Ditch Alteration Study Executive Summary

Technical Memo #4

April 8, 2022

FINAL

TABLE OF CONTENTS

List of Tables

1.0 INTRODUCTION

This is an Executive Summary of the findings for the three Technical Memorandums completed as part of the Ditch Alteration Study for the City of Ottawa. Each of the three Memorandums had a distinct focus, but they build on one another and together they point towards strategies that can enable the City of Ottawa to manage ditch alterations more effectively as part of its integrated stormwater management system.

Technical Memo #1 **Ditch Function and Impacts of Alterations**	▪ Review of the functions of roadside ditches ▪ Review of the key features of the City of Ottawa's Ditch Alteration Policy ▪ Impacts of ditch alterations
Technical Memo #2 **Policy Consistency Review**	▪ Review of degree of alignment between current Ditch Alteration Policy with other City Plans, Policies and Objectives, as well as Provincial and Federal legislation ▪ Review of administration of ditch alteration based on peer municipality policies, processes and enforcement mechanisms
Technical Memo #3 **Business Process Review**	▪ Analysis of strengths, weaknesses, opportunities and threats ▪ Recommends revisions to the policies governing ditch infilling to streamline current business processes ▪ Recommends mechanisms for policy monitoring, enforcement, and full cost recovery

1.1 Project Overview

Roadside ditches are critical infrastructure of the City of Ottawa's overall engineered drainage network along municipal streets that have a rural cross-section. They exist throughout the city in various urban, village, and rural contexts. Ditches provide an important stormwater management function within the drainage network via quantity collection and conveyance controls. In addition to assisting in the collection and conveyance of run-off from adjacent lands, roadside ditches provide a roadway drainage role that assists in preserving the longevity and integrity of the adjacent roadways which are themselves vitally important municipal infrastructure. However, the purpose and multiple benefits derived from a well-maintained, functioning municipal roadside ditch network is not widely understood by residents.

The City of Ottawa, through staff across a wide variety of services including Roads, Right of Way, Development Review and Asset Management, receives regular requests from property owners requesting to alter or fill in the ditch within the municipal right-of-way adjacent to their property. The rationale for such requests is typically either to reduce maintenance or to improve aesthetics along the street lot line. In some cases, improper ditch filling or alteration activities are completed by property owners, without municipal review and authorization. Improper ditch filling or alteration may cause an array of detrimental effects to private property or to City infrastructure, both locally as well as to the extended drainage system, and at times requiring remedial action by the City.

The City has retained Parsons to provide a professional and objective third-party review of the matter of ditch filling and alterations. The work includes preparing a series of memorandums focused on ditch function and impacts of ditch alterations, a ditch alteration policy consistency review, and a ditch alteration business process review.

2.0 DITCH FUNCTION AND IMPACTS OF DITCH ALTERATIONS (TECHNICAL MEMORANDUM #1)

The objective of Technical Memorandum #1 as part of the Ditch Alteration Study was to identify the functionality of roadside ditches, document the important services they provide the City, and to provide information on how ditch alterations affect both their function and serviceability. The Memorandum also reviewed the key features of the City of Ottawa's Ditch Alteration Policy and considered the financial impacts to the operation and maintenance of the ditch systems that have been altered or infilled without City approval.

2.1 Functions of Ditches

The primary purpose of Stormwater Management (SWM) is to detain and collect stormwater, to provide quantity control, and remove pollutants found in the runoff by providing quality control. Stormwater management is implemented to protect the natural systems, associated fish habitat as well as people living in the surrounding area.

Stormwater quantity controls are aimed at reducing the amount of run-off that is conveyed off the site. Techniques can include lot level controls such as on-site storage, sewer pipes, reduced lot grading, infiltration trenches, swales, storm sewers, and ditches. The implementation of SWM quality treatment measures improve the amount of sediment and pollutants within the runoff. Quality measures include ditches, low impact development (LID) practices, infiltration trenches, pervious pipe system, vegetated filters strips, and ponds to name a few.

Ditches play important functions in terms of both quantity and quality control of stormwater. They are a critical part of the stormwater management system protecting the watershed, creeks, streams, and rivers, as they are often the first segment in the flow route between development-generated runoff and the eventual receiving watercourse. Roadside ditches form a vitally important component of any SWM system, and their effective management should be a notable objective of any municipality.

