Toronto and Region Conservation Authority

Board of Directors Meeting
Revised Agenda

#3/20

April 24, 2020

10:00 A.M.

The meeting will be conducted via a video conference

Members of the public may view the livestream at the following link:

https://video.isilive.ca/trca/live.html

Pages

1. ACKNOWLEDGEMENT OF INDIGENOUS TERRITORY

2. MINUTES OF MEETING #1/20, HELD ON FEBRUARY 21, 2020
   Meeting Minutes

3. DISCLOSURE OF PECUNIARY INTEREST AND THE GENERAL NATURE THEREOF

4. DELEGATIONS

   4.1 Mr. Leith Coghlin, Managing Director, EnPointe Development Inc., in regard to agenda item 10.1.1 Request for Exchange of Toronto and Region Conservation Authority-owned Land

5. PRESENTATIONS

   5.1 Natalie Blake, Chief Human Resources Officer, TRCA in regard to Board of Directors COVID-19 Briefing 5

6. CORRESPONDENCE

7. SECTION I - ITEMS FOR BOARD OF DIRECTORS ACTION

   7.1 2020 BUDGET 19

8.8 SUMMARY OF 2020 TRCA POLICY CONSULTATION SUBMISSIONS AND RECENT PROVINCIAL POLICY INITIATIVES 500

8.9 TORONTO AND REGION CONSERVATION AUTHORITY ADMINISTRATIVE OFFICE BUILDING PROJECT 548

Project Update

9. MINUTES OF SPECIAL EXECUTIVE COMMITTEE MEETING, HELD ON FEBRUARY 21, 2020

Open Session Meeting Minutes

(Copy of the Closed Session Minutes will be circulated to the Board Members separately)

10. MATERIAL FROM EXECUTIVE COMMITTEE MEETING #1/20, HELD ON MARCH 13, 2020

Meeting Minutes

10.1 SECTION I - ITEMS FOR BOARD OF DIRECTORS ACTION

10.1.1 REQUEST FOR EXCHANGE OF TORONTO AND REGION CONSERVATION AUTHORITY-OWNED LAND

Report back on the request by the owner to acquire TRCA-owned lands located at the rear of 99 Wakelin Court, City of Vaughan, Regional Municipality of York, Humber River watershed via an exchange of land to resolve a historical encroachment from the previous Owner (CFN 61572).

(PDF Page 2/58)

10.1.2 CITY OF RICHMOND HILL

Proposed disposition of TRCA lands to address an earlier request from the City of Richmond Hill, for a conveyance of TRCA-owned lands located on west side of Bayview Avenue and north of Bethesda Side Road, in the City of Richmond Hill, Regional Municipality of York, required for municipal park infrastructure, Humber River watershed (CFN 59703).

(PDF Page 7/58)

10.1.3 REGIONAL MUNICIPALITY OF YORK

Receipt of a request from the Regional Municipality of York, for a permanent easement on Toronto and Region Conservation Authority-owned lands located on the north side of Rutherford Road and west of Keele Street, in the City of Vaughan, Regional Municipality of York, required for Rutherford Road widening from Jane Street to Basaltic Road, Don River watershed (CFN 62916).

(PDF Page 11/58)

10.1.4 GREENLANDS ACQUISITION PROJECT FOR 2016-2020

Acquisition of property located north of Kingston Road and west of Church Street, municipally known as 10 Elizabeth Street, in the Town of Ajax, Regional Municipality of Durham, under the "Greenlands Acquisition Project for 2016-2020," Flood Plain and Conservation Component, Duffins Creek watershed (CFN 61019).

(PDF Page 15/58)

10.1.5 TORONTO ZOO TRIPARTITE AGREEMENT

Update on discussions with the Toronto Zoo, City of Toronto and Parks Canada relating to the Tripartite Agreement and required work by Parks Canada, City of Toronto and other partners to finalize the Tripartite
Agreement and facilitate the design of the Rouge Gateway and Welcome Centre for the Rouge National Urban Park in the City of Toronto.

(PDF Page 19/58)

10.2 SECTION IV - ONTARIO REGULATION 166/06, AS AMENDED

Receipt of Ontario Regulation 166/06, as amended, for applications 11.1-11.2, which were approved or received at the Executive Committee Meeting #1/20, held on March 13, 2020

(PDF Page 27/58)

10.3 NEW BUSINESS

TRCA's Interim Pandemic Plan

Electronic Meeting Participation

2020 TRIECA Conference Cancellation

Maple Syrup Festival and March Break Programs

(PDF Page 56/58)

11. CLOSED SESSION

12. NEW BUSINESS

NEXT MEETING OF THE BOARD OF DIRECTORS #4/20, TO BE HELD ON MAY 22, 2020 AT 9:30 A.M. LOCATION TO BE DETERMINED.

John MacKenzie, Chief Executive Officer

/am

Board of Directors COVID-19 Briefing

Natalie Blake
Chief Human Resources Officer

April 24, 2020

Toronto and Region Conservation Authority

Executive Summary

This presentation provides a briefing on TRCA's strategic and tactical response to COVID-19:

- Background
- COVID-19 Response at a Glance
- COVID-19 Dashboard
- Phased Management of COVID-19
  - Prevention
  - Control
  - Management
  - Recovery
- Post COVID-19 – Growth Focus

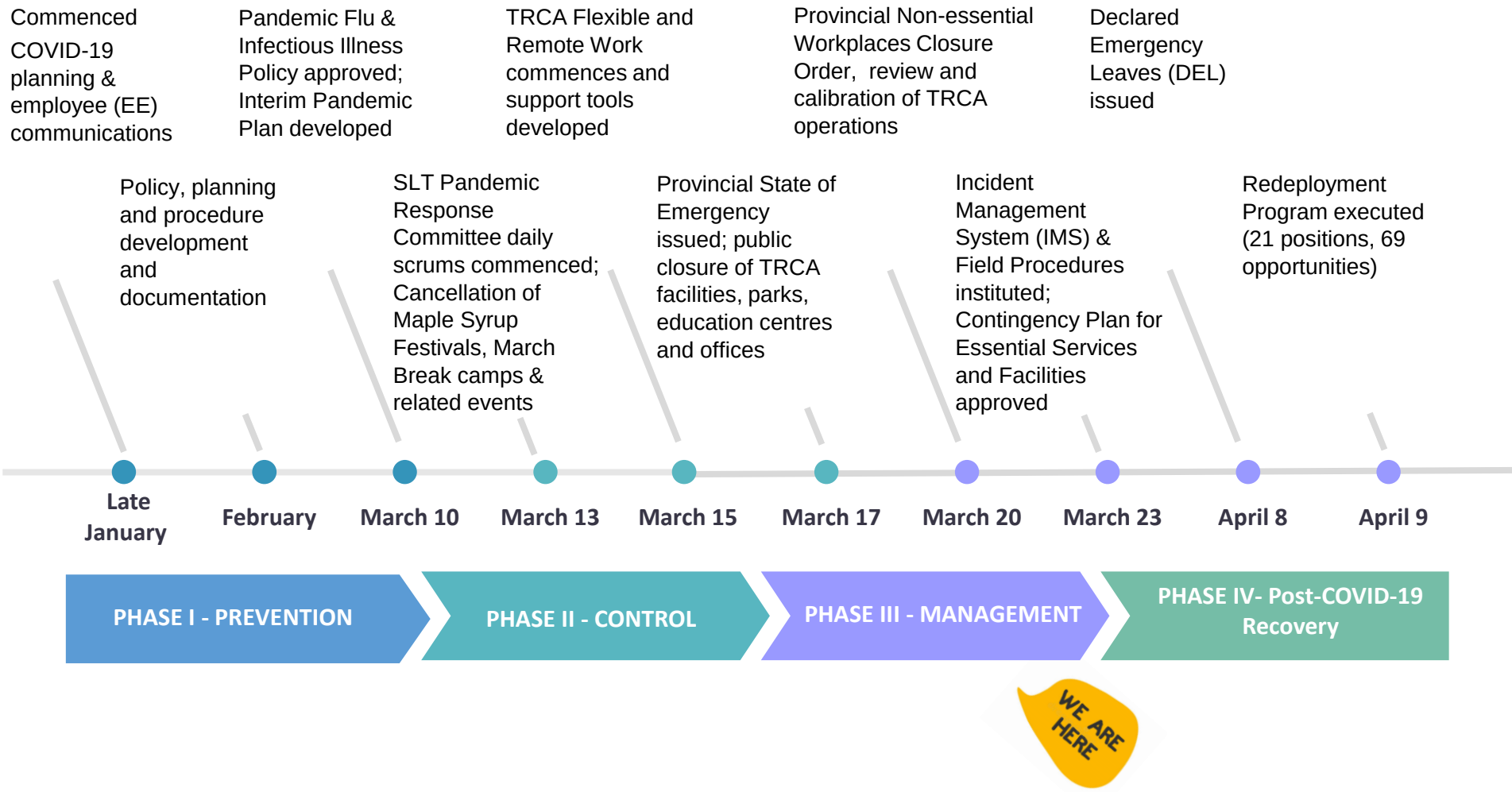
Background

COVID-19, a strand of coronavirus, has emerged as a significant risk to the personal wellbeing of TRCA's employees and our operational success.

Due to the uncertain, complex, and ambiguous effects COVID-19 is having, TRCA's Senior Leadership Team (SLT) has responded expeditiously, with the protection of our employees, stakeholders and public interest being our critical priority.

The SLT has faced extremely difficult decisions to lead during this unprecedented times in an effort to mitigate the extent of impact on employees, TRCA operations and the organization.

COVID-19 Response at a Glance



COVID-19 Dashboard

Redeployment Opportunities

21 Redeployment positions

69 Redeployment vacancies

45 Displaced employees expressed interest

24 Displaced employees applied for opportunities

Projected 2020 Authority Generated Loss

Up to 50%

TRCA COVID-19 Cases

1 Confirmed Case

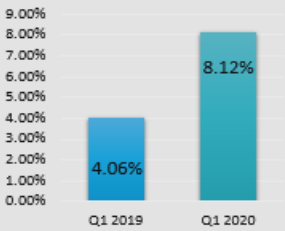
62 Self-isolation /quarantine

61 Resolved

EAP Utilization

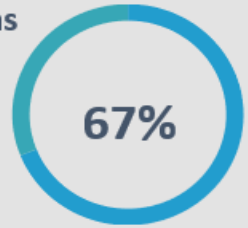
50%

Increase in utilization of ComPsych EAP supports



Remote Workplans

484 employees have a flexible or remote workplan in place



COVID-19 Resources

- Employee comms & FAQ's
- Manager Tactical Calls
- Remote Work
- Mental Health & Resiliency

Division	DEL's Issued
Education & Training	81
Parks & Culture	74
Corporate Services	4
Restoration & Infrastructure	4

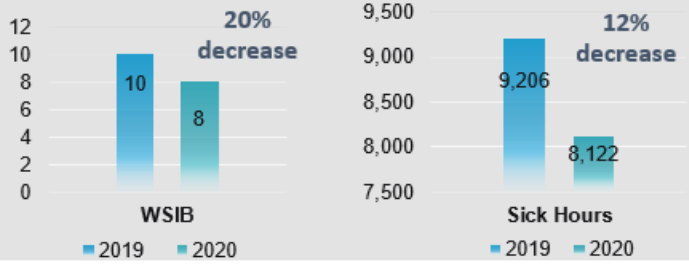
Declared Emergency Leaves (DEL) Issued

22.4%

22.4% (163) of employees were issued a DEL

The number of DEL's is expected to increase

Q1 WSIB and Sick Leave Stats



Phase I - Prevention

Focus on promoting everyday prevention action and strategies

Legislation, Policy Process Review

- Daily review of government and legislation updates
- Pandemic Flu & Infection Illness Policy
- Interim Pandemic Plan completed
- Contingency Plan for Essential Services and Facilities developed
- Identification of essential roles and three levels of back-up

Communication Strategy

- Frequent, clear and transparent communications
- Communications cater to different needs based on audience
- Utilization of reputable sources for information
- Communicating via multiple times in various mediums (Hub, email, verbal) to ensure adoption

Monitoring/Tracking

- Protocol for tracking and management of cases
- Ongoing assessment of service-level impacts
- Staffing plan to ensure critical positions can be filled

Change Management

- Clear messaging for managers
- Facility changes to adjust to changing environment

COVID-19 Resources and Supports

Employee Communications & Staff Hub Content

- 20+ employee communications issued
- Hygiene procedures posters deployed to all offices and field sites
- Mental Health and Wellness supports
- 163 individual DEL letters issued
- Refunds, Credits & Cancellations
- 100+ employee letters issued due to Maple Syrup & March Break cancellations
- Employee FAQ's developed to support active and employees on Declared Emergency Leave (DEL)
- Employee Assistance Program supports and communications
- Benefits updates, Out of Country Travel changes
- Interactive videos – hand washing, use of sanitizer

Polices, Plans and Procedures

- Pandemic Flu & Infectious Illness Policy
- Interim Pandemic Plan
- COVID-19 Management Decision Matrix
- Recruitment procedures and messaging
- DEL procedures and legislative requirements
- Contingency Plan for Essential Services and Facilities
- Incident Management System (IMS) & Field Procedures
- Construction and Field Sites Signage for social distancing
- Essential Work vehicle signage and employee confirmation letters
- Redeployment Program – procedures, communications, tools etc.

Remote Work Information

- Guide to Managing a Remote Team developed and shared with all managers
- Employee Guide to Working Remotely developed and shared with all staff
- Ergonomics Guidelines and recommendations shared with all employees
- Technology supports and documentation for remote work and virtual meetings
- Employee remote workplan templates and requirements

SLT Scrum and Manager Tactical Calls

- SLT Pandemic Response Committee scrums held daily during height of pandemic and have moved to 1-2x/week
- 5 Manager tactical calls held to share information and address manager specific questions

Phase II - Control

Increased actions driven by Public Health

SLT Pandemic Response Team

- SLT Pandemic Response Committee established
- Daily scrums commenced to provide cross functional support for time sensitive and critical decisions

Management of Public Health and Legislative Requirements

- Cancellation of March Break and Maple Syrup events
- Cancellation of TRIECA and other TRCA sponsored events
- Public closure of TRCA facilities, parks, education centres and offices
- Shift to virtual meetings

Incident Management

- Development of COVID-19 Management Decision Matrix
- Implementation of Manager Tactical Calls
- Incident management of TRCA COVID-19 related cases
- Recruitment placed on hold – filling of only critical positions

Environmental Scan

- Pulse check with peer Conservation Authorities, municipalities and not-for-profits to share information
- Ensure consistency and alignment of practices with peers and partners

Flexible & Remote Work

- Employee tools to support remote work resources
- Supports to create a healthy and safe remote workspace
- Managers guide to support and manage remote employees
- Ergonomic resources for remote employees

TRCA COVID-19 Management Decision Matrix

Criteria 1: Quarantine or Self-Isolation as Directed by Public Health				
Quarantine or Self-isolation Criteria	**Triage #1**	**Triage #2**	**Triage #3**	**Triage #4**
1. Development of COVID-19 symptoms. 2. Exposure to individuals with COVID-19 symptoms. 3. Returning from travel outside of Canada. 4. Been in close contact with an individual that has recently travelled outside of Canada and is experiencing fever and/or has a new or worsening cough. 5. Leave to provide care-giving responsibilities (i.e. childcare or care of elderly), per ESA. 6. Individuals who are immunocompromised. 7. Directed to self-isolate through indirect contact (exposure through spouse or acquaintance) by Public Health.	1. Where an employee is ill with COVID-19 or related symptoms the employee shall utilize sick leave, or can work remotely if feasible (this shall be the employees decision) 2. Every effort will be made for alternative work arrangements for that employee. 3. Employees are asked to speak to their supervisors if they are in this situation.	1. For individuals required to self-isolate or quarantine, every effort will be made to asses redeployment opportunities if an alternative work arrangement is not feasible.	1. Employees will be permitted to use sick leave/short term disability, vacation, lieu time, family emergency leave etc. OR the ESA approved Infectious Disease Emergency Leave **(choice is the employees)**. If the employee elects for the ESA leave, HR needs request ROE via payroll to be issued.	1. Employees who are quarantined that are not eligible for sick leave/STD, vacation etc., may be provided a discretionary leave with pay as approved at the discretion of the CEO per the *Pandemic & Infectious Disease Policy*.

Criteria 2: Self-isolation not directed by Public Health				
Self-Isolation Criteria	**Triage #1**	**Triage #2**	**Triage #3**	
1. Request for self-isolation due to living with high risk groups (i.e. 2. Request for self-isolation due to being high risk (i.e. pregnant, infants). 3. Request for self-isolation due to illness not related to COVID-19. 4. Request for self-isolation for social distancing (i.e. not utilizing public transit).	1. If the employee is able to work alternatively, efforts will be made to accommodate the request. 2. Employees are asked to speak to their direct supervisor. Note, in situations where the employee is a field worker (including contruction) there is limited ability to provide remote work. Rather, efforts can be made to support isolalation in the field	1. Assessment of redeployment if practical. Note, in situations where the employee is a field worker (including contruction) there is limited ability to redeploy.	1. Employees will be permitted to use sick days/STD, vacation, lieu time, family care leave etc. OR the ESA approved Infectious Disease Emergency Leave **(choice is the employees)**. If the employee elects for the ESA leave, HR needs request ROE via payroll to be issued.	

Phase III - Management

Continued operations

Employee Engagement

- Communication targeted to audiences
- Engagement Survey
- Execution of COLA/Merit
- Focus on retention drivers
- Leaders model empathy
- Recognition Program
- Work alignment
- Shift to virtual onboarding

Essential Workplaces Order

- Assessment of Essential Workplaces Orders
- Calibration of TRCA work and operations to comply with the Provincial Order
- Incident Management System (IMS) & Field Procedures instituted for COVID-19

Financial, Operational and Resource Assessment

- Balance risk with org. viability
- Ongoing hiring freeze of non-critical positions
- Reduced staffing & hours
- Chair and SLT pursuing government program stimulus opportunities
- Budgeting/staffing exercise based with varied lengths of COVID-19 impact

Declared Emergency Leaves (DEL)

- Create DEL roll-out plan
- Assessment of all TRCA positions to identify displacement
- Issue DEL's (163)
- Resources and supports for impacted employees
- Logistical matters
- Maintain support of impacted employees
- ROE's expediated to ensure no delay for federal supports

Redeployment

- Establish redeployment process
- Create redeployment action plan
- Prepare communication for execution of redeployment
- Provide training to redeployed employees
- Support employees through the transition

TRCA at Work

TRCA employees continue to demonstrate their commitment to safely delivering our valuable services to stakeholders, partners and members of the public.

- 17+ construction crews
- 484 employees with alternative work arrangements
- 75+ field staff performing planting, inspections etc.
- Positive feedback on service and business continuity received from multiple municipal partners and industry stakeholders

Phase IV - Recovery

Increased actions driven by Public Health

Communication Recovery Strategy

- Continued increase of communications for awareness through variety of mediums (tactical calls, Leadership Chats, TRCA Hub)
- Ongoing engagement and Communications to displaced employees

Phased Return for Full Operations

- Prioritization of regaining revenue streams
- Staffing requirements for revenue reintegration
- Operational prioritization of key work initiatives and projects
- TRCA alignment with key stakeholders and partners

Heath and Safety Prioritization

- Enhanced sanitation practices
- Review of SOP's and field work procedures
- Agility to address shifting government directives e.g. vaccination protocol, health and safety requirements etc.
- Plan for potential 2nd wave of COVID-19

Mgr Resources

- Managers provided tools and resources to manage within the new work environment
- Adjustment to operational priorities
- Calibration of employee Performance Development Program objectives

EE Resources

- Clear expectations
- EAP and wellness supports
- FAQ for ongoing support and to address common questions
- Focus on employee wellbeing
- Change management supports

Post COVID-19 – Growth Focus

Leadership Focus

Focus on vision of the future, increased SLT communications, change management to inspire and motivate staff, model transparency in all interactions, mindfulness in decision making suited to the emerging 'new normal', being present, visible, and available, clear and decisive post COVID-19 recovery plan.

Post-mortem

Opportunities through lessons learned: impacts assessment – strategic /ops plans, prioritization of work, people, service delivery, budget etc.; digital infrastructure; governance models, business disruption scenario planning.

Wellbeing – The Future of Work

Increased focus on holistic TRCA employee well being (physical, mental and emotional wellbeing); managing work-life integration; Shift from health and wellness being a "perk" to an entrenched requirement as a part of the employee experience at TRCA.

Workforce Capability

Future-proof our skills to keep up with change. Focus on creativity and critical thinking rather than routinized tasks in a shift to highly digitalized workforces.

Workplace Model Shift

Surge in remote/flexible work; virtual collaboration, workplace reintegration strategy; change management; preparing to do more with less; performance measurement by results.

Transformed Talent Models

Assess talent implications of the new environment and TRCA's strategy, increase in skills-based hiring; increased digitalization will provide ability to tap into a geographically diverse talent pool.

Learning Transformation

Pivot TRCA's Learning Strategy, create engaging virtual opportunities and incorporating gamification, virtual reality to learning, blended learning opportunities.

Culture and Engagement

Increased importance of workplace culture and engagement —focusing on monitoring, managing and curating a culture by design.

Natalie Blake, Chief Human Resources Officer
natalie.blake@trca.ca

Item 7.1

Section I – Items for Board of Directors Action

TO: Chair and Members of the Board of Directors
Meeting #3/20, Friday, April 24, 2020

FROM: Michael Tolensky, Chief Financial and Operating Officer

RE: **2020 BUDGET**

KEY ISSUE

Approval of Toronto and Region Conservation Authority's (TRCA) 2020 Budget, pre Covid-19, including municipal general (operating), capital levies, grants, donations, contract services, application fees, user fees and other revenues.

RECOMMENDATION

THAT the 2020 TRCA Budget, and all projects and programs therein, be adopted;

THAT TRCA staff be authorized to amend the 2020 Budget, to reflect actual 2019 provincial transfer payment allocations to set the amount of matching levy required by the Conservation Authorities Act;

THAT the cost of property taxes imposed by municipalities be included as additional levy to the participating municipalities where the lands are located, excluding the cost of property taxes which are passed on to a third party under a lease or similar agreement;

THAT, except where statutory or regulatory requirements provide otherwise, TRCA staff be authorized to enter into agreements with private sector organizations, non-governmental organizations or governments and their agencies for the undertaking of projects which are of benefit to TRCA and funded by the sponsoring organization or agency, including projects that have not been provided for in the approved TRCA budget;

AND FURTHER THAT authorized TRCA officials be directed to take such action as may be necessary to implement the foregoing, including obtaining approvals and the signing and execution of documents.

BACKGROUND

TRCA's annual budget is partially funded by levies to the upper tier partner municipalities within our jurisdiction as permitted under the Conservation Authorities Act and as set out in regulation. The budget also includes funding from other revenue sources such as contract services, user fees, application fees, internal charge backs, grants from other levels of government and through fundraising or donations.

RATIONALE

Enclosed in Attachment 1 is the recommended 2020 Budget, which is composed of operating and capital projects and programs.

Municipal Approvals
Preliminary budgets are prepared each year for submission to TRCA's partner municipalities. Staff meet with municipal staff throughout the year, as required by the budget processes in our partner upper tier municipalities and according to schedules that are set out by each participating municipality. Presentations are made to partner municipality staff and their respective committees and councils.

The funding identified in the recommended apportionment of the levies reflects the amounts that the partner municipalities have approved in their 2020 budgets. Contributions from the City of Toronto and the regional municipalities of Durham, Peel and York have received council approval. The Township of Adjala-Tosorontio and the Town of Mono have been advised of TRCA's levy request.

Notice of Meeting
As required by regulation, TRCA has provided 30 days' written notice to its partner municipalities of the date of the meeting at which the Board of Directors will consider the budget, which includes the approved municipal levies.

General Levy (Operating)
TRCA's total 2020 Operating Budget is set at $46 million, an approximate 1.8% increase over 2019. After considering all the factors that affect the general levy, including tax and interest adjustments, year over year shifts in Current Value Assessment (CVA) and individual partner municipal targets, TRCA has achieved total general levy funding in the amount of $15.4 million representing an average increase over 2019 of 4.18%. The general levy has been allocated to the participating partner municipalities as follows:

Partner Municipality	2019 General Levy ($)	2020 General Levy ($)	Change over 2019 (%)
Adjala-Tosorontio	885	930	5.08
Durham	581,850	596,000	2.43
Mono	1,480	1,700	14.86
Peel	1,917,000	1,920,355	0.18
Toronto	8,908,335	9,470,412	6.31
York	3,418,630	3,458,490	1.17
TOTAL	**14,828,180**	**15,447,887**	**4.18**

Capital Budget Summary
TRCA's total 2020 Capital Budget is set at $184 million, an approximately 8.9% increase over 2019. Capital levy makes up $48 million of the budget which is roughly $3 million higher than the 2019 budget. Capital projects are generally funded by partner municipalities on a benefitting municipality basis. That is, with few exceptions, capital projects funded by a partner municipality, are undertaken within that municipality. For TRCA, these projects are typically undertaken as per a Memorandum of Understanding or Service Level Agreement which highlights the importance of such agreements.

DETAILS OF WORK TO BE DONE
During the Covid-19 pandemic, TRCA is committed to introducing actions to support everyone's health and well-being while remaining operationally sustainable. Recognizing that circumstances are quickly evolving, TRCA is committed to monitoring, and acting swiftly to

address changing conditions. TRCA staff are projecting an expected decrease of 2020 budgeted revenues in excess of $20 million. These expected decreases are with certain exceptions in the Tourism and Recreation stream (Black Creek Pioneer Village, Conservation Parks, Bathurst Glen Golf Course, Events and Festivals) and Education and Outreach (School Programs e.g. Kortright, Family and Community programs).

On April 9th, 2020 numerous full-time, part-time and contract staff were placed on a Declared Emergency Leave to mitigate impacts of lost revenues and further projected losses due to Covid-19 restrictions. Some of these staff are being redeployed to essential service areas primarily funded by municipal capital budgets.

The Senior Leadership Team will continue to keep the Board of Directors informed as TRCA evaluates the evolving business needs of the Province, government agency and partner municipalities, and other stakeholders based on duration of the Covid-19 restrictions and future government directives.

TRCA staff will continue evaluating financial implications through the creation of a variety of business models that account for potential operational scenarios arising from Covid-19 that may impact TRCA's 2020 Budget. Staff will continue to work with partner municipalities, including lower tier municipalities, to provide essential services and special projects where TRCA has significant, specialized expertise.

Report prepared by: Jenifer Moravek, extension 5659
Emails: jenifer.moravek@trca.ca
For Information contact: Michael Tolensky, extension 5965
Emails: michael.tolensky@trca.ca
Date: April 3, 2020
Attachments: 1

Attachment 1: TRCA 2020 Budget

Toronto and Region Conservation Authority

2020 Budget
Operating and Capital

March 18, 2019

Table of Contents

Toronto and Region Conservation Authority
2020 Operating and Capital Budget

	2020 Budget	2019 Budget	Unaudited 2019 Actual	$ Change over 2019 Budget	% Change over 2019 Budget
Revenue					
Municipal					
Operating levy	15,448,000	14,828,000	14,828,560	620,000	4.2%
Capital levy	59,892,000	59,425,000	44,144,673	467,000	0.8%
Contract services	69,066,000	69,983,000	29,909,213	(917,000)	-1.3%
Grants	2,958,000	3,412,000	1,019,860	(454,000)	-13.3%
Provincial/Federal					
Provincial	4,949,000	5,432,000	7,108,351	(483,000)	-8.9%
Federal	12,570,000	8,400,000	3,139,254	4,170,000	49.6%
Contract services	-	-	-	-	0.0%
User fees, sales and admissions	22,185,000	23,569,000	20,843,087	(1,384,000)	-5.9%
Contract services					
Compensation agreements	2,363,000	2,685,000	881,409	(322,000)	-12.0%
Corporate and other	4,540,000	8,868,000	3,783,007	(4,328,000)	-48.8%
Rent and property interests	4,358,000	4,089,000	4,399,897	269,000	6.6%
Fundraising					
Donations	2,721,000	1,259,000	1,342,486	1,462,000	116.1%
Toronto and Region Conservation Foundation	6,394,000	1,477,000	3,436,804	4,917,000	332.9%
Investment income	730,000	716,000	601,171	14,000	2.0%
Sundry	27,000	7,000	1,152,975	20,000	
Total Revenue	208,201,000	204,150,000	136,590,747	4,051,000	2.0%

Toronto and Region Conservation Authority
2020 Operating and Capital Budget

	2020 Budget	2019 Budget	Unaudited 2019 Actual	$ Change over 2019 Budget	% Change over 2019 Budget
Expenditures					
Watershed Studies and Strategies					
Watershed Planning and Reporting	2,180,000	2,848,000	3,104,482	(668,000)	-23.5%
Climate Science	723,000	958,000	703,086	(235,000)	-24.5%
	2,903,000	3,806,000	3,807,568	(903,000)	-23.7%
Water Risk Management					
Water Resource Science	6,216,000	4,682,000	5,782,841	1,534,000	32.8%
Erosion Management	83,593,000	83,466,000	34,998,439	127,000	0.2%
Flood Management	5,593,000	5,463,000	4,971,661	130,000	2.4%
	95,402,000	93,611,000	45,752,941	1,791,000	1.9%
Regional Biodiversity					
Biodiversity Monitoring	2,701,000	2,670,000	2,368,274	31,000	1.2%
Ecosystem Management Research and Directions	1,168,000	935,000	770,771	233,000	24.9%
Forest Management	1,141,000	1,552,000	1,275,330	(411,000)	-26.5%
Restoration and Regeneration	11,444,000	17,092,000	11,936,733	(5,648,000)	-33.0%
	16,454,000	22,249,000	16,351,108	(5,795,000)	-26.0%
Greenspace Securement and Management					
Greenspace Securement	2,264,000	2,727,000	1,482,086	(463,000)	-17.0%
Greenspace Management	4,473,000	2,132,000	1,912,183	2,341,000	109.8%
Rental Properties	1,585,000	1,971,000	1,792,267	(386,000)	-19.6%
	8,322,000	6,830,000	5,186,536	1,492,000	21.8%
Tourism and Recreation					
Waterfront Parks	3,169,000	2,539,000	1,519,712	630,000	24.8%
Conservation Parks	5,573,000	6,146,000	6,251,249	(573,000)	-9.3%
Trails	11,494,000	6,951,000	3,614,302	4,543,000	65.4%
Bathurst Glen Golf Course	1,247,000	1,314,000	1,166,133	(67,000)	-5.1%
Black Creek Pioneer Village	4,404,000	4,924,000	4,437,219	(520,000)	-10.6%
Events and Festivals	607,000	647,000	615,565	(40,000)	-6.2%
Wedding and Corporate Events	-	-	-	-	0.0%
	26,494,000	22,521,000	17,604,180	3,973,000	17.6%
Planning and Development Review					
Development Planning and Regulation Permitting	6,629,000	6,543,000	5,932,258	86,000	1.3%
Environmental Assessment Planning and Permitting	3,865,000	3,982,000	3,119,989	(117,000)	-2.9%
Policy Development and Review	1,195,000	1,023,000	851,725	172,000	16.8%
	11,689,000	11,548,000	9,903,972	141,000	1.2%
Education and Outreach					
School Programs	11,628,000	14,083,000	8,426,043	(2,455,000)	-17.4%
Newcomer Services	1,011,000	885,000	860,014	126,000	14.2%
Family and Community Programs	1,134,000	1,299,000	1,067,158	(165,000)	-12.7%
	13,773,000	16,267,000	10,353,215	(2,494,000)	-15.3%
Sustainable Communities					
Living City Transition Program	6,496,000	7,241,000	5,477,800	(745,000)	-10.3%
Community Engagement	3,639,000	3,193,000	2,637,845	446,000	14.0%
Social Enterprise Development	-	-	-	-	0.0%
	10,135,000	10,434,000	8,115,645	(299,000)	-2.9%
Corporate Services					
Financial Management	3,802,000	3,019,000	2,965,654	783,000	25.9%
Corporate Management and Governance	38,297,000	22,837,000	8,320,799	15,460,000	67.7%
Human Resources	1,544,000	1,360,000	1,151,467	184,000	13.5%
Corporate Communications	2,030,000	1,811,000	1,913,575	219,000	12.1%
Information Infrastructure and Management	3,022,000	3,280,000	3,108,248	(258,000)	-7.9%
Project Recoveries	(3,941,000)	(5,495,000)	(3,251,181)	1,554,000	-28.3%
Vehicles and Equipment	(66,000)	(100,000)	(94,852)	34,000	-34.0%
	44,688,000	26,712,000	14,113,710	17,976,000	67.3%
Total Expenditures	229,860,000	213,978,000	131,188,875	15,882,000	7.4%
Net Surplus (Deficit)	(21,660,000)	(9,825,000)	5,401,870	(11,835,000)	120.5%
Head Office Construction Loan/Reserves	23,729,000	13,855,000	(4,111,615)	9,874,000	71.3%
Net Budget	2,069,000	4,030,000	1,290,255	(1,961,000)	-48.7%

Toronto and Region Conservation Authority
2020 Operating Budget

	2020 Budget	2019 Budget	Unaudited 2019 Actual	$ Change over 2019 Budget	% Change over 2019 Budget
Revenue					
Municipal					
Operating levy	15,448,000	14,828,000	14,828,560	620,000	4.2%
Capital levy	392,000	392,000	389,703	-	0.0%
Contract services	993,000	1,194,000	1,163,803	(201,000)	-16.8%
Grants	302,000	306,000	283,721	(4,000)	-1.3%
Provincial/Federal					
Provincial	2,133,000	1,869,000	1,599,819	264,000	14.1%
Federal	826,000	382,000	439,490	444,000	116.2%
Contract services	-	-	-	-	0.0%
User fees, sales and admissions	21,486,000	22,621,000	19,999,766	(1,135,000)	-5.0%
Contract services					
Compensation agreements	-	-	-	-	0.0%
Corporate and other	1,126,000	1,021,000	1,217,570	105,000	10.3%
Rent and property interests	3,344,000	3,726,000	4,121,535	(382,000)	-10.3%
Fundraising					
Donations	78,000	-	4,171	78,000	0.0%
Toronto and Region Conservation Foundation	1,413,000	716,000	737,099	697,000	97.3%
Investment income	725,000	711,000	851,177	14,000	2.0%
Sundry	27,000	7,000	1,152,975	20,000	285.7%
Total Revenue	48,293,000	47,773,000	46,789,389	520,000	1.1%

Toronto and Region Conservation Authority
2020 Operating Budget

	2020 Budget	2019 Budget	Unaudited 2019 Actual	$ Change over 2019 Budget	% Change over 2019 Budget
Expenditures					
Watershed Studies and Strategies					
Watershed Planning and Reporting	665,000	1,581,000	1,623,537	(916,000)	-57.9%
Climate Science	-	-	-	-	0.0%
	665,000	1,581,000	1,623,537	(916,000)	-57.9%
Water Risk Management					
Water Resource Science	-	-	-	-	0.0%
Erosion Management	-	-	-	-	0.0%
Flood Management	1,060,000	1,187,000	1,036,209	(127,000)	-10.7%
	1,060,000	1,187,000	1,036,209	(127,000)	-10.7%
Regional Biodiversity					
Biodiversity Monitoring	8,000	29,000	43,733	(21,000)	-72.4%
Ecosystem Management Research and Directions	-	-	-	-	0.0%
Forest Management	127,000	79,000	131,203	48,000	60.8%
Restoration and Regeneration	1,083,000	525,000	521,860	558,000	106.3%
	1,218,000	633,000	696,796	585,000	92.4%
Greenspace Securement and Management					
Greenspace Securement	-	-	-	-	0.0%
Greenspace Management	593,000	779,000	545,932	(186,000)	-23.9%
Rental Properties	1,585,000	1,971,000	1,792,267	(386,000)	-19.6%
	2,178,000	2,750,000	2,338,199	(572,000)	-20.8%
Tourism and Recreation					
Waterfront Parks	-	-	-	-	0.0%
Conservation Parks	5,178,000	5,523,000	5,824,348	(345,000)	-6.2%
Trails	-	-	475	-	0.0%
Bathurst Glen Golf Course	1,247,000	1,314,000	1,166,133	(67,000)	-5.1%
Black Creek Pioneer Village	4,033,000	4,232,000	3,976,517	(199,000)	-4.7%
Events and Festivals	607,000	647,000	615,565	(40,000)	-6.2%
Wedding and Corporate Events	-	-	-	-	0.0%
	11,065,000	11,716,000	11,583,038	(651,000)	-5.6%
Planning and Development Review					
Development Planning and Regulation Permitting	6,629,000	6,543,000	5,932,258	86,000	1.3%
Environmental Assessment Planning and Permitting	3,865,000	3,982,000	3,119,989	(117,000)	-2.9%
Policy Development and Review	553,000	493,000	445,435	60,000	12.2%
	11,047,000	11,018,000	9,497,682	29,000	0.3%
Education and Outreach					
School Programs	4,827,000	5,356,000	4,633,548	(529,000)	-9.9%
Newcomer Services	858,000	730,000	714,951	128,000	17.5%
Family and Community Programs	1,046,000	1,011,000	944,548	35,000	3.5%
	6,731,000	7,097,000	6,293,047	(366,000)	-5.2%
Sustainable Communities					
Living City Transition Program	145,000	146,000	142,978	(1,000)	-0.7%
Community Engagement	644,000	293,000	385,554	351,000	119.8%
Social Enterprise Development	-	-	-	-	0.0%
	789,000	439,000	528,532	350,000	79.7%
Corporate Services					
Financial Management	3,571,000	3,019,000	2,797,152	552,000	18.3%
Corporate Management and Governance	5,943,000	5,830,000	5,350,011	113,000	1.9%
Human Resources	1,514,000	1,312,000	1,126,945	202,000	15.4%
Corporate Communications	2,030,000	1,811,000	1,626,125	219,000	12.1%
Information Infrastructure and Management	2,454,000	2,608,000	2,607,213	(154,000)	-5.9%
Project Recoveries	(3,974,000)	(5,498,000)	(3,261,877)	1,524,000	-27.7%
Vehicles and Equipment	(66,000)	(100,000)	(94,852)	34,000	-34.0%
	11,472,000	8,982,000	10,150,717	2,490,000	27.7%
Total Expenditures	46,225,000	45,403,000	43,747,757	822,000	1.8%
Net Surplus (Deficit)	2,070,000	2,370,000	3,041,631	(300,000)	-12.7%
Head Office Construction Loan/Reserves	-	(80,000)	268,186	80,000	-100.0%
Net Budget	2,070,000	2,290,000	3,309,817	(220,000)	-9.6%

