties at the specified project phases and milestones.

An extensive list of City departments were represented on the internal Technical Advisory Committee (TAC), with key input provided from the Development Engineering; Environmental Services; Parks Infrastructure Planning and Development; Development Finance; Policy Planning and Special Programs; Parks, Forestry, and Horticulture Operations; Legal Services; and Infrastructure Planning and Corporate Asset Management departments.

External stakeholders included the Toronto & Region Conservation Authority (TRCA); the Ministry of the Environment, Conservation and Parks (MECP); York Region; Ministry of Natural Resources and Forestry; the Municipal Stormwater Management Discussion Group (MDSG), Municipal Engineers Association; and the Building Industry and Land Development Association (BILD),

A combination of in person and virtual meetings were held with both internal and external stakeholders to provide updates and present opportunities for feedback throughout each phase of the project. Select members of the TAC also had focused discussions with BILD and participated in product manufacturing plant tours as well as site visits to two Non-Conventional SWMF's being constructed in a park and another under the cities right of way which involved members of the Municipal Engineering Association – Development Engineering Committee (MEA-DEC) in Vaughan.

In addition, the Non-Conventional SWMF Policy and Acceptance Procedure was presented by Resilient Consulting to the City's Policy Committee on August 28, 2023 for feedback and input prior to finalizing all documents.

Policy, Acceptance Procedure, and Engineering Design Criteria & Standard Drawings

Resilient Consulting identified a list of key considerations that were utilized for the development of the Non-Conventional SWMF Policy, Acceptance Procedure, and Design Criteria Standards. The key considerations included:

- Engineering Design;
- Public Parks/Outdoor Recreation Planning;
- Social and Community Benefits;
- Urban Design;
- Operation and Maintenance;

- Inspection and Monitoring; and
- Financial Compensation.

The Policy outlines the principles of how Non-Conventional SWMF may be accepted and sets out the high-level requirements. The Acceptance Procedure outlines the process of how the City will review and accept Non-Conventional SWMFs and outlines the financial contribution assessment. The Engineering Design Criteria & Standard Drawings are the written technical details and requirements for how the Non-Conventional SWMFs will be designed, operated, maintained and assumed when utilized beneath right-of-ways and/or public parks and sets out requirements for documentation/submission requirements throughout the application review process.

The Municipal Non-Conventional SWMFs Policy, Acceptance Procedure, and Engineering Design Criteria & Standards Drawings are provided as Attachments No. 2, 3, and 4 respectively.

The key considerations contained within the Policy, Acceptance Procedure and Engineering Design Criteria & Standard Drawings are further detailed below.

Key Considerations for the Acceptance of Municipal Non-Conventional SWMFs

- Non-Conventional SWMFs may be considered for either greenfield or infill developments, if justified and feasible.
- Implementation of Non-Conventional SWMFs may be considered beneath City right-of-ways and/or parkland, subject to certain requirements and limitations.
- The proposed Non-Conventional SWMFs shall only be used for quantity control and extended detention. Water quality is required to be provided upstream of Non-Conventional SWMF by pre-treatment devices, however, separator / isolator rows for water quality controls can be provided for plastic Non-Conventional SWMFs in combination with upstream remaining pre-treatment quality controls.
- Infiltration of stormwater and a permanent pool within the Non-Conventional SWMFs are not acceptable due to more frequent confined space entry requirements and conditions being favourable for low dissolved oxygen concentrations and the development of noxious odours.
- The surface above a Non-Conventional SWMF shall be capable of meeting the loading requirements of heavy-duty vehicles as per Canadian Highway Bridge Design Code CL625ONT (e.g., capable of safely accommodating the weight of a transport truck trailer).
- Non-Conventional SWMFs shall be designed per City and MECP criteria and must have gravity drainage and shall be configured to drain fully between precipitation events (i.e., no pumps allowed).
- Pre-treatment using Low Impact Development, Oil Grit Separators, etc. shall be provided upstream of Non-Conventional SWMF.