The City of Ottawa has approximately 5,650 km of roadside ditches. Historically, the key objective of ditches was to provide the quickest means of safely directing storm water runoff away from roadways and properties. Currently it is recognized that ditches provide multiple benefits, including:

- Ditches are more environmentally friendly when compared to closed sewer systems, as they allow for infiltration into the ground, water quality treatment via sediment and pollutant removal, and reduction in peak flows;
- Vegetated ditches allow for the runoff to be absorbed by the vegetation located within the ditch, reducing the volume of storm runoff downstream;
- Ditches typically have more capacity than a sewer system and play a vitally important function in reducing downstream flooding during heavy rainfall events;
- Ditch systems that are well-design and well-maintained can provide a buffer to ongoing climate changes and as such they are a small but important part of the City's climate change adaptation strategy;
- Ditches provide drainage of the road base which protects the integrity of the road; and
- Ditches play a role in achieving groundwater recharge.

2.2 City of Ottawa Ditch Alteration Policy Framework

The elements of the current legal and procedural framework for the City of Ottawa to administer Local Improvements and Ditch Alteration is outlined below:

- Provincial Municipal Act 2001
    - Ontario Regulation 586/06 . Section 1.(2) Definitions, describes permitted "work" being defined as a capital work and specifically clause (b) adds that "work" includes *constructing any works for the collection, production, treatment, storage, supply, distribution, or conservation of*

water or for the collection, transmission, treatment, or disposal of sewage. In this respect ditch alterations can be interpreted to be a type of work that can be undertaken as a local improvement.

- Provincial Environmental Compliance Approvals
- City of Ottawa
    - Local Improvement Policy (Updated Policy was approved by Council on November 24, 2021)
    - Ditch Alteration Policy
        - Drainage By-law, superseded by the Site Alteration By-law

The City established a Local Improvement Policy in 2006 under the authority of the Municipal Act (2001) and predicated on Ontario Regulation 586/06 (Local Improvement Charges – Priority Lien Status). An updated Policy was recently approved by Council on November 24, 2021. Ditch Alterations can be interpreted as a Local Improvement under Ontario Regulation 586/06 and as per the City's Local Improvement Policy. Ditch Alterations are also subject to Ministry of Environment Conservation and Parks (MECP) Environmental Compliance Approval (ECA) requirements for discharges to water.

In 2007, City Council passed the Drainage By-law, prohibiting the obstruction or alteration of ditches and detailing the related maintenance activities. Acknowledging circumstances where ditch alterations would be permissible, a Ditch Alteration Policy was subsequently approved in July 2008. The City has since approved an over-arching Site Alteration By-law that defers to Ditch Alteration Policy criteria where applicable (as noted above the Drainage By-law is superseded by the Site Alteration By-law).

2.3 Impacts of Ditch Alterations

Ditch alterations and in-fills have impacts on ditch functions, services, and benefits. When altering a ditch, consideration must be given to the entire drainage catchment area to ensure no negative effects are created with respect to ditch conveyance capacity or public and private property. Unapproved alterations without proper technical engineering analysis may result in upstream flooding, basement flooding, reduced network conveyance, missed water quality treatment, aggravated water quality issues, and local infrastructure maintenance problems, including reduced life expectancies of the stormwater management system.

Various ditch alteration infill methods, and their effects on the function and benefits of the ditch on the integrated SWM system are identified in the table below:

Table 1: Ditch Alteration Methods and Their Impacts

METHOD	IMPACTS
Pipe installation ditch infill	▪ Driveway culverts – driveway culverts are typically not sized for storm events and ditches are sized for storm events. It is designed for runoff to flow over the driveways. ▪ Pipes within the ditch – The volume of water that can flow through a pipe is smaller, thus creating a restriction in the system, resulting in higher ponding water elevations upstream. The velocity of the water will be moving faster which will potentially impact erosions and could potentially overload the downstream system.
Ditch infill with no pipe installation	▪ A blockage in the system will create higher water ponding elevations upstream and an increased risk of flooding. All benefits of the ditch are lost.
Ditch infill with bio-retention LID	▪ The addition of an enhanced vegetated ditch bottom needs to be analyzed as part of the whole drainage system, as the vegetated area removes storage volume from the ditch and slows down flows.