Toronto and Region Conservation Authority
2020 Capital Budget

	2020 Budget	2019 Budget	Unaudited 2019 Actual	$ Change over 2019 Budget	% Change over 2019 Budget
Revenue					
Municipal					
Operating levy	-	-	-	-	0.0%
Capital levy	59,500,000	59,033,000	43,754,970	467,000	0.8%
Contract services	68,074,000	68,789,000	28,745,410	(715,000)	-1.0%
Grants	2,656,000	3,106,000	736,139	(450,000)	-14.5%
Provincial/Federal					
Provincial	2,815,000	3,564,000	5,508,532	(749,000)	-21.0%
Federal	11,744,000	8,017,000	2,699,763	3,727,000	46.5%
Contract services	-	-	-	-	0.0%
User fees, sales and admissions	699,000	948,000	843,321	(249,000)	-26.3%
Contract services					
Compensation agreements	2,363,000	2,685,000	881,409	(322,000)	-12.0%
Corporate and other	3,414,000	7,847,000	2,565,437	(4,433,000)	-56.5%
Rent and property interests	1,014,000	364,000	278,362	650,000	178.6%
Fundraising					
Donations	2,643,000	1,259,000	1,338,314	1,384,000	109.9%
Toronto and Region Conservation Foundation	4,981,000	761,000	2,699,705	4,220,000	554.5%
Investment income	5,000	5,000	(250,007)	-	0.0%
Sundry	-	-	-	-	0.0%
Total Revenue	159,908,000	156,378,000	89,801,355	3,530,000	2.3%

Toronto and Region Conservation Authority
2020 Capital Budget

	2020 Budget	2019 Budget	Unaudited 2019 Actual	$ Change over 2019 Budget	% Change over 2019 Budget
Expenditures					
Watershed Studies and Strategies					
Watershed Planning and Reporting	1,515,000	1,267,000	1,480,945	248,000	19.6%
Climate Science	723,000	958,000	703,086	(235,000)	-24.5%
	2,238,000	2,225,000	2,184,031	13,000	0.6%
Water Risk Management					
Water Resource Science	6,216,000	4,682,000	5,782,841	1,534,000	32.8%
Erosion Management	83,593,000	83,466,000	34,998,439	127,000	0.2%
Flood Management	4,533,000	4,275,000	3,935,452	258,000	6.0%
	94,342,000	92,423,000	44,716,732	1,919,000	2.1%
Regional Biodiversity					
Biodiversity Monitoring	2,694,000	2,640,000	2,324,541	54,000	2.0%
Ecosystem Management Research and Directions	1,168,000	935,000	770,771	233,000	24.9%
Forest Management	1,013,000	1,473,000	1,144,128	(460,000)	-31.2%
Restoration and Regeneration	10,361,000	16,567,000	11,414,873	(6,206,000)	-37.5%
	15,236,000	21,615,000	15,654,313	(6,379,000)	-29.5%
Greenspace Securement and Management					
Greenspace Securement	2,264,000	2,727,000	1,482,086	(463,000)	-17.0%
Greenspace Management	3,880,000	1,352,000	1,366,251	2,528,000	187.0%
	6,144,000	4,079,000	2,848,337	2,065,000	50.6%
Tourism and Recreation					
Waterfront Parks	3,169,000	2,539,000	1,519,712	630,000	24.8%
Conservation Parks	395,000	623,000	426,901	(228,000)	-36.6%
Trails	11,494,000	6,951,000	3,613,827	4,543,000	65.4%
Black Creek Pioneer Village	371,000	692,000	460,703	(321,000)	-46.4%
Events and Festivals	-	-	-	-	0.0%
	15,429,000	10,805,000	6,021,143	4,624,000	42.8%
Planning and Development Review					
Policy Development and Review	641,000	530,000	406,290	111,000	20.9%
	641,000	530,000	406,290	111,000	20.9%
Education and Outreach					
School Programs	6,802,000	8,727,000	3,792,495	(1,925,000)	-22.1%
Newcomer Services	153,000	155,000	145,063	(2,000)	-1.3%
Family and Community Programs	88,000	288,000	122,610	(200,000)	-69.4%
	7,043,000	9,170,000	4,060,168	(2,127,000)	-23.2%
Sustainable Communities					
Living City Transition Program	6,352,000	7,095,000	5,334,822	(743,000)	-10.5%
Community Engagement	2,995,000	2,900,000	2,252,292	95,000	3.3%
	9,347,000	9,995,000	7,587,114	(648,000)	-6.5%
Corporate Services					
Financial Management	231,000	-	168,502	231,000	0.0%
Corporate Management and Governance	32,353,000	17,007,000	2,970,788	15,346,000	90.2%
Human Resources	30,000	48,000	24,522	(18,000)	-37.5%
Corporate Communications	-	-	287,450	-	0.0%
Information Infrastructure and Management	568,000	672,000	501,034	(104,000)	-15.5%
Project Recoveries	33,000	4,000	10,696	29,000	725.0%
Vehicles and Equipment	-	-	-	-	0.0%
	33,215,000	17,731,000	3,962,992	15,484,000	87.3%
Total Expenditures	183,635,000	168,573,000	87,441,120	15,062,000	8.9%
Net Surplus (Deficit)	(23,728,000)	(12,195,000)	2,360,240	(11,533,000)	94.6%
Head Office Construction Loan/Reserves	23,729,000	13,935,000	(4,379,801)	9,794,000	70.3%
Net Budget	1,000	1,740,000	(2,019,561)	(1,739,000)	-99.9%

Toronto and Region Conservation Authority

2020 Operating and Capital Budget - Watershed Studies and Strategies - by object classification

	2020 Budget	2019 Budget	Unaudited 2019 Actual	$ Change over 2019 Budget	% Change over 2019 Budget
Revenue					
Municipal					
Operating levy	665,000	1,457,000	1,456,900	(792,000)	-54.4%
Capital levy	1,184,000	1,854,000	1,283,927	(670,000)	-36.1%
Contract services	190,000	204,000	69,487	(14,000)	-6.9%
Grants	136,000	-	(100,000)	136,000	0.0%
Provincial/Federal					
Provincial grants	250,000	175,000	91,235	75,000	42.9%
Federal grants	435,000	135,000	243,193	300,000	222.2%
Contract services	-	-	-	-	0.0%
User fees, sales and admissions	-	24,000	375	(24,000)	-100.0%
Contract services					
Compensation agreements	-	-	-	-	0.0%
Corporate and other	40,000	-	15,000	40,000	0.0%
Rent and property interests	-	-	-	-	0.0%
Fundraising					
Donations	-	7,000	-	(7,000)	-100.0%
Toronto and Region Conservation Foundation	3,000	-	796,051	3,000	0.0%
Investment income	-	-	-	-	0.0%
Sundry	-	-	-	-	0.0%
Total Revenue	2,903,000	3,856,000	3,856,168	(953,000)	-24.7%
Expenditures					
Wages and benefits	1,720,000	2,930,000	3,244,785	(1,210,000)	-41.3%
Contracted services	557,000	595,000	400,708	(38,000)	-6.4%
Materials and supplies	15,000	45,000	18,688	(30,000)	-66.7%
Utilities	-	-	-	-	0.0%
Property taxes	-	-	-	-	0.0%
	2,292,000	3,570,000	3,664,181	(1,278,000)	-35.8%
Internal Recoveries	-	(148,000)	(1,008)	148,000	-100.0%
Internal Charges	611,000	385,000	144,394	226,000	58.7%
Total Expenditures	2,903,000	3,807,000	3,807,567	(904,000)	-23.7%
Net Surplus (Deficit)	-	49,000	48,601	(49,000)	-100.0%
Reserves	-	-	(15,671)	-	0.0%
Net Budget	-	49,000	32,930	(49,000)	-100.0%

Toronto and Region Conservation Authority

2020 Operating and Capital Budget - Water Risk Management - by object classification

	2020 Budget	2019 Budget	Unaudited 2019 Actual	$ Change over 2019 Budget	% Change over 2019 Budget
Revenue					
Municipal					
Operating levy	664,000	861,000	860,600	(197,000)	-22.9%
Capital levy	21,186,000	22,365,000	19,263,035	(1,179,000)	-5.3%
Contract services	60,504,000	60,139,000	21,012,790	365,000	0.6%
Grants	352,000	-	183,115	352,000	0.0%
Provincial/Federal					
Provincial grants	2,554,000	2,183,000	2,885,168	371,000	17.0%
Federal grants	9,111,000	6,761,000	1,257,998	2,350,000	34.8%
Contract services	-	-	-	-	0.0%
User fees, sales and admissions	92,000	64,000	42,252	28,000	43.8%
Contract services					
Compensation agreements	60,000	21,000	8,424	39,000	185.7%
Corporate and other	1,082,000	1,353,000	1,180,938	(271,000)	-20.0%
Rent and property interests	-	-	-	-	0.0%
Fundraising					
Donations	1,000	1,000	-	-	0.0%
Toronto and Region Conservation Foundation	-	-	-	-	0.0%
Investment income	5,000	5,000	7,325	-	0.0%
Sundry	-	-	-	-	0.0%
Total Revenue	95,611,000	93,753,000	46,701,645	1,858,000	2.0%
Expenditures					
Wages and benefits	14,112,000	10,736,000	12,061,158	3,376,000	31.4%
Contracted services	62,411,000	64,420,000	26,798,484	(2,009,000)	-3.1%
Materials and supplies	16,645,000	14,053,000	3,392,792	2,592,000	18.4%
Utilities	26,000	28,000	30,172	(2,000)	-7.1%
Property taxes	-	18,000	-	(18,000)	-100.0%
	93,194,000	89,255,000	42,282,606	3,939,000	4.4%
Internal Recoveries	(543,000)	(12,661,000)	(1,737,350)	12,118,000	-95.7%
Internal Charges	2,751,000	17,016,000	5,207,684	(14,265,000)	-83.8%
Total Expenditures	95,402,000	93,610,000	45,752,940	1,792,000	1.9%
Net Surplus (Deficit)	209,000	143,000	948,705	66,000	46.2%
Reserves	-	-	(316,983)	-	0.0%
Net Budget	209,000	143,000	631,722	66,000	46.2%

Toronto and Region Conservation Authority

2020 Operating and Capital Budget - Regional Biodiversity - by object classification

	2020 Budget	2019 Budget	Unaudited 2019 Actual	$ Change over 2019 Budget	% Change over 2019 Budget
Revenue					
Municipal					
Operating levy	-	27,000	27,000	(27,000)	-100.0%
Capital levy	7,798,000	9,404,000	7,278,782	(1,606,000)	-17.1%
Contract services	2,148,000	2,895,000	5,722,082	(747,000)	-25.8%
Grants	281,000	453,000	168,984	(172,000)	-38.0%
Provincial/Federal					
Provincial grants	266,000	764,000	589,180	(498,000)	-65.2%
Federal grants	1,016,000	541,000	438,658	475,000	87.8%
Contract services	-	-	-	-	0.0%
User fees, sales and admissions	29,000	39,000	45,419	(10,000)	-25.6%
Contract services					
Compensation agreements	2,085,000	2,430,000	868,719	(345,000)	-14.2%
Corporate and other	1,659,000	5,582,000	1,151,178	(3,923,000)	-70.3%
Rent and property interests	-	-	20,250	-	0.0%
Fundraising					
Donations	550,000	-	6,240	550,000	0.0%
Toronto and Region Conservation Foundation	540,000	75,000	986,829	465,000	620.0%
Investment income	-	-	-	-	0.0%
Sundry	-	-	-	-	0.0%
Total Revenue	16,372,000	22,210,000	17,303,321	(5,838,000)	-26.3%
Expenditures					
Wages and benefits	13,957,000	14,127,000	8,943,306	(170,000)	-1.2%
Contracted services	(854,000)	3,342,000	4,154,035	(4,196,000)	-125.6%
Materials and supplies	2,424,000	3,159,000	1,996,562	(735,000)	-23.3%
Utilities	5,000	3,000	5,763	2,000	66.7%
Property taxes	8,000	1,000	6,331	7,000	700.0%
	15,540,000	20,632,000	15,105,997	(5,092,000)	-24.7%
Internal Recoveries	(5,438,000)	(4,033,000)	(5,252,800)	(1,405,000)	34.8%
Internal Charges	6,353,000	5,650,000	6,497,912	703,000	12.4%
Total Expenditures	16,455,000	22,249,000	16,351,109	(5,794,000)	-26.0%
Net Surplus (Deficit)	(83,000)	(39,000)	952,212	(44,000)	112.8%
Reserves	-	(100,000)	(652,471)	-	0.0%
Net Budget	(83,000)	(139,000)	299,741	(44,000)	31.7%

Toronto and Region Conservation Authority

2020 Operating and Capital Budget - Greenspace Securement and Management - by object classification

	2020 Budget	2019 Budget	Unaudited 2019 Actual	$ Change over 2019 Budget	% Change over 2019 Budget
Revenue					
Municipal					
Operating levy	-	1,095,000	1,095,200	(1,095,000)	-100.0%
Capital levy	3,068,000	1,326,000	831,887	1,742,000	131.4%
Contract services	174,000	198,000	24,540	(24,000)	-12.1%
Grants	54,000	1,277,000	203,637	(1,223,000)	-95.8%
Provincial/Federal					
Provincial grants	1,000	5,000	4,400	(4,000)	-80.0%
Federal grants	10,000	120,000	260,170	(110,000)	-91.7%
Contract services	-	-	-	-	0.0%
User fees, sales and admissions	-	-	4,625	-	0.0%
Contract services					
Compensation agreements	87,000	99,000	46	(12,000)	-12.1%
Corporate and other	75,000	180,000	61,410	(105,000)	-58.3%
Rent and property interests	4,080,000	3,832,000	4,003,897	248,000	6.5%
Fundraising					
Donations	1,900,000	1,000,000	1,175,000	900,000	90.0%
Toronto and Region Conservation Foundation	-	-	470,791	-	0.0%
Investment income	-	-	(257,332)	-	0.0%
Sundry	6,000	7,000	6,565	(1,000)	-14.3%
Total Revenue	9,455,000	9,139,000	7,884,836	316,000	3.5%
Expenditures					
Wages and benefits	1,615,000	2,068,000	1,585,813	(453,000)	-21.9%
Contracted services	3,234,000	1,573,000	1,138,197	1,661,000	105.6%
Materials and supplies	2,082,000	2,504,000	1,302,446	(422,000)	-16.9%
Utilities	55,000	67,000	107,468	(12,000)	-17.9%
Property taxes	617,000	775,000	674,321	(158,000)	-20.4%
	7,603,000	6,987,000	4,808,245	616,000	8.8%
Internal Recoveries	(163,000)	(790,000)	(378,818)	627,000	-79.4%
Internal Charges	882,000	631,000	757,110	251,000	39.8%
Total Expenditures	8,322,000	6,828,000	5,186,537	1,494,000	21.9%
Net Surplus (Deficit)	1,133,000	2,311,000	2,698,299	(1,178,000)	-51.0%
Reserves	-	-	-	-	0.0%
Net Budget	1,133,000	2,311,000	2,698,299	(1,178,000)	-51.0%

Toronto and Region Conservation Authority

2020 Operating and Capital Budget - Tourism and Recreation - by object classification

	2020 Budget	2019 Budget	Unaudited 2019 Actual	$ Change over 2019 Budget	% Change over 2019 Budget
Revenue					
Municipal					
Operating levy	864,000	1,507,000	1,506,300	(643,000)	-42.7%
Capital levy	4,793,000	5,441,000	4,075,779	(648,000)	-11.9%
Contract services	4,262,000	5,001,000	1,688,477	(739,000)	-14.8%
Grants	1,799,000	1,405,000	143,807	394,000	28.0%
Provincial/Federal					
Provincial grants	451,000	408,000	419,285	43,000	10.5%
Federal grants	272,000	10,000	243,481	262,000	2620.0%
Contract services	-	-	-	-	0.0%
User fees, sales and admissions	9,195,000	9,564,000	9,283,627	(369,000)	-3.9%
Contract services					
Compensation agreements	98,000	102,000	3,892	(4,000)	-3.9%
Corporate and other	186,000	84,000	162,085	102,000	121.4%
Rent and property interests	215,000	195,000	386,833	20,000	10.3%
Fundraising					
Donations	-	-	667	-	0.0%
Toronto and Region Conservation Foundation	4,359,000	571,000	65,705	3,788,000	663.4%
Investment income	-	-	(351)	-	0.0%
Sundry	-	-	-	-	0.0%
Total Revenue	26,494,000	24,288,000	17,979,587	2,206,000	9.1%
Expenditures					
Wages and benefits	11,274,000	10,103,000	9,521,662	1,171,000	11.6%
Contracted services	9,036,000	8,334,000	3,944,221	702,000	8.4%
Materials and supplies	2,332,000	2,123,000	1,727,897	209,000	9.8%
Utilities	626,000	685,000	803,818	(59,000)	-8.6%
Property taxes	-	-	455	-	0.0%
	23,268,000	21,245,000	15,998,053	2,023,000	9.5%
Internal Recoveries	(10,000)	(825,000)	(137,950)	815,000	-98.8%
Internal Charges	3,234,000	2,102,000	1,744,078	1,132,000	53.9%
Total Expenditures	26,492,000	22,522,000	17,604,181	3,970,000	17.6%
Net Surplus (Deficit)	2,000	1,766,000	375,406	(1,764,000)	-99.9%
Reserves	-	-	(2,853,424)	-	0.0%
Net Budget	2,000	1,766,000	(2,478,018)	(1,764,000)	-99.9%

Toronto and Region Conservation Authority

2020 Operating and Capital Budget - Planning and Development Review - by object classification

	2020 Budget	2019 Budget	Unaudited 2019 Actual	$ Change over 2019 Budget	% Change over 2019 Budget
Revenue					
Municipal					
Operating levy	935,000	-	-	935,000	0.0%
Capital levy	1,033,000	922,000	798,290	111,000	12.0%
Contract services	839,000	969,000	938,332	(130,000)	-13.4%
Grants	-	1,000	-	(1,000)	-100.0%
Provincial/Federal					
Provincial grants	477,000	440,000	397,733	37,000	8.4%
Federal grants	-	-	-	-	0.0%
Contract services	-	-	-	-	0.0%
User fees, sales and admissions	8,295,000	9,284,000	7,279,646	(989,000)	-10.7%
Contract services					
Compensation agreements	-	-	-	-	0.0%
Corporate and other	109,000	156,000	139,895	(47,000)	-30.1%
Rent and property interests	-	-	-	-	0.0%
Fundraising					
Donations	-	-	-	-	0.0%
Toronto and Region Conservation Foundation	-	-	-	-	0.0%
Investment income	-	-	-	-	0.0%
Sundry	-	-	-	-	0.0%
Total Revenue	11,688,000	11,772,000	9,553,896	(84,000)	-0.7%
Expenditures					
Wages and benefits	10,606,000	10,414,000	9,145,920	192,000	1.8%
Contracted services	652,000	730,000	356,037	(78,000)	-10.7%
Materials and supplies	115,000	97,000	127,160	18,000	18.6%
Utilities	-	-	-	-	0.0%
Property taxes	-	-	-	-	0.0%
	11,373,000	11,241,000	9,629,117	132,000	1.2%
Internal Recoveries	-	-	-	-	0.0%
Internal Charges	316,000	307,000	274,855	9,000	2.9%
Total Expenditures	11,689,000	11,548,000	9,903,972	141,000	1.2%
Net Surplus (Deficit)	(1,000)	224,000	(350,076)	(225,000)	-100.4%
Reserves	-	-	-	-	0.0%
Net Budget	(1,000)	224,000	(350,076)	(225,000)	-100.4%

Toronto and Region Conservation Authority

2020 Operating and Capital Budget - Education and Outreach - by object classification

	2020 Budget	2019 Budget	Unaudited 2019 Actual	$ Change over 2019 Budget	% Change over 2019 Budget
Revenue					
Municipal					
Operating levy	1,679,000	2,231,000	2,230,700	(552,000)	-24.7%
Capital levy	6,188,000	8,457,000	3,447,407	(2,269,000)	-26.8%
Contract services	-	3,000	1,800	(3,000)	-100.0%
Grants	89,000	-	-	89,000	0.0%
Provincial/Federal					
Provincial grants	804,000	699,000	429,952	105,000	15.0%
Federal grants	451,000	407,000	462,014	44,000	10.8%
Contract services	-	-	-	-	0.0%
User fees, sales and admissions	3,843,000	3,645,000	3,339,891	198,000	5.4%
Contract services					
Compensation agreements	-	-	-	-	0.0%
Corporate and other	306,000	276,000	145,819	30,000	10.9%
Rent and property interests	29,000	28,000	(41,760)	1,000	3.6%
Fundraising					
Donations	25,000	2,000	22,934	23,000	1150.0%
Toronto and Region Conservation Foundation	359,000	498,000	328,740	(139,000)	-27.9%
Investment income	-	-	2,725	-	0.0%
Sundry	-	-	-	-	0.0%
Total Revenue	13,773,000	16,246,000	10,370,222	(2,473,000)	-15.2%
Expenditures					
Wages and benefits	7,016,000	7,155,000	6,748,453	(139,000)	-1.9%
Contracted services	5,780,000	7,727,000	2,763,681	(1,947,000)	-25.2%
Materials and supplies	618,000	653,000	493,779	(35,000)	-5.4%
Utilities	218,000	229,000	212,468	(11,000)	-4.8%
Property taxes	-	-	-	-	0.0%
	13,632,000	15,764,000	10,218,381	(2,132,000)	-13.5%
Internal Recoveries	(690,000)	(758,000)	(760,137)	68,000	-9.0%
Internal Charges	832,000	1,261,000	894,972	(429,000)	-34.0%
Total Expenditures	13,774,000	16,267,000	10,353,216	(2,493,000)	-15.3%
Net Surplus (Deficit)	(1,000)	(21,000)	17,006	20,000	-95.2%
Reserves	-	20,000	249,297	-	0.0%
Net Budget	(1,000)	(1,000)	266,303	20,000	-2000.0%

Toronto and Region Conservation Authority

2020 Operating and Capital Budget - Sustainable Communities - by object classification

	2020 Budget	2019 Budget	Unaudited 2019 Actual	$ Change over 2019 Budget	% Change over 2019 Budget
Revenue					
Municipal					
Operating levy	155,000	128,000	127,600	27,000	21.1%
Capital levy	6,436,000	5,913,000	4,846,486	523,000	8.8%
Contract services	916,000	573,000	250,076	343,000	59.9%
Grants	26,000	36,000	90,097	(10,000)	-27.8%
Provincial/Federal					
Provincial grants	80,000	678,000	486,175	(598,000)	-88.2%
Federal grants	141,000	412,000	224,353	(271,000)	-65.8%
Contract services	-	-	-	-	0.0%
User fees, sales and admissions	646,000	862,000	734,790	(216,000)	-25.1%
Contract services					
Compensation agreements	33,000	33,000	327	-	0.0%
Corporate and other	980,000	1,230,000	890,377	(250,000)	-20.3%
Rent and property interests	-	-	-	-	0.0%
Fundraising					
Donations	245,000	249,000	137,374	(4,000)	-1.6%
Toronto and Region Conservation Foundation	478,000	320,000	417,162	158,000	49.4%
Investment income	-	-	-	-	0.0%
Sundry	-	-	-	-	0.0%
Total Revenue	10,136,000	10,434,000	8,204,817	(298,000)	-2.9%
Expenditures					
Wages and benefits	6,283,000	6,182,000	5,902,391	101,000	1.6%
Contracted services	2,577,000	2,761,000	1,175,676	(184,000)	-6.7%
Materials and supplies	320,000	322,000	196,997	(2,000)	-0.6%
Utilities	-	-	472	-	0.0%
Property taxes	-	-	-	-	0.0%
	9,180,000	9,265,000	7,275,536	(85,000)	-0.9%
Internal Recoveries	(277,000)	(695,000)	(635,621)	418,000	-60.1%
Internal Charges	1,232,000	1,862,000	1,475,730	(630,000)	-33.8%
Total Expenditures	10,135,000	10,432,000	8,115,645	(297,000)	-2.8%
Net Surplus (Deficit)	1,000	2,000	89,172	(1,000)	-50.0%
Reserves	-	-	(150,349)	-	0.0%
Net Budget	1,000	2,000	(61,177)	(1,000)	-50.0%

Toronto and Region Conservation Authority

2020 Operating and Capital Budget - Corporate Services - by object classification

	2020 Budget	2019 Budget	Unaudited 2019 Actual	$ Change over 2019 Budget	% Change over 2019 Budget
Revenue					
Municipal					
Operating levy	10,487,000	7,523,000	7,524,260	2,964,000	39.4%
Capital levy	8,205,000	3,744,000	2,319,080	4,461,000	119.2%
Contract services	33,000	-	201,628	33,000	0.0%
Grants	222,000	240,000	330,221	(18,000)	-7.5%
Provincial/Federal					
Provincial grants	66,000	80,000	1,805,224	(14,000)	-17.5%
Federal grants	1,135,000	13,000	9,387	1,122,000	8630.8%
Contract services	-	-	-	-	0.0%
User fees, sales and admissions	85,000	85,000	112,463	-	0.0%
Contract services					
Compensation agreements	-	-	-	-	0.0%
Corporate and other	104,000	7,000	36,305	97,000	1385.7%
Rent and property interests	34,000	34,000	30,677	-	0.0%
Fundraising					
Donations	-	-	270	-	0.0%
Toronto and Region Conservation Foundation	655,000	14,000	371,525	641,000	4578.6%
Investment income	725,000	711,000	848,804	14,000	2.0%
Sundry	22,000	-	1,146,410	22,000	100.0%
Total Revenue	21,773,000	12,451,000	14,736,254	9,322,000	74.9%
Expenditures					
Wages and benefits	13,067,000	12,229,000	11,819,623	838,000	6.9%
Contracted services	37,532,000	21,303,000	8,508,235	16,229,000	76.2%
Materials and supplies	2,884,000	2,412,000	1,793,102	472,000	19.6%
Utilities	65,000	67,000	81,992	(2,000)	-3.0%
Property taxes	229,000	6,000	5,045	223,000	3716.7%
	53,777,000	36,017,000	22,207,997	17,760,000	49.3%
Internal Recoveries	(9,491,000)	(10,049,000)	(9,043,983)	558,000	-5.6%
Internal Charges	402,000	743,000	949,696	(341,000)	-45.9%
Total Expenditures	44,688,000	26,711,000	14,113,710	17,977,000	67.3%
Net Surplus (Deficit)	(22,915,000)	(14,260,000)	622,544	(8,655,000)	60.7%
Head Office Construction Loan/Reserves	23,729,000	13,935,000	(372,013)	9,794,000	70.3%
Net Budget	814,000	(325,000)	250,531	1,139,000	-350.5%

Toronto and Region Conservation Authority

2020 Operating and Capital Levy

($000s)

Service Area	Capital Levy Durham	Peel	Toronto	York	Operating Levy	Total
Watershed Studies and Strategies	11	550	252	198	665	1,676
Water Risk Management	358	2,362	12,159	1,894	664	17,437
Regional Biodiversity	436	4,080	1,833	1,094	-	7,443
Greenspace Securement and Management	3	1,507	64	165	-	1,739
Tourism and Recreation	106	1,077	4,507	244	864	6,798
Planning and Development Review	14	447	321	110	935	1,827
Education and Outreach	-	1,803	147	184	1,678	3,812
Sustainable Communities	104	3,370	1,100	469	155	5,198
Corporate Services	82	1,923	4,442	635	10,487	17,569
	1,114	**17,119**	**24,825**	**4,993**	**15,448**	**63,499**

Apportionment of 2020 General Levy

	Matching Levy	Matching Non Levy	Tax Adujstment	Non CVA Levy	2020 General Levy	2019 General Levy	$ Change over 2019	% Change over 2019
Township of Adjala-Tosorontio	25	905	-	-	930	885	45	5.1%
Regional Municipality of Durham	11,266	404,153	100,326	80,255	596,000	581,850	14,150	2.4%
City of Toronto	256,700	9,209,032	4,680	-	9,470,412	8,908,335	562,077	6.3%
Town of Mono	32	1,172	496	-	1,700	1,480	220	14.9%
Regional Municipality of Peel	44,126	1,582,988	46,829	246,412	1,920,355	1,917,000	3,355	0.2%
Regional Municipality of York	87,542	3,140,554	185,281	45,113	3,458,490	3,418,630	39,860	1.2%
	399,691	**14,338,804**	**337,612**	**371,780**	**15,447,887**	**14,828,180**	**619,707**	**4.2%**

Toronto and Region Conservation Authority

2020 Basis of Apportionment - Municipal Levy

($000s)

Municipality	Current Value Assessment*	% of Municipality in Authority	Current Value Assessment in Jurisdiction	Total Population	Population in Authority
Township of Adjala-Tosorontio	2,214	4	89	9,245	370
Durham, Regional Municipality of	47,611	*	39,522	193,761	161,646
City of Toronto	900,553	100	900,553	2,190,133	2,190,133
Town of Mono	2,264	5	113	7,570	379
Peel, Regional Municipality of	347,561	*	154,800	1,065,891	492,407
York, Regional Municipality of	338,019	*	307,115	762,455	684,284
	1,638,222		1,402,192	4,229,055	3,529,219
Analysis of Regional Municipalities*					
Durham, Regional Municipality of					
Ajax, Town of	21,238	85	18,265	95,480	82,113
Pickering, Town of	21,376	95	20,307	80,079	76,075
Uxbridge Township	4,997	19	950	18,202	3,458
	47,611		39,522	193,761	161,646
Peel, Regional Municipality of					
Brampton, City	118,793	63	74,840	425,729	268,209
Mississauga, City of	208,462	55	11,168	581,325	191,837
Caledon, Town of	20,306	33	68,792	58,837	32,360
	347,561		154,800	1,065,891	492,407
York, Regional Municipality of					
Aurora, Town of	17,977	4	719	46,499	1,860
Markham, Town of	108,830	100	108,829	253,350	253,350
Richmond Hill, Town of	67,456	99	66,781	148,973	147,483
Vaughan, Town of	120,666	100	120,666	256,661	256,661
Whitchurch-Stouffville, Town of	13,554	43	5,829	35,391	15,218
King Township	9,536	45	4,291	21,581	9,711
	338,019		307,115	762,455	684,283

* As provided by the Ministry of Natural Resouces and Forestry

Toronto and Region Conservation Authority

2020 Operating and Capital Budget

Full-time Equivalent Employees (FTEs)

	Operating	Capital	Total
2020			
Watershed Studies and Strategies	4.25	9.83	14.08
Water Risk Management	7.45	146.65	154.10
Regional Biodiversity	15.43	155.11	170.54
Greenspace Securement and Management	8.17	9.14	17.31
Tourism and Recreation	122.61	43.64	166.25
Planning and Development Review	92.64	2.75	95.39
Education and Outreach	72.45	15.84	88.29
Sustainable Communities	3.10	61.78	64.88
Corporate Services	103.90	19.45	123.35
	430.00	**464.19**	**894.19**
2019			
Watershed Studies and Strategies	11.27	13.55	24.82
Water Risk Management	8.40	106.44	114.84
Regional Biodiversity	15.44	167.20	182.64
Greenspace Securement and Management	10.45	11.37	21.82
Tourism and Recreation	127.84	23.56	151.40
Planning and Development Review	89.62	2.40	92.02
Education and Outreach	76.75	13.75	90.50
Sustainable Communities	2.68	62.56	65.24
Corporate Services	101.78	13.20	114.98
	444.23	**414.03**	**858.26**

Toronto and Region Conservation Authority
2020 Operating and Capital Budget - Watershed Studies and Strategies

	2020 Budget	2019 Budget	Unaudited 2019 Actual	$ Change over 2019 Budget	% Change over 2019 Budget
Revenue					
Municipal					
Operating levy	665,000	1,457,000	1,456,900	(792,000)	-54.4%
Capital levy	1,184,000	1,854,000	1,283,927	(670,000)	-36.1%
Contract services	190,000	204,000	69,487	(14,000)	-6.9%
Grants	136,000	-	(100,000)	136,000	0.0%
Provincial/Federal					
Provincial grants	250,000	175,000	91,235	75,000	42.9%
Federal grants	435,000	135,000	243,193	300,000	222.2%
Contract services	-	-	-	-	0.0%
User fees, sales and admissions	-	24,000	375	(24,000)	-100.0%
Contract services					
Compensation agreements	-	-	-	-	0.0%
Corporate and other	40,000	-	15,000	40,000	0.0%
Rent and property interests	-	-	-	-	0.0%
Fundraising					
Donations	-	7,000	-	(7,000)	-100.0%
Toronto and Region Conservation Foundation	3,000	-	796,051	3,000	0.0%
Investment income	-	-	-	-	0.0%
Sundry	-	-	-	-	
Total Revenue	2,903,000	3,856,000	3,856,168	(953,000)	-24.7%
Expenditures					
Watershed Planning and Reporting					
Watershed Plans and Strategies	1,892,000	2,605,000	2,975,728	(713,000)	-27.4%
Report Cards	288,000	243,000	128,754	45,000	18.5%
	2,180,000	2,848,000	3,104,482	(668,000)	-23.5%
Climate Science					
Emerging and Integrative Climate Science	723,000	958,000	703,086	(235,000)	-24.5%
	723,000	958,000	703,086	(235,000)	-24.5%
Total Expenditures	2,903,000	3,806,000	3,807,568	(903,000)	-23.7%
Net Surplus (Deficit)	-	50,000	48,600	(50,000)	-100.0%
Reserves	-	-	(15,671)	-	0.0%
Net Budget	-	50,000	32,929	(50,000)	-100.0%

Toronto and Region Conservation Authority
2020 Operating and Capital Budget - Water Risk Management

	2020 Budget	2019 Budget	Unaudited 2019 Actual	$ Change over 2019 Budget	% Change over 2019 Budget
Revenue					
Municipal					
Operating levy	664,000	861,000	860,600	(197,000)	-22.9%
Capital levy	21,186,000	22,365,000	19,263,035	(1,179,000)	-5.3%
Contract services	60,504,000	60,139,000	21,012,790	365,000	0.6%
Grants	352,000	-	183,115	352,000	0.0%
Provincial/Federal					
Provincial grants	2,554,000	2,183,000	2,885,168	371,000	17.0%
Federal grants	9,111,000	6,761,000	1,257,998	2,350,000	34.8%
Contract services	-	-	-	-	0.0%
User fees, sales and admissions	92,000	64,000	42,252	28,000	43.8%
Contract services					
Compensation agreements	60,000	21,000	8,424	39,000	185.7%
Corporate and other	1,082,000	1,353,000	1,180,938	(271,000)	-20.0%
Rent and property interests	-	-	-	-	0.0%
Fundraising					
Donations	1,000	1,000	-	-	0.0%
Toronto and Region Conservation Foundation	-	-	-	-	0.0%
Investment income	5,000	5,000	7,325	-	0.0%
Sundry	-	-	-	-	
Total Revenue	95,611,000	93,753,000	46,701,645	1,858,000	2.0%
Expenditures					
Water Resource Science					
Groundwater Strategies	702,000	749,000	733,975	(47,000)	-6.3%
Source Water Protection Strategy	557,000	507,000	437,528	50,000	9.9%
Regional Monitoring - Water	732,000	487,000	469,050	245,000	50.3%
Hydrology	56,000	130,000	11,704	(74,000)	-56.9%
Stormwater Management Strategies	3,735,000	1,877,000	3,395,980	1,858,000	99.0%
Flood Plain Mapping	435,000	932,000	734,603	(497,000)	-53.3%
	6,217,000	4,682,000	5,782,840	1,535,000	32.8%
Erosion Management					
Capital Works	81,574,000	81,717,000	34,438,560	(143,000)	-0.2%
Hazard Monitoring	2,019,000	1,749,000	559,879	270,000	15.4%
	83,593,000	83,466,000	34,998,439	127,000	0.2%
Flood Management					
Flood Forecasting and Warning	713,000	829,000	612,769	(116,000)	-14.0%
Flood Risk Management	3,302,000	3,053,000	3,085,295	249,000	8.2%
Flood Infrastructure and Operations	1,578,000	1,581,000	1,273,597	(3,000)	-0.2%
	5,593,000	5,463,000	4,971,661	130,000	2.4%
Total Expenditures	95,403,000	93,611,000	45,752,940	1,792,000	1.9%
Net Surplus (Deficit)	209,000	143,000	948,704	66,000	46.2%
Reserves	-	-	(316,983)	-	0.0%
Net Budget	209,000	143,000	631,721	66,000	46.2%

Toronto and Region Conservation Authority
2020 Operating and Capital Budget - Regional Biodiversity