- The Non-Conventional SWMF Engineering Design Criteria & Standard Drawings includes a list of acceptable technologies that must meet minimum CSA, OPSD, and/or ASTM standards and include:
 - Cast-in Place Concrete
 - Pre-Cast Concrete
 - Superpipes (Concrete)
 - Polymeric (Plastic) Chambers
 - Superpipes (Plastic)

The structural design of any of the above technologies must be sealed by a Professional Engineer. The concrete and plastic type facility must be designed to have a minimum service life of 100 years and 50 years respectively.

Parkland Considerations

- The design and programming of the public parks based on required outdoor recreational facilities and amenities shall not be compromised by the introduction of Non-Conventional SWMFs.
- Frequent operation and maintenance of Non-Conventional SWMFs should not interfere with the public park required programming or routine operations and maintenance.
- Major repair/replacement works of Non-Conventional SWMFs under parks should be on an infrequent basis (25 years for concrete and 50 years for plastic systems) to avoid disruption to Park's programming, operation and maintenance.
- Provisions of parkland credits for dual use SWMFs may be considered in accordance with Parkland Dedication By-Law 168-2022, subject to meeting criteria set out in this policy.
- To receive parkland dedication, the design of a Non-Conventional SWMF under a park shall not encumber park operations in any way; shall not impact active and/or passive parks programming; shall ensure public parks are open and accessible to the public and are designed and developed to City standards; and shall minimize future mature tree removal.
- To be accepted for parkland dedication, the landowner shall enter into a developer build agreement with the City to design and build the park and be reimbursed based on eligible development charge costs for public parks as per Developer Build Park Policy, No. 07 .2. 05, to the City's satisfaction.
- A minimum of 1.8 m depth of cover will be required above the Non-Conventional SWMF to allow flexibility with potential future park programming.
- The acceptable public parkland uses above Non-Conventional SWMFs is provided on Table 3 of the Engineering Design Criteria & Standard Drawings document (Attachment 4).

Road Right-of-way Considerations

- Non-Conventional SWMFs may be proposed within a City road right-of-way if there are no other alternatives in the boulevard or park.
- No widening of a City standard road right-of-way is permitted to accommodate the incorporation of a Non-Conventional SWMF. Non-Conventional SWMFs can be placed within the road right-of-way without infringing with planned or existing utilities/services.
- Typical separations and set back requirements from other infrastructure /utilities within the road right-of-way must be met and shall comply with the applicable criteria and standards.
- A minimum of 1.2 m depth of cover will be required, per City's Engineering Criteria.
- The design of Non-Conventional SWMFs shall consider minimizing impacts to traffic during frequent operation and maintenance activities and may limit major repair works to greater than a 25-year timeframe.

Operation and Maintenance

- An operation and maintenance manual are required to be completed for all components of a stormwater management solution including water quality, extended detention and water quantity controls. The manual shall include typical information on operation and maintenance such as a detailed breakdown of the procedure, level of effort, equipment and cost for operation and maintenance of the complete stormwater management solution.
- Frequent inspection of the Non-Conventional SWMFs shall not require confined space entry. In addition, all the pre-treatment devices upstream of the proposed Non-Conventional SWMFs shall not require confined space entry.
- Maintenance work shall be completed using conventional methods such as vacuum and flushing; minimize disruption to the public; and be completed on hard surfaces to reduce restoration costs.
- Confined space entry of Non-Conventional SWMFs is expected for infrequent maintenance/rehabilitation on a >25-year period or a 10-year period for structural inspections.
- The monitoring requirements as per City's MECP Consolidated Linear Infrastructure- Environmental Compliance Approval (CLI-ECA) shall be met to the satisfaction of the City.