	The removal of storage volume and the slower flows could result in flooding upstream.
Ditch infill with perforated pipe and swale	▪ Provides additional beneficial water quality treatment to the SWM system, although the storage volumes typically provided within the ditch are removed. ▪ The quality benefits of this system are also difficult to quantify because it is dependent upon many factors (pipe slope, number and size of perforations, depth of flow).
Ditch bottom treatments	▪ Altering the bottom of the ditch with granular, river stone or low-lying vegetation can improve the quality treatment within the SWM system however, this type of treatment must still be validated by an engineering assessment to ensure conveyance is not unduly impacted. Ditches with altered bottom treatments still have maintenance requirements which would need to be considered prior to any approval for such an alteration. If City approval were to be granted, a property owner would be responsible for ongoing regular maintenance, including remedial works as the need arises.

2.4 Financial Implications and Recommendations

The financial implications related to one-off ditch in-fill alteration adjacent to road networks are proportionate to the resulting effects of the in-fill. Ditch in-fill removes the ability for the road base to drain properly. Unapproved ditch in-fill has the potential to increase flooding, erosion, and ponding. A ditch that is in-filled with a perforated pipe and swale system without prior approval by the city will increase maintenance and operation costs, and these costs need be evaluated on a case-by-case basis.

Recommendations to address the financial implications of ditch in-filling include:

- Ditches need to be routinely inspected and cleaned or else additional financial demands will be placed upon the City;
- At ditch in-fill locations a road base subdrain can be added to the edge of the roadway to promote drainage of the road base;
- Roadside ditch in-fill alteration SWM systems should be inspected after every significant storm event for the first two years to ensure proper functioning of the SWM system, increasing the maintenance requirements of the system. After the first two years and with no adverse effects the SWM can be inspected yearly;
- The following activities should be routinely completed on existing ditch systems. The items are even more crucial when an unapproved ditch in-fill alteration has been completed because the function of the SWM has altered without review of the effects on the system;
    - Observations resulting from inspection;
    - Hydraulic operation (detention time, standing water, evidence, or occurrence of overflows);
    - Condition of vegetation in and around the area;
    - Occurrence of obstructions at the culverts or pipes (inlet and outlet);
    - Evidence of spills and oil/grease contaminations;
    - Frequency of trash build up;
    - Measurement of sediment depth (especially upstream of in-fill areas); and
    - Recommendation for inspection and maintenance program for coming year.

3.0 POLICY CONSISTENCY REVIEW (TECHNICAL MEMORANDUM #2)

The objective of Technical Memorandum #2 was to identify the degree of alignment and consistency of the City of Ottawa's current Ditch Alteration Policy with other City Plans, Policies and Objectives. This also included consistencies within the context of current municipal and local Conservation Authority practices, relevant Provincial and Federal Policies and Regulations, and insights drawn from approaches to ditch alteration used by other municipalities.

3.1 Alignment of Ditch Alteration Policy with other City of Ottawa Plans and Strategies

The degree of alignment and consistency between the current City of Ottawa Ditch Alteration Policy and other City policies are summarized below, along with recommendations for increasing policy coherence.

Stormwater Asset Management Plan: The Stormwater Asset Management Plan (SWAMP) is currently under development. The Ditch Alteration Policy is in alignment and consistent with the current Asset Management Plan (AMP).

Climate Change Master Plan: The City of Ottawa Climate Change Master Plan (CCMP) is a framework for how the City will mitigate and adapt to the changing climate of the next three decades. The current Ditch Alteration Policy does not directly relate ditch alteration to the effects and impacts of climate change.

Recommended changes to the policy include:

- A strong relationship needs to be made stating that climate change will increase the adverse effects caused by ditch alterations completed without the appropriate technical analysis or adherence to the City's Design Guidelines;
- The City needs to ensure that the Policy requirement of an engineering assessment includes a focus on climate change;
- The updated floodplain mapping and community flood risk profiles currently being completed by the City as part of the CCMP will need to be reviewed and incorporated as part of the assessment to prepare for and respond to increasing flooding; and
- The City's Ditch Alteration Policy should be incorporated into the development and application of the Stormwater Asset Management Plan, as roadside ditches are relevant to the discussion about the impact of climate change on infrastructure construction projects.

Climate Change and Resiliency Plan: Climate resiliency is how we adapt in response to the change in climate conditions which could include extreme weather such as heavy rains/windstorms, rain, and snow, and shifts in temperature. The City's Climate Change and Resiliency Plan (CCRP) is still under development. The Ditch Alteration Policy is indirectly aligned with the CCRP. The Ditch Alteration Policy does not directly reference climate change and the impacts of ditch alteration, and the climate resiliency document does not reference ditch alterations as a method of protecting private property from flooding.