	2020 Budget	2019 Budget	Unaudited 2019 Actual	$ Change over 2019 Budget	% Change over 2019 Budget
Revenue					
Municipal					
Operating levy	-	27,000	27,000	(27,000)	-100.0%
Capital levy	7,798,000	9,404,000	7,278,782	(1,606,000)	-17.1%
Contract services	2,148,000	2,896,000	5,722,082	(748,000)	-25.8%
Grants	281,000	453,000	168,984	(172,000)	-38.0%
Provincial/Federal					
Provincial grants	266,000	764,000	589,180	(498,000)	-65.2%
Federal grants	1,016,000	541,000	438,658	475,000	87.8%
Contract services	-	-	-	-	0.0%
User fees, sales and admissions	29,000	39,000	45,419	(10,000)	-25.6%
Contract services					
Compensation agreements	2,085,000	2,430,000	868,719	(345,000)	-14.2%
Corporate and other	1,659,000	5,582,000	1,151,178	(3,923,000)	-70.3%
Rent and property interests	-	-	20,250	-	0.0%
Fundraising					
Donations	550,000	-	6,240	550,000	0.0%
Toronto and Region Conservation Foundation	540,000	75,000	986,829	465,000	620.0%
Investment income	-	-	-	-	0.0%
Sundry	-	-	-	-	
Total Revenue	16,372,000	22,211,000	17,303,321	(5,839,000)	-26.3%
Expenditures					
Biodiversity Monitoring					
Regional Monitoring - Biodiversity	1,241,000	1,286,000	1,026,701	(45,000)	-3.5%
Activity Based Monitoring	794,000	580,000	605,189	214,000	36.9%
Terrestrial Inventory and Assessment	479,000	433,000	442,974	46,000	10.6%
Waterfront Monitoring	187,000	371,000	293,410	(184,000)	-49.6%
	2,701,000	2,670,000	2,368,274	31,000	1.2%
Ecosystem Management Research and Directions					
Aquatic System Priority Planning	515,000	446,000	326,430	69,000	15.5%
Terrestrial (and Integrated) Ecosystem Management	646,000	481,000	424,005	165,000	34.3%
Natural Channel Design	-	-	-	-	0.0%
Restoration Opportunities Bank	7,000	8,000	20,336	(1,000)	-12.5%
	1,168,000	935,000	770,771	233,000	24.9%
Forest Management					
Managed Forest Tax Incentive Planning	17,000	12,000	11,072	5,000	41.7%
Hazard Tree Management	556,000	904,000	633,252	(348,000)	-38.5%
Invasive Species Management	45,000	227,000	222,886	(182,000)	-80.2%
Forest Management Planning	37,000	25,000	38,639	12,000	48.0%
Forest Management Operations	487,000	384,000	369,481	103,000	26.8%
	1,142,000	1,552,000	1,275,330	(410,000)	-26.4%
Restoration and Regeneration					
Propagation and Sale of Plants	100,000	105,000	60,349	(5,000)	-4.8%
Inland and Lakefill Soil Management	361,000	287,000	330,914	74,000	25.8%
Shoreline Restoration	1,093,000	1,105,000	1,660,815	(12,000)	-1.1%
Wetlands	1,174,000	1,135,000	3,235,819	39,000	3.4%
Riparian and Flood Plain Restoration	496,000	531,000	509,241	(35,000)	-6.6%
Natural Channel and Stream Restoration	2,683,000	1,418,000	1,118,360	1,265,000	89.2%
Terrestrial Planting	1,419,000	3,510,000	2,319,655	(2,091,000)	-59.6%
Wildlife Habitat Management	249,000	222,000	240,964	27,000	12.2%
Compensation Restoration	1,779,000	2,129,000	646,233	(350,000)	-16.4%
Watershed Restoration	2,091,000	6,650,000	1,814,382	(4,559,000)	-68.6%
	11,445,000	17,092,000	11,936,732	(5,647,000)	-33.0%
Total Expenditures	16,456,000	22,249,000	16,351,107	(5,793,000)	-26.0%
Net Surplus (Deficit)	(82,000)	(38,000)	952,212	(44,000)	115.8%
Reserves	-	(100,000)	(652,471)	100,000	-100.0%
Net Budget	(82,000)	(138,000)	299,741	56,000	-40.6%

Toronto and Region Conservation Authority
2020 Operating and Capital Budget - Greenspace Securement and Management

	2020 Budget	2019 Budget	Unaudited 2019 Actual	$ Change over 2019 Budget	% Change over 2019 Budget
Revenue					
Municipal					
Operating levy	-	1,095,000	1,095,200	(1,095,000)	-100.0%
Capital levy	3,068,000	1,326,000	831,887	1,742,000	131.4%
Contract services	174,000	199,000	24,540	(25,000)	-12.6%
Grants	54,000	1,277,000	203,637	(1,223,000)	-95.8%
Provincial/Federal					
Provincial grants	1,000	5,000	4,400	(4,000)	-80.0%
Federal grants	10,000	120,000	260,170	(110,000)	-91.7%
Contract services	-	-	-	-	0.0%
User fees, sales and admissions	-	-	4,625	-	0.0%
Contract services					
Compensation agreements	87,000	99,000	46	(12,000)	-12.1%
Corporate and other	75,000	180,000	61,410	(105,000)	-58.3%
Rent and property interests	4,080,000	3,832,000	4,003,897	248,000	6.5%
Fundraising					
Donations	1,900,000	1,000,000	1,175,000	900,000	90.0%
Toronto and Region Conservation Foundation	-	-	470,791	-	0.0%
Investment income	-	-	(257,332)	-	0.0%
Sundry	6,000	7,000	6,565	(1,000)	
Total Revenue	9,455,000	9,140,000	7,884,836	315,000	3.4%
Expenditures					
Greenspace Securement					
Greenspace Land Acqusition	2,264,000	2,727,000	1,480,855	(463,000)	-17.0%
Greenspace Planning	-	-	1,230	-	0.0%
	2,264,000	2,727,000	1,482,085	(463,000)	-17.0%
Greenspace Management					
Archaeology	210,000	365,000	187,711	(155,000)	-42.5%
Property Taxes and Insurance	333,000	343,000	296,141	(10,000)	-2.9%
Resource Management Planning	1,175,000	439,000	848,105	736,000	167.7%
Inventory and Audit	-	131,000	124,296	(131,000)	-100.0%
Implementation	2,713,000	820,000	423,098	1,893,000	230.9%
Hazard Management	42,000	33,000	32,832	9,000	27.3%
	4,473,000	2,131,000	1,912,183	2,342,000	109.9%
Rental Properties					
Rentals	1,585,000	1,971,000	1,792,267	(386,000)	-19.6%
	1,585,000	1,971,000	1,792,267	(386,000)	-19.6%
Total Expenditures	8,322,000	6,829,000	5,186,535	1,493,000	21.9%
Net Surplus (Deficit)	1,133,000	2,311,000	2,698,300	(1,178,000)	-51.0%
Reserves	-	-	-	-	0.0%
Net Budget	1,133,000	2,311,000	2,698,300	(1,178,000)	-51.0%

Toronto and Region Conservation Authority
2020 Operating and Capital Budget - Tourism and Recreation

	2020 Budget	2019 Budget	Unaudited 2019 Actual	$ Change over 2019 Budget	% Change over 2019 Budget
Revenue					
Municipal					
Operating levy	864,000	1,507,000	1,506,300	(643,000)	-42.7%
Capital levy	4,793,000	5,441,000	4,075,779	(648,000)	-11.9%
Contract services	4,262,000	5,001,000	1,688,477	(739,000)	-14.8%
Grants	1,799,000	1,405,000	143,807	394,000	28.0%
Provincial/Federal					
Provincial grants	451,000	408,000	419,285	43,000	10.5%
Federal grants	272,000	10,000	243,481	262,000	2620.0%
Contract services	-	-	-	-	0.0%
User fees, sales and admissions	9,195,000	9,564,000	9,283,627	(369,000)	-3.9%
Contract services					
Compensation agreements	98,000	102,000	3,892	(4,000)	-3.9%
Corporate and other	186,000	84,000	162,085	102,000	121.4%
Rent and property interests	215,000	196,000	386,833	19,000	9.7%
Fundraising					
Donations	-	-	667	-	0.0%
Toronto and Region Conservation Foundation	4,359,000	571,000	65,705	3,788,000	663.4%
Investment income	-	-	(351)	-	0.0%
Sundry	-	-	-	-	
Total Revenue	26,494,000	24,289,000	17,979,587	2,205,000	9.1%
Expenditures					
Waterfront Parks					
General Maintenance	284,000	284,000	1,320,496	-	0.0%
Park Planning	2,476,000	1,266,000	37,740	1,210,000	95.6%
Arsenal Lands	-	-	-	-	0.0%
Park Development	409,000	990,000	161,476	(581,000)	-58.7%
	3,169,000	2,540,000	1,519,712	629,000	24.8%
Conservation Parks					
Day Use	2,779,000	2,818,000	3,004,980	(39,000)	-1.4%
Picnics	1,247,000	1,316,000	985,394	(69,000)	-5.2%
Swimming	533,000	478,000	611,466	55,000	11.5%
Fishing	19,000	15,000	14,497	4,000	26.7%
Mountain Biking	-	-	-	-	0.0%
Camping	932,000	1,453,000	1,553,861	(521,000)	-35.9%
Cross Country Skiing	58,000	42,000	68,327	16,000	38.1%
Filming	5,000	25,000	12,608	(20,000)	-80.0%
Park Development	-	-	117	-	0.0%
	5,573,000	6,147,000	6,251,250	(574,000)	-9.3%
Trails					
Trail Development	9,534,000	6,459,000	3,080,949	3,075,000	47.6%
Trail Management	486,000	196,000	308,869	290,000	148.0%
Trail Planning	1,473,000	296,000	224,484	1,177,000	397.6%
TRCA Trail Strategy	-	-	-	-	0.0%
	11,493,000	6,951,000	3,614,302	4,542,000	65.3%
Bathurst Glen Golf Course					
Golf Course	1,247,000	1,314,000	1,166,133	(67,000)	-5.1%
	1,247,000	1,314,000	1,166,133	(67,000)	-5.1%
Black Creek Pioneer Village					
Heritage Village	4,404,000	4,924,000	4,437,219	(520,000)	-10.6%
	4,404,000	4,924,000	4,437,219	(520,000)	-10.6%
Events and Festivals					
Kortright	184,000	207,000	174,490	(23,000)	-11.1%
Black Creek Pioneer Village	226,000	247,000	223,555	(21,000)	-8.5%
Other Facilities	198,000	193,000	217,520	5,000	2.6%
	608,000	647,000	615,565	(39,000)	-6.0%
Wedding and Corporate Events					
Kortright	-	-	-	-	0.0%
Black Creek Pioneer Village	-	-	-	-	0.0%
Other Facilities	-	-	-	-	0.0%
	-	-	-	-	0.0%
Total Expenditures	26,494,000	22,523,000	17,604,181	3,971,000	17.6%
Net Surplus (Deficit)	1,000	1,768,000	375,407	(1,767,000)	-99.9%
Reserves	-	-	(2,853,424)	-	0.0%
Net Budget	1,000	1,768,000	(2,478,017)	(1,767,000)	-99.9%

Toronto and Region Conservation Authority
2020 Operating and Capital Budget - Planning and Development Review

	2020 Budget	2019 Budget	Unaudited 2019 Actual	$ Change over 2019 Budget	% Change over 2019 Budget
Revenue					
Municipal					
Operating levy	935,000	-	-	935,000	0.0%
Capital levy	1,033,000	922,000	798,290	111,000	12.0%
Contract services	839,000	969,000	938,332	(130,000)	-13.4%
Grants	-	1,000	-	(1,000)	-100.0%
Provincial/Federal					
Provincial grants	477,000	440,000	397,733	37,000	8.4%
Federal grants	-	-	-	-	0.0%
Contract services	-	-	-	-	0.0%
User fees, sales and admissions	8,295,000	9,284,000	7,279,646	(989,000)	-10.7%
Contract services					
Compensation agreements	-	-	-	-	0.0%
Corporate and other	109,000	156,000	139,895	(47,000)	-30.1%
Rent and property interests	-	-	-	-	0.0%
Fundraising					
Donations	-	-	-	-	0.0%
Toronto and Region Conservation Foundation	-	-	-	-	0.0%
Investment income	-	-	-	-	0.0%
Sundry	-	-	-	-	
Total Revenue	11,688,000	11,772,000	9,553,896	(84,000)	-0.7%
Expenditures					
Development Planning and Regulation Permitting					
Planning	2,389,000	2,455,000	2,085,003	(66,000)	-2.7%
Permitting	1,797,000	1,781,000	1,425,726	16,000	0.9%
Enquiries	49,000	45,000	19,602	4,000	8.9%
Technical Services	1,890,000	1,760,000	1,818,331	130,000	7.4%
Development Enforcement and Compliance	504,000	503,000	583,595	1,000	0.2%
	6,629,000	6,544,000	5,932,257	85,000	1.3%
Environmental Assessment Planning and Permitting					
Planning (Basic, Servicing Agreements, Master Plans)	1,257,000	1,217,000	978,973	40,000	3.3%
Permitting	1,018,000	1,105,000	963,624	(87,000)	-7.9%
Development Enforcement and Compliance	336,000	335,000	315,527	1,000	0.3%
Technical Services	1,254,000	1,325,000	861,865	(71,000)	-5.4%
	3,865,000	3,982,000	3,119,989	(117,000)	-2.9%
Policy Development and Review					
Policy	1,195,000	1,023,000	851,725	172,000	16.8%
	1,195,000	1,023,000	851,725	172,000	16.8%
Total Expenditures	11,689,000	11,549,000	9,903,971	140,000	1.2%
Net Surplus (Deficit)	(1,000)	224,000	(350,076)	(225,000)	-100.4%
Reserves	-	-	-	-	0.0%
Net Budget	(1,000)	224,000	(350,076)	(225,000)	-100.4%

Toronto and Region Conservation Authority
2020 Operating and Capital Budget - Education and Outreach

	2020 Budget	2019 Budget	Unaudited 2019 Actual	$ Change over 2019 Budget	% Change over 2019 Budget
Revenue					
Municipal					
Operating levy	1,679,000	2,231,000	2,230,700	(552,000)	-24.7%
Capital levy	6,188,000	8,457,000	3,447,407	(2,269,000)	-26.8%
Contract services	-	3,000	1,800	(3,000)	-100.0%
Grants	89,000	-	-	89,000	0.0%
Provincial/Federal					
Provincial grants	804,000	699,000	429,952	105,000	15.0%
Federal grants	451,000	407,000	462,014	44,000	10.8%
Contract services	-	-	-	-	0.0%
User fees, sales and admissions	3,843,000	3,645,000	3,339,891	198,000	5.4%
Contract services					
Compensation agreements	-	-	-	-	0.0%
Corporate and other	306,000	276,000	145,819	30,000	10.9%
Rent and property interests	29,000	28,000	(41,760)	1,000	3.6%
Fundraising					
Donations	25,000	2,000	22,934	23,000	1150.0%
Toronto and Region Conservation Foundation	359,000	498,000	328,740	(139,000)	-27.9%
Investment income	-	-	2,725	-	0.0%
Sundry	-	-	-	-	
Total Revenue	13,773,000	16,246,000	10,370,222	(2,473,000)	-15.2%
Expenditures					
School Programs					
Early Learners	484,000	721,000	643,144	(237,000)	-32.9%
Post Secondary	46,000	65,000	84,975	(19,000)	-29.2%
Elementary	5,959,000	6,074,000	5,361,015	(115,000)	-1.9%
Secondary	5,139,000	7,223,000	2,336,909	(2,084,000)	-28.9%
	11,628,000	14,083,000	8,426,043	(2,455,000)	-17.4%
Newcomer Services					
Development of Internationally Trained Professionals	858,000	730,000	714,951	128,000	17.5%
Multicultural Connections Program	153,000	155,000	145,063	(2,000)	-1.3%
	1,011,000	885,000	860,014	126,000	14.2%
Family and Community Programs					
Kortright	844,000	900,000	792,798	(56,000)	-6.2%
Bolton Camp Development	5,000	250,000	55	(245,000)	-98.0%
Other Locations	285,000	149,000	274,305	136,000	91.3%
	1,134,000	1,299,000	1,067,158	(165,000)	-12.7%
Total Expenditures	13,773,000	16,267,000	10,353,215	(2,494,000)	-15.3%
Net Surplus (Deficit)	(1,000)	(21,000)	17,007	20,000	-95.2%
Reserves	-	20,000	249,297	(20,000)	-100.0%
Net Budget	(1,000)	(1,000)	266,304	-	0.0%

Toronto and Region Conservation Authority
2020 Operating and Capital Budget - Sustainable Communities

	2020 Budget	2019 Budget	Unaudited 2019 Actual	$ Change over 2019 Budget	% Change over 2019 Budget
Revenue					
Municipal					
Operating levy	155,000	128,000	127,600	27,000	21.1%
Capital levy	6,436,000	5,913,000	4,846,486	523,000	8.8%
Contract services	916,000	573,000	250,076	343,000	59.9%
Grants	26,000	36,000	90,097	(10,000)	-27.8%
Provincial/Federal					
Provincial grants	80,000	678,000	486,175	(598,000)	-88.2%
Federal grants	141,000	412,000	224,353	(271,000)	-65.8%
Contract services	-	-	-	-	0.0%
User fees, sales and admissions	646,000	862,000	734,790	(216,000)	-25.1%
Contract services					
Compensation agreements	33,000	33,000	327	-	0.0%
Corporate and other	980,000	1,230,000	890,377	(250,000)	-20.3%
Rent and property interests	-	-	-	-	0.0%
Fundraising					
Donations	245,000	249,000	137,374	(4,000)	-1.6%
Toronto and Region Conservation Foundation	478,000	320,000	417,162	158,000	49.4%
Investment income	-	-	-	-	0.0%
Sundry	-	-	-	-	
Total Revenue	10,136,000	10,434,000	8,204,817	(298,000)	-2.9%
Expenditures					
Living City Transition Program					
Sustainable Neighbourhood	1,080,000	1,056,000	801,709	24,000	2.3%
Community Transformation	718,000	1,130,000	682,416	(412,000)	-36.5%
Partners in Project Green	1,170,000	1,585,000	855,913	(415,000)	-26.2%
Urban Agriculture	287,000	325,000	195,912	(38,000)	-11.7%
Sustainable Technology Evaluation Program	2,006,000	2,214,000	2,148,708	(208,000)	-9.4%
Climate Consortium	813,000	573,000	590,223	240,000	41.9%
Green Infrastructure Ontario	422,000	358,000	202,918	64,000	17.9%
	6,496,000	7,241,000	5,477,799	(745,000)	-10.3%
Community Engagement					
Citizen Based Regeneration	1,771,000	1,838,000	1,536,959	(67,000)	-3.6%
Stewardship	1,012,000	684,000	725,853	328,000	48.0%
Watershed Engagement	856,000	671,000	375,034	185,000	27.6%
	3,639,000	3,193,000	2,637,846	446,000	14.0%
Social Enterprise Development					
Social Enterprise	-	-	-	-	0.0%
	-	-	-	-	0.0%
Total Expenditures	10,135,000	10,434,000	8,115,645	(299,000)	-2.9%
Net Surplus (Deficit)	1,000	-	89,172	1,000	0.0%
Reserves	-	-	(150,349)	-	0.0%
Net Budget	1,000	-	(61,177)	1,000	0.0%

Toronto and Region Conservation Authority
2020 Operating and Capital Budget - Corporate Services

	2020 Budget	2019 Budget	Unaudited 2019 Actual	$ Change over 2019 Budget	% Change over 2019 Budget
Revenue					
Municipal					
Operating levy	10,487,000	7,523,000	7,524,260	2,964,000	39.4%
Capital levy	8,205,000	3,744,000	2,319,079	4,461,000	119.2%
Contract services	33,000	-	201,628	33,000	0.0%
Grants	222,000	240,000	330,221	(18,000)	-7.5%
Provincial/Federal					
Provincial grants	66,000	80,000	1,805,224	(14,000)	-17.5%
Federal grants	1,135,000	13,000	9,387	1,122,000	8630.8%
Contract services	-	-	-	-	0.0%
User fees, sales and admissions	85,000	86,000	112,463	(1,000)	-1.2%
Contract services					
Compensation agreements	-	-	-	-	0.0%
Corporate and other	104,000	7,000	36,305	97,000	1385.7%
Rent and property interests	34,000	34,000	30,677	-	0.0%
Fundraising					
Donations	-	-	270	-	0.0%
Toronto and Region Conservation Foundation	655,000	14,000	371,525	641,000	4578.6%
Investment income	725,000	711,000	848,804	14,000	2.0%
Sundry	22,000	-	1,146,410	22,000	
Total Revenue	21,773,000	12,452,000	14,736,253	9,321,000	74.9%
Expenditures					
Financial Management					
Accounting and Reporting	2,237,000	2,233,000	2,261,897	4,000	0.2%
Business Planning and Strategic Management	1,565,000	786,000	703,757	779,000	99.1%
	3,802,000	3,019,000	2,965,654	783,000	25.9%
Corporate Management and Governance					
Corporate Secretariat	1,500,000	1,371,000	1,244,950	129,000	9.4%
Corporate Sustainability Management	-	-	143	-	0.0%
Support Services	36,349,000	21,120,000	6,755,197	15,229,000	72.1%
Risk Management	-	-	-	-	0.0%
Office of the CEO	448,000	346,000	320,509	102,000	29.5%
	38,297,000	22,837,000	8,320,799	15,460,000	67.7%
Human Resources					
Volunteers	30,000	48,000	25,262	(18,000)	-37.5%
Employee Support	1,514,000	1,312,000	1,126,945	202,000	15.4%
Health and Safety	-	-	(967)	-	0.0%
Human Capital Planning and Strategies	-	-	227	-	0.0%
	1,544,000	1,360,000	1,151,467	184,000	13.5%
Corporate Communications					
Communications	1,733,000	1,754,000	1,851,568	(21,000)	-1.2%
Digital and Social Media	298,000	57,000	62,007	241,000	422.8%
	2,031,000	1,811,000	1,913,575	220,000	12.1%
Information Infrastructure and Management					
Information Technology	1,517,000	1,450,000	1,227,438	67,000	4.6%
Knowledge and Data Management	1,233,000	1,830,000	1,652,571	(597,000)	-32.6%
Business Software	272,000	-	228,238	272,000	0.0%
	3,022,000	3,280,000	3,108,247	(258,000)	-7.9%
Project Recoveries					
Project Recoveries	(3,941,000)	(5,495,000)	(3,251,181)	1,554,000	-28.3%
	(3,941,000)	(5,495,000)	(3,251,181)	1,554,000	-28.3%
Vehicles and Equipment					
Operations	(1,264,000)	(1,205,000)	(939,337)	(59,000)	4.9%
Acquisitions	1,198,000	1,105,000	844,485	93,000	8.4%
	(66,000)	(100,000)	(94,852)	34,000	-34.0%
Total Expenditures	44,689,000	26,712,000	14,113,709	17,977,000	67.3%
Net Surplus (Deficit)	(22,915,000)	(14,259,000)	622,543	(8,656,000)	60.7%
Head Office Construction Loan	23,729,000	13,935,000	(372,013)	9,794,000	70.3%
Net Budget	814,000	(324,000)	250,530	1,138,000	-351.2%

Toronto and Region Conservation Authority

2020 Operating and Capital Budget - excluding tangible capital asset expenditures

	2020 Budget	2019 Budget	Unaudited 2019 Actual	$ Change over 2019 Budget	% Change over 2019 Budget
Revenue					
Municipal					
Operating levy	15,448,000	14,828,000	14,828,560	620,000	4.2%
Capital levy	59,892,000	59,425,000	44,144,673	467,000	0.8%
Contract services	69,066,000	69,983,000	29,909,213	(917,000)	-1.3%
Grants	2,958,000	3,412,000	1,019,860	(454,000)	-13.3%
Provincial/Federal					
Provincial	4,949,000	5,432,000	7,108,351	(483,000)	-8.9%
Federal	12,570,000	8,400,000	3,139,254	4,170,000	49.6%
Contract services	-	-	-	-	0.0%
User fees, sales and admissions	22,185,000	23,569,000	20,843,087	(1,384,000)	-5.9%
Contract services					
Compensation agreements	2,363,000	2,685,000	881,409	(322,000)	-12.0%
Corporate and other	4,540,000	8,868,000	3,783,007	(4,328,000)	-48.8%
Rent and property interests	4,358,000	4,089,000	4,399,897	269,000	6.6%
Fundraising					
Donations	2,721,000	1,259,000	1,342,486	1,462,000	116.1%
Toronto and Region Conservation Foundation	6,394,000	1,477,000	3,436,804	4,917,000	332.9%
Investment income	730,000	716,000	601,171	14,000	2.0%
Net gain/loss on sale of tangible capital assets	-	-	-	-	0.0%
Sundry	27,000	7,000	1,152,975	20,000	
Total Revenue	208,201,000	204,150,000	136,590,747	4,051,000	2.0%

Toronto and Region Conservation Authority
2020 Operating and Capital Budget - excluding tangible capital asset expenditures

	2020 Budget	2019 Budget	Unaudited 2019 Actual	$ Change over 2019 Budget	% Change over 2019 Budget
Expenditures					
Watershed Studies and Strategies					
Watershed Planning and Reporting	2,185,000	2,848,000	3,104,482	(663,000)	-23.3%
Climate Science	724,000	958,000	703,086	(234,000)	-24.4%
	2,909,000	3,806,000	3,807,568	(897,000)	-23.6%
Water Risk Management					
Water Resource Science	6,222,000	4,682,000	5,782,841	1,540,000	32.9%
Erosion Management	85,196,000	83,466,000	34,998,439	1,730,000	2.1%
Flood Management	5,834,000	5,463,000	4,971,661	371,000	6.8%
	97,252,000	93,611,000	45,752,941	3,641,000	3.9%
Regional Biodiversity					
Biodiversity Monitoring	2,775,000	2,670,000	2,368,274	105,000	3.9%
Ecosystem Management Research and Directions	1,170,000	935,000	770,771	235,000	25.1%
Forest Management	1,143,000	1,552,000	1,275,330	(409,000)	-26.4%
Restoration and Regeneration	11,457,000	17,092,000	11,936,733	(5,635,000)	-33.0%
	16,545,000	22,249,000	16,351,108	(5,704,000)	-25.6%
Greenspace Securement and Management					
Greenspace Securement	2,684,000	2,727,000	1,482,086	(43,000)	-1.6%
Greenspace Management	4,508,000	2,132,000	1,912,183	2,376,000	111.4%
Rental Properties	2,055,000	1,971,000	1,792,267	84,000	4.3%
	9,247,000	6,830,000	5,186,536	2,417,000	35.4%
Tourism and Recreation					
Waterfront Parks	4,365,000	2,539,000	1,519,712	1,826,000	71.9%
Conservation Parks	7,752,000	6,146,000	6,251,249	1,606,000	26.1%
Trails	11,679,000	6,951,000	3,614,302	4,728,000	68.0%
Bathurst Glen Golf Course	1,250,000	1,314,000	1,166,133	(64,000)	-4.9%
Black Creek Pioneer Village	4,634,000	4,924,000	4,437,219	(290,000)	-5.9%
Events and Festivals	615,000	647,000	615,565	(32,000)	-4.9%
Wedding and Corporate Events	1,000	-	-	1,000	0.0%
	30,296,000	22,521,000	17,604,180	7,775,000	34.5%
Planning and Development Review					
Development Planning and Regulation Permitting	6,639,000	6,543,000	5,932,258	96,000	1.5%
Environmental Assessment Planning and Permitting	3,868,000	3,982,000	3,119,989	(114,000)	-2.9%
Policy Development and Review	1,195,000	1,023,000	851,725	172,000	16.8%
	11,702,000	11,548,000	9,903,972	154,000	1.3%
Education and Outreach					
School Programs	11,933,000	14,083,000	8,426,043	(2,150,000)	-15.3%
Newcomer Services	1,013,000	885,000	860,014	128,000	14.5%
Family and Community Programs	1,134,000	1,299,000	1,067,158	(165,000)	-12.7%
	14,080,000	16,267,000	10,353,215	(2,187,000)	-13.4%
Sustainable Communities					
Living City Transition Program	6,684,000	7,241,000	5,477,800	(557,000)	-7.7%
Community Engagement	3,640,000	3,193,000	2,637,845	447,000	14.0%
Social Enterprise Development	-	-	-	-	0.0%
	10,324,000	10,434,000	8,115,645	(110,000)	-1.1%
Corporate Services					
Financial Management	3,802,000	3,019,000	2,965,654	783,000	25.9%
Corporate Management and Governance	39,215,000	22,837,000	8,320,799	16,378,000	71.7%
Human Resources	1,544,000	1,360,000	1,151,467	184,000	13.5%
Corporate Communications	2,043,000	1,811,000	1,913,575	232,000	12.8%
Information Infrastructure and Management	3,119,000	3,280,000	3,108,248	(161,000)	-4.9%
Project Recoveries	(3,925,000)	(5,494,000)	(3,251,181)	1,569,000	-28.6%
Vehicles and Equipment	201,000	(100,000)	(94,852)	301,000	-301.0%
	45,999,000	26,713,000	14,113,710	19,286,000	72.2%
Total Expenditures	238,354,000	213,979,000	131,188,875	24,375,000	11.4%
Net Surplus (Deficit)	(30,154,000)	(9,826,000)	5,401,870	(20,328,000)	206.9%
Head Office Construction Loan	23,729,000	13,855,000	(4,111,615)	9,874,000	71.3%
Net Budget	(6,425,000)	4,029,000	1,290,255	(10,454,000)	-259.5%

Toronto and Region Conservation Authority

2020 Operating and Capital Budget - by object classification - excluding tangible capital asset expenditures

	2020 Budget	2019 Budget	Unaudited 2019 Year to date	$ Change over 2019 Budget	% Change over 2019 Budget
Revenue					
Municipal					
Operating levy	15,448,000	14,828,000	14,828,560	620,000	4.2%
Capital levy	59,896,000	59,424,000	44,144,671	472,000	0.8%
Contract services	69,066,000	69,983,000	29,909,213	(917,000)	-1.3%
Grants	2,958,000	3,412,000	1,019,860	(454,000)	-13.3%
Government					
Provincial	4,949,000	5,432,000	7,108,351	(483,000)	-8.9%
Federal	12,570,000	8,400,000	3,139,254	4,170,000	49.6%
Contract services	-	-	-	-	0.0%
User fees, sales and admissions	22,185,000	23,569,000	20,843,087	(1,384,000)	-5.9%
Contract services					
Compensation agreements	2,363,000	2,685,000	881,409	(322,000)	-12.0%
Corporate and other	4,540,000	8,868,000	3,783,007	(4,328,000)	-48.8%
Rent and property interests	4,358,000	4,089,000	4,399,897	269,000	6.6%
Fundraising					
Donations	2,721,000	1,259,000	1,342,486	1,462,000	116.1%
Toronto and Region Conservation Foundation	6,394,000	1,477,000	3,436,804	4,917,000	332.9%
Investment income	730,000	716,000	601,171	14,000	2.0%
Net gain/loss on sale of tangible capital assets	-	-	-	-	0.0%
Sundry	27,000	7,000	1,152,975	20,000	
Total Revenue	208,201,000	204,150,000	136,590,747	3,584,000	1.8%
Expenditures					
Wages and benefits	79,651,000	75,944,000	68,973,111	3,707,000	4.9%
Contracted services	120,926,000	110,785,000	49,239,274	10,141,000	9.2%
Materials and supplies	27,434,000	25,369,000	11,049,422	2,065,000	8.1%
Utilities	995,000	1,078,000	1,242,152	(83,000)	-7.7%
Property taxes	854,000	800,000	686,152	54,000	6.8%
	229,860,000	213,976,000	131,190,111	15,884,000	7.4%
Internal Recoveries	(16,613,000)	(29,958,000)	(17,947,667)	13,345,000	-44.5%
Internal Charges	16,613,000	29,958,000	17,946,432	(13,345,000)	-44.5%
	229,860,000	213,976,000	131,188,876	15,884,000	7.4%
Add Amortization	8,494,000	-	-	8,494,000	0.0%
Total Expenditures	238,354,000	213,976,000	131,188,876	24,378,000	11.4%
Net Surplus (Deficit)	(30,153,000)	(9,826,000)	5,401,871	(20,794,000)	211.6%
Head Office Construction Loan	23,729,000	13,855,000	(4,111,615)	9,874,000	71.3%
Net Budget	(6,424,000)	4,029,000	1,290,256	(10,920,000)	-271.0%

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Toronto and Region Conservation Authority

Item 7.2

Section I – Items for Board of Directors Action

TO: Chair and Members of the Board of Directors
Meeting #3/20, Friday, April 24, 2020

FROM: Michael Tolensky, Chief Financial and Operating Officer

RE: **PROCUREMENT SUMMARY**
2019 Annual Summary

KEY ISSUE

Receipt of the 2019 summary of procurements approved by the Chief Executive Officer or Designate, Executive Committee, or the Board of Directors.

RECOMMENDATION

THAT the 2019 Procurement Summary Report (the Report) of Toronto and Region Conservation Authority (TRCA) for procurements approved in excess of $10K in 2019 be received;

AND FURTHER THAT the Report continue to be provided to the Executive Committee on a yearly basis, with a link to the full list of procurements over $10K available on the TRCA website.

BACKGROUND

At Authority Meeting #5/05, held on June 24, 2005, staff were requested to report to the Authority on contracts executed by TRCA in excess of $10K. Pursuant to this resolution, a summary of awarded contracts in 2019 are included in Attachment 1. All contract revisions that were approved in 2019, including previously approved revisions associated with the contract, are recorded in Attachment 2.

At Board of Directors Meeting #8/18, held on October 26, 2018, the Procurement Policy (the Policy) was approved. Approval thresholds and purchasing methods (expense authorization) are included in Attachment 3. As permitted under the Policy, the Chief Executive Officer has designated senior staff to approve purchases up to $10K which are not included in this summary report. Excluded from the summary report are goods and services exempt from procurement and purchase order approvals (these items are listed in Attachment 4). Attachment 5 lists the non-application criteria for goods and services exempt from public sector procurement guidelines. Attachment 6 includes the criteria for limited tendering procurement.

In accordance with resolution #A31/18 from Authority Meeting #2/18, held on March 23, 2018, the full list of procurements over $10K has not been attached to the agenda and will be provided via a link to the TRCA website.

FINANCIAL DETAILS

The total value of procurements for TRCA in 2019, in excess of $10,000 approved by the Chief Executive Officer or Designate, Executive Committee, or Board of Directors, was approximately $46.4M ($64.4M in 2018), including contingencies and excluding applicable taxes.

The decrease in the total value of approved procurements in 2019 can be attributed to fewer multi-year and large dollar value contracts executed in 2019. The number of Vendor of Record

Arrangements established has also decreased from previous years.

As shown in Attachment 2, the total value of contract increases was $6.9M and contract decreases due to scope changes was $4.4M for a total net value of revisions equal to approximately $2.5M. These contract increases and decreases are largely a result of changes associated with the East Don Trail construction project. Scope changes for the East Don Trail construction project are largely due to changing and unknown or challenging physical site conditions (e.g., seepage areas) reflecting the nature of the project within this environmentally sensitive and deeply incised valley.

In 2019, approximately 66% of approved contracts included a contingency in the range of 10-15% (Attachment 7). The total amount of contingency that was approved in 2019 was $3.96M, of which approximately $527K was used by the end of the year. Contracts that were approved in 2019 that are multi-year contracts may have an additional portion of the contingency used over the course of the contract term. Contingencies for new and multi-year contracts will continue to be formally tracked and reported on.