Financial Requirements and Cost Recovery

- At the detailed design stage of the development planning application process, the Landowner shall provide a one-time Offset Fee, calculated in present value, for

the Non-Conventional SWMF(s) to compensate the City for any increase in costs when compared to a Conventional SWMF(s). The Offset Fee shall be a requirement of the Subdivision or other Development Related Agreement and be provided to the City prior to the registration of the Subdivision or other Development Related Agreement. The fee calculation is based on the operation, inspection and maintenance costs over a 50-year lifecycle for the Non-Conventional SMWF and is the ownership cost differential between a Conventional and a Non-Conventional SWMF. The formula is as follows:

$$\text{Final Offset Fee} = \text{Inspection/Monitoring Costs} + \text{Maintenance Costs}$$

Where:

- *“Inspection/Monitoring Costs” is the differential between the inspection and monitoring costs for Conventional vs. Non-Conventional SWMF;*
 - *“Maintenance Costs” is the differential between maintenance costs, including structural inspections, OGS component replacement, sediment removal, and inlet/outlet replacements, for a Conventional vs. Non-Conventional SWMF.*
- The Final Offset Fee will be calculated on a site-by-site basis and will represent the difference in inspection/monitoring costs and maintenance costs. The offset fee can be very minimal for more simple applications to an increased level for a more elaborate application. The Final Offset Fee calculation shall be based on unitary prices prescribed in the Non-Conventional SWMF Engineering Design Criteria & Standard Drawings document and shall be subject to annual indexing to the Statistics Canada Non-Residential Construction Price Index beginning from the year of the Non-Conventional SWMF Engineering Design Criteria. Adjustments to unit rates may be made by the City through updates of the Engineering Design Criteria & Standard Drawing document to maintain accuracy to current typical industry rates.
 - A 25-year Manufacture Warranty is to be provided at time of assumption. In lieu of the Warranty, rehabilitation cost as identified in the policy will be requested. This will be added to the Final Offset fee.
 - For Infill Sites that are less than 2 ha in size in which superpipes are proposed, the inclusion of replacement/rehabilitation costs are not required for the Final Offset Fee calculation.

Financial Impact

It is anticipated that the potential increase in ownership costs to the City will be mitigated through the collection of an Offset Fee for the Non-Conventional SWMFs to address inspection/monitoring costs and routine maintenance costs that may be incurred. This fee will be collected and deposited into City reserves and invested as per the City's standard practices to mitigate future costs.

Operational Impact

As part of the stakeholder engagement, staff from applicable City departments were members of the technical advisory committee and participated in discussions and review at each stage in the development of the Policy, Acceptance Procedure, and Engineering Design Standard Criteria & Drawings. Key contributors included staff from Development Engineering, Environmental Services, Parks Infrastructure Planning and Development, and Development Finance as these departments have direct involvement in the review, acceptance, operation and maintenance, and financial processes related to Non-Conventional SWMFs.

Broader Regional Impacts/Considerations

There are no anticipated Regional impacts as the Policy and Acceptance Procedure for Non-Conventional SWMF(s) only apply to City owned lands.

Conclusion

It is recommended that Council approve the Municipal Non-Conventional SWMFs Policy and Acceptance Procedure as it will ensure there is clear and transparent guidance on where Non-Conventional SWMFs can be accepted by the City. This will enable a streamlined evaluation and acceptance process for Non-Conventional SWMFs; make sure a list of allowable stormwater management technologies/facility configurations is available and maintained. It will also ensure a differential fee recovery formula is maintained for the City to mitigate the anticipated increased costs associated with the operation, inspection and maintenance of Non-Conventional SWMFs when compared to Conventional SWMFs.

For more information, please contact Frank Suppa, Director, Development Engineering, Ext.8255.

Attachments (to be provided prior to the meeting)

1. Non-Conventional Stormwater Management Facilities Background Report by Resilient Consulting Corporation, dated February 14, 2023.
2. City of Vaughan Municipal Non-Conventional Stormwater Management Facilities Policy dated June 5, 2024.
3. City of Vaughan Municipal Non-Conventional Stormwater Management Facilities Acceptance Procedure dated June 5, 2024.
4. City of Vaughan Non-Conventional Stormwater Management Facility Engineering Design Criteria & Standard Drawings dated June 5, 2024.

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