Low-Impact Development and Stormwater Retrofit Initiatives: The Low Impact Development (LID) study reviewed the subwatershed health metrics such as terrestrial subwatershed health, stormwater management, water quality, stream channel and riparian health, and aquatic ecology. These are all items that are to be reviewed and accounted for as part of the ditch alteration policy engineering assessment requirement, and these items should be consistently applied across the City. The Ditch Alteration Policy is in alignment and consistent with the City of Ottawa LID Screening Tool for Municipal Right-of-Ways Report, and this report will provide a good resource for the engineering assessment requirement. Additionally, the Ontario Ministry of the Environment, Conservation and Parks has recently published the Low Impact Development Stormwater Management Guidance Manual, *Draft for Consultation January 2022*.

Official Plan Intensification Policies: The Official Plan does not directly reference ditches or ditch in-fill alterations -- although the City's current Ditch Alteration Policy does address themes within the Official Plan. The Ditch

Alteration Policy addresses the implications of uncontrolled stormwater runoff, such as impact upon aquatic habitat, increased erosion, decreased quality of the receiving watercourse, and increased flooding. The Ditch Alteration Policy is also in alignment with the importance of SWM to mitigate the land use impacts to receiving watercourses.

Infrastructure Master Plan: The Infrastructure Master Plan (IMP) provides support to the Official Plan by ensuring there is sufficient infrastructure capacity provided to accommodate development and redevelopment within the city where it occurs. Section 5.4 of the IMP details the Stormwater Systems, Section 5.5 is Responding to Intensification, and Section 5.6 is Servicing in the Rural Area and Urban Area Enclaves.

The City's Ditch Alteration Policy is in alignment and consistent with the message of the IMP. This includes the importance of the City's drainage systems, and watercourse health which includes water quality, LID approaches, and capacity reviews. The IMP also serves as a reference document when engineering assessments are required as part of the Ditch Alteration Policy.

3.2 Alignment of Ditch Alteration Policy with Provincial and Federal Regulations

Environmental Compliance Approval: When completing a Permit for Sewage Works in the Province of Ontario, a Ministry of the Environment, Conservation and Parks (MECP) Environmental Compliance Approval (ECA) may be required. An ECA is an approval issued by the MECP under Part II.1 of the Environmental Protection Act.

A ditch infill alteration could be classified as a non-standard case within the MECP ECA application guide. Non-standard cases may fall under a Transfer of Review Program where the designated municipality has been provided the authority to review ECA applications and supporting documents on behalf of the Ministry. A full-width ditch infill alteration will need to be designed per the Ministry *Stormwater Management Planning and Design Manual* to meet the MECP ECA requirements.

An ECA for an individual ditch alteration can be made, although the impacts to the watershed and full drainage system will need to be assessed to ensure the alteration is designed per the Ministry *Stormwater Management Planning and Design Manual* and the full system continues to function as designed.

Conservation Authorities: The Rideau Valley Conservation Authority (RVCA), Mississippi Valley Conservation Authority and the South Nation Conservation Authority administer Regulations under the Conservation Authorities Act. The location of a site determines if a Permit from a Conservation Authority is needed.

Canadian Fisheries Act: The Canadian Fisheries Act empowers Fisheries and Oceans Canada (DFO) to conserve and protect fish and fish habitat across Canada. The Act was amended on June 21, 2019. Not all ditches fall under the supervision of the Fisheries Act, only those that are connected to a fish bearing watercourse or providing indirect fish habitat (SWM ponds), meaning the ditch is dry most of the time.

3.3 Insights from Approaches used by Other Municipalities

Approaches to ditch alteration used by other Canadian municipalities were reviewed, and insights for the City of Ottawa were identified.

AECOM Review, 2018: A technical memorandum prepared by AECOM in 2018 concluded that the City of Ottawa's Ditch Alteration Policy is more advanced than most other municipalities when it comes to guidance documents and the approach to ditch alteration. The Town of Abbotsford's Good Neighbour Bylaw was identified as a leading example of a regulatory framework for the prevention of ditch in-filling prevention. In line with the key takeaway from the review of the Town of Whitby Policy and Ditch Site Alterations Policy, the City of Ottawa should continue to place importance on having a clearly communicated Policy with easily understood rules and procedures.