Report prepared by: Lisa Moore, extension 5846
Emails: lisa.moore@trca.ca
For Information contact: Lisa Moore, extension 5846
Emails: lisa.moore@trca.ca
Date: March 9, 2020
Attachments: 7

Attachment 1 – Summary of Procurements
Attachment 2 – Contract Revisions
Attachment 3 – Expense Authorization
Attachment 4 – Goods and Services Exempt from Procurement and Purchase Order Approvals
Attachment 5 – Non-Application Criteria
Attachment 6 – Limited Tendering Criteria
Attachment 7 – Contingency Summary

Attachment 1 - Summary of Procurements

Highest Ranked								
Project Name	**Goods/Services Procured**	**Awarded Bidder**	**Contract Cost**	**Contingency Cost**	**Total Cost (Before Revisions)**	**Total Vendors**	**Responded**	**TRCA Division (Responsible)**
Eldorado Court, Grandravine Drive and Ladyshot Crescent, in the City of Toronto	Engineering services for slope stability, erosion risk assessment, and alternative conceptual design for forty-five (45) properties in the City of Toronto.	AECOM CANADA LTD.	$225,489.00	$22,548.90	$248,037.90	11	5	Restoration and Infrastructure
Fill Quality Control, Site Decommissioning and Environmental Monitoring Programs	2019 laboratory analytical services.	ALS Canada Ltd	$49,300.00	$4,930.00	$54,230.00	4	3	Restoration and Infrastructure
Wiley Bridge	Professional engineering services for preliminary design, detailed design and contract administration services.	AMTEC Engineering Ltd.	$36,325.00	$5,448.75	$41,773.75	17	3	Corporate Services
Upper Highland Creek Pan Am Path Connection	Pre-construction and post-construction CCTV inspection services of sanitary infrastructure.	Andrews Engineer	$33,274.00	$12,000.00	$45,274.00	12	1	Restoration and Infrastructure
Newtonbrook Creek Bridge Replacement Slope Stabilization Project	Engineering services for detailed designs for slope stabilization.	AQUAFOR BEECH LIMITED	$35,800.00	$3,580.00	$39,380.00	7	2	Restoration and Infrastructure

Attachment 1 - Summary of Procurements

Highest Ranked								
Project Name	**Goods/Services Procured**	**Awarded Bidder**	**Contract Cost**	**Contingency Cost**	**Total Cost (Before Revisions)**	**Total Vendors**	**Responded**	**TRCA Division (Responsible)**
Grey Abbey Ravine Slope Stabilization Project	Engineering services for development of detailed designs.	AQUAFOR BEECH LIMITED	$59,160.00	$5,916.00	$65,076.00	5	1	Restoration and Infrastructure
Yellow Creek Channel Stabilization	Professional engineering services for 3 conceptual designs and detailed design package.	Aquafor Beech Ltd.	$36,950.00	$5,542.50	$42,492.50	6	3	Restoration and Infrastructure
Humber River Bank Stabilization Project (P-004, P-005)	Professional engineering services for geomorphic assessment, geotechnical investigation, and detailed design development.	Aquafor Beech Ltd.	$59,980.00	$5,998.00	$65,978.00	7	5	Restoration and Infrastructure
TRCA New Administrative Office Building	Facilities management services.	Bouygues Energies & Services	$386,410.79	$57,961.62	$444,372.41	23	4	Corporate Services
Outdoor Gathering Space at Morningside Park Project	Urban indigenous collaboration and consultation services to develop design requirements.	Cambium Aboriginal Inc	$54,634.74	$8,195.21	$62,829.95	4	2	Community Engagement and Outreach

Attachment 1 - Summary of Procurements

Highest Ranked								
Project Name	**Goods/Services Procured**	**Awarded Bidder**	**Contract Cost**	**Contingency Cost**	**Total Cost (Before Revisions)**	**Total Vendors**	**Responded**	**TRCA Division (Responsible)**
TRCA GIS Plotter Machine	Toner and printhead.	CDW Canada Inc.	$16,009.20	$1,600.92	$17,610.12	2	2	Corporate Services
Appletree Court and Seeley Drive Erosion Control and Slope Stabilization Project	Geotechnical engineering services for slope stability and erosion risk assessment.	Central Earth Engineering	$18,440.00	$5,000.00	$23,440.00	7	3	Restoration and Infrastructure
Gaffney Park Erosion Control and Drainage	Professional engineering services for geotechnical investigation and conceptual design development.	Central Earth Engineering	$23,640.00	$2,364.00	$26,004.00	12	5	Restoration and Infrastructure
Lakeland Drive Major Maintenance Project	Geotechnical engineering services for a slope stability assessment and development of conceptual design alternatives.	Central Earth Engineering	$102,670.00	$15,400.50	$118,070.50	5	2	Restoration and Infrastructure
37-39 Topcliff Avenue Slope Stabilization Project	Professional engineering services for a geotechnical investigation to update detailed design package.	Central Earth Engineering, Ltd.	$17,990.00	$1,799.00	$19,789.00	8	3	Restoration and Infrastructure

Attachment 1 - Summary of Procurements

Highest Ranked								
Project Name	**Goods/Services Procured**	**Awarded Bidder**	**Contract Cost**	**Contingency Cost**	**Total Cost (Before Revisions)**	**Total Vendors**	**Responded**	**TRCA Division (Responsible)**
Flood Risk Awareness and Education Program's Public Open House	Public meeting facilitation services.	DILLON CONSULTING LTD	$22,730.00	$4,546.00	$27,276.00	5	5	Development and Engineering Services
Region of Peel Energy Savings Workshops	Energy engineering services for Region of Peel's energy conservation and GHG reduction projects.	Enerlife Consulting Inc.	$28,345.00	$5,669.00	$34,014.00	3	2	Watershed Strategies
Conservation Drive Park Stream Restoration	Fluvial Geomorphic and Hydraulic Assessment and Design.	GEO MORPHIX LTD.	$10,257.50	$1,025.75	$11,283.25	6	4	Restoration and Infrastructure
TRCA's New Administrative Office Building	Vertical test boring services for ground-loop heat exchange.	GEOSOURCE ENERGY	$31,000.00	$3,100.00	$34,100.00	9	2	Corporate Services
Morningside East Scarborough Storefront Trail	Engineering services for a geotechnical investigation and detailed design of a trail connection.	GHD	$73,493.00	$7,349.30	$80,842.30	7	3	Restoration and Infrastructure
Palace Pier Court Headland Maintenance Project	Coastal engineering services for detailed designs.	GHD Limited	$39,319.50	$3,931.95	$43,251.45	7	4	Restoration and Infrastructure

Attachment 1 - Summary of Procurements

Highest Ranked								
Project Name	**Goods/Services Procured**	**Awarded Bidder**	**Contract Cost**	**Contingency Cost**	**Total Cost (Before Revisions)**	**Total Vendors**	**Responded**	**TRCA Division (Responsible)**
Bartley Drive Ravine	Geomorphic analysis, erosion -risk assessment, and two concept designs.	GHD Limited	$41,534.00	$4,153.40	$45,687.40	3	3	Restoration and Infrastructure
73-95 Clarinda Drive Slope Stabilization and Erosion Control Project	Professional engineering services for hydraulic analysis, stormwater management analyses, tree inventory, and geomorphic assessment.	GHD Limited	$54,200.00	$5,420.00	$59,620.00	5	4	Restoration and Infrastructure
Prince of Wales Major Maintenance Project	Coastal engineering services to develop detailed designs.	GHD Limited	$53,371.00	$8,005.65	$61,376.65	8	5	Restoration and Infrastructure
26-30 Livingston Road Phase 6	Civil engineering services for detailed design development.	GRECK & ASSOCIATES LTD.	$19,630.00	$3,926.00	$23,556.00	5	1	Restoration and Infrastructure
King's Park Stream Restoration Project	Professional engineering for fluvial geomorphology, hydraulic assessment, and design.	GRECK & ASSOCIATES LTD.	$33,636.00	$5,045.40	$38,681.40	7	3	Restoration and Infrastructure

Attachment 1 - Summary of Procurements

Highest Ranked								
Project Name	**Goods/Services Procured**	**Awarded Bidder**	**Contract Cost**	**Contingency Cost**	**Total Cost (Before Revisions)**	**Total Vendors**	**Responded**	**TRCA Division (Responsible)**
German Mills Settlers Park Sanitary Infrastructure Protection Project	Professional engineering services for detailed design and construction administration.	GRECK & ASSOCIATES LTD.	$56,020.00	$8,403.00	$64,423.00	8	3	Restoration and Infrastructure
Equipment Acquisition - Electrofishing Vessel	Fabrication of new electrofishing boat.	HALLTECH AQUATIC RESEARCH INC.	$85,250.00	$17,050.00	$102,300.00	8	1	Corporate Services
Patterson Richvale and Valley	Rental, installation and demobilization of bypass pumping systems.	Herc Rentals	$40,125.00	$6,018.75	$46,143.75	9	3	Restoration and Infrastructure
BCPV Flynn House Exhibit	Conceptual and final graphic design of exhibit.	HOLMAN EXHIBITS	$29,500.00	$4,425.00	$33,925.00	7	3	Parks and Culture
Master CCTV Contract for City of Toronto Erosion Control and Slope Stabilization Projects - 2019/2020	Pre-construction and post-construction closed circuit television (CCTV) inspections.	INFRASTRUCTURE INTELLIGENCE SERVICES INC.	$30,370.00	$3,037.00	$33,407.00	11	3	Restoration and Infrastructure
Black Creek Pioneer Village	Professional consulting services for the commissioning of BCPV Visitor's Centre Mechanical System.	JLSR Engineering Inc.	$26,800.00	$2,680.00	$29,480.00	3	3	Corporate Services

Attachment 1 - Summary of Procurements

Highest Ranked								
Project Name	**Goods/Services Procured**	**Awarded Bidder**	**Contract Cost**	**Contingency Cost**	**Total Cost (Before Revisions)**	**Total Vendors**	**Responded**	**TRCA Division (Responsible)**
2019 Bolton Flood and Ice Jam	Engineering consulting services to investigate and analyze the 2019 Bolton Ice Jam.	KGS GRoup	$50,914.00	$10,182.80	$61,096.80	18	3	Development and Engineering Services
Ajax and Pickering Dykes Rehabilitation Class EA	Engineering services to undertake a Conservation Ontario Class EA.	KGS Group Consulting Engineers	$155,107.00	$38,776.75	$193,883.75	17	2	Development and Engineering Services
G. Ross Lord Dam Gate Operation	Consulting services for Don River floodplain mapping update and G. Ross Lord Dam gate operational review.	KGS Group Consulting Engineers	$169,775.00	$33,955.00	$203,730.00	27	6	Restoration and Infrastructure
Bolton Berm Major Maintenance	professional engineering services for detailed design.	KGS Group Consulting Engineers	$204,139.00	$20,413.90	$224,552.90	31	1	Restoration and Infrastructure
Climate Change Key Performance Indicators	Professional consulting services for the development of logic models, theory of change and a template and methodology for outcome based Key Performance Indicators (KPIs).	KPMG	$135,367.50	$27,073.50	$162,441.00	4	4	Parks and Culture

Attachment 1 - Summary of Procurements

Highest Ranked								
Project Name	**Goods/Services Procured**	**Awarded Bidder**	**Contract Cost**	**Contingency Cost**	**Total Cost (Before Revisions)**	**Total Vendors**	**Responded**	**TRCA Division (Responsible)**
Microsoft Software Licenses	Microsoft E3 licensing for full-time staff.	Long View	$125,000.00	$12,500.00	$137,500.00	5	5	Corporate Services
Microsoft Licensing Solutions Provider	Microsoft subscription for products and services.	Long View Systems Corporation	$594,472.08	$59,447.21	$653,919.29	4	4	Corporate Services
Bolton Camp Retaining Wall	Geotechnical engineering services for proposed retaining wall design.	McIntosh Perry Consulting Engineers	$8,510.00	$1,702.00	$10,212.00	36	8	Corporate Services
70 Main Street South Erosion Control Project	Engineering services for detailed design development and engineering support.	Mooney Mataxas Inc.	$52,184.40	$7,827.66	$60,012.06	37	4	Restoration and Infrastructure
Albion Hills Field Centre Loading Dock	Professional Engineering Services for the assessment/ investigation, preliminary designs and development of a detailed design.	MOON-MATZ LTD.	$25,490.00	$2,549.00	$28,039.00	28	4	Corporate Services
Albion Hills Field Centre	15 small adult sized adjustable fat bikes and 2 junior fat bikes.	Moose Bicycle	$14,885.00	$744.25	$15,629.25	4	4	Education and Training

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Highland Creek Markham Branch (Corporate Drive) Flood Remediation Class EA	Consulting engineering services to undertake a flood remediation technical study and a municipal class environmental assessment.	MORRISON HERSHFIELD LIMITED	$367,158.00	$55,000.00	$422,158.00	2	2	Restoration and Infrastructure
Broadview and Eastern Flood Protection	Design services for phase 1 of implementation.	Morrison Hershfield Limited/Morrison	$62,000.00	$12,400.00	$74,400.00	29	1	Corporate Services
Uniformed Security Services for TRCA Facilities 2019 - 2024	Uniformed security services.	Neptune Security	$962,950.00	$144,442.50	$1,107,392.50	4	4	Parks and Culture
Rainbow Creek Sanitary Trunk Sewer	Fluvial geomorphic assessment and concept development.	Palmer Environmental Consulting Group Inc.	$16,382.00	$1,638.20	$18,020.20	6	2	Restoration and Infrastructure
West Don River in E.T. Seton Park Major Maintenance Project	Professional fluvial geomorphic consulting services.	Palmer Environmental Consulting Group Inc.	$16,946.00	$2,541.90	$19,487.90	6	5	Restoration and Infrastructure
72 Heath Street East	Geotechnical engineering consulting services.	Palmer Environmental Consulting Group Inc.	$19,529.00	$1,792.90	$21,321.90	7	3	Restoration and Infrastructure

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Newtonbrook Creek South of Finch Avenue East	Fluvial geomorphology services.	Palmer Environmental Consulting Group Inc.	$19,955.00	$2,993.25	$22,948.25	5	5	Restoration and Infrastructure
Black Creek Tributary East of Topcliff Avenue	Geomorphic analysis, erosion risk assessment, and conceptual design.	Palmer Environmental Consulting Group Inc.	$11,253.00	$1,687.95	$12,940.95	3	3	Restoration and Infrastructure
Lambton Woods Park Pedestrian Bridge Replacement	Engineering and detailed design services.	Planmac Engineering Inc.	$24,487.50	$4,897.50	$29,385.00	6	6	Restoration and Infrastructure
Governor's Bridge Lookout	Engineering design services.	PLANT ARCHITECT INC.	$37,998.00	$3,799.80	$41,797.80	5	2	Restoration and Infrastructure
Sustainable Neighbourhood Action Program - Videography	Video Production Services for the SNAP team.	POWERLINE FILMS	$19,840.00	$3,968.00	$23,808.00	3	3	Corporate Services
Burke Brook Ravine, East of Bayview Trail Improvements	Engineering and design consulting services for trail improvements.	R.V. ANDERSON ASSOCIATES LIMITED	$93,173.75	$9,317.37	$102,491.12	7	1	Restoration and Infrastructure

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Ajax Waterfront Outfall Protection	Coastal engineering services.	Resilient Consulting Corporation	$12,880.00	$1,288.00	$14,168.00	7	2	Restoration and Infrastructure
NDMP Floodplain Mapping Update	Engineering support services for the technical review of NDMP funded floodplain mapping updates and technical input into watershed planning initiatives.	Resilient Consulting Corporation	$50,000.00	$5,000.00	$55,000.00	2	2	Development and Engineering Services
Duffins Marsh Southwest Lagoon Restoration	Professional engineering services for restoration of Simcoe Point Marsh Water Control/Carp Exclusion Gates.	Resilient Consulting Ltd.	$27,918.00	$2,791.80	$30,709.80	3	1	Restoration and Infrastructure
Eastern Beaches 2019 Emergency Flood Mitigation Works	Coastal engineering design services.	Shoreplan Engineering Ltd.	$12,800.00	$1,280.00	$14,080.00	4	3	Restoration and Infrastructure
Ward's Island Shoreline Protection	Coastal assessment and detailed design services.	Shoreplan Engineering Ltd.	$14,900.00	$1,490.00	$16,390.00	4	2	Restoration and Infrastructure

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Frisco Road Outlook	Coastal engineering design services.	Shoreplan Engineering Ltd.	$15,500.00	$1,550.00	$17,050.00	3	3	Restoration and Infrastructure
Humber Bay Park East Major Maintenance Project	Coastal engineering services to develop detailed designs.	Shoreplan Engineering Ltd.	$107,400.00	$10,740.00	$118,140.00	16	3	Restoration and Infrastructure
Magical Christmas Forest 2019	Santa services.	Sphere Entertainment	$12,500.00	$625.00	$13,125.00	4	2	Education and Training
Kortright Gift Shop	Supply and delivery of packaged food service and disposable items.	Sysco	$10,000.00	$1,000.00	$11,000.00	3	3	Education and Training
TRCA's New Administrative Office Building	Public art consulting services.	Tatar Art Projects	$35,000.00	$3,500.00	$38,500.00	5	3	Corporate Services
Microsoft Office 365 Migration	Consulting Services to migrate from IBM Notes to Office 365.	Telus Communications Inc.	$125,975.00	$0.00	$125,975.00	5	3	Corporate Services

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Vulnerability Assessment for IT Systems	IT security services for systems penetration and vulnerability testing.	TeraMach	$23,525.00	$0.00	$23,525.00	2	2	Corporate Services
96-106 Windhill Crescent	Geotechnical engineering services for slope stability and erosion risk assessment.	Terraprobe Inc.	$28,425.00	$2,842.50	$31,267.50	7	3	Restoration and Infrastructure
111 Longview Crescent Erosion Control Project	Engineering services for detailed design development.	Terraprobe Inc.	$34,270.00	$5,140.50	$39,410.50	2	2	Restoration and Infrastructure
35-37 Shendale Dr. Slope Stabilization Project	Geotechnical engineering services for detailed design.	TERRAPROBE INC.	$40,685.00	$4,068.50	$44,753.50	2	2	Restoration and Infrastructure
St. Andrews Cemetery Slope Stability & Erosion Risk Assessment	Engineering services for slope stabilization and erosion risk assessment.	TERRAPROBE INC.	$49,565.00	$4,956.50	$54,521.50	5	1	Restoration and Infrastructure
Alderbrook Drive and Bucksburn Road	Professional structural engineering services.	TERRAPROBE INC.	$51,070.00	$7,660.50	$58,730.50	5	1	Restoration and Infrastructure

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90 Meadowcliffe Drive	Geotechnical, civil engineering, and landscape architecture services.	TERRAPROBE INC.	$63,085.00	$12,617.00	$75,702.00	5	2	Restoration and Infrastructure
Denison Road	Geotechnical engineering services to undertake a slope stability assessment and conceptual design alternatives.	TERRAPROBE INC.	$66,085.00	$13,217.00	$79,302.00	6	3	Restoration and Infrastructure
21, 23 , & 25 Peacham Crescent Erosion Control and Slope Stabilization Project	Engineering services to develop detail designs.	TERRAPROBE INC.	$94,990.00	$9,499.00	$104,489.00	6	2	Restoration and Infrastructure
Bartley Drive Ravine	Geotechnical engineering services and conceptual design development.	Terraprobe, Inc.	$34,660.00	$5,199.00	$39,859.00	2	2	Restoration and Infrastructure
Claremont Field Centre Food Supply	Protein for Claremont Field Centre.	THE BUTCHER SHOPPE	$9,800.00	$490.00	$10,290.00	2	2	Education and Training
2019 Bike The Creek	BBQ lunch catering for community participants.	The Gourmet Group	$8,600.00	$2,150.00	$10,750.00	3	3	Community Engagement and Outreach

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High Barn at Albion Hills CA	Professional Engineering Services for the structural assessment, detailed design and construction administration.	Thornton Tomasetti Canada Inc.	$16,800.00	$2,520.00	$19,320.00	7	6	Corporate Services
York Region Canopy Cover Mapping and Change Assessment	Land cover and tree canopy mapping services for 2019.	UNIVERSITY OF VERMONT	$72,163.80	$0.00	$72,163.80	5	3	Policy and Planning
Mimico Creek Floodplain Mapping Update	Engineering services for HEC-RAS hydraulic model and floodplain mapping update.	Valdor Engineering Inc.	$37,573.00	$3,757.30	$41,330.30	9	9	Development and Engineering Services
Supplementary Bare Root Fall 2019	Supplementary bare root plants for TRCA Fall Planting Program/Projects.	VERBINNEN'S NURSERY	$16,921.25	$3,384.25	$20,305.50	5	4	Restoration and Infrastructure
Solid Waste and Recycling Collection Management Program	Solid waste and recycling services from 2019 to 2021.	Waste Management of Canada	$116,692.00	$11,669.20	$128,361.20	4	4	Corporate Services
Sunnyside Park Revetment Maintenance Project	Coastal engineering services to develop detailed design.	WF Baird and Associates	$57,998.00	$5,799.80	$63,797.80	7	2	Restoration and Infrastructure

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2019 Rouge River Floodplain Mapping Update - Phase I	Engineering services for HEC-RAS hydraulic model and floodplain mapping update.	Wood Environment & Infrastructure Solutions	$87,435.86	$8,743.59	$96,179.45	6	6	Restoration and Infrastructure
Rouge River Floodplain Mapping - Phase 2	Engineering services for HEC-RAS hydraulic model and floodplain mapping update.	Wood Environment & Infrastructure Solutions	$94,391.11	$9,439.11	$103,830.22	8	8	Development and Engineering Services
Duffins Creek Floodplain Mapping Update	Engineering services for HEC-RAS hydraulic model and floodplain mapping update.	Wood Environment & Infrastructure Solutions	$99,910.00	$9,991.00	$109,901.00	11	11	Development and Engineering Services
Black Creek at Rockcliffe SPA Flood Remediation and Transportation Feasibility Study	Professional engineering services.	Wood Environmental & Infrastructure Solutions	$498,126.00	$49,812.60	$547,938.60	3	3	Development and Engineering Services
Petticoat Creek Hydrology Update	Engineering services for the development of a hydrologic model.	WSP Canada Group Ltd.	$55,205.00	$8,280.75	$63,485.75	6	6	Development and Engineering Services
Don River Floodplain Mapping Update – Phase II	Engineering services for the preparation of a HEC-RAS hydraulic model and floodplain mapping update.	WSP Canada Group Ltd.	$99,962.50	$16,000.00	$115,962.50	22	4	Development and Engineering Services

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RWMP/Mayfield/RNUP/Seaton/Bathurst Glen/Albion Hills	2019 Water quality lab analysis.	York Durham Regional Environmental Laboratory	$33,290.40	$3,329.04	$36,619.44	1	1	Restoration and Infrastructure

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TRIECA Conference 2020	Facility rental and catering services.	2012111 Ont Inc O/A Pearson Convention Center	$82,722.84	$12,408.43	$95,131.27	3	3	Education and Training
2019 Vehicle Acquisition - Environmental Monitoring and Data Management.	Acquisition of one (1) class 1 crew cab truck.	ADDISON CHEVROLET-GMC-BUICK	$33,550.00	$3,355.00	$36,905.00	7	2	Corporate Services
Albion Hills Field Centre	General contractor for the demolition and new construction of the Albion Hills Field Centre loading dock.	Adems Restoration	$149,000.00	$29,800.00	$178,800.00	3	3	Corporate Services
Various Restoration Projects	Drone services and delivery of unrestricted license of imagery/data to TRCA.	AeroVision Canada	$9,480.00	$2,370.00	$11,850.00	5	4	Restoration and Infrastructure
LiDAR 2019	LiDAR data for all of TRCA jurisdiction and York Region.	Airborne Imaging	$153,775.62	$0.00	$153,775.62	7	7	Corporate Services

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Jennifer - Whitburn Multi-use Trail Connection	Construction services for an AODA compliant multi use trail.	AMAC Paving Ltd.	$181,157.50	$18,115.75	$199,273.25	13	9	Restoration and Infrastructure
2019 Equipment Acquisitions	Supply and delivery of one (1) new 6" diesel silenced trash pump.	AMCO PUMP MANUFACTURING INC.	$66,674.00	$6,667.40	$73,341.40	7	2	Corporate Services
Albion Hills CA	Supply and installation of pedestrian railing.	Anthony Furlano Construction Inc.	$20,500.00	$4,100.00	$24,600.00	37	5	Restoration and Infrastructure
Paradise Park	Asphalt road paving.	Appco Paving	$22,000.00	$2,200.00	$24,200.00	8	4	Restoration and Infrastructure
Petticoat Creek Pool	Install transition area in asphalt to eliminate tripping hazard.	Appco Paving Ltd.	$10,000.00	$1,000.00	$11,000.00	1	1	Corporate Services
Ice for Resale 2019 - 2020 Operating Seasons	Ice for resale at TRCA Parks facilities.	Arctic Glacier Canada Inc.	$9,900.00	$990.00	$10,890.00	3	3	Parks and Culture
Professor Lake	Asphalt re-paving services.	Ashland Paving Ltd	$44,284.61	$11,071.15	$55,355.76	8	3	Restoration and Infrastructure
Bluffer's Park South Headland and Beach Major Maintenance	Supply and delivery of 14,000 tonnes of 5-7 tonne armourstone.	Atlantis Marine Construction	$973,000.00	$97,300.00	$1,070,300.00	17	3	Restoration and Infrastructure

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Mimico Creek Behind Ridgegate Crescent	Ontario Land Surveyor (OLS) services.	AVANTI SURVEYING INC.	$14,000.00	$1,400.00	$15,400.00	11	4	Restoration and Infrastructure
Restoration and Infrastructure Campus	Electrical upgrades at both the Restoration Services Centre and Boyd Centre for construction operations and electric vehicle charging stations.	BOLTON ELECTRIC COMPANY INC	$12,700.00	$3,175.00	$15,875.00	2	2	Restoration and Infrastructure
Upper Highland Creek at Ellesmere Road - Pan Am Path Connection Project	Labour, equipment and materials for the installation of three pedestrian bridges and connecting asphalt trail.	Bronte Construction Ltd.	$2,977,000.00	$297,700.00	$3,274,700.00	23	3	Restoration and Infrastructure
Long Branch Major Maintenance Project	Supply and delivery of 4-6 tonne armourstone.	C.D.R. YOUNG'S AGGREGATES INC.	$207,246.00	$0.00	$207,246.00	11	3	Restoration and Infrastructure
2020 Maple Syrup Festival	Horse drawn wagon rides at Bruce's Mill and Kortright.	Caledon Horse and Carriage	$28,500.00	$2,850.00	$31,350.00	6	2	Corporate Services
Bathurst Glen GC and Bruce's Mill CA	2500 x 12 - 2 piece range balls.	Callaway Golf Company	$16,875.00	$1,687.50	$18,562.50	3	2	Parks and Culture

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Construction and Restoration Projects Temporary Fencing	Supply and delivery of 6 foot high galvanized steel fence panels.	Can Industrial	$10,000.00	$0.00	$10,000.00	10	2	Restoration and Infrastructure
Various Construction Projects	6 foot high construction fence minimum 60 pounds per panel.	Can Industrial	$32,050.00	$3,205.00	$35,255.00	6	2	Restoration and Infrastructure
Indian Line Campground	Steel doors and frames for washroom buildings, workshop and driveshed.	CANUCK DOOR SYSTEMS.COM	$15,200.00	$1,520.00	$16,720.00	3	3	Parks and Culture
Bluffer's Park South Headland and Beach Major Maintenance	5-7 tonne armour stone.	CDR Young Aggregates	$999,875.00	$99,987.50	$1,099,862.50	15	1	Restoration and Infrastructure
Lakeview Waterfront Connection Project	Supply and delivery of 2-5 Tonne piece stackable armourstone.	CDR Young's Aggregates	$527,000.00	$52,700.00	$579,700.00	9	4	Restoration and Infrastructure
Lakeview Waterfront Connection Project	Supply and delivery of 6-8 tonne piece armourstone with flat bottom and top.	CDR Young's Aggregates	$105,600.00	$10,560.00	$116,160.00	9	4	Restoration and Infrastructure
Upper Nine Storm Pond Retrofit Drainage Infrastructure	Supply and delivery of manholes and headwall components as per design/drawings.	Con-Cast Pipe Inc.	$22,905.00	$2,290.50	$25,195.50	10	2	Restoration and Infrastructure

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Restoration and Infrastructure Campus and Swan Lake	Fire alarm and emergency lighting inspection, certification, testing, maintenance and repair services.	Control Fire Systems	$22,110.00	$6,633.00	$28,743.00	5	2	Restoration and Infrastructure
Morningside Park	Tracked carrier crawler to move material on-site.	Cooper Equipment Rentals	$9,875.00	$987.50	$10,862.50	4	4	Restoration and Infrastructure
Claremont Nature Centre	Propane fuel for heating.	Cooper Fuels Ltd.	$8,500.00	$1,700.00	$10,200.00	3	3	Education and Training
Paradise Park Wetland	Rental of tracked crawler.	cooper rental	$9,500.00	$950.00	$10,450.00	3	3	Restoration and Infrastructure
9751 Canada Company Way Washroom Renovation	Equipment, labour and materials for renovation of second floor washroom.	Cornerstone Building and Property Services Inc.	$11,467.47	$1,376.10	$12,843.57	5	2	Corporate Services
R&I Asset - Office Container	Supply and delivery of a 20 foot steel office container.	Coxon's Sales and Rentals	$16,995.00	$0.00	$16,995.00	10	1	Restoration and Infrastructure
Don Mills Access, South of Overlea Trail Project	Supply, delivery and installation of concrete park infrastructure.	CSL GROUP LTD.	$257,180.00	$25,718.00	$282,898.00	3	3	Restoration and Infrastructure

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Planting Sites Fall 2019	Deer fencing.	Deer Fence Canada Inc.	$13,568.00	$1,356.80	$14,924.80	4	3	Restoration and Infrastructure
7395 Reesor Rd Building	Labour, equipment and materials for demolition and removal.	Delsan-A.I.M. Environmental Services inc.	$22,120.00	$4,424.00	$26,544.00	3	3	Corporate Services
Pomona Creek P-080 Sanitary Infrastructure Protection Project	Asphalt paving is required to replace 255 m2 of asphalt trail.	DIAMOND EARTHWORKS CORP.	$15,081.75	$1,508.18	$16,589.93	9	5	Restoration and Infrastructure
Tennis Canada SWMP	Asphalt re-paving services.	DIAMOND EARTHWORKS CORP.	$33,210.00	$6,642.00	$39,852.00	8	3	Restoration and Infrastructure
Various Construction Projects	Labour, equipment and materials for paving and repaving of park trails and parking lots at 6 sites.	DIAMOND EARTHWORKS CORP.	$308,749.30	$30,874.93	$339,624.23	12	8	Restoration and Infrastructure
Toronto SWMP Maintenance Polymer	Solidification reagent for 8 City of Toronto SWMPs.	DiCorp	$204,900.00	$30,735.00	$235,635.00	7	3	Restoration and Infrastructure
York University SWMP Maintenance POLYMER	Sediment solidification of storm pond sediments as part of a pond cleanout for York University's Tennis Canada pond.	Di-Corp	$16,524.00	$1,652.40	$18,176.40	4	2	Restoration and Infrastructure

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Petticoat Creek Conservation Area	Electrical contractor services to upgrade the main control panels in the pool house.	DILISADO ENTERPRISES	$34,850.00	$5,227.50	$40,077.50	3	3	Corporate Services
2019 Vehicle Acquisition - Engineering Projects Supervisor	Acquisition of one (1) class 2 crew cab truck.	DONWAY FORD SALES LIMITED	$37,709.00	$3,770.90	$41,479.90	7	1	Corporate Services
2019 Vehicle Acquisitions - Restoration Projects and Resource Management Projects	Acquisition of two (2) 550/5500 (Class 5) crew cab chassis trucks.	DONWAY FORD SALES LIMITED	$159,278.72	$15,927.87	$175,206.59	7	2	Corporate Services
Kortright Winter Maintenance Supplies	Salt/Sand mix 50% for winter road maintenance.	DRAGLAM SALT	$9,416.00	$941.60	$10,357.60	4	2	Education and Training
Mimico Creek behind Ridgegate Crescent	Pre and post condition surveys and vibration monitoring.	DST Consulting Engineers Inc.	$26,600.00	$2,660.00	$29,260.00	3	2	Restoration and Infrastructure
Ashbridges Bay Landform Project	Supply and delivery of core stone.	DUFFERIN AGGREGATES	$3,367,000.00	$336,700.00	$3,703,700.00	24	6	Restoration and Infrastructure
Tommy Thompson Park	Supply and install 6 swing gates for the purpose of traffic calming.	Dufferin Iron & Railings	$10,800.00	$2,160.00	$12,960.00	11	5	Restoration and Infrastructure

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Bolton Camp	Construction of sewage pump station, sanitary sewer and watermain.	Earth Boring Co. Ltd.	$3,847,082.00	$769,416.40	$4,616,498.40	6	6	Corporate Services
Shredded Pine Mulch Fall 2019 Restoration Projects	Mulch for plantings.	EARTHCO SOIL MIXTURES	$10,080.00	$1,008.00	$11,088.00	6	3	Restoration and Infrastructure
Spring Planting 2019	Shredded pine mulch.	Earthco Soils Inc	$19,259.00	$3,851.80	$23,110.80	4	3	Restoration and Infrastructure
2019 Equipment Acquisition - Resource Management Projects (RMP)	Supply and delivery of two (2) new tractor mounted skidding winches.	EASTERN FARM MACHINERY LTD.	$11,600.00	$1,160.00	$12,760.00	4	2	Corporate Services
2019 Equipment Acquisition	Supply and delivery of One (1) Off-Road Utility Vehicle.	Ed Stewart's Equipment Ltd.	$20,400.00	$2,040.00	$22,440.00	2	1	Corporate Services
2019 Equipment Acquisition - Glen Haffy Conservation Area	Acquisition of one (1) off-road utility vehicle.	Ed Stewart's Equipment Ltd.	$23,547.63	$2,354.76	$25,902.39	4	1	Corporate Services
7395 Reesor Rd	Pre Demolition Asbestos Containing Materials abatement.	ENVIROSAFE INC.	$9,630.00	$1,926.00	$11,556.00	4	2	Corporate Services
2019 Sugarbush Maple Syrup Festival & Magical Christmas Forest	Horse drawn wagon rides.	Fairytale Horse and Carriage	$41,300.00	$4,130.00	$45,430.00	6	2	Parks and Culture

Attachment 1 - Summary of Procurements

Lowest Bid								
Project Name	**Goods/Services Procured**	**Awarded Bidder**	**Contract Cost**	**Contingency Cost**	**Total Cost (Before Revisions)**	**Total Vendors**	**Responded**	**TRCA Division (Responsible)**
24 Norfield Crescent - Minor Works	Contracting services for replacement of chain-link fencing.	FG Fencing and General Construction	$13,329.18	$1,332.92	$14,662.10	6	1	Restoration and Infrastructure
Indian Line Campground, Albion Hills Campground, and Glen Rouge Campground	Bagged firewood and kindling for resale 2019 & 2020 operating seasons.	Firewood Guys	$78,550.00	$7,855.00	$86,405.00	4	3	Parks and Culture
Boyd Centre Cafeteria Interior Renovations	Construction goods and services for interior renovation of Boyd Centre Cafeteria.	Fresco Enterprises Inc.	$278,530.38	$41,779.56	$320,309.94	5	5	Corporate Services
2019 Equipment Acquisition - Bathurst Glen Golf Course	Acquisition of one (1) triplex mower.	G.C. DUKE EQUIPMENT LTD.	$40,900.00	$4,090.00	$44,990.00	5	3	Corporate Services
Etobicoke Valley Park Major Maintenance Project	Rental of access mats capable of withstanding weight up to 50 Tons and protecting underground City of Toronto infrastructure.	Gallo Contracting Ltd.	$12,895.00	$1,289.50	$14,184.50	3	3	Restoration and Infrastructure
Yellow Creek near Heath Street Erosion Control and Slope Stabilization Project - Emergency Works	Rental, delivery and assembly of timber, or equivalent, access mud mats.	Gallo Contracting Ltd.	$28,950.00	$5,790.00	$34,740.00	8	1	Restoration and Infrastructure

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Boyd Office Workshop	Roof insulation services.	Gara Farm Buildings Inc	$14,900.00	$2,980.00	$17,880.00	7	4	Restoration and Infrastructure
Governor's Bridge Lookout Redesign Project	Geotechnical and engineering services for concept designs.	Geomaple Geotechnics Inc.	$13,100.00	$1,965.00	$15,065.00	3	3	Restoration and Infrastructure
Nashville-Kirby Trail Phase 2	Geotechnical and structural engineering services.	GeoTerre Limited	$11,350.00	$2,270.00	$13,620.00	8	7	Restoration and Infrastructure
Rotary Park	Haulage of unsuitable armour stone off the site.	Glenn Windrem Trucking	$9,300.00	$930.00	$10,230.00	7	1	Restoration and Infrastructure
Long Branch Major Maintenance Project	Supply and delivery of 300-600mm rip rap.	Glenn Windrem Trucking	$223,200.00	$0.00	$223,200.00	11	1	Restoration and Infrastructure
Bluffer's Park South Headland and Beach Major Maintenance	Supply and delivery of 2,200 tons of 300-600 mm rip rap material.	Glenn Windrem Trucking	$84,700.00	$8,470.00	$93,170.00	17	4	Restoration and Infrastructure
Bluffer's Park South Headland and Beach Major Maintenance	Supply and delivery of 2,400 tons of 500-800 mm rip rap material.	Glenn Windrem Trucking	$92,400.00	$9,240.00	$101,640.00	17	4	Restoration and Infrastructure
Lakeview Waterfront Connection Project	Supply and delivery of 3-5 Tonne piece non-stackable armourstone.	Glenn Windrem Trucking	$470,000.00	$47,000.00	$517,000.00	9	4	Restoration and Infrastructure

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Lakeview Waterfront Connection Project	Supply and delivery of 0.4-0.8 tonne piece non-stackable armourstone.	Glenn Windrem Trucking	$125,550.00	$12,555.00	$138,105.00	9	3	Restoration and Infrastructure
Lakeview Waterfront Connection Project	Supply and delivery of 225mm-450mm rip-rap.	Glenn Windrem Trucking	$194,400.00	$19,440.00	$213,840.00	9	3	Restoration and Infrastructure
Wilket Creek Rehabilitation Reach 2	Off-site removal of stockpiled soil.	Green space Landscaping & property Services Inc.	$124,750.00	$12,475.00	$137,225.00	8	8	Restoration and Infrastructure
2019 Equipment Acquisitions - Restoration Projects	Supply and delivery of one (1) flex wing mower.	GREEN TRACTORS INC.	$24,795.00	$2,479.50	$27,274.50	8	4	Corporate Services
2019 Equipment Acquisitions - Clarement Field Center	Acquisition of one (1) 25 PTO HP compact utility tractor.	GREEN TRACTORS INC. (PORT PERRY)	$62,405.00	$6,240.50	$68,645.50	9	1	Corporate Services
Restoration and Infrastructure Campus	Pest control services for 3 years.	GreenLeaf Pest Control Inc.	$13,678.49	$3,419.62	$17,098.11	6	1	Restoration and Infrastructure
Soil Amendment Nursery 2019	Aged Pine Bark Fines required to amend TRCA Nursery fields to increase organic matter, help lower pH, improve overall soil structure.	Gro-Bark (Ontario) Ltd.	$11,360.00	$1,704.00	$13,064.00	5	3	Restoration and Infrastructure

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Toronto SWMP Maintenance	Stockpiled sediment hauling and disposal services.	Ground Force Environmental Inc.	$819,467.00	$122,920.05	$942,387.05	20	2	Restoration and Infrastructure
York University SWMP Maintenance	Hauling and disposal of storm pond sediments.	Groundforce Environmental	$73,881.25	$7,388.13	$81,269.38	4	1	Restoration and Infrastructure
Conservation Parks	Automatic gate entry systems at Heart Lake and Petticoat Creek Conservation Areas.	HAWKINS CONTRACTING SERVICES LIMITED.	$123,863.00	$24,772.60	$148,635.60	6	3	Parks and Culture
Mud Creek Reach 6 - Phase 2	Rental of a by-pass pumping system.	Herc Rentals	$43,300.00	$4,330.00	$47,630.00	5	2	Restoration and Infrastructure
Mimico Creek behind Ridgegate Crescent	Closed circuit television (CCTV) inspections to document pre and post construction conditions of sanitary and stormwater infrastructure.	INFRASTRUCTURE INTELLIGENCE SERVICES INC.	$12,150.00	$1,215.00	$13,365.00	3	2	Restoration and Infrastructure
Toronto SWMP	CCTV inspection services.	INFRASTRUCTURE INTELLIGENCE SERVICES INC.	$17,160.00	$1,716.00	$18,876.00	10	3	Restoration and Infrastructure

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Patterson Creek 2019 Erosion Control Projects	Closed circuit television (CCTV) inspections to document pre- and post-construction conditions of sanitary infrastructure.	INFRASTRUCTURE INTELLIGENCE SERVICES INC.	$17,240.00	$2,170.00	$19,410.00	8	2	Restoration and Infrastructure
Jennifer - Whitburn Multiuse Trail Connection Project	Closed circuit television (CCTV) inspections to document pre-construction conditions of stormwater and sanitary infrastructure.	Infrastructure Intelligence Services Inc.	$19,900.00	$1,990.00	$21,890.00	10	2	Restoration and Infrastructure
Rouge National Urban Park	Articulated concrete block system to be used as soil stabilization for farm vehicle access and multi-use trail through small tributary.	International Erosion Control Systems Inc.	$15,890.85	$1,589.09	$17,479.94	3	3	Restoration and Infrastructure
Peacham Crescent Slope Stabilization Project	Ontario Land Surveyor (OLS) services.	Ivan B. Wallace Ontario Land Surveyor Ltd	$14,300.00	$1,430.00	$15,730.00	11	6	Restoration and Infrastructure
Bolton Berm Major Maintenance Project	Ontario Land Surveyor (OLS) services.	Ivan B. Wallace Ontario Land Surveyor Ltd.	$24,670.00	$2,467.00	$27,137.00	15	1	Restoration and Infrastructure