City of Markham Policy: The City of Markham has a Roadside Ditch Alteration Within the Public Road Allowance Policy that is to be read in conjunction with the related road occupancy By-law 2018-109. The Policy's purpose is to document the general requirements for the City to permit filling or alterations of drainage ditches and to

remove existing unauthorized ditch in-filling within the road allowance. Markham's Policy appears to contain several items which are the same as in the City of Ottawa's Policy. The City of Markham Policy clearly states that alteration will only be permitted for driveway/entrances or if it has been determined to be beneficial to the operations and maintenance of the City roads and pursuant to an engineering assessment.

Township of North Frontenac Roadside Ditch Alteration Policy: The Policy states that there must be evidence to demonstrate that the ditch alteration is beneficial to the operations and maintenance of the Township Road system. The North Frontenac Policy clearly states that alteration (installation and material) cost, hydraulic assessment cost, additional work determined by the Manager, and existing utility (gas, bell, hydro) will be at the expense of the proponent. In comparison, the City of Ottawa's Policy is more detailed in the listed exceptions to the Policy, considering and providing information regarding technical, economical, and administrative factors affecting the alteration.

Town of Fort Erie Roadside Ditch Alteration Policy: The Town of Fort Erie passed By-law 93-10 on August 9, 2010, to adopt a Roadside Ditch Alteration Policy. The Policy is very similar in content and format to the City of Ottawa's Policy. The financial principles within the Policy state that the Town of Fort Erie will assume the cost for the labour, materials, equipment, and disposal related to the ditch alteration removal and reinstatement of an open ditch system. In addition, there will be no compensation for the Owners who incurred costs to infill their ditch that is being reinstated. This Policy is very similar to the City of Ottawa's Policy with the formatting of the document being almost the same. It can be concluded that the Town of Fort Erie used the City of Ottawa Policy and re-worded most items so that their Policy did not appear to be a direct copy of the City of Ottawa's Ditch Alteration Policy.

City of Burlington Site Alteration Permit: The City of Burlington has a Site Alteration Permit screening application authorized under By-law 64-2014 and amended by By-law 093-2020. This is a pre-screening application for works being proposed. The application poses questions regarding the work being proposed to determine if a Site Alteration Permit is required. This is a good example of a prescreening form that the City of Ottawa could implement when receiving ditch alteration requests. When it has been determined that a Site Alteration is permitted, the requirements of By-law 64-2014 are followed.

4.0 BUSINESS PROCESS REVIEW (TECHNICAL MEMORANDUM #3)

The objective of Technical Memorandum #3 was to provide recommendations to revise and streamline the current Ditch Alteration Policy. This memo also provided recommendations to the City for the transition from current practices to future recommended practices in the areas of monitoring, enforcement, and cost recovery.

4.1 Business Process Recommendations

Following the completion of research on approaches used by other municipalities and prevailing best practices, and dialogue held with working group meetings of key City of Ottawa staff, it was recognized that the City's approach to Local Improvement and Ditch Alteration could be improved. An analysis of strengths, weaknesses, opportunities, and threats regarding the City's current Ditch Alteration Policy was undertaken, and corresponding recommendations were identified.

Unlike many other municipalities in Ontario, the City of Ottawa has a Ditch Alteration Policy, which is recognized in and of itself as a strength. The City of Ottawa is already more advanced than other municipalities when it comes to addressing the issue of ditch alteration; with additional implementation efforts the City can continue to be a leader. There is an opportunity to increase consistency and transparency, as well as to better serve and educate property owners about the importance of ditches in protecting public and private property from damage and degradation. The following table summarizes the business process recommendations presented in Technical Memorandum #3.

Table 2: Business Process Recommendations for Ditch Alteration in the City of Ottawa

Streamline Existing Process	Towards a Renewed Policy and Business Process for Ditch Alterations	
▪ Map existing ditch alteration processes in detail: a) Individual owner request for ditch alteration b) Multiple owner request for ditch alteration c) Illegal ditch reinstatement ▪ Create stakeholder matrix ▪ Review existing engineering information ▪ Maintain engineering assessment requirement ▪ Enhance policy coherence with other City policies	**Policy Revisions**	▪ Establish strategic goal for Ditch Alteration Policy ▪ Articulate Customer Service Principles ▪ Define and differential ditches and swales ▪ Consider evolving Provincial requirements ▪ Articulate Local Improvement Process approach for multiple-owner ditch alteration requests within the Policy
	Business Process Innovation for Requests from Individuals	▪ Create Project Management Plan ▪ Implement a new 8-step process for ditch alteration request from individuals 1) Intake Application Request 2) Initial Staff Screening 3) Independent Engineering Assessment 4) City Agreement in Principle 5) Cost Recovery Agreement 6) Engineering Design Review 7) Construction Implementation 8) Inspection & Monitoring
	Enforcement & Education	▪ Formalize Enforcement Strategy ▪ Do not preclude future enforcement and cost recovery based on date of illegal works ▪ Provide opportunity for owner to reinstate illegally infilled ditch at their cost within a timeframe prior to City reinstatement ▪ Detail Default, Remedial Action, Offences and Penalties in Policy ▪ Educate property owners
	Monitoring	▪ Develop a Monitoring Plan
	Cost Recovery	▪ Entrench the User-Pay Principle in the Policy ▪ Explicitly identify components of costs eligible for recovery ▪ Consider recovery of administrative fees ▪ Identify roles and responsibilities for calculating project costs ▪ Consider tax deferral mechanism ▪ Seek alternate revenue sources from provincial and federal governments

Parsons's emphasizes our recommendation that ditch alteration either on a lot-by-lot basis or multiple property alterations only be approved following a detailed engineering assessment of how the alteration will affect the stormwater management for the catchment area that the alteration is located within. The City's decision to approve or reject any proposed ditch alteration will be informed by the engineering assessment recommendations. This assessment shall be undertaken by a qualified and experienced professional engineer, licensed in the Province of Ontario, and at the expense of the proponent.

The City should not consider any alteration to a roadside ditch if the basis of this request is solely for aesthetic purposes only (e.g., to enhance current or proposed landscaping or for the ease of lawn mowing).

As a clarification to the current Policy, the City should determine if an Environmental Compliance Approval (ECA) is required from the Ministry of the Environment, Conservation and Parks (MECP) for the ditch alteration works. As these proposed works fall within the municipal road allowance, the City would be required to sign the ECA application form. However. the Fee associated with this application should be borne for the property owner(s).

The requirements for this detailed engineering assessment are currently outlined under *Section 7.3 Engineering Assessment of the Ditch Alteration Policy*. Since the current Policy was approved by City Council in 2008 the advancement of Low Impact Development (LID) Design Guidelines was not established until several years later. Therefore section 7.3 should be amended accordingly to recognize LID as a tool to implement sustainable stormwater practices that will help to ensure the continued health of our watersheds.

Additionally, the impacts of Climate Change need to be emphasized in recognition of the City of Ottawa's April 24, 2019 declaration of a Climate Change Emergency. The City's current Sewer Design Guidelines, Section 8.3.12 - Climate Change, provides the necessary criteria for this evaluation.

5.0 CONCLUSION

The Ditch Alteration Policy was approved by Council in July 2008 to document the circumstances and general process requirements for the City to permit filling or alteration of drainage ditches and drainage courses within City road rights-of-way and those in registered and unregistered easements that convey stormwater from public lands. Council has since directed the City to update this Policy to increase consistency and transparency, better educate property owners, and increase protection of public and private property.

The intent of this review is to document how roadside ditches benefits the City through managing stormwater quantity and quality, protecting and supporting infrastructure, providing flood protection, and supporting climate change resiliency. To provide direction for ditch alterations based upon new technologies and techniques used to emulate the natural drainage cycle, and to ensure alignment with City of Ottawa Plans, Policies and By-laws, local Conservation Authority Regulations to deliver watershed-based resource management programs, and Provincial and Federal Acts and Regulations.

From the work undertaken, it was concluded that municipal roadside ditches provide invaluable, incalculable value to the land uses, communities, and watersheds that they are located in. Not only do they play a vitally important stormwater management role, but they also protect the adjacent lands and roadways from risk of flooding or failure, they play a role in mitigating risks associated with climate change and extreme weather events, they assist in groundwater recharge, and they contribute to green communities and healthy watersheds. Duty of care needs to be taken in decisions to authorize requests to alter roadside ditches.