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Project Name	**Goods/Services Procured**	**Awarded Bidder**	**Contract Cost**	**Contingency Cost**	**Total Cost (Before Revisions)**	**Total Vendors**	**Responded**	**TRCA Division (Responsible)**
Riverdale Park East Slope Regrading Project	Hydroseeding services.	J. Lipani Turf Group	$32,129.00	$3,212.90	$35,341.90	7	3	Restoration and Infrastructure
7959 Steeles Avenue	Labour, equipment, and materials for renovation of two (2) full washrooms.	Joe Pace & Sons Lts.	$14,998.40	$2,249.76	$17,248.16	6	6	Corporate Services
Tapscott SWMP	Sediment hauling and disposal services.	KGS	$134,200.00	$13,420.00	$147,620.00	11	4	Restoration and Infrastructure
Various 2019 Restoration Projects	Terraseeding services for 6 (six) sites within the GTA.	KING HYDROSEEDING INC.	$54,762.24	$8,214.34	$62,976.58	7	2	Restoration and Infrastructure
2019 Equipment Acquisitions	Acquisition of One (1) Four Seat Off-Road Utility Vehicle.	KOOY BROTHERS LAWN EQUIPMENT LTD.	$19,450.00	$1,945.00	$21,395.00	4	2	Corporate Services
2019 Equipment Acquisition - Resource Management Projects	Acquisition of one (1) tractor drawn log forwarding trailer.	KOOY BROTHERS LAWN EQUIPMENT LTD.	$27,210.00	$2,721.00	$29,931.00	2	1	Corporate Services
2019 Equipment Acquisition - Albion Hills Conservation Area	Acquisition of one (1) off-road utility vehicle with tracks.	KOOY BROTHERS LAWN EQUIPMENT LTD.	$41,000.00	$4,100.00	$45,100.00	4	2	Corporate Services
Albion Hills Community Farm	General contractor for structural rehabilitation and electrical upgrades to High Barn.	KSAL General Contracting	$39,000.00	$7,800.00	$46,800.00	3	3	Corporate Services

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Restoration Services Centre	Maintenance and servicing of the Clivus composting toilets at RSC.	Lamoureux Mechanical Service Ltd.	$34,221.00	$5,133.15	$39,354.15	5	1	Restoration and Infrastructure
37 and 39 Topcliff Dr., 35 and 37 Shendale Dr. and 253-255 Burbank Dr.	Ontario Land Surveyor (OLS) services.	Land Survey Group Inc.	$29,677.00	$4,451.55	$34,128.55	3	3	Restoration and Infrastructure
Martin Goodman Trail at Baselands	Terraseeding services.	LANDSOURCE ORGANIX LTD.	$19,710.00	$3,942.00	$23,652.00	7	5	Restoration and Infrastructure
TO Islands 2019 Flooding	Aquadams.	Layfield Canada Ltd.	$26,480.00	$2,648.00	$29,128.00	3	2	Restoration and Infrastructure
Various 2019 Restoration Projects	Supply and application of herbicide.	LEUSCHNER'S LAWN & LANDSCAPE	$181,056.28	$18,105.63	$199,161.91	6	2	Restoration and Infrastructure
Black Creek Pioneer Village	Wagon Ride services for March Break, Thanksgiving and December Christmas weekends.	Lionel's Farm	$14,025.00	$1,402.50	$15,427.50	6	2	Parks and Culture
Royal York MC06 Minor Maintenance	Pre and post construction CCTV inspection for buried infrastructure.	M.E. Andrews & Associates Ltd.	$20,960.00	$2,096.00	$23,056.00	3	1	Restoration and Infrastructure
Monarch Nation	Translation English - French.	Marie Eve Laneville	$9,000.00	$2,250.00	$11,250.00	2	2	Education and Training

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Bathurst Glen GC	Golf cart rentals for 2019 and 2020 operating seasons (2 Years).	MASTERS GOLF CARTS	$51,200.00	$10,240.00	$61,440.00	5	3	Parks and Culture
Yonge York Mills Channel Reach 2	Services to repair cracks and fill voids in the concrete channel.	McPherson Andrews	$56,698.00	$5,669.80	$62,367.80	16	2	Restoration and Infrastructure
Bathurst Glen GC and Bruce's Mill CA	Non-calcareous, washed, medium gradation sand for greens and bunkers.	Miller Waste Systems Inc.	$13,377.00	$1,337.70	$14,714.70	3	2	Parks and Culture
Don Mills Access Trail	Tipping fees for disposal of asphalt.	Millwick Transfer Station	$9,750.00	$975.00	$10,725.00	8	8	Restoration and Infrastructure
Ashbridges Bay Landform	New 10' x 40' Office Trailer (acquired as TRCA asset).	MOBILEASE RENTALS INC.	$33,925.00	$0.00	$33,925.00	5	3	Restoration and Infrastructure
TRCA's New Administrative Office Building	Fencing rental for tree protection during construction.	MODU-LOC FENCE RENTALS	$41,988.00	$4,198.80	$46,186.80	3	3	Corporate Services
Monarch Nation Program	Supply and delivery of native plants.	Native Plants in Claremont	$10,687.50	$0.00	$10,687.50	3	3	Education and Training
TRCA Nursery Program Spring 2019	Bare root tree & shrub liner stack.	Neil Vanderkruk Holdings Inc.	$11,962.50	$2,392.50	$14,355.00	5	4	Restoration and Infrastructure
Petticoat CA Pool	White and blue paint for main pool and splash poos.	Northeastern Swimming Pool Distribution	$13,824.00	$1,382.40	$15,206.40	3	3	Parks and Culture

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Various TRCA Restoration Projects	Rental of timber/crane mats	Northern Mat	$13,100.00	$1,310.00	$14,410.00	5	2	Restoration and Infrastructure
1025 Scarlett Road Phase 2	Rental, delivery and assembly of timber access mud mats for phase 2 works.	Northern Mat & Bridge Ltd. Partnership	$17,356.20	$3,471.24	$20,827.44	8	2	Restoration and Infrastructure
Riverdale Park East Slope Regrading Project	Rental, delivery and assembly of timber, or equivalent, access mud mats.	Northern Mat & Bridge Ltd. Partnership	$19,586.20	$3,917.24	$23,503.44	6	2	Restoration and Infrastructure
Peel Village Golf Course	Rental of access mats.	Northern Mat & Bridge Ltd. Partnership	$38,771.56	$3,877.16	$42,648.72	8	2	Restoration and Infrastructure
Restoration and Infrastructure Campus and Kortright Centre for Conservation	Dust Control floor mat service for 2 years.	OLYMPIC DUST CONTROL	$21,572.00	$3,235.80	$24,807.80	3	2	Restoration and Infrastructure
McEwen Pedestrian Bridge Replacement	Consulting services for fluvial geomorphic assessment and geotechnical investigation.	Palmer Environmental Consulting Group Inc.	$21,995.00	$2,199.50	$24,194.50	7	3	Restoration and Infrastructure
Partners in Project Green 2019 Fall Forum	Facility rental.	Pearson Convention Centre	$13,342.88	$1,334.29	$14,677.17	3	3	Community Engagement and Outreach
TRCA Nursery Program Spring 2019	Purchase of bare root tree & shrub liner stack.	PINENEEDLE FARMS	$27,594.50	$5,518.90	$33,113.40	5	4	Restoration and Infrastructure

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101 Exchange Ave. Building	Electrical contracting services to modify existing generator loads.	Plan Group Inc.	$10,500.00	$2,100.00	$12,600.00	3	3	Corporate Services
Glen Haffy Conservation Area	Hydro service replacement for Glen Haffy Conservation Area.	PLATINUM ELECTRICAL CONTRACTORS INC.	$299,095.00	$59,819.00	$358,914.00	5	5	Corporate Services
7831 14th Ave.	Labour, equipment and materials for renovation of two (2) washrooms and kitchen ceiling repairs.	Prompt Builders Inc.	$15,200.00	$2,280.00	$17,480.00	8	8	Corporate Services
Caledon Canada Day 2019	Pyrotechnics for the 23rd annual Caledon Canada Day event.	Pyroworld	$12,975.56	$1,297.56	$14,273.12	4	1	Parks and Culture
Cover Crop for Restoration Sites	Supply and delivery of cover crop mixes for various restoration projects.	QUALITY SEEDS LTD.	$9,207.00	$920.70	$10,127.70	3	3	Restoration and Infrastructure
Beaucourt Road (12-30) Major Maintenance Project	Labour, equipment and materials necessary to repair a TRCA-owned retaining wall.	R & M CONSTRUCTION	$818,313.00	$163,662.60	$981,975.60	5	4	Restoration and Infrastructure
Humber Marshes Osprey Nesting Structure	Installation of pole and platform.	R&J Machine	$11,090.00	$1,109.00	$12,199.00	3	1	Restoration and Infrastructure
Spring Planting 2019	Deer fencing.	Roma Fence	$17,055.00	$1,705.50	$18,760.50	4	2	Restoration and Infrastructure

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Claireville Highway 50 Meadow Restoration	Supply of native grass and forb seed and seed drilling services.	RURAL LAMBTON STEWARDSHIP NETWORK	$15,200.00	$1,520.00	$16,720.00	7	1	Restoration and Infrastructure
Various 2019 Restoration Projects	Native seed.	RURAL LAMBTON STEWARDSHIP NETWORK	$17,684.32	$1,768.43	$19,452.75	4	3	Restoration and Infrastructure
2019 Vehicle Acquisitions - Corporate Services Pooled Resources	Acquisition of three (3) compact hybrid sedans.	SCARBOROUGH TOYOTA	$87,802.50	$8,780.25	$96,582.75	3	2	Corporate Services
Glen Haffy 2019-2021	Trout fish feed for Glen Haffy Conservation Area fish hatchery.	Sharpe Farm Supplies Ltd.	$63,180.00	$6,318.00	$69,498.00	3	3	Parks and Culture
TRCA 2019 Nursery Program	Bare root tree & shrub liner stock.	SHERIDAN NURSERIES	$12,975.00	$2,595.00	$15,570.00	5	4	Restoration and Infrastructure
Indian Line Campground and Albion Hills 2019	Various items for resale at the snack bar and camp store.	STEWART FOODSERVICE INC.	$15,571.61	$1,557.16	$17,128.77	3	1	Parks and Culture
Various Restoration Projects	Purchase of new, fully assembled, heavy duty - hemlock, fir or hardwood 4 ft wide Crane Mats.	Sturgeon Falls Brush	$25,200.00	$2,520.00	$27,720.00	7	4	Restoration and Infrastructure
Duffins Creek Environmental Education Centre	Snow plowing and salt/sand application of interior road.	T.H.FORSYTHE HAULAGE LTD	$9,500.00	$2,375.00	$11,875.00	7	7	Education and Training

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Jennifer - Whitburn for Swale Restoration	ScourStop transition mats.	TERRAFIX GEOSYNTHETICS INC.	$17,848.20	$1,784.82	$19,633.02	2	1	Restoration and Infrastructure
Franklin Pond	Bentonite (Geosynthetic Clay) Liner for the Franklin Garden Pond.	TERRAFIX GEOSYNTHETICS INC.	$28,625.00	$2,862.50	$31,487.50	4	4	Restoration and Infrastructure
Restoration and Engineering Projects 2019	Supply and Delivery of biodegradable and net free erosion control blankets.	TERRAFIX GEOSYNTHETICS INC.	$91,800.00	$9,180.00	$100,980.00	4	2	Restoration and Infrastructure
2019 Vehicle Rentals - Environmental Monitoring and Data Management	Supply and delivery of One (1) Class 2 Truck and Two (2) Class 1 Trucks for a period for a rental period of 5 months.	THOMAS SOLUTIONS	$11,055.00	$1,105.50	$12,160.50	3	3	Corporate Services
2019 Vehicle Rentals - Erosion Hazard Monitoring Program	Supply and delivery of short term rental vehicles.	THOMAS SOLUTIONS	$17,520.00	$1,752.00	$19,272.00	3	3	Corporate Services
Meadoway Project Restoration	Supply of short term rental vehicles to assist with the transportation of supplies and materials.	THOMAS SOLUTIONS	$18,000.00	$1,800.00	$19,800.00	3	3	Corporate Services
2019 Vehicle Rental - Etobicoke Mimico Watershed	Supply of two (2) short term rental vehicles.	THOMAS SOLUTIONS	$18,236.00	$1,823.60	$20,059.60	3	3	Corporate Services

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2019 Vehicle Rentals - Resource Management Projects	Supply of short term rental vehicles.	THOMAS SOLUTIONS	$19,632.00	$2,195.00	$21,827.00	3	3	Corporate Services
2019 Vehicle Rentals - Environmental Monitoring and Data Management	Rental of seven (7) compact passenger cars for Environmental Monitoring and Data Management (EMDM) Terrestrial Inventories & Monitoring (TIM).	THOMAS SOLUTIONS	$20,965.00	$2,096.50	$23,061.50	3	3	Corporate Services
Black Creek Pioneer Village	Elevator Maintenance 2019-2021.	ThyssenKrupp Elevator (Canada) Limited	$20,197.80	$4,039.56	$24,237.36	4	1	Parks and Culture
Riverdale Park East	Supply and delivery of top soil.	TMI Contracting and Equipment Rental Ltd.	$79,200.00	$0.00	$79,200.00	6	3	Restoration and Infrastructure
14555 Humber Station Rd.	Roofing services for roof and eaves replacement.	Tony K Roofing Inc.	$10,500.00	$1,260.00	$11,760.00	6	2	Corporate Services
8940 Claireville Conservation Road	Roofing services for eaves trough replacement.	Tony K. Roofing	$12,500.00	$1,250.00	$13,750.00	2	2	Corporate Services
TRCA Residential Rentals	Eaves cleaning, eaves re-fastening and gutter cover installation services.	Tony K. Roofing	$42,000.00	$4,200.00	$46,200.00	2	2	Corporate Services

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2661 16th Sideroad	Roofing services.	Tony K. Roofing Inc.	$11,400.00	$1,368.00	$12,768.00	5	2	Corporate Services
Markham Thermal Mitigation Design	Consulting services for engineering drawings and construction administration.	Urbantech	$20,000.00	$4,000.00	$24,000.00	6	3	Education and Training
TRCA 2019 Fall Planting Program	Various species of Caliper trees.	UXBRIDGE NURSERIES LIMITED	$10,195.00	$1,019.50	$11,214.50	3	3	Restoration and Infrastructure
TRCA's New Administrative Office Building	Kitchen/food service design services for a small cafeteria.	Van Velzen & Radchenko	$12,750.00	$2,550.00	$15,300.00	15	1	Corporate Services
Black Creek Pioneer Village	Siding and facade retrofit.	VEMA CORP	$88,700.00	$8,870.00	$97,570.00	3	2	Corporate Services
Maple Syrup Festival	Maple syrup products for resale.	Voisin's Maple Products	$16,500.00	$1,650.00	$18,150.00	1	1	Parks and Culture
Peel Village Golf Course	Paving and restoration of a section of the parking lot.	Vox Construction	$18,260.00	$1,826.00	$20,086.00	3	3	Restoration and Infrastructure
Aquatic Facilities - 2019	Plastic Wristbands for use at 3 TRCA Aquatic Facilities.	Wristband Resources	$13,240.00	$2,648.00	$15,888.00	5	2	Parks and Culture

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Endpoint Antivirus (ESET) License Renewal	ESET Secure Business 1 Year Renewal - Endpoint Security/Antivirus for Windows workstations, servers and android devices.	Xylotek Solutions Inc.	$11,232.00	$0.00	$11,232.00	2	2	Corporate Services
TRCA's New Administrative Office Building	Demolition services required for the existing portable buildings.	York Demolition Corp.	$44,818.00	$4,481.80	$49,299.80	3	3	Corporate Services

Not Highest Ranked								
Project Name	**Goods/Services Procured**	**Awarded Bidder**	**Contract Cost**	**Contingency Cost**	**Total Cost (Before Revisions)**	**Total Vendors**	**Responded**	**TRCA Division (Responsible)**
The Meadoway - Visualization Toolkit	Professional landscape design services for development of a visualization toolkit.	Perkins + Will	$245,975.00	$0.00	$245,975.00	12	12	Corporate Services

Limited Tendering								
Project Name	**Goods/Services Procured**	**Awarded Bidder**	**Contract Cost**	**Contingency Cost**	**Total Cost (Before Revisions)**	**Criteria for Limited Tendering**	**Responded (Not Applicable)**	**TRCA Division (Responsible)**
Yellow Creek Below Summerhill Gardens Emergency Works	Pre and post construction CCTV inspection and pipe condition report.	Andrews Engineer	$31,500.00	$3,150.00	$34,650.00	(d)	N/A	Restoration and Infrastructure

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Limited Tendering								
Project Name	**Goods/Services Procured**	**Awarded Bidder**	**Contract Cost**	**Contingency Cost**	**Total Cost (Before Revisions)**	**Criteria for Limited Tendering**	**Responded (Not Applicable)**	**TRCA Division (Responsible)**
Peel Village Golf Course Sanitary Infrastructure Protection Project	Pre and post construction CCTV inspections of two parallel 1050 mm diameter sanitary mains.	Andrews.Engineer	$21,841.77	$3,276.27	$25,118.04	(c) (i)	N/A	Restoration and Infrastructure
2019 Acquisition - Toronto Islands	Acquisition of two (2) six inch diesel trash pumps.	AQUATECH DEWATERING COMPANY INC.	$198,951.34	$19,895.13	$218,846.47	(a) (ii)	N/A	Corporate Services
Hydrometric and Flood Warning System	Cloud based software suite.	Aquatic Informatics Inc.	$20,335.34	$2,033.53	$22,368.87	(b) (v)	N/A	Development and Engineering Services
RSC Building Automation System	Maintenance inspection services of building automation system (BAS).	Automated Logic - Canada Ltd	$16,096.00	$4,024.00	$20,120.00	(b) (v)	N/A	Restoration and Infrastructure
Community Engagement Software	Renewal of Engagement HQ community engagement software license.	Bang The Table LLC	$20,500.00	$2,050.00	$22,550.00	(b) (ii)	N/A	Watershed Strategies

Attachment 1 - Summary of Procurements

Limited Tendering								
Project Name	**Goods/Services Procured**	**Awarded Bidder**	**Contract Cost**	**Contingency Cost**	**Total Cost (Before Revisions)**	**Criteria for Limited Tendering**	**Responded (Not Applicable)**	**TRCA Division (Responsible)**
Earth Rangers Building	Purchase of Voice Over Internet Protocol (VoIP) equipment, programming, licensing, and maintenance.	BELL CANADA	$17,271.60	$3,454.32	$20,725.92	(c) (i)	N/A	Corporate Services
Conservation Parks Advertising	Traffic Ads on Virgin Radio Station.	Bell Media Radio GP	$14,850.00	$0.00	$14,850.00	(b) (iii)	N/A	Corporate Services
Heart Lake CA	Plumbing services for relocation of pool filter PVC supply line.	BEOTHUK	$17,848.05	$1,784.81	$19,632.86	(b) (vi)	N/A	Corporate Services
Kortright Nature School	Natural playground elements - loose parts, wacky posts, and log tunnel.	Bienenstock Natural Playgrounds	$10,593.85	$529.69	$11,123.54	(b) (iii)	N/A	Education and Training
2019 Kortright Billboards	Digital billboard at Bathurst St. and Rutherford Rd.	Branded Cities Company Canada	$10,475.00	$0.00	$10,475.00	(b) (iii)	N/A	Corporate Services
Albion Hills CA	Chlorine gas cylinders for swimming pool water chemistry.	BRENNTAG CANADA INC.	$12,000.00	$600.00	$12,600.00	(b) (iii)	N/A	Parks and Culture

Attachment 1 - Summary of Procurements

Limited Tendering								
Project Name	**Goods/Services Procured**	**Awarded Bidder**	**Contract Cost**	**Contingency Cost**	**Total Cost (Before Revisions)**	**Criteria for Limited Tendering**	**Responded (Not Applicable)**	**TRCA Division (Responsible)**
Restoration Services Centre Building	Three year mechanical maintenance services.	BRUNO PLUMBING & CONTRACTING INC.	$23,886.16	$4,777.23	$28,663.39	(c) (ii)	N/A	Restoration and Infrastructure
Indian Line Campground Dump Station	Emergency engineering design and contract administration services for failure of submersible pump.	CALDER ENGINEERING LTD.	$35,000.00	$7,000.00	$42,000.00	(d)	N/A	Corporate Services
Fish Telemetry Database	Database management for fish acoustic telemetry study.	CARLETON UNIVERSITY	$20,000.00	$0.00	$20,000.00	(b) (iii)	N/A	Restoration and Infrastructure
2017-2019 Electric Vehicle Charging Station	Supply and delivery of two (2) new dual wand charging stations and one (1) extra year of Software as a Service (SaS) cloud based subscription.	CHARGEPOINT	$9,580.00	$958.00	$10,538.00	(b) (v)	N/A	Corporate Services
Media Services	Renewal of Cision media services.	Cision Canada Inc.	$16,590.00	$0.00	$16,590.00	(c) (i)	N/A	Corporate Services

Attachment 1 - Summary of Procurements

Limited Tendering								
Project Name	**Goods/Services Procured**	**Awarded Bidder**	**Contract Cost**	**Contingency Cost**	**Total Cost (Before Revisions)**	**Criteria for Limited Tendering**	**Responded (Not Applicable)**	**TRCA Division (Responsible)**
Latornell Symposium	Admission fee for TRCA staff across multiple divisions.	Conservation Ontario	$11,000.00	$0.00	$11,000.00	(b) (iii)	N/A	Education and Training
Erosion Risk Management Staff Training	Confrontation management and conflict resolution training services.	Control Institute	$10,350.00	$1,035.00	$11,385.00	(b) (iii)	N/A	Restoration and Infrastructure
Paddle the Don 2019	Canoes for Paddle the Don.	COWAN CANOE KAYAK LIVERY	$9,550.00	$1,432.50	$10,982.50	(b) (iii)	N/A	Community Engagement and Outreach
Paid Advertising - Parks and Culture	CP24 ads to promote park activities.	CP24 - A DIVISION OF BELL MEDIA INC.	$26,460.00	$0.00	$26,460.00	(b) (iii)	N/A	Corporate Services
Paid Advertising - Parks and Culture	2020 Parks campaign - Traffic ads on CP24.	CP24 - A DIVISION OF BELL MEDIA INC.	$28,728.00	$0.00	$28,728.00	(b) (iii)	N/A	Corporate Services
Petticoat Creek CA	Durham Regional Police Services for 2019 operating season.	DURHAM REGIONAL POLICE SERVICE	$24,992.83	$2,499.28	$27,492.11	(b) (iv)	N/A	Parks and Culture

Attachment 1 - Summary of Procurements

Limited Tendering								
Project Name	**Goods/Services Procured**	**Awarded Bidder**	**Contract Cost**	**Contingency Cost**	**Total Cost (Before Revisions)**	**Criteria for Limited Tendering**	**Responded (Not Applicable)**	**TRCA Division (Responsible)**
Environics Data Access	Renewal of Environics data access for 3 years.	Environics Analytics Inc	$90,000.00	$0.00	$90,000.00	(c) (i)	N/A	Corporate Services
Jennifer - Whitburn Multi-use Trail	Four (4) EP 1990-IPE-P-A-R surface mounted bench with backrest and armrests.	Equiparc	$11,423.00	$1,142.30	$12,565.30	(c) (i)	N/A	Restoration and Infrastructure
Minutes and Agendas System	Board meeting management solution for a term of 3 years.	eSCRIBE Software Ltd.	$23,062.50	$0.00	$23,062.50	(b) (ii)	N/A	Corporate Services
2019 Pay Equity Audit and Assessment	Assessment for supplementary employee group.	Gallagher	$12,378.00	$1,237.80	$13,615.80	(c) (i)	N/A	Human Resources
Kortright Gift Shop	Supply and delivery of wholesale gifts and souvenir items for resale.	Gift Craft	$13,000.00	$1,300.00	$14,300.00	(b) (iii)	N/A	Education and Training
TRCA New Administrative Office Building	Additional soil testing services.	GOLDER ASSOCIATES LTD	$8,910.00	$1,782.00	$10,692.00	(c) (ii)	N/A	Corporate Services

Attachment 1 - Summary of Procurements

Limited Tendering								
Project Name	**Goods/Services Procured**	**Awarded Bidder**	**Contract Cost**	**Contingency Cost**	**Total Cost (Before Revisions)**	**Criteria for Limited Tendering**	**Responded (Not Applicable)**	**TRCA Division (Responsible)**
LID Treatment Train Tool - Version 2 - Phase 2	Services to further enhance and develop hydrological modelling software.	Golder Associates Ltd	$38,680.00	$7,736.00	$46,416.00	(c) (i)	N/A	Policy and Planning
BCPV Gift Shop	The supply and delivery of prepackaged food service items for resale.	GOODMARK FOOD INC.	$22,000.00	$2,200.00	$24,200.00	(b) (iii)	N/A	Parks and Culture
Patterson Richvale Sanitary Infrastructure Protection and Valleylands Erosion Control	Professional engineering construction support services.	GRECK & ASSOCIATES LTD.	$26,500.00	$2,650.00	$29,150.00	(b) (v)	N/A	Restoration and Infrastructure
TRCA Real Time Stream Gauge Network	Three Sutron 9210B Xlite dataloggers.	HOSKIN SCIENTIFIC LTD.	$10,923.00	$546.15	$11,469.15	(b) (iii)	N/A	Restoration and Infrastructure
Carruthers Flood Forecasting and Warning	Two Ott Pluvio2 precipitation gauges, two Sutron 9210 Dataloggers, and mounting hardware.	HOSKIN SCIENTIFIC LTD.	$22,118.00	$2,211.80	$24,329.80	(b) (v)	N/A	Development and Engineering Services

Attachment 1 - Summary of Procurements

Limited Tendering								
Project Name	**Goods/Services Procured**	**Awarded Bidder**	**Contract Cost**	**Contingency Cost**	**Total Cost (Before Revisions)**	**Criteria for Limited Tendering**	**Responded (Not Applicable)**	**TRCA Division (Responsible)**
2019 Equipment Acquisition - Compact (14') Electrofishing Boat	Supply and delivery of boat mounted electrofishing components for a compact (14') electrofishing boat.	HOSKIN SCIENTIFIC LTD.	$27,714.00	$2,771.40	$30,485.40	(c) (i)	N/A	Corporate Services
2020 Equipment Acquisition - Electrofishing Components	Supply and delivery of boat mounted electrofishing components.	HOSKIN SCIENTIFIC LTD.	$31,583.00	$3,158.30	$34,741.30	(c) (i)	N/A	Corporate Services
G. Ross Lord Dam	Radio telemetered water level sensors to monitor pressure relief wells and piezometers.	HOSKIN SCIENTIFIC LTD.	$41,645.00	$0.00	$41,645.00	(b) (iii)	N/A	Restoration and Infrastructure
Bolton Camp	Hydro One pole relocation work at Bolton Camp.	HYDRO ONE NETWORKS INC.	$12,251.77	$1,225.18	$13,476.95	(b) (iv)	N/A	Corporate Services
Glen Haffy Hydro Upgrade	Hydro One services for hydro upgrade.	HYDRO ONE NETWORKS INC.	$13,995.42	$1,399.54	$15,394.96	(b) (iv)	N/A	Corporate Services

Attachment 1 - Summary of Procurements

Limited Tendering								
Project Name	**Goods/Services Procured**	**Awarded Bidder**	**Contract Cost**	**Contingency Cost**	**Total Cost (Before Revisions)**	**Criteria for Limited Tendering**	**Responded (Not Applicable)**	**TRCA Division (Responsible)**
Bolton Camp	Electrical services from Hydro One to move and replace electrical poles.	HYDRO ONE NETWORKS INC.	$79,723.32	$7,972.33	$87,695.65	(b) (iv)	N/A	Corporate Services
Toronto Harbour Telemetry Study	24 Acoustic Telemetry Fish Transmitters, 60 receiver batteries.	InnovaSea Marine Systems Canada Inc.	$20,874.00	$2,087.40	$22,961.40	(b) (v)	N/A	Restoration and Infrastructure
Canada Goose Management Program 2019	Canada Goose Management Relocation Services.	INTEGRATED GOOSE MANAGEMENT SERVICES	$22,500.00	$2,250.00	$24,750.00	(c) (i)	N/A	Restoration and Infrastructure
TRCA Forestry Program	TreeAzin systemic herbicide application and supplies.	Lallemand Inc/BIOFOREST	$13,405.60	$2,010.84	$15,416.44	(b) (iii)	N/A	Restoration and Infrastructure
Jennifer Court - Whitburn Crescent Multi-use Trail Connection Project	Cedar post and paddle fencing material.	Lanark Cedar	$50,000.00	$0.00	$50,000.00	(b) (iii)	N/A	Restoration and Infrastructure
Don Mills Access Trail Project	Eight Equiparc benches for the multiple seating areas incorporated into the trail head design.	Maglin Site Furniture	$12,335.00	$1,233.50	$13,568.50	(b) (v)	N/A	Restoration and Infrastructure

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Limited Tendering								
Project Name	**Goods/Services Procured**	**Awarded Bidder**	**Contract Cost**	**Contingency Cost**	**Total Cost (Before Revisions)**	**Criteria for Limited Tendering**	**Responded (Not Applicable)**	**TRCA Division (Responsible)**
HR Research and Advisory services	HR Research and Advisory services to improve HR performance.	McLean & Company	$18,960.00	$1,896.00	$20,856.00	(b) (iii)	N/A	Human Resources
2019 Commercial Vehicle Registration	Commercial vehicle licensing package for all Toronto and Region Conservation Authority (TRCA) commercial vehicles.	MINISTER OF FINANCE	$23,291.25	$0.00	$23,291.25	(b) (iv)	N/A	Corporate Services
Mitacs Accelerate Program: Thermal Imaging	Internship for project support.	Mitacs Inc.	$50,000.00	$0.00	$50,000.00	(b) (iii)	N/A	Policy and Planning
Mitacs Accelerate Program: The tributary - coastal wetland nexus in Durham Region	Postdoctoral fellow project support.	Ontario Tech University	$25,000.00	$0.00	$25,000.00	(b) (iii)	N/A	Community Engagement and Outreach
Kortright Visitor Centre	New fire pump controller for the fire sprinkler system.	Onyx-Fire Protection Services Inc.	$9,365.00	$1,873.00	$11,238.00	(d)	N/A	Education and Training

Attachment 1 - Summary of Procurements

Limited Tendering								
Project Name	**Goods/Services Procured**	**Awarded Bidder**	**Contract Cost**	**Contingency Cost**	**Total Cost (Before Revisions)**	**Criteria for Limited Tendering**	**Responded (Not Applicable)**	**TRCA Division (Responsible)**
Black Creek Pioneer Village	TTC subway ads.	PATTISON OUTDOOR ADVERTISING LP	$19,608.00	$0.00	$19,608.00	(b) (iii)	N/A	Corporate Services
Wilket Creek Rehabilitation Project Reach 2	Rental of a by-pass pumping system.	RAIN FOR RENT CANADA ULC	$13,372.40	$2,005.86	$15,378.26	(c) (i)	N/A	Restoration and Infrastructure
TRCA Stream Gauge Network	Three In-Situ LevelTroll 500 pressure transducers with 50' sensor cables, two non-vented LevelTroll 400 pressure transducers and two BaroTroll barometric pressure sensors.	RICE ENGINEERING & OPERATING LTD.	$10,575.78	$528.79	$11,104.57	(b) (iii)	N/A	Restoration and Infrastructure
Lake Ontario Contaminant Load Study	Replacement In-Situ AT-600 water quality sonde.	RICE ENGINEERING & OPERATING LTD.	$11,093.94	$1,109.39	$12,203.33	(b) (v)	N/A	Restoration and Infrastructure
Erosion Risk Management Projects	4 AT600 sondes for monitoring water turbidity.	Rice Resource Technologies Inc.	$40,621.27	$4,062.13	$44,683.40	(b) (v)	N/A	Restoration and Infrastructure

Attachment 1 - Summary of Procurements

Limited Tendering								
Project Name	**Goods/Services Procured**	**Awarded Bidder**	**Contract Cost**	**Contingency Cost**	**Total Cost (Before Revisions)**	**Criteria for Limited Tendering**	**Responded (Not Applicable)**	**TRCA Division (Responsible)**
Electronic Records Management Software (Laserfiche)	Renewal of the Laserfiche Software Assurance Plan (LSAP).	Ricoh Canada Inc.	$26,038.00	$0.00	$26,038.00	(b) (ii)	N/A	Corporate Services
TRCA Planting Program	Cocofibre pot liners to facilitate production of 2019 crop of aquatic plants and willow bioplugs.	S.L. NATURAL FIBRE PRODUCTS INC.	$17,089.00	$3,417.80	$20,506.80	(b) (iii)	N/A	Restoration and Infrastructure
East Don Trail Project	Landscape design and contract administration services.	SCHOLLEN & COMPANY INC.	$43,981.00	$8,796.20	$52,777.20	(c) (i)	N/A	Corporate Services
TRCA Corporate Website	Professional website maintenance services.	Simalam Media Inc.	$25,000.00	$0.00	$25,000.00	(c) (i)	N/A	Corporate Services
TRCA Gauging Website	Renewal of maintenance services for 3 years.	Simalam Media Inc.	$28,800.00	$2,880.00	$31,680.00	(b) (v)	N/A	Development and Engineering Services

Attachment 1 - Summary of Procurements

Limited Tendering								
Project Name	**Goods/Services Procured**	**Awarded Bidder**	**Contract Cost**	**Contingency Cost**	**Total Cost (Before Revisions)**	**Criteria for Limited Tendering**	**Responded (Not Applicable)**	**TRCA Division (Responsible)**
Albion Hills Conservation Area	Engineering services for assessment and conditions survey of all services and utilities supporting the existing structures.	STEPHENSON ENGINEERING LTD.	$68,500.00	$13,700.00	$82,200.00	(c) (i)	N/A	Corporate Services
Tommy Thompson Park	Incineration of invasive species (Phragmites australis) stems.	Stericylce Environmental Solutions	$9,350.40	$935.04	$10,285.44	(b) (iii)	N/A	Restoration and Infrastructure
Real Time Flood Warning Gauge Network	Cellular IP services.	TELUS	$25,000.00	$0.00	$25,000.00	(c) (i)	N/A	Development and Engineering Services
23 Brixham Terrace	Supply and delivery of Flexamat Plus material.	TERRAFIX GEOSYNTHETICS INC.	$42,224.00	$4,222.40	$46,446.40	(b) (ii)	N/A	Restoration and Infrastructure
Yellow Creek Below Summerhill Gardens Emergency Works	Engineering services for peer review of design drawings and engineering support during construction.	TERRAPROBE INC.	$18,470.00	$2,600.00	$21,070.00	(c) (i)	N/A	Restoration and Infrastructure

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Limited Tendering								
Project Name	**Goods/Services Procured**	**Awarded Bidder**	**Contract Cost**	**Contingency Cost**	**Total Cost (Before Revisions)**	**Criteria for Limited Tendering**	**Responded (Not Applicable)**	**TRCA Division (Responsible)**
Conflict Resolution Training	Confrontation management and conflict resolution training services.	THE CONTROL INSTITUTE INC.	$9,250.00	$925.00	$10,175.00	(b) (iii)	N/A	Development and Engineering Services
2019 Equipment Acquisition - Albion Hills Conservation Area	Supply, delivery, and installation of one (1) cross country ski trail groomer.	THE SHOP INDUSTRIAL	$16,362.50	$1,636.25	$17,998.75	(b) (iii)	N/A	Corporate Services
Black Creek Pioneer Village	Structural engineering review of Town Hall Drive Shed for repairs.	Thornton Tomasetti Canada Inc.	$9,900.00	$1,980.00	$11,880.00	(d)	N/A	Corporate Services
2019 Equipment Acquisitions - Resource Management Projects	Acquisition of one (1) new seed bed lifter.	TIMM ENTERPRISES LTD.	$16,979.00	$1,697.90	$18,676.90	(b) (iii)	N/A	Corporate Services
TRCA's New Administrative Office Building	New hydro service installation.	TORONTO HYDRO ELECTRIC SYSTEM	$10,000.00	$1,000.00	$11,000.00	(b) (iv)	N/A	Corporate Services

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Limited Tendering								
Project Name	**Goods/Services Procured**	**Awarded Bidder**	**Contract Cost**	**Contingency Cost**	**Total Cost (Before Revisions)**	**Criteria for Limited Tendering**	**Responded (Not Applicable)**	**TRCA Division (Responsible)**
Glen Rouge Campground	2019 Toronto Police Services.	TORONTO POLICE SERVICES	$21,425.40	$2,142.54	$23,567.94	(b) (iv)	N/A	Parks and Culture
Mitacs Accelerate Program: Disentangling Effects of Multiple Stressors on Nuisance Benthic Algae (Cladophora) in Nearshore Regions of the Great Lakes	Postdoctoral fellow project support services.	University of Windsor	$50,000.00	$0.00	$50,000.00	(b) (iii)	N/A	Community Engagement and Outreach
Kortright Centre Glass House	Emergency repair services.	VEMA CORP	$45,000.00	$6,750.00	$51,750.00	(d)	N/A	Corporate Services
Black Creek Pioneer Village	Emergency electrical contracting services to restore powerline and reconnect power.	Vitall Inc.	$34,500.00	$5,175.00	$39,675.00	(c) (ii)	N/A	Corporate Services
Petticoat Creek CA	Emergency electrical services for installation of new High Voltage line between S2 and S6.	Vitall Inc.	$60,500.00	$9,075.00	$69,575.00	(d)	N/A	Corporate Services

Attachment 1 - Summary of Procurements

Limited Tendering								
Project Name	**Goods/Services Procured**	**Awarded Bidder**	**Contract Cost**	**Contingency Cost**	**Total Cost (Before Revisions)**	**Criteria for Limited Tendering**	**Responded (Not Applicable)**	**TRCA Division (Responsible)**
Kortright Centre for Conservation Giftshop	Maple syrup products for resale.	Voisin's Maple Products Ltd.	$27,000.00	$2,700.00	$29,700.00	(b) (iii)	N/A	Education and Outreach Division

Vendor of Record Arrangements								
Project Name	**Goods/Services Procured**	**Awarded Bidders**	**Contract Cost**	**Contingency Cost**	**Total Cost (Before Revisions)**	**Total Vendors**	**Responded**	**TRCA Division (Responsible)**
Snow Removal Services 2019-2020	Snow removal and ice management services for various TRCA properties.	AAA Landscaping; Ivy Property Services	$170,000.00	$17,000.00	$187,000.00	3	2	Corporate Services
Emergency Response, Clean-up and Disposal of Spills and Hazardous Materials	Emergency spills response and hazardous waste disposal services.	Accuworx Inc.; QM LP	$200,000.00	$20,000.00	$220,000.00	3	2	Corporate Services
Office Seating	Supply, delivery and installation of office seating and furniture.	Allsteel; Ergo Industrial Seating Systems; Global Upholstery Co Inc.; Haworth Inc.; Teknion Ltd.	$9,999.00	$0.00	$9,999.00	5	5	Corporate Services
Dyed Diesel	Supply and delivery of dyed diesel to fuel equipment on TRCA projects.	Alpha Oil	$134,498.00	$0.00	$134,498.00	1	1	Restoration and Infrastructure