A Ditch Alteration Policy web scan of other Canadian municipalities undertaken by the City, concluded that many municipalities do not have a public ditch alteration policy, although some may have non-public policies, or ditch alteration may be invoked within other local By-laws. The web scan concluded that the City of Ottawa has a more formalized process compared to other municipalities when it comes to ditch alteration policies and regulations. Many other Canadian municipalities follow a process as identified within the Water Resources Act, whereby a Director receives permit applications that are reviewed and approved using engineering considerations. This approach requires other municipalities to place reliance on By-laws. Because of this, the City also completed a review of other municipalities' By-laws to see how other municipalities managed ditch alterations. It was concluded that there is no single approach to ditch alteration management, and yet most municipalities reported having issues with unapproved ditch in-filling alterations.

In many respects, Ottawa's Ditch Alteration Policy is relatively robust compared to some other municipalities when it comes to guidance documents or policies regarding ditch alteration. The key aspects of the ditch

alteration framework which vary among municipalities are purpose, exceptions to the scope, engineering assessment requirements, financial principles, and cost allocations.

The business process recommendations contained within Technical Memorandum #3 – Business Process Review, and as summarized above in Table 2, along with the supporting policy directions should provide the City with the necessary clarity to satisfy Council's direction to update the current Policy.

6.0 GLOSSARY

The following definitions have been gathered from many sources as related to the City's Plans, Policies and Strategies, and relevant Provincial and Federal Policies, Acts and Regulations governing the impact of storm water (open channel drainage) and preservation of the natural environment.

"Canadian Fisheries Act" - One of Canada's oldest and most important environmental laws, the Fisheries Act, was enacted in 1868 – a year after Confederation. In the late 1970s habitat protection provisions were added to the Act, including a prohibition (unless authorized) against the "harmful alteration, disruption or destruction of fish habitat" (HADD).

"Climate Change Master Plan" - The Climate Change Master Plan is the City's overarching framework for how Ottawa will mitigate and adapt to climate change over the next three decades to reduce greenhouse gas emissions and respond to the current and future effects of climate change**.** The plan aims to take unprecedented collective action to transition Ottawa into a clean, renewable, and resilient city by 2050.

"Climate Change Resiliency" - Resiliency is the ability to cope with change. Climate resiliency is how well the City adapts in response to climate conditions now and in the future. These conditions may include extreme weather such as heavy rains or windstorms and gradual shifts in temperature, rain, and snow. It is different from climate change mitigation which refers to the City's efforts to limit climate change by reducing greenhouse gas emissions.

"Conservation Authority" - In Ontario, conservation authorities develop and deliver local, watershed-based resource management programs on behalf of the province and municipalities. Programs carried out by the conservation authority include natural hazard management such as flood and erosion control, and drought/low water program; management of conservation authority owned land; drinking water source protection (under the *Clean Water Act)*; and surface water and groundwater monitoring programs.

"Ditch Alteration Policy" - The City has determined that the ditch alteration will not interfere with utilities, any other City capital works or maintenance work planned for the area. Designs for the ditch alterations will be in conformance to City of Ottawa Sewer Design Guidelines, construction standards and specifications. The Policy documents the circumstances and general process requirements for the City to permit filling or alteration of drainage ditches and drainage courses within the City Road rights-of-ways and those in registered and unregistered easements that convey stormwater from public lands.

"Drainage Act" - The Province of Ontario developed the Drainage Act to provide a process to solve drainage problems while recognizing that the solution requires the participation and input of the entire drainage community. The Drainage Act provides a mechanism to construct a new drainage solution on private and/or public property and includes further provisions for managing that drainage system into the future.

"Environmental Protection Act" - Ontario Environmental Protection Act, 1990**.** The aim of the Environmental Protection Act is to protect and conserve our natural environment. The act includes provisions on vehicles, waste management, renewable energy, spills, and it covers the prohibition, reporting, and handling of contamination.

"Infrastructure Master Plan" - The Infrastructure Master Plan (IMP) is a strategic document that sets growth-related goals, objectives, and priorities for municipal infrastructure related to water purification and distribution, wastewater collection and treatment, and stormwater management, supporting the City's New Official Plan project.

"Integrated Stormwater Management" – An approach to stormwater management that integrates the land use planning, engineering, and environmental science functions with the goal of protecting property and wildlife habitat while accommodating land development.

"Intensification" - The City of Ottawa is growing toward the future — a future in which we will be known as a city with pedestrian-friendly streets and neighbourhoods, where people don't have to rely on their car, and were

moving around the city is fast and easy. This also means intensification. Although the idea can be controversial, intensification is part of a bigger picture: it is the way to grow for any major city.

"Levels of Service" – The purposes of Levels of Service (LOS) are to define and measure service delivery performance to customers and stakeholders, and then asset strategies are designed to achieve those LOS, which closely align to overall City goals in the Official Plan and other strategic planning documents.

"Local Improvement Policy" – The City established the Local Improvement Policy in 2006. While the Ontario Regulation 586/06 (Local Improvements) was enacted under the *Municipal Act, 2001* in 2007. These regulations set the procedural requirements for undertaking many of the types of infrastructure upgrades that a municipality is commonly requested to perform as "local improvements". Ditch Alteration, on the other hand, is recognized as an applicable form of Local Improvement.

"Low Impact Development" – Low Impact Development (LID) refers to systems and practices that use or mimic natural processes that result in the infiltration, evapotranspiration or use of stormwater to protect water quality and associated aquatic habitat.

"Site Alteration By-law" – A by-law of the City of Ottawa (approved in 2018) to protect its agricultural resources and natural heritage features from negative impacts caused by site alteration, and to prevent drainage issues and public nuisances resulting from site alteration activities. This By-law uses the Drainage By-law as a its foundation. In fact, it replaces the Drainage By-law and the former municipalities' topsoil protection by-laws. It does not apply to any area already regulated by the local Conservation Authorities such as a floodplain or a significant wetland.

"Stormwater Asset Management Plan" – This Plan is a strategic document (currently under development) with a 10-year view of the strategies that will be applied to infrastructure assets (such as Stormwater Management) to achieve service-delivery expectations, aligning with the City's financial status. Other Assets in the SWM AMP include the collection, transmission, treatment, retention, infiltration, control, and disposal of stormwater (rainwater and snowmelt).

7.0 REFERENCES

1. Final Technical Memo #1 – Ditch Function and Impacts of Ditch Alterations, Parsons, December 3, 2021.
2. Final Technical Memo #2 – Ditch Alteration Policy Consistency Review, Parsons, January 10, 2022.
3. Draft Final Technical Memo #3 v3 – Ditch Alteration Business Process Review, Parsons, February 9, 2022.
4. City of Ottawa, Ditch Alteration Policy, Public Works and Services Department, Approved by City Council, July 9, 2008.
5. City of Ottawa FACT SHEET – Roadside Drainage Systems – Request for Ditch Alteration.
6. Provincial Municipal Act, Province of Ontario, 2001.
7. Ontario Regulation 586/06 – Local Improvement Charges – Priority Lien Status, Province of Ontario.
8. City of Ottawa Local Improvement Policy, updated Policy November 24, 2021.
9. City of Ottawa Site Alteration By-law No. 2018-164.
10. City of Ottawa Stormwater Asset Management Master Plan (still under development).
11. City of Ottawa Climate Change Master Plan amended December 2020.
12. City of Ottawa Climate Resiliency (still under development).
13. City of Ottawa Low Impact Development Screening Tool for Municipal Right-of-Ways, Aquafor Beech Ltd., April 2020.
14. Ontario Ministry of the Environment, Conservation and Parks, Draft Low Impact Development Stormwater Management Guidance Manual, January 2022
15. City of Ottawa Official Plan, 2021.
16. City of Ottawa Infrastructure Master Plan, 2013.
17. Technical Memo #1 – Stormwater Maintenance Reviews and Levels of Service Framework, AECOM, February 2019.
18. City of Markham Roadside Ditch Alteration within the Public Road Allowance, Policy No. 2018-109-01, Feb 3, 2020. (Related Policy: Road Occupancy By-law 2018-109).
19. Township of North Frontenac Roadside Ditch Alteration Policy – November 2013 (By-law #104-13).
20. Town of Fort Erie Roadside Ditch Alteration Policy – August 2010 (By-law #93-10).
21. City of Burlington Site Alteration Permit – May 2014 (By-law #64-2014).
22. Ontario Guide to applying for an environmental compliance approval, September 10, 2021 (web based).
23. Ontario Guide to applying for an environmental compliance approval (pdf version), Version 1, Publication Date December 2012.
24. Ontario Water Resources Act, R.S.O. 1990, c. 0.40, June 1, 2021.
25. Government of Canada, Introducing Canada's Modernized *Fisheries Act*, (web based), date modified: 2021-04-14.