Attachment 1 - Summary of Procurements

Vendor of Record Arrangements								
Project Name	**Goods/Services Procured**	**Awarded Bidders**	**Contract Cost**	**Contingency Cost**	**Total Cost (Before Revisions)**	**Total Vendors**	**Responded**	**TRCA Division (Responsible)**
Master Detailed Designs for City of Toronto Major Maintenance Projects	Development of conceptual and detailed designs for multiple TRCA-owned erosion control structures throughout the City of Toronto.	Aquafor Beech Ltd.; Geo Morphix Ltd.	$163,329.00	$16,332.90	$179,661.90	74	2	Restoration and Infrastructure
Sweeping and Flusher Truck Services	Sweeping and flusher truck services.	Centennial Construction and Equipment Rentals	$135,195.00	$0.00	$135,195.00	11	1	Restoration and Infrastructure
Rental of Portable Toilets	Rental of portable toilets for TRCA projects, events and parks facilities.	Chantlers Environmental Services Ltd.; Portable Toilet Rentals Inc.	$149,640.00	$0.00	$149,640.00	10	2	Restoration and Infrastructure
Supply and Delivery of Top Soil	Supply and delivery of screen and stockpiled topsoil.	Cliffords Haulage Ltd.; Glenn Windrem Trucking; J Jenkins and Son Landscape Contractors Ltd.; Earthco Soil Mixtures	$106,785.00	$0.00	$106,785.00	10	5	Restoration and Infrastructure
Rental of Steel Road Plates	Rental of steel road plates for TRCA construction and restoration projects.	Cos Shore Inc.; Superior Disposal	$45,505.00	$0.00	$45,505.00	8	2	Restoration and Infrastructure
Erosion and Sediment Control Materials	Supply and delivery of erosion and sediment control materials.	Devron Sales Ltd.; Organic Express; Armtec-Canada Culvert	$500,000.00	$0.00	$500,000.00	22	3	Restoration and Infrastructure

Attachment 1 - Summary of Procurements

Vendor of Record Arrangements								
Project Name	**Goods/Services Procured**	**Awarded Bidders**	**Contract Cost**	**Contingency Cost**	**Total Cost (Before Revisions)**	**Total Vendors**	**Responded**	**TRCA Division (Responsible)**
Construction Waste Disposal	Construction waste disposal services.	Draglam Waste & Recycling; Public Disposal and Recycling Inc.; GFL Environmental Inc.; Superior Disposal	$90,200.00	$0.00	$90,200.00	25	5	Restoration and Infrastructure
Aggregate Materials	Supply and delivery of various aggregate materials.	Glenn Windrem Trucking; James Dick Construction Ltd.; Dufferin Aggregates; JC Rock Ltd.; Elite Stone Quarries	$4,000,000.00	$0.00	$4,000,000.00	23	5	Restoration and Infrastructure
Rental of Construction Fence	Rental of construction fencing (including delivery/setup and tear down/pickup).	Modu-loc Fence Rentals; Sunbelt Rentals of Canada Inc.	$124,000.00	$0.00	$124,000.00	9	2	Restoration and Infrastructure
Designated Substance and Hazardous Material Surveys, Abatement and Disposal	Professional services for designated substance surveys.	Peritus Environmental; Maple Environmental; OHE Consultants	$90,000.00	$9,000.00	$99,000.00	14	3	Corporate Services
Operated Heavy Construction Equipment	Rental of operated heavy construction equipment and dump trucks for various TRCA projects.	Sartor Environmental Group Inc.; Dynex Construction Inc.; Valefield Contracting Inc.; TMI Contracting and Equipment Rental Ltd.; Trisan Construction	$5,000,000.00	$0.00	$5,000,000.00	6	5	Restoration and Infrastructure

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Vendor of Record Arrangements								
Project Name	**Goods/Services Procured**	**Awarded Bidders**	**Contract Cost**	**Contingency Cost**	**Total Cost (Before Revisions)**	**Total Vendors**	**Responded**	**TRCA Division (Responsible)**
Rental of Storage Containers and Office Trailers	Rental of mobile offices and steel storage containers for construction and restoration projects.	Sunbelt Rentals of Canada Inc.; Mobile Mini Canada; Williams Scotsman Inc.	$34,250.00	$0.00	$34,250.00	14	3	Restoration and Infrastructure
Phase 1 Environmental Site Assessment	Consulting services for Phase 1 environmental site assessments.	Trinity Consultants Ontario Inc.; PGL Environmental Consultants	$240,000.00	$0.00	$240,000.00	63	2	Corporate Services
Supply of Pool Chemicals	Supply and delivery of pool chemicals for Parks facilities.	Water & Ice North America Inc.; SP&S; Glen Chemicals	$95,830.08	$9,583.01	$105,413.09	3	3	Parks and Culture
		TOTALS	**$42,435,682.29**	**$3,956,416.07**	**$46,392,098.36**			

Attachment 2 - Contract Revisions

Highest Ranked

Project Name	Goods/Services Procured	Awarded Bidder	Contract Cost	Contingency Approved ($)	Contingency Approved (%)	Revision Date	Revision Cost	Contingency Used ($)	Contingency Used (%)	Agreement Start Date	Agreement End Date
Provincial Flood Forecasting and Warning Workshop 2019	Booking of facility, including catering services.	2012111 Ont Inc O/A Pearson Convention Center	$4,862.20	$972.44	20%	9/27/2019	$2,145.00	$0.00	0%	8/8/2019	9/18/2019
Downtown Brampton Flood Protection EA	EA planning and engineering services for Phase 1 - 4 of the Municipal Class EA.	AECOM	$248,870.00	$74,661.00	30%	12/10/2019	$2,857.00	$2,857.00	4%	7/23/2018	3/31/2020
						10/4/2019	$5,700.00	$5,700.00	8%		
						3/15/2019	$13,288.00	$13,288.00	18%		
Eldorado Court, Grandravine Drive and Ladyshot Crescent	Engineering services for slope stability, erosion risk assessment, and conceptual design alternatives for forty-five (45) properties.	AECOM CANADA LTD.	$225,489.00	$22,548.90	10%	11/4/2019	$1,500.00	$1,500.00	7%	10/1/2019	12/31/2020
						12/19/2019	$5,105.00	$5,105.00	23%		
Eastern & Broadview Flood Protection Project Class EA	Professional engineering services for hydraulic modelling and design services.	AECOM CANADA LTD. C/O T10002C	$88,404.42	$44,202.21	50%	11/20/2018	$6,226.00	$6,226.00	14%	9/20/2017	6/30/2019
						3/9/2018	$7,997.00	$7,997.00	18%		
						1/21/2019	$22,977.00	$22,977.00	52%		
						9/17/2018	$4,928.00	$4,928.00	11%		
Green Cleaning Services	Green cleaning services for the Boyd Centre.	Allcare Maintenance Services Inc.	$33,480.00	$3,348.00	10%	9/9/2019	$34,833.00	$3,348.00	100%	9/5/2017	10/31/2020
						6/11/2018	$34,150.00	$0.00	0%		
Green Cleaning Services	Green cleaning services for the Restoration Services Centre.	Allcare Maintenance Services Inc.	$18,900.00	$1,890.00	10%	6/11/2018	$26,316.00	$0.00	0%	10/1/2017	10/31/2020
						7/10/2019	$26,842.00	$0.00	0%		
						11/17/2017	$6,900.00	$0.00	0%		
Green Cleaning Services	Green Cleaning Services for the Swan Lake Centre for Innovation and Conservation.	Allcare Maintenance Services Inc.	$20,340.00	$4,068.00	20%	2/11/2018	$20,747.00	$0.00	0%	9/30/2017	10/31/2020
						7/10/2019	$21,162.00	$0.00	0%		
Wiley Bridge	Professional engineering services for design and contract administration.	AMTEC Engineering Ltd.	$36,325.00	$5,448.75	15%	9/5/2019	$5,500.00	$5,449.00	100%	2/6/2019	11/25/2019
Upper Highland Creek Pan Am Path Connection	Pre and post construction CCTV inspection services.	Andrews Engineer	$33,274.00	$12,000.00	36%	6/11/2019	$7,000.00	$7,000.00	58%	5/8/2019	12/31/2020

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Highest Ranked

Project Name	Goods/Services Procured	Awarded Bidder	Contract Cost	Contingency Approved ($)	Contingency Approved (%)	Revision Date	Revision Cost	Contingency Used ($)	Contingency Used (%)	Agreement Start Date	Agreement End Date
Brampton Flood Protection Project	Project management and EA expertise services.	Anneliese Grieve Strategic Env Plan Solutions	$220,590.00	$66,177.00	30%	4/1/2019	$16,875.00	$16,875.00	25%	8/1/2018	3/31/2020
Morningside/Rouge River Fishway/Dissipator	Engineering services for assessment and restoration detailed design.	Aquafor Beech	$44,235.00	$6,635.25	15%	6/12/2019	$1,500.00	$1,500.00	23%	3/8/2018	12/31/2019
Humber River in York FPM Update	Engineering services for HEC-RAS hydraulic model and 66 floodplain map sheets.	AQUAFOR BEECH LIMITED	$95,850.00	$19,200.00	20%	3/22/2019	$16,500.00	$16,500.00	86%	10/8/2018	6/30/2019
Upper Highland Creek at Ellesmere Pan Am Trail Connection	Engineering services for detailed design.	AQUAFOR BEECH LIMITED	$85,440.00	$12,000.00	14%	6/12/2019	$2,000.00	$2,000.00	17%	5/3/2016	8/31/2020
						8/23/2017	$2,500.00	$2,500.00	21%		
						2/19/2019	$13,285.00	$0.00	0%		
						12/18/2019	$22,000.00	$7,500.00	63%		
						8/9/2018	$19,040.00	$0.00	0%		
						1/6/2017	$21,400.00	$0.00	0%		
						8/22/2017	$1,100.00	$0.00	0%		
Claireville Conservation Area	Professional engineering services for design.	Candevcon	$80,500.00	$8,050.00	10%	9/16/2019	$15,830.00	$8,050.00	100%	8/22/2018	8/28/2020
19 - 31 Ridge Point Crescent Erosion Control and Slope Stabilization Project	Geotechnical engineering services for detailed design.	Central Earth Engineering	$56,280.00	$6,013.00	11%	9/5/2019	$17,425.00	$6,013.00	100%	6/13/2018	12/30/2022
						9/10/2018	($5,910.00)	$0.00	0%		
2 to 6 Cherry Hills Road Erosion Control Project	Geotechnical engineering services for design development.	Central Earth Engineering	$34,940.00	$5,241.00	15%	5/15/2019	$2,250.00	$2,250.00	43%	7/25/2018	5/31/2019
Appletree Court and Seeley Drive Erosion Control and Slope Stabilization Project	Geotechnical engineering services for slope stability and erosion risk assessment.	Central Earth Engineering	$18,440.00	$5,000.00	27%	7/26/2019	$1,280.00	$1,280.00	26%	6/26/2019	12/31/2020
Lakeland Drive Major Maintenance Project	Geotechnical engineering services for slope stability assessment and conceptual design alternatives.	Central Earth Engineering	$102,670.00	$15,400.50	15%	10/4/2019	($10,000.00)	$0.00	0%	7/26/2019	12/31/2020

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37-39 Topcliff Avenue Slope Stabilization Project	Professional engineering services for a geotechnical investigation to update detailed design package.	Central Earth Engineering, Ltd.	$17,990.00	$1,799.00	10%	10/3/2019	$6,750.00	$1,799.00	100%	8/22/2019	12/31/2021
Eastern & Broadview Flood Protection Project Class EA	Professional EA management, planning, and engineering services.	DILLON CONSULTING LTD	$290,002.00	$87,000.60	30%	10/29/2018	$9,105.00	$9,105.00	10%	9/27/2017	6/30/2020
						7/3/2019	$9,350.00	$9,350.00	11%		
						11/9/2017	$10,125.00	$10,125.00	12%		
						4/9/2019	$11,475.00	$11,475.00	13%		
						7/22/2019	$13,316.00	$13,316.00	15%		
Beaucourt Road (12-30) Major Maintenance Project	Engineering services for detailed design.	Ecosystem Recovery Inc.	$29,320.00	$5,864.00	20%	4/16/2019	$2,710.00	$2,710.00	46%	6/13/2017	12/31/2020
						12/19/2019	$7,960.00	$3,154.00	54%		
Appletree Court and Seeley Drive Erosion Control and Slope Stabilization Project – Phase 2	Geomorphic engineering services for detailed design.	Ecosystem Recovery Inc.	$79,742.00	$7,974.20	10%	2/19/2019	$7,900.00	$7,900.00	99%	12/4/2018	12/31/2020
						11/13/2019	$2,170.00	$74.00	1%		
Gaffney Park Slope Stabilization Project	Professional engineering services for detailed design.	exp Services Inc.	$83,650.00	$8,365.00	10%	11/12/2018	$4,000.00	$4,000.00	48%	6/13/2017	5/31/2019
						3/6/2019	$18,750.00	$0.00	0%		
Coatsworth Cut Channel Dredging Project	Channel dredging works for safe navigation.	GALCON MARINE LTD	$203,500.00	$40,700.00	20%	12/7/2018	$15,000.00	$15,000.00	37%	10/2/2018	3/31/2019
						1/14/2019	$10,903.00	$10,903.00	27%		
TRCA New Administrative Office Building	Vertical test bore for ground-loop heat exchange.	GEOSOURCE ENERGY	$31,000.00	$3,100.00	10%	2/5/2019	$1,500.00	$0.00	0%	1/7/2019	12/31/2019
Surface Cover Pilot Project	Installation of a vertical borehole for a geothermal loop.	Geosource Energy Inc	$19,300.00	$1,930.00	10%	11/5/2019	$2,250.00	$1,930.00	100%	9/10/2018	4/30/2019
Peel Village Golf Course - Sanitary Infrastructure Protection	Engineering services for hydraulic analysis and detailed design.	GHD	$56,824.00	$5,682.40	10%	2/4/2019	$950.00	$950.00	17%	5/9/2018	8/31/2019

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73-95 Clarinda Drive Slope Stabilization and Erosion Control Project	Professional engineering services for hydraulic analysis, stormwater management analyses, tree inventory, and geomorphic assessment.	GHD Limited	$54,200.00	$5,420.00	10%	6/13/2019	$250.00	$250.00	5%	4/29/2019	12/30/2020
Palace Pier Court Headland Maintenance Project	Coastal engineering services for detailed design.	GHD Limited	$39,319.50	$3,931.95	10%	12/2/2019	$3,200.00	$3,200.00	81%	6/17/2019	12/31/2020
TRCA 2019 Fall Planting Projects/Programs	Assorted wildflowers.	GROW WILD!	$7,829.00	$1,174.35	15%	9/25/2019	$1,202.00	$1,174.00	100%	9/16/2019	10/31/2019
Flynn House Exhibit	Exhibit concept and final graphic design and exhibit installation.	GXCentrik Design Inc.	$10,500.00	$1,050.00	10%	2/7/2019	$1,409.00	$0.00	0%	10/24/2018	2/28/2019
						12/18/2018	$15,655.00	$1,050.00	100%		
Patterson Richvale and Valley	Rental, installation and demobilization of bypass pumping systems.	Herc Rentals	$40,125.00	$6,018.75	15%	12/11/2019	($3,569.00)	$0.00	0%	6/24/2019	9/30/2021
						12/11/2019	$18,707.00	$6,019.00	100%		
Kennedy Valley Trail, South Etobicoke Sherway Garden Trail & Valleywood Phase 2 Trail Bridge Project	Design build services.	Hobden Construction Company Ltd.	$404,650.00	$40,465.00	10%	5/31/2018	$6,950.00	$6,950.00	17%	5/2/2017	6/30/2019
						6/21/2018	$7,327.00	$7,327.00	18%		
						3/14/2018	$7,332.00	$7,332.00	18%		
						11/1/2017	$17,954.00	$17,954.00	44%		
						5/17/2019	$24,275.00	$0.00	0%		
						6/5/2018	$77,187.00	$0.00	0%		
						9/29/2017	$229,838.00	$0.00	0%		

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Master CCTV Contract for City of Toronto Erosion Control and Slope Stabilization Projects - 2019/2020	Pre-construction and post-construction closed circuit television (CCTV) inspections.	INFRASTRUCTURE INTELLIGENCE SERVICES INC.	$30,370.00	$3,037.00	10%	12/12/2019	$690.00	$690.00	23%	7/29/2019	1/3/2022
						9/9/2019	$6,262.00	$0.00	0%		
						10/11/2019	$6,450.00	$0.00	0%		
						12/12/2019	$7,403.00	$0.00	0%		
Ajax and Pickering Dykes Rehabilitation Class EA	Engineering services to undertake a Conservation Ontario Class EA.	KGS Group Consulting Engineers	$155,107.00	$38,776.75	25%	7/30/2019	$13,989.00	$13,989.00	36%	6/12/2019	9/25/2019
G. Ross Lord Dam	Don River floodplain mapping update and G. Ross Lord Dam gate operational review.	KGS Group Consulting Engineers	$169,775.00	$33,955.00	20%	4/25/2019	$4,857.00	$4,857.00	14%	2/28/2019	4/1/2020
Highland Creek Watershed Hydrology Update	Engineering services for PCSWMM hydrology, HEC-RAS hydraulic model, and 27 standard floodplain map sheets.	MATRIX SOLUTIONS INC.	$199,514.00	$39,902.80	20%	7/25/2019	$5,000.00	$5,000.00	13%	10/15/2018	1/31/2020
						12/17/2019	$10,500.00	$10,500.00	26%		
Downtown Brampton Flood Protection EA	Water resource engineering services.	Matrix Solutions Inc.	$173,670.00	$52,101.00	30%	2/12/2019	$14,845.00	$14,845.00	28%	8/1/2018	3/31/2020

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East Don Trail Construction - Phase 1	Construction goods and services for 3.1km of asphalt trail, 1 boardwalk and 4 bridges.	Metric Contracting Services Corporation	$9,949,934.01	$1,492,490.10	15%	7/9/2019	$750.00	$750.00	0%	8/20/2018	12/31/2020
						7/17/2019	($161,170.52)	$0.00	0%		
						11/15/2018	($70,941.32)	$0.00	0%		
						1/30/2019	$5,505.00	$5,505.00	0%		
						9/13/2019	$5,565.00	$5,565.00	0%		
						11/16/2018	$2,936.00	$2,936.00	0%		
						2/6/2019	$2,999.00	$2,999.00	0%		
						12/7/2018	$406,556.00	$406,556.00	27%		
						12/12/2019	$671,664.00	$0.00	0%		
						10/29/2019	$137,537.00	$137,537.00	9%		
						7/29/2019	$78,154.00	$78,154.00	5%		
						11/8/2019	$94,325.00	$94,325.00	6%		
						2/1/2019	$21,921.00	$21,921.00	1%		
						10/29/2019	$48,923.00	$48,923.00	3%		
						5/28/2019	$53,173.00	$53,173.00	4%		
						2/5/2019	$63,237.00	$63,237.00	4%		
						7/30/2019	$40,661.00	$40,661.00	3%		
						3/13/2019	$43,277.00	$43,277.00	3%		
						10/10/2019	$13,702.00	$13,702.00	1%		
						4/4/2019	$14,457.00	$14,457.00	1%		
						6/21/2019	$8,361.00	$8,361.00	1%		
						2/14/2019	$6,728.00	$6,728.00	0%		
						5/13/2019	$3,303.00	$3,303.00	0%		

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Project Name	Goods/Services Procured	Awarded Bidder	Contract Cost	Contingency Approved ($)	Contingency Approved (%)	Revision Date	Revision Cost	Contingency Used ($)	Contingency Used (%)	Agreement Start Date	Agreement End Date
East Don Trail Construction - Phase 2	Construction goods and services for 3.1km of asphalt trail, 1 boardwalk and 4 bridges.	Metric Contracting Services Corporation	$9,797,493.62	$1,469,624.04	15%	8/16/2018	($3,839,880.34)	$0.00	0%	7/5/2018	7/1/2020
						10/18/2019	($52,170.00)	$0.00	0%		
						7/17/2019	($39,997.00)	$0.00	0%		
						5/13/2019	$1,599.00	$1,599.00	0%		
						9/13/2019	$2,558.00	$2,558.00	0%		
						6/10/2019	$5,105.00	$5,105.00	0%		
						2/5/2019	$5,116.00	$5,116.00	0%		
						3/13/2019	$5,116.00	$5,116.00	0%		
						10/16/2019	$3,037.00	$3,037.00	0%		
						10/10/2019	$3,154.00	$3,154.00	0%		
						11/15/2018	$5,955.00	$5,955.00	0%		
						4/4/2019	$6,276.00	$6,276.00	0%		
						2/14/2019	$8,313.00	$8,313.00	1%		
						1/30/2019	$8,316.00	$8,316.00	1%		
						10/28/2019	$9,528.00	$9,528.00	1%		
						9/19/2019	$22,250.00	$22,250.00	2%		
						10/31/2019	$24,290.00	$24,290.00	2%		
						10/25/2019	$34,132.00	$34,132.00	2%		
						11/25/2019	$37,303.00	$37,303.00	3%		
						10/25/2019	$44,520.00	$44,520.00	3%		
						12/9/2019	$44,869.00	$44,869.00	3%		
						3/29/2019	$15,791.00	$15,791.00	1%		
						4/24/2019	$21,418.00	$21,418.00	1%		
						10/25/2019	$71,840.00	$71,840.00	5%		
						12/5/2019	$130,724.00	$130,724.00	9%		
						12/7/2018	$281,440.00	$281,440.00	19%		

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Rainbow Creek Sanitary Trunk Sewer	Fluvial geomorphic engineering services for assessment and conceptual design.	Palmer Environmental Consulting Group Inc.	$16,382.00	$1,638.20	10%	8/2/2019	$13,956.00	$0.00	0%	5/21/2019	12/31/2019
						6/26/2019	$2,800.00	$1,638.00	100%		
West Don River in E.T. Seton Park Major Maintenance Project	Professional fluvial geomorphic consulting services for geomorphic assessment, meander belt width delineation and erosion risk assessment.	Palmer Environmental Consulting Group Inc.	$16,946.00	$2,541.90	15%	10/2/2019	$14,900.00	$2,542.00	100%	3/22/2019	12/22/2021
Heart Lake Conservation Area	Engineering services for detailed design of the new Heart Lake water system.	R.J. BURNSIDE & ASSOCIATES LIMITED	$78,335.00	$7,833.50	10%	4/15/2019	$12,000.00	$7,834.00	100%	7/19/2017	3/31/2018
30 Northline Road Erosion Control and Slope Stabilization Project	Geotechnical and water resources engineering services for detailed design.	TERRAPROBE INC.	$44,749.00	$24,810.00	55%	7/5/2019	$17,908.00	$17,908.00	72%	1/12/2016	12/31/2021
						7/8/2019	$33,772.00	$6,902.00	28%		
37 - 77 Rossmull Crescent	Geotechnical engineering services for slope stability and erosion risk assessment.	TERRAPROBE INC.	$33,164.00	$3,316.40	10%	1/8/2019	$375.00	$375.00	11%	10/8/2018	12/31/2019
Denison Road Long Term Stable Slope Crest (LTSSC) Update	Geotechnical engineering services for slope stability assessment and conceptual design alternatives.	TERRAPROBE INC.	$66,085.00	$13,217.00	20%	12/2/2019	$140.00	$140.00	1%	6/6/2019	6/6/2020
Don Valley Drive and Hillside Drive	Geotechnical engineering services for slope stability analysis and erosion risk assessment.	TERRAPROBE INC.	$162,020.00	$16,202.00	10%	2/20/2018	$950.00	$950.00	6%	9/20/2017	4/17/2020
						6/7/2018	$1,650.00	$1,650.00	10%		
Moore Park Ravine along 191 - 195 Hudson Drive - Slope Stabilization Project	Detailed design services.	TERRAPROBE INC.	$57,400.00	$8,610.00	15%	4/16/2019	($10,874.00)	$0.00	0%	11/17/2017	12/31/2020
Yellow Creek behind Heath Street East	Geotechnical and structural engineering services for concept designs.	Terraprobe Inc.	$21,115.00	$3,167.25	15%	5/6/2019	$2,600.00	$0.00	0%	4/19/2018	12/31/2022

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2019 Bike The Creek	BBQ lunch catering for community participants.	The Gourmet Group	$8,600.00	$2,150.00	25%	10/9/2019	$2,130.00	$2,130.00	99%	6/22/2019	6/22/2019
The Meadoway	100 grow trays and 10 grow lights for classes to grow native plants.	Veseys	$3,000.00	$600.00	20%	11/20/2019	$4,420.00	$600.00	100%	3/13/2019	6/28/2019
Ashbridges Bay Park Major Maintenance	Coastal engineering services for detailed design.	W.F. Baird & Associates	$89,242.00	$8,924.20	10%	12/12/2019	$32,900.00	$8,942.00	100%	8/28/2018	12/31/2020
Toronto Islands Flood Characterization and Risk Assessment Project 2018	Engineering services for flood characterization and risk assessment.	W.F. Baird and Associates Coastal Engineers Ltd.	$174,092.00	$17,409.20	10%	8/28/2019	$3,390.00	$3,390.00	19%	8/15/2018	8/31/2019
Sunnyside Park Revetment Maintenance Project	Coastal engineering services for detailed designs.	WF Baird and Associates	$57,998.00	$5,799.80	10%	12/18/2019	$8,000.00	$5,800.00	100%	9/3/2019	12/31/2020
2019 Rouge River Floodplain Mapping Update - Phase I	Engineering services for HEC-RAS hydraulic model and floodplain mapping update.	Wood Environment & Infrastructure Solutions	$87,435.86	$8,743.59	10%	12/20/2019	$1,998.00	$1,998.00	23%	1/25/2019	12/31/2019
						10/23/2019	$3,040.00	$3,040.00	35%		
Black Creek at Rockcliffe SPA Flood Remediation and Transportation Feasibility Study	Professional engineering services.	Wood Environmental & Infrastructure Solutions	$498,126.00	$49,812.60	10%	10/4/2019	$1,982.00	$1,982.00	4%	6/17/2019	12/31/2020
						9/27/2019	$5,589.00	$5,589.00	11%		
						9/10/2019	$21,320.00	$21,320.00	43%		
RWMP/Mayfield/RNUP/Seaton/Bathurst Glen/Albion Hills	2019 Water quality lab analysis.	York Durham Regional Environmental Laboratory	$33,290.40	$3,329.04	10%	12/16/2019	$7,329.00	$3,329.00	100%	1/1/2019	12/31/2019
TRCA New Administrative Office Building	Architectural, landscape, and engineering final design services.	ZAS Architects Inc. and Bulcholz McEvoy Architects Ltd.	$3,533,860.00	$353,386.00	10%	5/22/2019	$103,475.00	$103,475.00	29%	9/22/2017	12/31/2021
						9/30/2019	$5,290.00	$0.00	0%		
						9/17/2019	$10,590.00	$0.00	0%		
						4/8/2019	$78,060.00	$0.00	0%		

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Lowest Bid

Project Name	Goods/Services Procured	Awarded Bidder	Contract Cost	Contingency Approved ($)	Contingency Approved (%)	Revision Date	Revision Cost	Contingency Used ($)	Contingency Used (%)	Agreement Start Date	Agreement End Date
York University SWMP Maintenance	Sediment solidification of storm pond sediments.	Di-Corp	$16,524.00	$1,652.40	10%	9/23/2019	$11,016.00	$1,652.00	100%	9/2/2019	12/31/2019
						10/31/2019	$24,786.00	$0.00	0%		
Albion Hills Field Centre	General contractor for the demolition and new construction of the Albion Hills Field Centre loading dock.	Adems Restoration	$149,000.00	$29,800.00	20%	12/12/2019	$1,200.00	$1,200.00	4%	11/11/2019	1/20/2020
Bolton Camp Phase 1 Redevelopment Project	High voltage electrical services.	Alineutility Limited	$181,720.00	$27,258.00	15%	9/20/2019	$6,500.00	$6,500.00	24%	9/28/2018	3/29/2019
						9/19/2019	$10,566.00	$10,566.00	39%		
						9/23/2019	$17,500.00	$10,192.00	37%		
Lakeview Waterfront Connection Project	Sandblasting, inspecting for micro-cracks, and galvanizing two temporary steel bridges.	Allsteel Fabrication Inc	$73,959.20	$7,395.92	10%	1/9/2019	$6,620.00	$6,620.00	90%	1/7/2019	5/1/2019
						4/10/2019	$4,950.00	$0.00	0%		
						2/22/2019	$11,128.00	$776.00	10%		
Jennifer - Whitburn Multi-use Trail Connection	Labour, equipment, and material for asphalt paving.	AMAC Paving Ltd.	$181,157.50	$18,115.75	10%	12/9/2019	($12,968.00)	$0.00	0%	10/1/2019	12/30/2022
Restoration Services Centre	Rental of a three unit washroom trailer to accommodate additional staff.	AMPOT PORTABLE TOILETS INC.	$18,260.00	$3,652.00	20%	10/1/2018	$18,300.00	$3,652.00	100%	11/2/2017	11/1/2020
						10/29/2019	$18,300.00	$0.00	0%		
Etobicoke Valley Park (EC04 and EC03.4) Major Maintenance	Pre and post-construction CCTV inspections.	andrews.engineer	$36,476.00	$5,471.40	15%	6/14/2019	$1,500.00	$0.00	0%	11/14/2018	12/31/2019
						1/28/2019	$8,000.00	$5,471.00	100%		
Mud Creek Reach 6	Pre- and post-construction CCTV inspection services.	AQUA TECH SOLUTIONS INC.	$5,600.00	$840.00	15%	12/4/2019	($4,560.00)	$0.00	0%	10/22/2019	12/31/2020
						11/12/2019	$7,060.00	$840.00	100%		

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Project Name	Goods/Services Procured	Awarded Bidder	Contract Cost	Contingency Approved ($)	Contingency Approved (%)	Revision Date	Revision Cost	Contingency Used ($)	Contingency Used (%)	Agreement Start Date	Agreement End Date
19 - 31 Ridge Point Crescent	Ontario Land Surveyor (OLS) services to complete a legal survey, property boundary stakeout, installation of property monuments, and a Reference Plan (R-Plan).	AVANTI SURVEYING INC.	$10,500.00	$750.00	7%	5/30/2019	$2,000.00	$0.00	0%	9/19/2018	5/31/2020
Mimico Creek Behind Ridgegate Crescent	Ontario Land Surveyor (OLS) for Surveyor's Real Property Report (SRPR), property boundary stakeout prior to construction, and installation of new property monuments.	AVANTI SURVEYING INC.	$14,000.00	$1,400.00	10%	9/16/2019	$2,000.00	$0.00	0%	7/16/2019	12/31/2021
Heart Lake Conservation Area	Labour, equipment and material for the potable water line replacement.	AVERTEX UTILITY SOLUTIONS INC.	$429,124.00	$85,824.80	20%	10/24/2019	$227.00	$227.00	0%	2/5/2018	12/31/2020
						10/25/2019	$873.00	$873.00	1%		
						10/28/2019	$5,000.00	$5,000.00	6%		
						4/19/2018	$7,410.00	$7,410.00	9%		
						1/29/2019	$19,494.00	$19,494.00	23%		
Restoration and Infrastructure Campus	Electrical upgrades at both the Restoration Services Centre and Boyd Centre for construction operations and electric vehicle charging stations.	BOLTON ELECTRIC COMPANY INC	$12,700.00	$3,175.00	25%	11/14/2019	$12,732.00	$3,175.00	100%	4/1/2019	12/20/2019
West Don Trail	Parking lot paving goods and services.	Bond Paving	$337,769.00	$33,776.90	10%	8/20/2019	($105,812.00)	$0.00	0%	9/4/2018	5/31/2019
						9/16/2019	$4,100.00	$0.00	0%		
						9/10/2019	$12,845.00	$0.00	0%		
						9/6/2019	$22,251.00	$0.00	0%		
Bolton Camp	Rental of security cameras.	Caliber Communications	$18,515.00	$1,851.50	10%	2/8/2019	$31,740.00	$0.00	0%	6/18/2018	12/31/2019

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Rotary Park Shoreline Maintenance	Supply and delivery of 4-6 tonne piece armoustrone.	CDR Young Aggregates	$124,360.00	$12,436.00	10%	4/5/2019	$21,763.00	$12,436.00	100%	7/10/2018	12/31/2019
TRCA Planting Program/Projects Spring 2019	Wooden stakes.	CENTRAL FAIRBANK LUMBER	$6,040.00	$1,208.00	20%	4/24/2019	$3,240.00	$1,208.00	100%	4/4/2019	12/31/2019
Various Parks and Culture Events 2018	Supply and delivery of portable toilets for various events at Parks facilities.	Chantlers	$16,200.00	$1,620.00	10%	2/22/2019	$17,820.00	$0.00	0%	4/30/2018	4/30/2020
Black Creek Pioneer Village	Firewood and kindling to support programming and operations.	City Loggers	$3,700.00	$370.00	10%	1/31/2019	$3,700.00	$370.00	100%	5/23/2018	5/23/2019
RSC and Boyd Centre	Fire inspection Services.	Control Fire Systems	$1,538.80	$76.94	5%	11/6/2019	$7,588.00	$77.00	100%	8/6/2018	8/2/2019
Don Mills Access, South of Overlea Trail Project	Supply, delivery and installation of concrete park infrastructure.	CSL GROUP LTD.	$257,180.00	$25,718.00	10%	11/27/2019	($4,227.00)	$0.00	0%	10/17/2019	3/31/2020
Franklin Pond Project	Construction goods and services for boardwalk structures and landscaping works.	CSL GROUP LTD.	$1,318,555.00	$197,783.25	15%	10/15/2019	$10,522.00	$10,522.00	5%	12/10/2018	12/31/2019
						9/11/2019	$23,733.00	$23,733.00	12%		
Gaffney Park Slope Stabilization Project	Supply and installation of slope stabilization and drainage system .	CSL Group Ltd.	$698,400.00	$139,680.00	20%	9/9/2019	$1,031.00	$1,031.00	1%	10/1/2018	8/31/2019
						5/13/2019	$2,700.00	$2,700.00	2%		
						6/25/2019	$7,761.00	$7,761.00	6%		
						1/11/2019	$13,304.00	$13,304.00	10%		
						12/5/2018	$21,250.00	$21,250.00	15%		
						2/27/2019	$24,076.00	$24,076.00	17%		
						5/2/2019	$38,868.00	$38,868.00	28%		
Fall 2019 Planting Program	Deer fencing.	Deer Fence Canada Inc.	$13,568.00	$1,356.80	10%	9/20/2019	$1,008.00	$1,008.00	74%	9/16/2019	12/31/2019

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Project Name	Goods/Services Procured	Awarded Bidder	Contract Cost	Contingency Approved ($)	Contingency Approved (%)	Revision Date	Revision Cost	Contingency Used ($)	Contingency Used (%)	Agreement Start Date	Agreement End Date
21 and 24 Disan Court Erosion Control and Slope Stabilization Project	Labour, material, and equipment to pave driveway.	Diamond Earthworks Corp.	$3,740.00	$374.00	10%	6/3/2019	$850.00	$0.00	0%	10/25/2018	12/31/2019
						5/29/2019	$3,200.00	$374.00	100%		
Pomona P-080 Sanitary Protection	Labour, equipment and materials for asphalt paving of 255 m2 of trail.	DIAMOND EARTHWORKS CORP.	$15,081.75	$1,508.18	10%	5/21/2019	$1,925.00	$1,508.00	100%	4/15/2019	10/8/2019
Milne Dam	Engineering services to investigate deficiencies at Milne Dam.	DM Wills Associates	$84,375.00	$16,875.00	20%	1/7/2019	$6,900.00	$6,900.00	41%	6/14/2018	3/31/2019
Tommy Thompson Park	Supply and installation 6 swing gates for traffic calming.	Dufferin Iron & Railings	$10,800.00	$2,160.00	20%	8/13/2019	$3,850.00	$2,160.00	100%	6/10/2019	10/31/2019
Bolton Camp	Construction of sewage pump station, sanitary sewer and watermain.	Earth Boring Co. Ltd.	$3,847,082.00	$769,416.40	20%	10/10/2019	($12,120.00)	$0.00	0%	6/5/2019	1/31/2020
						10/23/2019	$2,148.00	$2,148.00	0%		
Riverhead Drive Minor Works	Eavestrough replacement services.	Eaves Experts	$3,570.00	$357.00	10%	3/28/2019	($600.00)	$0.00	0%	12/13/2018	12/12/2021
						4/19/2019	$0.00	$0.00	0%		
West Don River near Langstaff (P-128)	Engineering services for geomorphic assessment and conceptual designs.	Ecosystem Recovery Inc.	$35,485.00	$3,548.50	10%	6/17/2019	$14,540.00	$0.00	0%	10/20/2017	7/31/2020
						2/13/2018	$5,800.00	$3,549.00	100%		
Various TRCA Construction Projects	Supply and installation of various type of fencing at four (4) construction projects.	FG Fencing and General Construction	$57,016.76	$5,701.68	10%	1/18/2019	($10,938.00)	$0.00	0%	5/7/2018	12/31/2019
						6/6/2018	$650.00	$650.00	11%		
						5/14/2018	$2,048.00	$2,048.00	36%		
						4/22/2019	$1,579.00	$0.00	0%		
						9/19/2018	$8,406.00	$3,004.00	53%		

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Project Name	Goods/Services Procured	Awarded Bidder	Contract Cost	Contingency Approved ($)	Contingency Approved (%)	Revision Date	Revision Cost	Contingency Used ($)	Contingency Used (%)	Agreement Start Date	Agreement End Date
Parks & Culture Resale Items 2019	Supply and delivery of firewood and kindling for resale at Indian Line Campground; Albion Hills Campground; and Glen Rouge Campground.	Firewood Guys	$78,550.00	$7,855.00	10%	12/12/2019	$12,255.00	$7,855.00	100%	4/15/2019	10/31/2020
Boyd Centre Cafeteria Interior Renovations	Construction goods and services for interior renovation of Boyd Centre Cafeteria.	Fresco Enterprises Inc.	$278,530.38	$41,779.56	15%	12/12/2019	($1,000.00)	$0.00	0%	12/2/2019	4/24/2020
						12/11/2019	$1,298.00	$1,298.00	3%		
R&I Tick Removal Kits	Tick removal Kits.	G. Magnotta Foundation	$995.00	$149.25	15%	5/28/2019	$995.00	$149.00	100%	4/22/2019	4/26/2019
Gibraltar Point Erosion Control Project	Construction goods and services for a near shore reef and groyne.	GALCON MARINE LTD	$9,077,161.00	$907,716.10	10%	9/11/2019	$8,020.00	$8,020.00	1%	9/10/2018	12/28/2020
						10/19/2018	$14,895.00	$14,895.00	2%		
Lakeview Waterfront Connection Project	Fabrication, supply and delivery of a temporary bridge.	GANAWA COMPANY LTD.	$62,300.00	$6,230.00	10%	3/28/2019	$25,380.00	$6,230.00	100%	11/5/2018	2/28/2019
Jennifer Court - Whitburn Crescent Multi-use Trail	Subgrade and granular compaction testing service.	Geomaple Geotechnics Inc.	$3,140.00	$314.00	10%	10/11/2019	($720.00)	$0.00	0%	8/12/2019	12/31/2021
Jennifer-Whitburn Trail Connection Project	Geotechnical and structural engineering services for draft design drawings.	Geomaple Geotechnics Inc.	$7,350.00	$735.00	10%	5/1/2019	$2,500.00	$0.00	0%	8/2/2018	12/31/2020
TRCA Central Filing	Numbered labels for records files.	Gibson Printing	$1,196.00	$119.60	10%	10/5/2019	$1,220.00	$120.00	100%	7/23/2018	5/31/2019
Rotary Park Shoreline Maintenance	Supply of dump tickets for disposal of Table 2 soil.	GM Excavating	$3,250.00	$650.00	20%	3/5/2019	$3,250.00	$650.00	100%	2/12/2019	4/30/2019
Wilket Creek Rehabilitation Reach 2	Off-site removal of stockpiled soil.	Green space Landscaping & property Services Inc.	$124,750.00	$12,475.00	10%	10/8/2019	($8,050.00)	$0.00	0%	5/13/2019	10/31/2019
						10/1/2019	($5,425.00)	$0.00	0%		
						10/24/2019	$15,328.00	$12,475.00	100%		

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Project Name	Goods/Services Procured	Awarded Bidder	Contract Cost	Contingency Approved ($)	Contingency Approved (%)	Revision Date	Revision Cost	Contingency Used ($)	Contingency Used (%)	Agreement Start Date	Agreement End Date
Restoration and Infrastructure Campus	Pest control services.	GreenLeaf Pest Control Inc.	$13,678.49	$3,419.62	25%	9/9/2019	$1,605.00	$1,605.00	47%	1/31/2019	2/28/2022
						12/3/2019	$16,590.00	$0.00	0%		
York University SWMP Maintenance	Hauling and disposal of storm pond sediments.	Groundforce Environmental	$73,881.25	$7,388.13	10%	10/30/2019	$20,749.00	$7,388.00	100%	9/2/2019	12/31/2019
Denison Road Major Maintenance	Labour, equipment and material for asphalt paving and terraseeding works.	Hilton Construction	$45,872.36	$9,174.47	20%	4/10/2019	$8,873.00	$8,873.00	97%	11/15/2018	6/30/2019
						5/17/2019	$4,950.00	$301.00	3%		
						5/30/2019	$6,442.00	$0.00	0%		
Jennifer - Whitburn Multiuse Trail Connection Project	Pre construction CCTV inspections.	Infrastructure Intelligence Services Inc.	$19,900.00	$1,990.00	10%	6/19/2019	($4,125.00)	$0.00	0%	5/3/2019	9/3/2020
9 Alderbrook Drive	Ontario Land Surveyor (OLS) services to complete a Legal Boundary Survey, Surveyor's Real Property Report and Draft/Final Reference Plan.	Ivan B. Wallace O.L.S. Ltd	$5,300.00	$795.00	15%	6/26/2019	$1,975.00	$795.00	100%	11/9/2018	7/31/2020
TO Islands 2019 Flooding	Aquadams.	Layfield Canada Ltd.	$26,480.00	$2,648.00	10%	6/12/2019	$18,960.00	$2,648.00	100%	5/21/2019	12/20/2019
Parks and Culture Facilities	Fire inspection Services.	Life Line Fire Protection	$8,890.00	$889.00	10%	4/11/2019	$8,890.00	$0.00	0%	1/5/2018	1/5/2021
Mud Creek Reach 2 Culvert Replacement Project	Construction goods and services for a boardwalk, water feature, and culvert replacement.	MCPHERSON-ANDREWS CONTRACTING LTD.	$602,647.00	$60,264.70	10%	9/20/2018	$3,085.00	$3,085.00	5%	8/16/2018	4/30/2020
						11/2/2018	$6,780.00	$6,780.00	11%		
						4/30/2019	$49,523.00	$49,523.00	82%		
						11/20/2019	$257,149.00	$0.00	0%		
TRCA Nursery Program	Bulk willow canes made up of 4 different species.	Neil Vanderkruk Holdings Inc.	$8,000.00	$1,600.00	20%	3/4/2019	$4,000.00	$1,600.00	100%	1/7/2019	5/31/2019

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1025 Scarlett Road Phase 2	Rental, delivery and assembly of timber access mud mats.	Northern Mat & Bridge Ltd. Partnership	$17,356.20	$3,471.24	20%	8/6/2019	$2,394.00	$2,394.00	69%	5/27/2019	8/30/2019
Peel Village Golf Course - Sanitary Infrastructure Protection	Rental of access mats.	Northern Mat & Bridge Ltd. Partnership	$38,771.56	$3,877.16	10%	2/28/2019	$2,473.00	$2,473.00	64%	1/23/2019	4/30/2019
Black Creek Trail at Shoreham Dr	Labour, equipment and material for asphalt paving works.	PACIFIC PAVING	$25,460.50	$5,092.10	20%	11/7/2019	$77,273.00	$0.00	0%	11/1/2018	12/31/2020
Heart Lake Conservation Area	Ticket kiosk retrofit and security upgrades at the Heart Lake Aquatic Facility.	PCI CONTRACTING MECHANICAL	$18,680.00	$1,500.00	8%	5/8/2019	$4,000.00	$1,500.00	100%	1/17/2019	5/31/2019
101 Exchange Ave. Building	Electrical contracting services to modify existing generator loads.	Plan Group Inc.	$10,500.00	$2,100.00	20%	4/2/2019	$766.00	$766.00	36%	3/25/2019	7/12/2019
						4/8/2019	$1,720.00	$1,335.00	64%		
						5/9/2019	$33,000.00	$0.00	0%		
Various Restoration Project Sites	Supply and delivery of cover crop mixes.	QUALITY SEEDS LTD.	$9,207.00	$920.70	10%	10/8/2019	$5,011.00	$921.00	100%	4/24/2019	12/30/2019
5 Shoreham Drive Project	Hazardous substance abatement, demolition waste management and site grading services.	Salandria Ltd.	$227,003.00	$34,050.45	15%	2/4/2019	$1,981.00	$1,981.00	6%	12/26/2018	3/29/2019
						2/1/2019	$9,704.00	$9,704.00	28%		
						2/6/2019	$57,883.00	$0.00	0%		
23 Brixham Terrace	Compaction testing services for slope stabilization and asphalt repaving works.	TERRAPROBE INC.	$6,125.00	$612.50	10%	5/15/2019	$950.00	$612.00	100%	4/30/2019	7/1/2019
Brock Road North	Truck rental.	THOMAS SOLUTIONS	$11,872.00	$2,374.40	20%	2/19/2019	$11,265.00	$2,374.00	100%	3/14/2018	12/31/2019
Jennifer - Whitburn Multiuse Trail Connection Project	The mobilization, set-up and operation of soil screening equipment.	TMI Contracting and Equipment Rental Ltd.	$7,400.00	$740.00	10%	11/6/2019	$1,280.00	$740.00	100%	9/23/2019	12/31/2020

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TRCA Residential Rental Properties	Eaves trough replacement services.	Tony K. Roofing	$12,500.00	$1,250.00	10%	12/12/2019	$21,000.00	$0.00	0%	10/21/2019	11/20/2019
1025 Scarlett Rd	Form and pouring of new concrete sidewalk and bench pad.	VoX Construction Inc.	$4,300.00	$430.00	10%	7/17/2019	$2,790.00	$430.00	100%	7/15/2019	7/25/2019
Etobicoke Valley Park	Asphalt paving services.	VoX Construction Inc.	$5,600.00	$560.00	10%	11/5/2019	$500.00	$500.00	89%	10/18/2019	12/31/2019
TRCA New Administrative Office Building	Demolition servicesfor removal of portable buildings at 5 Shoreham Drive.	York Demolition Corp.	$44,818.00	$4,481.80	10%	5/31/2019	$360.00	$360.00	8%	6/3/2019	6/30/2019

Limited Tendering

Project Name	Goods/Services Procured	Awarded Bidder	Contract Cost	Contingency Approved ($)	Contingency Approved (%)	Revision Date	Revision Cost	Contingency Used ($)	Contingency Used (%)	Agreement Start Date	Agreement End Date
P-524 Yonge Street Flume 2	Consulting services to update the detailed design drawings and associated HECRAS modelling.	AQUAFOR BEECH LIMITED	$6,200.00	$620.00	10%	10/17/2019	$3,600.00	$620.00	100%	6/26/2019	6/26/2021
Patterson Richvale Sanitary Infrastructure Protection and Valleylands Erosion Control	Engineering services for construction support and construction verification reporting.	GRECK & ASSOCIATES LTD.	$26,500.00	$2,650.00	10%	8/26/2019	$4,650.00	$2,650.00	100%	6/5/2019	12/31/2020
						11/12/2019	$6,825.00	$0.00	0%		
Swan Lake Outdoor Education Centre	Annual HVAC maintenance services.	HTS	$2,500.00	$500.00	20%	9/23/2019	$2,355.00	$0.00	0%	5/1/2019	4/30/2020
TRCA New Administrative Office Building	Legal land survey and topographical services.	J.D.Barnes Ltd.	$4,900.00	$490.00	10%	11/18/2019	$1,950.00	$0.00	0%	7/17/2019	12/31/2019
						8/2/2019	$8,600.00	$0.00	0%		
						12/4/2019	$16,775.00	$0.00	0%		
Kubota Track Carrier Maintenance	Annual service and repairs.	KOOY BROTHERS LAWN EQUIPMENT LTD.	$2,000.00	$400.00	20%	4/17/2019	$1,330.00	$400.00	100%	3/14/2019	4/30/2019
Boyd Centre	Preventative maintenance services for Boyd HVAC systems.	Service Experts	$5,000.00	$1,000.00	20%	4/16/2019	$2,034.00	$0.00	0%	5/1/2019	3/31/2021

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Limited Tendering

Project Name	Goods/Services Procured	Awarded Bidder	Contract Cost	Contingency Approved ($)	Contingency Approved (%)	Revision Date	Revision Cost	Contingency Used ($)	Contingency Used (%)	Agreement Start Date	Agreement End Date
Boyd Centre & Workshop	Boiler repair services.	Service Experts	$4,517.00	$1,000.00	22%	5/21/2019	$3,216.00	$485.00	49%	3/25/2019	6/30/2019
Yellow Creek Below Summerhill Gardens Emergency Works	Professional engineering services for peer review of design drawings and construction support.	TERRAPROBE INC.	$18,470.00	$2,600.00	14%	11/25/2019	($13,850.00)	$0.00	0%	10/1/2019	12/31/2020
Kortright Centre Glass House	Engineering services for tender design drawings.	WSP Canada Group Ltd.	$5,000.00	$1,000.00	20%	12/13/2019	$5,100.00	$0.00	0%	2/27/2019	8/28/2020
						11/18/2019	$26,560.00	$0.00	0%		

Not Highest Ranked

Project Name	Goods/Services Procured	Awarded Bidder	Contract Cost	Contingency Approved ($)	Contingency Approved (%)	Revision Date	Revision Cost	Contingency Used ($)	Contingency Used (%)	Agreement Start Date	Agreement End Date
Human Resources Information System	Human resources and payroll information system (software as a service).	Ceridian HCM Inc.	$1,599,569.00	$239,935.35	15%	7/5/2019	$31,920.00	$31,920.00	13%	5/25/2018	11/30/2019
The Meadoway	Professional landscape architecture and design services.	Perkins + Will	$245,975.00	$0.00	0%	9/9/2019	$4,690.00	$0.00	0%	1/24/2019	12/31/2019
						3/11/2019	$17,000.00	$0.00	0%		

Preferred Source

Project Name	Goods/Services Procured	Awarded Bidder	Contract Cost	Contingency Approved ($)	Contingency Approved (%)	Revision Date	Revision Cost	Contingency Used ($)	Contingency Used (%)	Agreement Start Date	Agreement End Date
Armoured Car Services 2018 - 2019	Armoured cash pick-up and transportation services for Black Creek Pioneer Village, Kortright Centre for Conservation and Bathurst Glen Golf Course.	BRINK'S CANADA LTD.	$6,257.93	$1,251.59	20%	6/19/2019	$38,956.92	$0.00	0%	10/15/2018	6/30/2020
2019 Geoscience Workshop	Booking of conference venue - Delta Hotels Guelph by Marriott.	Delta Hotels Guelph Conference Centre	$7,138.70	$713.87	10%	3/6/2019	$12,334.00	$713.00	100%	6/22/2018	2/28/2019
Provision of LID Treatment Train Tool - Version 2 - Phase 1	Enhancement/development of hydrological modeling software.	Golder and Associates	$85,080.00	$0.00	0%	4/16/2019	$3,500.00	$0.00	0%	8/30/2018	7/31/2019

Attachment 2 - Contract Revisions

Preferred Source

Project Name	Goods/Services Procured	Awarded Bidder	Contract Cost	Contingency Approved ($)	Contingency Approved (%)	Revision Date	Revision Cost	Contingency Used ($)	Contingency Used (%)	Agreement Start Date	Agreement End Date
TRCA New Administrative Office Building	Professional consulting services to develop the sustainability program and manage the sustainability certification process.	Green Reason Inc.	$87,500.00	$8,750.00	10%	9/10/2019	$5,500.00	$0.00	0%	1/8/2018	8/31/2021
						4/5/2019	$9,800.00	$0.00	0%		
Carruthers Creek Watershed Plan	Geomorphic engineering services.	MATRIX SOLUTIONS INC.	$1,530.00	$0.00	0%	9/13/2019	$2,670.00	$0.00	0%	11/5/2018	12/31/2019
12 Azalea Court	Geotechnical engineering services for slope stability assessment and conceptual alternatives.	TERRAPROBE INC.	$32,515.00	$4,877.25	15%	11/6/2018	$4,871.00	$4,871.00	100%	1/11/2018	1/31/2020
						3/22/2019	$12,650.00	$0.00	0%		
SWM Humber hydrology update	Additional analysis of 130.5 hours to complete the final report.	WSP Canada Group Ltd.	$18,830.00	$1,883.00	10%	8/9/2019	$3,630.00	$1,883.00	100%	12/11/2018	4/1/2020

Sole Source

Project Name	Goods/Services Procured	Awarded Bidder	Contract Cost	Contingency Approved ($)	Contingency Approved (%)	Revision Date	Revision Cost	Contingency Used ($)	Contingency Used (%)	Agreement Start Date	Agreement End Date
Humber River between 1025 Scarlett Road and Cruickshank Park Erosion Control and Slope Stabilization Project Phase 2	Removal and reconfiguration of the existing GameTime children's playground.	Park N Play Design Company Ltd.	$77,053.60	$7,705.36	10%	6/25/2019	$2,598.00	$2,598.00	34%	6/3/2019	12/31/2019
						6/7/2019	$5,014.00	$5,014.00	65%		

Attachment 2 - Contract Revisions

Vendor of Record

Project Name	Goods/Services Procured	Awarded Bidder	Contract Cost	Contingency Approved ($)	Contingency Approved (%)	Revision Date	Revision Cost	Contingency Used ($)	Contingency Used (%)	Agreement Start Date	Agreement End Date
Various 2018 Construction Projects	Street sweeping and flusher truck services.	A&G The Road Cleaners Ltd.; Durham Power Sweeping; Centennial Construction & Equipment Rentals	$90,000.00	$0.00	0%	2/27/2019	$110,000.00	$0.00	0%	1/1/2018	12/31/2019
Dyed Diesel Fuel Supply and Delivery for 2018 Construction Season	Supply and delivery of dyed diesel and fuel for various 2018 construction projects.	Alpha Oil Inc.; Canada Clean Fuels Inc.	$85,000.00	$0.00	0%	8/15/2018	$65,000.00	$0.00	0%	1/1/2018	12/31/2019
						2/26/2019	$100,000.00	$0.00	0%		
Various 2018 Construction Projects	Rental of site toilets.	Chantler's Environmental Services Ltd.; Remediation Worx Environmental Services Inc.; K. Winter Sanitation Inc.; Ampot Portable Toilets Inc.	$80,000.00	$0.00	0%	2/26/2019	$50,000.00	$0.00	0%	1/1/2018	12/31/2019
Various Construction Projects 2018/2019	Vendor or record arrangement for rental of small construction equipment.	Cooper Equipment Rentals; Sunbelt Rentals Canada; United Rentals; Hertz Equipment Rental; and Battlefield Equipment Rentals.	$300,000.00	$0.00	0%	5/17/2019	$400,000.00	$0.00	0%	8/1/2018	8/1/2020
Various 2018 Construction Projects	Woody debris disposal services.	Draglam Waste & Recycling; Kirby Waste Transfer Solutions; Public Disposal and Recycling Inc.; Superior Disposal; Miller Waste Systems Inc.	$90,000.00	$0.00	0%	2/28/2019	$50,000.00	$0.00	0%	1/1/2018	12/31/2019

Attachment 2 - Contract Revisions

Vendor of Record

Project Name	Goods/Services Procured	Awarded Bidder	Contract Cost	Contingency Approved ($)	Contingency Approved (%)	Revision Date	Revision Cost	Contingency Used ($)	Contingency Used (%)	Agreement Start Date	Agreement End Date
Various 2018 Construction Projects	Rental of office trailers and storage containers.	Mobile Mini Canada; ATCO Structures and Logistics	$70,000.00	$0.00	0%	2/26/2019	$40,000.00	$0.00	0%	1/1/2018	12/31/2019
Various 2018 Construction Projects	Rental of six foot high construction fencing.	Modu-loc Fence Rentals; Sunbelt Rentals of Canada	$95,000.00	$0.00	0%	2/26/2019	$95,000.00	$0.00	0%	1/1/2018	12/31/2019
Rogers Communications Inc. VOR Adoption Agreement	Rogers wireless devices and services.	Rogers Wireless Inc.	$1,200,000.00	$0.00	0%	9/3/2019	$59,377.00	$0.00	0%	2/1/2014	10/17/2022
						9/10/2019	$65,744.00	$0.00	0%		
						10/24/2019	$31,622.00	$0.00	0%		
Various 2018 Construction Projects	Rental of steel road plates.	Superior Disposal; Cos Shore Inc.; Sunbelt Rentals of Canada	$65,000.00	$0.00	0%	2/26/2019	$40,000.00	$0.00	0%	1/1/2018	12/31/2019
Various Erosion Projects	Vendor of record arrangement for supply and delivery of erosion and sediment control materials.	Terrafix Geosynthetics Inc.; Hanes GeoComponents	$350,000.00	$0.00	0%	10/31/2018	$760.00	$0.00	0%	8/1/2017	5/3/2019
						10/23/2017	$2,600.00	$0.00	0%		
						9/15/2017	$6,680.00	$0.00	0%		
						4/23/2019	$134,164.00	$0.00	0%		

*Note: Negative values represent reduction in Contract Cost due to scope changes.

TOTAL INCREASE	**$6,851,277.92**
TOTAL DECREASE	**($4,378,907.18)**
NET TOTAL	**$2,472,370.74**

Attachment 3 – Expense Authorization

	Authorized Buyer	Manager	Senior Manager or Associate Director	Director or Senior Director	Procurement and Legal Services	Accounting Services	Controller	CFOO and CEO	Executive Committee	Board of Directors
Procurement	≥ $5,000	≥ $10,000	≥ $50,000	≥ $100,000	≥ $50,000		≥ $100,000	≥ $250,000	≥ $250,000	≥ $500,000
Purchase Order	> $0				PO as agreement	> $0				
Payment Requisition	> $0	≥ $10,000	≥ $50,000			> $0	≥ $10,000			

Attachment 4 - Goods/Services Exempt from Procurement and Purchase Order Approvals

- Customer Refunds;
- Insurance Deductibles;
- Legal Settlements;
- Payroll Requisitions;
- Payments to Current and Past Employees;
- Petty Cash Replenishment/Floats; and
- Payments to Toronto and Region Conservation Foundation.

Attachment 5 – Non-Application Criteria

The following does not apply to the requirements set out in the guidelines:

(a) public employment contracts;

(b) non-legally binding agreements;

(c) any form of assistance, such as grants, loans, guarantees, and financial incentives;

(d) a contract awarded under a cooperation agreement with an international cooperation organization if the procurement is financed, in whole or in part, by that organization, only to the extent that the agreement includes rules for awarding contracts that differ from the obligations of the CFTA;

(e) acquisition or rental of land, existing buildings, or other immovable property, or the rights thereon;

(f) measures necessary to protect intellectual property, provided that the measures are not applied in a manner that would constitute a means of arbitrary or unjustifiable discrimination for non-Ontario vendors or are a disguised restriction on trade;

(g) procurement or acquisition of:

  (i) fiscal agency or depository services;

  (ii) liquidation and management services for regulated financial institutions; or

  (iii) services related to the sale, redemption, and distribution of public debt, including loans and government bonds, notes, and other securities;

(h) procurement of:

  (i) financial services respecting the management of TRCA financial assets and liabilities (i.e. treasury operations), including ancillary advisory and information services, whether or not delivered by a financial institution;

  (ii) health services or social services;

  (iii) services that may, under applicable law, only be provided by licensed lawyers or notaries; or

  (iv) services of expert witnesses or factual witnesses used in court or legal proceedings; or

(i) procurement of goods or services:

(i) financed primarily from donations that require the procurement to be conducted in a manner inconsistent with the CFTA;

(ii) by TRCA on behalf of an entity not covered by the CFTA;

(iii) between one government body or enterprise and another government body or enterprise;

(iv) from philanthropic institutions, non-profit organizations, prison labour, or natural persons with disabilities; or

(v) under a commercial agreement between a procuring entity which operates sporting or convention facilities and an entity not covered by the guidelines that contains provisions inconsistent with the guidelines.

Attachment 6 – Limited Tendering Criteria

Limited tendering may occur for the following circumstances, however, TRCA may elect to conduct a competitive process for transparency, best value, or other reasons. Consult with Procurement and Legal Services if you are unsure if one of these scenarios exists.

Mandatory consultation with Procurement and Legal Services is required prior to initiating a limited tendering process.

Scenario		Example	Notes
(a) If conducted a procurement process in accordance with the Procurement Policy and provided that the requirements of the original competitive procurement documentation are not substantially modified:	(i) No bids were submitted, or no vendors requested participation;		
	(ii) no bids that conform to the essential requirements of the solicitation documentation were submitted;	TRCA has asked for A and the proponent is proposing B.	Can be used for when none of the bids have met the minimum scoring requirements in an RFP process or all of the bids have been disqualified. Not to be used because TRCA is unhappy with the bids, or unhappy with the prices and want to re-scope.
	(iii) no bids satisfied the conditions for participation; or	No bidders attend a mandatory bidders meeting or no bidders had specific certification that is required.	
	(iv) the submitted bids were collusive.	In bidding for public sector construction work, construction firms would collude in setting artificially high prices. Firms would decide which contracts they	When rival firms agree to work together by setting higher prices in order to make higher profits.

		wanted, and rivals would bid purposefully high price.	
(b) if the goods or services can be supplied only by a particular vendor and no reasonable alternative or substitute goods or services exist for any of the following reasons:	(i) the requirement is for a work of art;	A painting by famous painter.	Does not apply to massively produced works of art (e.g. Ikea art).
	(ii) the protection of patents, copyrights, or other exclusive rights;	IT software.	
	(iii) due to an absence of competition for technical reasons;	Purchase of rain or stream gauge equipment or certain hydraulic modelling services.	
	(iv) the supply of goods or services is controlled by a vendor that is a statutory monopoly;	Utilities (Bell, Toronto Hydro, Rogers), or the LCBO.	Cannot be legally purchased elsewhere.
	(v) to ensure compatibility with existing goods, or to maintain specialized goods that must be maintained by the manufacturer of those goods or its representative;	A piece of equipment won't function unless the part is replaced or maintenance occurs by the manufacturer or its representative.	Does not apply to services.
	(vi) work is to be performed on property by a contractor according to provisions of a warranty or guarantee held in respect of the property or the original work;		
	(vii) work is to be performed on a leased building or related property, or portions thereof, that may be performed only by the lessor; or	Quadreal is retained to provide roof repairs at 101 Exchange Ave.	
	(viii) the procurement is for subscriptions to newspapers, magazines, or other periodicals.		
(c) For additional deliveries by the original vendor of goods or services that were not included in the initial solicitation, if a change of vendor	(i) cannot be made for economic or technical reasons such as requirements of interchangeability or interoperability with existing equipment, software,	Further improvements to LID tool.	Allowed to go back to the original scope provider but internal justification is needed as to why it wasn't included in the

for such additional goods or services:	services, or installations procured under the initial procurement; and		original scope. Primarily used for IT procurement.
	(ii) would cause significant inconvenience or substantial duplication of costs for TRCA.	Contractor is already on site and doing work and there is another slope failure and additional work is required - this would reduce duplication of mobilization costs.	During consultation, the scope, risk, value, relativity to the project, and the circumstances arising will be examined.
(d) if strictly necessary, and for reasons of urgency brought about by events unforeseeable by TRCA, the goods or services could not be obtained in time using an open competitive procurement;		Natural disasters, EOC is activated, roof is blown off one of our residential rental properties (includes work associated with insurance claims).	Emergency, not to be used for poor planning.
(e) for goods purchased on a commodity market;		Wheat, coffee, sugar, fruit, coco, precious metals.	Not for manufactured products.
(f) if TRCA procures a prototype or a first good or service that is developed in the course of, and for, a particular contract for research, experiment, study, or original development[1];		TRCA is approached to trial a new product or 3D printing services to create a unique product or part for a piece of equipment.	Not used for a pilot project.
(g) for purchases made under exceptionally advantageous conditions that only arise in the very short term in the case of unusual disposals such as those arising from liquidation, receivership, or bankruptcy, but not for routine purchases from regular vendors;		A supplier is going out of business due to bankruptcy or other circumstances and there is a deep discounted sale.	

[1] Original development of a first good or service may include limited production or supply in order to incorporate the results of field testing and to demonstrate that the good or service is suitable for production or supply in quantity to acceptable quality standards, but does not include quantity production or supply to establish commercial viability or to recover research and development costs.

(h) if a contract is awarded to a winner of a design contest provided that:	(i) the contest has been organized in a manner that is consistent with the principles of the CFTA, in particular relating to the publication of a tender notice; and		Cannot limit the contest to Province of Ontario. Does not apply to design charrette, or design build.
	(ii) the participants are judged by an independent jury with a view to a design contract being awarded to a winner.		
(i) if goods or consulting services regarding matters of a confidential or privileged nature are to be purchased and the disclosure of those matters through an open competitive procurement process could reasonably be expected to compromise government confidentiality, result in the waiver of privilege, cause economic disruption, or otherwise be contrary to the public interest [2].		TRCA requires a consultant to deal with an HR issue.	

[2] In using limited tendering under this paragraph (i), compliance with Article 516 of the CFTA (Transparency of Procurement Information) is also not required (e.g., the procuring entity is not required to post award information).

Attachment 7 - Contingency Summary

Contingency Range	# of Contracts 2018	# of Contracts 2019	% of Contracts 2018	% of Contracts 2019	Total Contract Cost 2018	Total Contract Cost 2019	Total Contingency 2018	Total Contingency 2019
0% - 9%	55	**53**	18%	**15%**	$6,371,848.78	**$12,467,383.08**	$6,355.00	**$5,856.78**
10% - 15%	199	**228**	65%	**66%**	$51,858,325.93	**$25,277,437.51**	$1,087,486.00	**$2,493,681.33**
16% - 20%	40	**53**	13%	**15%**	$4,546,846.61	**$8,201,763.15**	$143,214.00	**$1,363,633.44**
21% - 30%	12	**11**	4%	**3%**	$1,615,582.81	**$400,240.62**	$33,179.00	**$81,244.52**
Greater than 30%	1	**1**	0%	**0%**	$10,300.00	**$45,274.00**	$0.00	**$12,000.00**
TOTAL	**307**	**346**	**100%**	**100%**	**$64,402,904.13**	**$46,392,098.36**	**$1,270,234.00**	**$3,956,416.07**

Total Contingency Approved ($) 2018	Total Contingency Approved ($) 2019	Total Contingency Approved (%) 2018	Total Contingency Approved (%) 2019	Total Contingency Used ($) 2018	Total Contingency Used ($) 2019	Total Contingency Used (%) 2018	Total Contingency Used (%) 2019	Total Awarded Bidders 2018	Total Awarded Bidders 2019
$7,084,861.94	**$3,956,416.07**	12%	**9%**	$1,270,234.00	$527,295.00	18%	13%	261	**379**

Item 7.3

Section I – Items for Board of Directors Action

TO: Chair and Members of the Board of Directors
Meeting #3/20, Friday, April 24, 2020

FROM: Michael Tolensky, Chief Financial and Operating Officer

RE: **SUPPLY OF SHORT-TERM RENTAL VEHICLES**
Award of Contract 10022750

KEY ISSUE
Award of contract for the supply of short-term rental vehicles.

RECOMMENDATION

WHEREAS Toronto and Region Conservation Authority (TRCA) currently owns and operates a fleet of 105 motor vehicles and periodically requires Short-Term Rental (STR) Vehicles to facilitate program operations and the implementation of deliverables during peak operating season;

AND WHEREAS TRCA staff has identified a need for STR Vehicles during peak operating season to assist in the implementation of projects and programs having a demand for fleet resources;

AND WHEREAS TRCA solicited proposals for STR Vehicles through a publicly advertised process and evaluated the proposals based on pre-established criteria;

THEREFORE, LET IT BE RESOLVED THAT TRCA award contract 10022750 to Thomas Solutions for the supply of STR Vehicles for a period of three (3) years effective the date of agreement execution being the highest ranked proponent, having a total cost of $765,000 plus applicable taxes, to be expended as authorized by TRCA staff;

THAT TRCA staff be authorized to approve additional expenditures to a maximum of 10% of the contract value, plus applicable taxes, in excess of the contract cost as a contingency allowance if deemed necessary;

THAT should TRCA staff be unable to negotiate a contract with the above-mentioned proponent, staff be authorized to enter into and conclude contract negotiations with other Proponents that submitted proposals, beginning with the next highest ranked Proponent meeting TRCA specifications;

AND FURTHER THAT authorized TRCA officials be directed to take necessary action to implement the contract, including obtaining any required approvals and the signing and execution of any documents and any extension periods as approved.

BACKGROUND
TRCA's Vehicles and Equipment (Fleet) unit provides a range of services to various TRCA programs which rely on fleet assets to facilitate program operations and complete identified deliverables.

Peak operating season ranges from March/April through November for most TRCA projects and programs, however, periodically this extends beyond the typical peak season in some instances. Demand on TRCA owned fleet increases during this time, however, workload and scheduling is such that STR Vehicle demand similarly increases for projects and programs. Analysis of past vehicle rentals has shown approximately 40 STR Vehicles have been required on an annual basis to support programs. These vehicles range in classification and configuration pending program requirements.

The duration a STR Vehicle remains in service during the operating season varies pending project and program requirements, however, this timing typically ranges from two – ten months. In past operating seasons, STR Vehicles were acquired on an as-needed basis by various TRCA programs. To streamline STR Vehicle demand and improve efficiencies in the management and oversight of STR Vehicles the administration and management was brought under the purvue of the Vehicles and Equipment (Fleet) unit in 2019. It was at this time TRCA staff acknowledged the need for a long-term vendor and began planning for implementation in 2020 to improve operational efficiencies.

RATIONALE

Contract 10022750 was posted on the procurement portal www.biddingo.com on January 6th 2020 with a closing date of February 6th, 2020. Questions and or comments related to the contract were received until January 24th, 2020. Questions received were related to clarifications from the scope of work, subsequently an addendum was posted to www.biddingo.com on January 27th,2020 for all proponents. A total of ten (10) proponents downloaded the documents and four (4) proposals were received from the following proponents:

- Discount Car and Truck Rentals
- Enterprise Rent-a-Car
- The Driving Force
- Thomas Solutions

An evaluation committee comprised of staff from TRCA's Corporate Services and Restoration and Infrastructure Division reviewed the proposals. The criteria used to evaluate and select the recommended Proponent included the following.

Criteria	Weight (%)	Minimum Score (%)
Proponents Information and Profile	20	-
Key Personnel	10	-
Experience and Methodology	20	-
Scope of Work Capabilities	10	-
Sub-Total Proposal	60	30
Pricing	40	-
Sub-Total Pricing	40	-
Total Points	100	-

Thomas Solutions achieved the highest overall score based on the evaluation criteria. Therefore, it is recommended that RFP 10022750 be awarded to Thomas Solutions at a total annual cost of not to exceed $255,000 plus 10% contingency, plus applicable taxes, it being the highest ranked proponent meeting TRCA specifications. Proponents scores and staff analysis of the evaluation results can be provided in an in-camera presentation, upon request.

Relationship to Building the Living City, the TRCA 2013-2022 Strategic Plan
This report supports the following strategy set forth in the TRCA 2013-2022 Strategic Plan:
Strategy 7 – Build partnerships and new business models

FINANCIAL DETAILS
Funds are available in TRCA Vehicle and Equipment Acquisition fund (701-11) throughout the duration of the contract.

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Date: February 27, 2020

Item 7.4

Section I – Items for Board of Directors Action

TO: Chair and Members of the Board of Directors
Meeting #3/20, Friday, April 24, 2020

FROM: Moranne McDonnell, Director, Restoration and Infrastructure

RE: **VENDOR OF RECORD FOR SUPPLY AND DELIVERY OF VARIOUS EROSION AND SEDIMENT CONTROL MATERIALS – CONTRACT EXTENSION**

KEY ISSUE
Extension of Contract No. 10020448 expiry date from May 6, 2020 to May 6, 2021.

RECOMMENDATION

WHEREAS Toronto and Region Conservation Authority (TRCA) is engaged in a variety of programs/projects that require the utilization of erosion and sediment control materials;

AND WHEREAS TRCA solicited proposals through a publicly advertised process and awarded Contract No. 10020448 to Armtec-Canada Culvert, Devron Sales Ltd., and Organic Express Inc. at Board of Directors Meeting RES.#A69/19;

AND WHEREAS staff are satisfied with the goods and services provided to date under the current contract;

THEREFORE, LET IT BE RESOLVED THAT TRCA staff be directed to exercise their contractual right to extend the Vendor of Record arrangement with Armtec-Canada Culvert, Devron Sales Ltd., and Organic Express Inc. for the supply and delivery of various erosion and sediment control materials for an additional year;

THAT Contract No. 10020448 for supply and delivery of various erosion and sediment control materials be extended at a total cost not to exceed $472,200, plus applicable taxes, to be expended as authorized by TRCA staff;

THAT vendors may increase unit rates at the time of extension in accordance with the original contract terms;

THAT if a situation is present where the vendors of record are not available for a particular project, staff be authorized to follow the Procurement Policy to retain a vendor;

AND FURTHER THAT authorized TRCA officials be directed to take whatever action may be required to implement the vendor of record extension, including obtaining any necessary approvals and the signing and execution of any documents.

BACKGROUND
TRCA requires various materials for preventing erosion and sediment deposition in waterways adjacent to a variety of engineering, habitat restoration and trail building projects throughout TRCA's jurisdiction. Through a VOR arrangement for erosion and sediment control materials, vendors are authorized to provide these goods and services for a defined period of time and with fixed pricing. In accordance with the contract documents for the VOR arrangement, staff

may issue Purchase Orders for any vendor on the list with the goods, expertise and experience required for their project or program requirements.

Furthermore, where the suppliers on the VOR list are not available for a particular project within the timelines required for TRCA to meet its deliverables, staff are authorized to procure the required goods and services following TRCA's Procurement Policy. Vendors are required to provide all resources required to service the divisional or program needs in accordance with applicable laws, codes, standards, terms and conditions of the vendor of record agreement.

At Board of Directors Meeting #4/19, held on April 26, 2019, Resolution #A69/19 was approved in part as follows:

> *THAT TRCA staff be directed to establish a Vendor of Record arrangement with Armtec-Canada Culvert, Devron Sales Ltd., and Organic Express Inc. for the supply and delivery of various erosion and sediment control materials for one (1) year with the option to extend for an additional year;*

RATIONALE
On February 26, 2020 the Evaluation Committee for this contract conducted an annual review of the performance of vendors for Contract 10020448. The Committee recommended extending the current contract for an additional year with all vendors, as the value and quality of services delivered by the vendors under this contract was deemed satisfactory by TRCA staff.

Based on the daily expenditures during the term of the contract, the proposed extension period from May 6, 2020 to May 6, 2021 will require an increase in value of the contract by $402,550. An additional $8,050 is required for a potential increase of vendor unit rates by 2%, to account for Consumer Price Index (CPI) adjustments; plus $61,600 to account for a projected increase in orders by 15% during the extension term, for a total value of $472,200, plus applicable taxes.

Relationship to Building the Living City, the TRCA 2013-2022 Strategic Plan
This report supports the following strategies set forth in the TRCA 2013-2022 Strategic Plan:
Strategy 2 – Manage our regional water resources for current and future generations
Strategy 7 – Build partnerships and new business models

FINANCIAL DETAILS
The anticipated value of the extension of this contract is approximately $472,200 plus applicable taxes. An increase or decrease in workload will have an impact on the value of this contract. All vendors on the VOR list understand both the potential cost and resource implications associated with changes in workload. The services will be provided on an "as required" basis with no minimum hours guaranteed.

Vendors may increase unit rates, to a maximum of the preceding year's Ontario Consumer Price Index (Toronto – All Items category) as published by Statistics Canada, at the time of extension. The most recent data published by Statistics Canada indicates a percentage change of +1.6 for the period of January 2019 – January 2020; which translates to a 1.6% increase in vendor unit rates across all material categories. The value increase being proposed for this contract extension assumes a 2% increase of unit rates at the time of extension (May 6, 2020) for all Vendors.

Funds for this contract are identified in a variety of capital and cost recoverable project accounts.

Item 7.4

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Item 7.5

Section I – Items for Board of Directors Action

TO: Chair and Members of the Board of Directors
Meeting #3/20, Friday, April 24, 2020

FROM: Michael Tolensky, Chief Financial and Operating Officer

RE: **GREENSPACE ACQUISITION PROJECT 2021-2030**

KEY ISSUE

Approval of Toronto and Region Conservation Authority's (TRCA) Greenspace Acquisition Project for 2021-2030.

RECOMMENDATION

THAT the Greenspace Acquisition Project for 2021-2030, as provided in this report be approved;

THAT the Minister of the Environment, Conservation and Parks be requested to approve the project pursuant to Section 24 of the *Conservation Authorities Act*;

THAT authorized TRCA officials be directed to take any necessary action to implement the Greenspace Acquisition Project 2021-2030;

AND FURTHER THAT staff report back to the Board of Directors on a Greenspace Securement and Management Plan in Q4 of 2020.

BACKGROUND

TRCA is permitted to secure greenspace in order to provide the programs and services provided in Section 21(1) of the *Conservation Authorities Act* (R.S.O. 1990, c. C.27), which states:

> For the purposes of accomplishing its objects, an authority has power,
>
> c) to acquire by purchase, lease or otherwise and to expropriate any land that it may require, and, subject to subsection (2), to sell, lease or otherwise dispose of land so acquired.

Section 24 of the *Conservation Authorities Act* states:

> (1) Before proceeding with a project, the authority shall file plans and a description with the Minister and obtain his or her approval in writing.

TRCA has received Ministerial approval for past Greenlands Acquisition Projects to meet the requirements in Section 24 of the *Conservation Authorities Act* so that land sale funding can be used to secure lands under the project. Under the project, whenever any land or any use or right therein is secured, it is being secured for one or more of the following purposes: flood control, erosion control, bank stabilization, shoreline management works or the preservation of environmentally sensitive lands. Among other things, Ministerial approval enables TRCA to acquire land through Crown Right, an exemption under the *Planning Act* to secure land without having to follow the municipal consent process under Section 51 of the *Planning Act*.

The *Conservation Authorities Act* is currently under review. Should there be changes to the *Act* resulting in new considerations, staff will report back to the Board with an updated Greenspace Acquisition Project.

If it is determined by TRCA that the land, use or right therein, is not being secured for any of these purposes, TRCA will comply with the consent provisions of the *Planning Act* (Government of Ontario, 1990b) prior to securement, as applicable.

RATIONALE

Greenspace Acquisition Project 2021-2030

Land is a foundational piece of TRCA's work. TRCA needs to be able to secure greenspace expeditiously to deliver its programs and services in a timely and effective manner.

The Greenspace Acquisition Project for 2021-2030, when approved by the Ministry of the Environment, Conservation and Parks under Section 24 of the *Conservation Authorities Act*, will be the chief legal mechanism used by TRCA to secure greenspace lands for their protection.

Criteria for Securement

TRCA has established its criteria for greenspaces to be secured based on Section 20 of the *Conservation Authorities Act* and through working with its partner municipalities to deliver agreed upon projects in support of its vision and updated Strategic Plan. These criteria include:

- Flood control, flood vulnerable, erosion control and reservoir project lands, and associated access lands
- Valley and stream corridors
- Lake Ontario waterfront
- Environmentally Significant Areas
- Life Science Areas of Natural and Scientific Interest
- Wetlands
- Kettle lake or wetland features
- Highly Vulnerable Aquifers
- Carolinian forest
- Important woodland/vegetation/habitat linkages
- Interior forest areas, and/or lands which contribute to the expansion of interior forest habitats
- Riparian habitat zones
- Habitat for aquatic and terrestrial species of concern and sensitive species, including those listed under the *Species at Risk Act* and the *Endangered Species Act*
- Lands identified for the target system in TRCA's watershed plans and Terrestrial Natural Heritage System Strategy and municipal natural heritage systems
- Significant Groundwater Recharge Areas
- Landform Conservation Areas Categories 1 and 2 on the Oak Ridges Moraine
- Lands identified in the Niagara Escarpment Plan, especially Escarpment Natural Areas and Escarpment Protection Areas
- Lands that provide terrestrial and aquatic habitat restoration opportunities, including lands identified as priority for ecosystem restoration
- Links for a regional trail system

- Links to greenspace systems in neighbouring conservation authorities
- Lands that are identified by TRCA in cooperation with its member municipalities and/or the Province of Ontario as being complementary to the TRCA greenspace system
- Lands that provide access to lands secured by TRCA
- Lands that provide a buffer from surrounding land uses to the aforementioned areas.

Factors for Securement
Each potential property will be evaluated on its suitability for securement according to the following factors:

- The significance of the lands to the greenspace system.
- The nature and immediacy of the threat to the greenspace (such as vacant lots of record in natural areas which have existing development rights).
- The degree of flood and erosion risk.
- The need for the greenspace to support TRCA projects and programs.
- The relationship of a specific property to those already in public ownership (e.g., securing greenspaces around existing TRCA properties which results in larger, more intact areas that are better buffered from surrounding land uses and which supports greater protection of people and property).
- The availability of access to the property.
- The ability to achieve an equitable geographic distribution of greenspace.
- The ability of TRCA or other agencies to conserve and maintain the greenspace.
- The availability of alternatives to securement, such as stewardship or regulation.
- The willingness of the owner to enter into negotiations.
- The costs and availability of funding for both securement and long-term management.

Securement Types and Tools
There are several kinds of property ownership. TRCA secures full interest in properties through fee simple and limited interests through easements, covenants, leases or agreements. Each has costs and benefits so the appropriate type of ownership to ensure the protection of the features or functions of the greenspace is determined based on the quality and significance of available resources.

TRCA uses several tools for securing property rights, including the planning process, arms-length transaction, donation, land exchange, expropriation, extended tenancy, right of first refusal, joint ownership, purchase and resale, and agreement. These tools may be used alone or in combination.

Relationship to Building the Living City, the TRCA 2013-2022 Strategic Plan
This report supports the following strategies set forth in the TRCA 2013-2022 Strategic Plan:
Strategy 3 – Rethink greenspace to maximize its value
Strategy 4 – Create complete communities that integrate nature and the built environment
Strategy 7 – Build partnerships and new business models
Strategy 12 – Facilitate a region-wide approach to sustainability

FINANCIAL DETAILS

Past greenspace securement funding has varied in source and type of contribution:

Source	Contribution
Participating Municipalities	Capital levy Securement funding programs
Private Owners	Donation of land as a condition of development approval Land exchange includes land and due diligence costs
Federal Government	Securement funding programs
Provincial Government	Land sale revenue
Local Municipalities	Securement funding programs
Non-government Organizations	Securement funding programs Donations Fundraising Knowledge and information

The City of Toronto primarily conducts their own greenspace securement with certain exceptions. The regional municipalities of Durham, Peel and York all have greenspace securement funds to which TRCA is eligible to apply. In addition, these municipalities contribute to TRCA greenspace securement costs at a rate of $0.70 per $1 in the Regional Municipality of Peel, $0.50 per $1 in the Regional Municipality of York and $0.40 per $1 in the Regional Municipality of Durham. TRCA's other participating municipalities do not have similar funding contribution arrangements. It should be noted that City of Toronto pays for the management of the majority of TRCA-owned lands within the City under the 1961 and 1972 Management Agreements.

Once acquired, TRCA manages lands to provide its programs and services. The cost of managing TRCA lands varies depending on the programs and services to which the land contributes. These costs will be refined in the Greenspace Securement and Management Plan being developed by staff.

DETAILS OF WORK TO BE DONE

- Subject to Board of Director's approval, apply for project approval from the Minister of the Environment, Conservation and Parks.
- Continue to work with TRCA's partner municipalities and other stakeholders to secure greenspace that supports TRCA programs and services.
- Develop a more detailed Greenspace Securement and Management Plan and report to the TRCA Board of Directors in Q4 of 2020. The document will explain TRCA's systematic approach to land acquisition, discuss some priorities for acquisition and provide transparent rationale as to why properties are acquired and how those lands will be managed in support of its programs and services.

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Date: February 10, 2020

Item 7.6

Section I – Items for the Board of Directors Action

TO: Chair and Members of the Board of Directors
Meeting #3/20, Friday, April 24, 2020

FROM: Michael Tolensky, Chief Financial and Operating Officer

RE: **REPORT ON TRCA IN-HOUSE LEGAL CAPACITY AND STATUS OF CONTINUOUS IMPROVEMENT EFFORTS**

KEY ISSUE

Status update on Toronto and Region Conservation Authority (TRCA) efforts to build in-house legal capacity and investigate further potential cost savings through efficiencies and cost recovery.

RECOMMENDATION

THAT this staff report regarding TRCA's in-house legal capacity and cost saving measures involving partner municipalities be received;

AND FURTHER THAT staff be directed to examine opportunities for coordinated representation of TRCA's interests for Local Planning Appeal Tribunal (LPAT) matters where feasible.

BACKGROUND

TRCA hired its first in-house legal counsel position in the organization's history in February 2019. This role provides legal advice and support to the Board of Directors, TRCA's Senior Leadership Team and staff across all divisions in respect of contracts, agreements, claims, litigation, policies and procedures, legislation, land use and environmental planning matters, real estate matters, and oversees TRCA's risk management and insurance programs.

Having in-house legal counsel is a best practice for an organization of TRCA's magnitude and was further driven by an increase in the scope and complexity of TRCA's operations. TRCA's 2020 annual budget, which includes projected expenses in excess of $200 million represents an increase of over 100% from five years ago (2016), primarily driven by construction contracts for TRCA projects and fee-for-service agreements with partner municipalities.

TRCA expended over $1 million in external legal fees in 2018.

During discussions with the Board of Directors on various items, questions have been asked on whether there is further opportunity to reduce or share costs related to legal services. This status update helps to address those questions.

RATIONALE

Legal services are a corporate service within TRCA's Property and Risk Management business unit. Direct reports to the Legal Counsel position include a Risk Advisor and a Law Clerk. The Risk Advisor is responsible for administration of claims and insurance matters and coordinating TRCA's risk management program. The Law Clerk is a new one-year contract position that will enable property conveyances and other land transactions, registrations, title searches and lien checks to be completed in-house. The Law Clerk will also assist with other contracts and agreements, as assigned.

Legal services provided in-house include:

- Negotiating, drafting and approving contracts and agreements, including Service Level Agreements and Management Agreements with municipalities;
- Legal advice on planning matters, including development applications and appeals before the Local Planning Appeal Tribunal;
- Real property matters, including drafting and review of easement agreements, restrictive covenants and leases;
- Advice on legislation including the *Conservation Authorities Act*, *Planning Act*, *Environmental Assessment Act, Municipal Freedom of Information and Protection of Privacy Act, Conservation Land Act* and *Construction Act*; and
- Retaining external counsel and managing associated legal accounts.

TRCA retains external legal services through a Vendor of Record (VOR) arrangement with several full service law firms. Currently, TRCA outsources human resources matters, real estate transactions, complex agreements, specialized legal advice, and litigation including insured claims. The VOR procurement process was conducted in 2016 and existing agreements cover the period until January 31, 2021. A new procurement process will be conducted in 2020, and new agreements will in place when existing agreements expire. A review of external legal expenditures since 2016 will be conducted to identify cost efficiencies and inform the procurement process.

The cost of external legal services is born by TRCA with limited exceptions, such as defence costs for insured claims and land transfers with municipalities. Bringing basic real estate services and transactions in-house will decrease external legal expenditures. Further, there is opportunity to consider cost recovery fees for property and legal services as part of updates to TRCA fee schedules, once *Conservation Authority Act* amendments come into force.

One opportunity that has been discussed is the notion of sharing the costs of external legal counsel with partner municipalities, if the municipality and TRCA are aligned. While this measure could help address some situations where there is alignment between partner municipality and TRCA, it would remove or limit TRCA's ability to act independently from the municipality if there was a change in direction by either party. While a joint retainer of counsel may be possible where a settlement is likely, it is not without risks. Staff will consider this opportunity based on various factors in the future based on the specific sitaution.

Relationship to Building the Living City, the TRCA 2013-2022 Strategic Plan
This report supports the following strategy set forth in the TRCA 2013-2022 Strategic Plan:
Strategy 7 – Build partnerships and new business models

FINANCIAL DETAILS
As legal expenditures exceeded $1 million in 2018, staff project that in-house legal counsel will result in cost savings from completing selected functions internally. The goal is to advance a business case through a future budget process to make the Law Clerk position permanent, through bringing certain real estate services and transactions in house.

DETAILS OF WORK TO BE DONE
Activities to continue to build legal services capacity include:

- Conduct review of external legal expenditures under the existing VOR arrangement.
- Report to Board of Directors on results of the VOR procurement process and execute

new agreements with external legal firms.
- Explore opportunities to coordinate legal representation and share costs with municipalities, in particular for low risk hearings.
- Subject to *Conservation Authorities Act* changes and regulations, bring forward for consideration in TRCA's fee schedules proposed fees for legal agreements and land transactions on a cost recovery basis.

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Date: March 12, 2020

Item 7.7

Section I – Items for Board of Directors Action

TO: Chair and Members of the Board of Directors
Meeting #3/20, Friday, April 24, 2020

FROM: Moranne McDonnell, Director, Restoration and Infrastructure

RE: **CENTENNIAL COLLEGE PROGRESS CAMPUS-MILITARY TRAIL ROAD MULTI-USE TRAIL**

KEY ISSUE

Staff report on the Member Motion regarding the progress on restoration of connections and bridges between the Centennial College Progress Campus and Military Trail Road to create a multi-use trail including the funding required for the project.

RECOMMENDATION

THAT this report on the status to restore connections and bridges between the Centennial College Progress Campus and Military Trail Road to create a multi-use trail including the funding required for the project be received;

AND FURTHER THAT staff work with the City of Toronto on this project once it is identified in a City of Toronto capital plan.

BACKGROUND

TRCA has been in discussion with the City of Toronto regarding the opportunity to create a multi-use trail in the greenspace of the Highland Creek ravine between the Centennial College Progress Campus and Military Trail Road in Scarborough (see Attachment 1). The area includes steep-sloped valleys and is bordered by residential development in the surrounding tablelands. The land is owned by Toronto and Region Conservation Authority (TRCA) and managed by the City of Toronto.

The area has an existing trailhead, and a significant amount of capital infrastructure including; a water access easement, sanitary sewer crossings, revetments, weirs, bed controls, outfalls, manholes and retaining walls. The City of Toronto's preliminary feasibility assessment has identified that at least two bridges would be required to cross the Highland Creek in support of a trail connection.

At the City of Toronto's Public Works and Infrastructure Committee meeting #25/17, held on November 29, 2017, Item 25.14 was referred to the Budget Committee for consideration in the 2018 budget process as follows:

> *That City Council request the General Manager, Transportation Services, and the Acting Chief Financial Officer, to include funding to commence the work to complete the Military Trail Multi-Use Trail to Centennial College Progress Campus for consideration in the 2018 budget process with other City priorities.*
>
> *That the General Manager of Transportation Services work in consultation with TRCA and Parks, Forestry and Recreation to commence the work and restore connections and bridges between the Centennial College Progress Campus and Military Trail Road.*

An update on this proposed project was provided in Attachment 10 of the City of Toronto's Cycling Network Plan Update as received by City Council at Meeting #9/19, held on July 16 – 18, 2019. The report indicated that the City Toronto's Transportation Services, Parks, Forestry and Recreation, and Toronto Water would review this as a future project, but that there are several higher priority projects to be completed in the area.

At Toronto and Region Conservation Authority's (TRCA) Executive Committee Meeting #11/19, held on February 7, 2020, Resolution #B150/19 was approved as follows:

> *THAT the Toronto Region Conservation Authority include funding to plan for the design and implementation process to complete a Military Trail Multi-Use Trail to Centennial College Progress Campus in the 2020 budget process;*
>
> *AND FURTHER THAT Toronto Region Conservation Authority staff report back to the Board of Directors at the scheduled April 24, 2020 Board of Directors meeting on the progress to restore connections and bridges between the Centennial College Progress Campus and Military Trail Road to create a multi-use trail including the funding required for the project.*

RATIONALE

The Highland Creek ravine between the Centennial College Progress Campus and Military Trail Road is owned by Toronto and Region Conservation Authority (TRCA), however it is managed by the City of Toronto under the 1972 land management agreements. Therefore, all management and development costs of this land, including trail management and development, are the responsibility of the City of Toronto. Accordingly, TRCA has not assigned any budget to the development of a multi-use trail connection in the area of interest.

This proposed connection is not identified in TRCA's Trail Strategy for the Greater Toronto Region (Trail Strategy) because it is not classified as a regional trail based on the definition within the Trail Strategy. It is also not part of The Loop Trail concept identified as part of implementing the City of Toronto's Ravine Strategy. TRCA does recognize that the proposed trail would be a connector to the regional trail network as it facilitates connection to the multi-use trail in The Meadoway.

TRCA staff is working actively with City of Toronto staff to coordinate trail development and improvement projects in support of the Trail Strategy and City of Toronto priorities. Staff has reached out to the City of Toronto regarding the Military Trail Multi-Use Trail, and have indicated the following:

- This area is outside of the key actions and recommendations required to implement the Ravine Strategy over the next 10 years
- Other large trail initiatives such as The Meadoway and Upper Highland Creek Trail will provide a more direct connection to this local trail
- Preliminary feasibility of this proposed connection to Centennial College has indicated that at least two bridges may be required, some of them significant in size, crossing the Highland Creek
- This is a very challenging project, with a very high cost and it may not even be able to facilitate the minimum standards of a multi-use for both pedestrians and cyclists

- There are no current capital plans to develop a trail at this location in City of Toronto Parks, Forestry and Recreation or Transportation Services budgets.

Based on consultations with City of Toronto staff and given the significant and costly infrastructure that this project would require, TRCA staff believe that planning for this project at this time is premature and should be deferred until such time as the project is identified in a City of Toronto capital plan or special project.

Relationship to Building the Living City, the TRCA 2013-2022 Strategic Plan
This report supports the following strategy set forth in the TRCA 2013-2022 Strategic Plan:
Strategy 4 – Create complete communities that integrate nature and the built environment

FINANCIAL DETAILS
Any TRCA work associated with the development of a multi-use trail connection in the area of interest will be on a fee-for-service basis under the existing Master Service Agreement with the City of Toronto.

DETAILS OF WORK TO BE DONE

- In support of the Trail Strategy, TRCA will continue to meet with the City of Toronto to coordinate trail project implementation plans, seek opportunities for partnership, secure land and easements, and address trail ownership and management.

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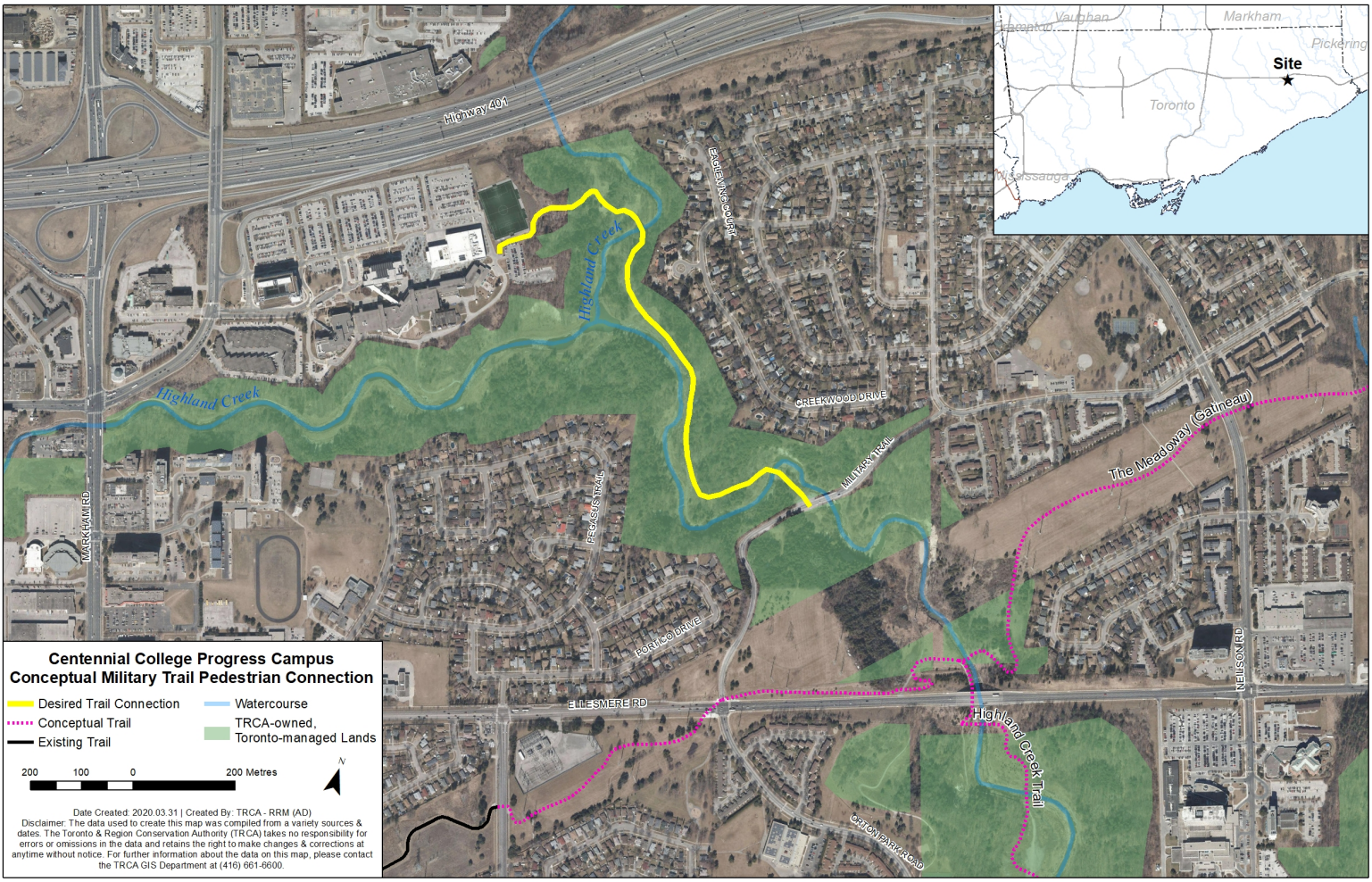
Date: March 12, 2020
Attachments: 1

Attachment 1: Centennial College Progress Campus to Military Trail Conceptual Pedestrian Connection


Centennial College Progress Campus
Conceptual Military Trail Pedestrian Connection
Desired Trail Connection
Conceptual Trail
Existing Trail
Watercourse
TRCA-owned, Toronto-managed Lands
200 100 0 200 Metres
N
Date Created: 2020.03.31 | Created By: TRCA - RRM (AD)
Disclaimer: The data used to create this map was compiled from a variety sources & dates. The Toronto & Region Conservation Authority (TRCA) takes no responsibility for errors or omissions in the data and retains the right to make changes & corrections at anytime without notice. For further information about the data on this map, please contact the TRCA GIS Department at (416) 661-6600.
Highway 401
Highland Creek
Highland Creek
MARKHAM RD
EASTVIEW HTS COURT
GREENWOOD DRIVE
MILITARY TRAIL
PEGASUS TRAIL
PORTICO DRIVE
ELLESMERE RD
The Meadoway (Catineau)
NELSON RD
Highland Creek Trail
ORTON PARK ROAD
Site
Vaughan
Markham
Pickering
Toronto

Item 7.8

Section I – Items for Board of Directors Action

TO: Chair and Members of the Board of Directors
Meeting #3/20, Friday, April 24, 2020

FROM: Laurie Nelson, Director, Policy Planning
Barbara Montgomery, Legal Counsel

RE: **UPDATE ON PLANNING ACT RELATED MEMORANDUMS OF UNDERSTANDING AND SERVICE LEVEL AGREEMENTS WITH PARTNER MUNICIPALITIES**

KEY ISSUE

To report back on matters related to Toronto and Region Conservation Authority's (TRCA) role under the *Planning Act* when negotiating Memorandums of Understanding (MOUs) and Service Level Agreements (SLAs) with Partner Municipalities in the context of the updated *Conservation Authorities Act* and enabling regulations.

RECOMMENDATION

WHEREAS through Bill 108, the *More Homes, More Choices Act*, the *Planning Act* was amended to streamline development approvals processes and facilitate faster decisions by reducing decision timelines for municipalities and the province;

THEREFORE, LET IT BE RESOLVED THAT given the reduced timelines for application review under Bill 108, Toronto and Region Conservation Authority (TRCA) staff be directed when negotiating or updating Memorandums of Understandings (MOUs) and Service Level Agreements (SLAs) dealing with *Planning Act* matters, that agreements include provisions to ensure TRCA can provide comments within the statutory timeframes;

THAT such provisions provide a mechanism to ensure official plan policies for complete applications are regularly reviewed to ensure TRCA's requirements are fully reflected; provide for strengthened coordination with TRCA in the municipality's pre-application process; and provide for coordinated representation of municipal and TRCA interests for Local Planning Appeal Tribunal (LPAT) appeals, where feasible;

THAT TRCA continues to work with BILD, consultants, development companies and municipal partners on updated TRCA guidelines, that help with the streamlining of applications;

THAT TRCA ensure that any fees for services provided to municipalities that are recouped from the taxpayers or service users, be collected in accordance with the *Municipal Act* as well as the *Conservation Authorities Act* and associated regulations; and

AND FURTHER THAT the Clerk and Manager, Policy, so advise BILD, the Clerks, the Chief Planning Officials, the Chief Financial Officers, and Legal Counsel of our municipal partners.

BACKGROUND

At Board of Directors Meeting #11/19, held on January 24, 2020, Resolution #A237/19 regarding the "Update on Memorandums of Understanding and Service Level Agreements with Partner Municipalities' report was approved as follows:

> *WHEREAS Toronto and Region Conservation Authority (TRCA) RES.#A121/19, adopted at the June 21, 2019 Board of Directors meeting, directed staff to pursue and execute updated Memorandums of Understanding (MOUs) and Service Level Agreements (SLAs) with its partner municipalities in accordance with the amendments to the Conservation Authorities Act made by Bill 108 and designed to improve accountability and transparency around the work of conservation authorities funded by municipalities;*
>
> *AND WHEREAS the Conservation Authorities Act amendments prompt the need for agreements for non-mandatory programs and services to be negotiated with regional municipalities, City of Toronto and lower tier municipalities as part of the transition plan process following proclamation of the enabling regulations associated with the Bill 108 amendments to the Conservation Authorities Act;*
>
> *AND WHEREAS TRCA delivers a significant amount of value-added services to its partner municipalities that will be further strengthened through SLAs, where formal agreements do not currently exist;*
>
> *AND WHEREAS TRCA staff have held numerous meetings with municipal representatives in our jurisdiction since receiving Board of Directors direction on June 21, 2019;*
>
> *THEREFORE, LET IT BE RESOLVED THAT staff continue to work with partner municipalities to execute updated MOUs and SLAs based on mutually agreed upon services;*
>
> *THAT the Board of Directors representatives in lower tier municipalities request support from their municipal staff in ensuring that consideration is given for TRCA to be relieved from standard purchasing requirements based on their unique expertise and within the scope and mandate of the Conservation Authorities Act (e.g. flood and erosion management) in a manner similar to the City of Toronto and other municipalities in our jurisdiction;*
>
> *THAT staff be directed when negotiating MOUs and SLAs that where there is any conflict between an upper and lower tier municipality for any services related to Planning Act matters, the municipality that is deemed the approval authority under the Planning Act shall prevail;*
>
> *THAT staff report back to the Board of Directors on the progress of these agreements once draft Conservation Authorities Act regulations are released;*
>
> *AND FURTHER THAT the Clerk and Manager, Policy, so advise municipal partners.*

Further to the above, staff were directed to report back to the February 7, 2020 Executive Committee meeting on the potential implementation of the following proposed amendments to Resolution #A237/19:

Resolution #A238/19 (Amendment 1): THAT with Planning Act matters, given the reduced timelines for application reviews under Bill 108, if staff are unable to meet review timelines as needed by the upper or lower tier municipality as applicable, that the MOUs and SLAs include clauses whereby TRCA not be held liable for any ramifications with terms such as "opt out" clauses at the Parties discretion.

Resolution # A239/19 (Amendment 2): THAT staff ensure that any fees for services provided to municipalities that are recouped from the taxpayers or service users, be collected in accordance with the Municipal Act as well as the Conservation Authorities Act.

This report was deferred to the March, (and subsequently the April), meeting of the Board of Directors in order to allow for sufficient review of the implications of the proposed amendments by TRCA's Legal Counsel and senior staff and the state of emergency declared by the Province.

RATIONALE

Toronto and Region Conservation Authority (TRCA) provides technical support to its municipal partners through Memorandums of Understanding and Service Level Agreements in implementing the natural heritage, natural hazard and water resource policies of municipal and provincial plans. In working with approval authorities, along with private and public proponents, TRCA supports comprehensive planning to ensure development and infrastructure are adequately set back and protected from natural hazards and environmentally sensitive areas. In addition to our role as an agency delegated the responsibility to represent the provincial interest on natural hazards under Section 3.1 of the Provincial Policy Statement (PPS), TRCA achieves these goals in the following capacities:

- A public commenting body under the *Planning Act* and *Environmental Assessment Act*;
- A regulatory authority under section 28 of the *Conservation Authorities Act*;
- A Source Protection Authority under the *Clean Water Act*;
- A service provider to our municipal partners;
- A watershed-based resource management agency; and
- A landowner, being second only to the Province in amount of land ownership in TRCA watersheds.

In these roles, consistent with the Province's "Policies and Procedures for Conservation Authority Plan Review and Permitting Activities", TRCA works in collaboration with municipalities and stakeholders to protect people and property from flooding and other natural hazards and to conserve natural resources.

Resolution #A238/19 (Amendment 1)

TRCA recognizes the importance of certainty, efficiency, transparency and accountability in the development review process, so that quality housing supply and supporting infrastructure can be brought to market in a timely and environmentally sustainable manner. TRCA's past and ongoing efforts to increase operational efficiencies, streamline processes and enhance customer service, which collectively aim to support and contribute to provincial priorities to streamline the planning and development approvals process, were outlined in a report to the Board of Directors on March 29, 2019. Since that time, staff have been working closely with our municipal partners, the development community, (BILD, individual development companies, consultants and proponents) and Conservation Ontario to continue these efforts.

Through Bill 108, the *More Homes, More Choices Act*, the *Planning Act* was amended to streamline development approvals processes and facilitate faster decisions by reducing decision timelines for municipalities and the province to 120 days for official plans and amendments, 90 days for zoning by-laws and amendments (except where there is a concurrent official plan amendment) and 120 days for plans of subdivision. In our submission to the Province when these amendments were proposed, TRCA advised that it would be a significant challenge to meet these proposed timelines without, requiring complete information early in the planning process. TRCA finds that when efforts to compile all required information to make decisions are done well and made early, it leads to innovative more sustainable and approvable urban designs that result in shorter review times, more timely approvals by TRCA and by others, and cost reductions in the short and long term for all stakeholders. This collaborative approach, which includes the provision of high quality information in appropriate formats at the front end of the development process, also helps to avoid appeals to the Local Planning Appeal Tribunal (LPAT) thus avoiding delays, costs and uncertainty associated with these appeals processes. Accordingly, TRCA recommended the shortening of timelines be coupled with mandatory or strengthened requirements for pre-consultation and the upfront submission of complete applications with all supporting technical studies to enable timely municipal and agency reviews. A similar recommendation was made by TRCA in response to the recent review of the Provincial Policy Statement (PPS). These recommendations were unfortunately not addressed in the legislation but TRCA continues to advocate for, and work with BILD, consulting companies, and developers to stress the importance of the approach.

Staff have considered the issue of how MOUs and SLAs can respond to the challenge of reduced timelines for application review under the *Planning Act*. Staff recommend MOUs and SLAs include clauses to ensure TRCA can provide its comments within the statutory timeframes. In cases where TRCA staff are unable to meet review timelines and complete applications as a means of streamlining for reasons, including but not limited to, missing or lack of required information, comments should be provided as soon thereafter as possible. Clauses within the MOUs and SLAs should also address these situations to ensure that TRCA's legislated and provincially delegated and regulatory interests are addressed. Municipalities and approval authorities rely on TRCA's technical advice to ensure decisions on planning applications conform to official plans and are consistent with the PPS. It is therefore recommended that given the reduced timelines for application review under Bill 108, MOUs and SLAs dealing with *Planning Act* matters shall ensure TRCA can provide comments within the statutory timeframes by including provisions that:

- Provide a mechanism to ensure official plan policies for complete applications are regularly reviewed to ensure TRCA's requirements are fully reflected*;*
- Provide for strengthened coordination with TRCA in the municipality's pre-application process; and
- Provide for coordinated representation of municipal and TRCA interests for LPAT appeals, where feasible*.*

Resolution # A239/19 (Amendment 2):
TRCA supports a cost recovery approach to setting its fees, consistent with the *Municipal Act* and the *Planning Act*. Under the *Municipal Act*, municipalities may enact bylaws to impose fees and charges for services or activities, or for the use of its property including property under its control. Generally, such fees and charges are determined on a cost recovery basis, as there must be a reasonable relationship between the fee or charge and the cost to deliver the service. Similarly, under the *Planning Act* municipalities may establish fees for the processing of planning applications, designed to meet only the anticipated cost in respect of the processing of

each type of application.

In a similar fashion to municipal partners, TRCA assesses fees for services to recover the costs of delivering the services. Currently, TRCA follows the Ministry of Natural Resources and Forestry (MNRF) Policies and Procedures for Charging of Conservation Authority Fees and TRCA's Planning, Permitting and Environmental Assessment Fees Policy/Guideline 2009, approved at Authority Meeting #10/09, held on January 8, 2010, Resolution #232/09. In 2011, the Authority directed staff to achieve full cost recovery for eligible planning and development services. TRCA reached 100% cost recovery in 2015 and have maintained it since that time. Fee schedules have been approved by the Board of Directors on a biannual basis. A base fee adjustment for cost of living has been applied for every two years, in addition to the provision of a comprehensive level of service /cost recovery assessment. Prior to seeking Board approval of the fee schedules, it has been TRCA's practice to consult with members of BILD on the proposed fee schedules and cost recovery assessment.

Pursuant to the Bill 139 amendments to the *Conservation Authorities Act* in 2017, which are not yet in force, the Minister may determine classes of programs and services in respect of which a conservation authority may charge a fee, and enact regulations respecting the amounts of fees that may be charged for a program or service, including the manner in which fees are calculated. If no amount is prescribed, the fee is the amount determined by the authority. Subject to the *Conservation Authorities Act* and any new enabling regulations, TRCA will continue to establish its fee schedules based on the principle of cost recovery consistent with current provincial MNRF procedures and TRCA policy.

Relationship to Building the Living City, the TRCA 2013-2022 Strategic Plan
This report supports the following strategy set forth in the TRCA 2013-2022 Strategic Plan:
Strategy 7 – Build partnerships and new business models

FINANCIAL DETAILS
Staff are engaged in this legislative review, MOU/SLA, and policy analysis work per the normal course of duty with funding support provided by TRCA's participating municipalities to account 120-12.

DETAILS OF WORK TO BE DONE
TRCA staff will communicate to the Board of Directors, municipal partners and relevant stakeholders, once known, information related to the draft enabling regulations under the *Conservation Authorities Act*. Staff will continue to meet with municipal partners and seek opportunities to ensure TRCA's requirements are fully reflected as part of a complete application under the *Planning Act* and to strengthen coordination with TRCA in the municipal pre-application process in an effort to meet the reduced timelines for application review under Bill 108.

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Date: March 20, 2020

Item 7.9

Section I – Items for Board of Directors Action

TO: Chair and Members of the Board of Directors
Meeting #3/20, Friday, April 24, 2020

FROM: Darryl Gray, Director, Education and Training

RE: **NEW EROSION AND SEDIMENT CONTROL GUIDE FOR URBAN CONSTRUCTION**

KEY ISSUE

Board endorsement of the *Erosion and Sediment Control (ESC) Guide for Urban Construction* and a development review streamlining initiative for construction sites applying continuous monitoring. The Guide was circulated for comments and is now finalized for use in the review of ESC submissions under planning, environmental assessment and TRCA permit processes.

RECOMMENDATION

WHEREAS over 2018 and 2019, based on up-to-date knowledge from science and practice, Toronto and Region Conservation Authority (TRCA) staff developed the draft *Erosion and Sediment Control (ESC) Guide for Urban Construction* (hereafter referred to as 'the Guide") as an update to the 2006 *Greater Golden Horseshoe Area Conservation Authorities ESC Guideline for Urban Construction,* and to provide updated information on TRCA expectations related to the design of ESC plans and reports subject to TRCA review, and the inspection and maintenance of ESC measures during construction;

AND WHEREAS in 2019, TRCA staff sought and received input on the draft Guide from provincial agencies, conservation authorities, municipalities, and private sector stakeholders, including the Building Industry and Land Development Association (BILD), and the Greater Toronto Sewer and Watermain Contractors Association, and have now finalized the Guide;

THEREFORE LET IT BE RESOLVED THAT the Board of Directors endorse the Erosion and Sediment Control Guide for Urban Construction for use, beginning in September 2020, by public and private proponents of construction projects and TRCA staff involved in the development review and approval processes, and enforcement;

THAT in the time leading up to the Guide coming into effect in TRCA's jurisdiction in September 2020, TRCA conduct training workshops for staff, municipal partners and practitioners in the development industry, recognizing changing COVID-19 directives, in order to allow all stakeholders to become familiar with how the Guide will be applied in the review and approval of development applications;

THAT TRCA staff establish a voluntary program to allow for streamlined review and approvals of ESC submissions (plans and reports) for construction projects where the proponent agrees to institute continuous real-time turbidity (suspended sediment concentration) monitoring to evaluate their compliance with the turbidity targets defined in the Guide;

AND FURTHER THAT TRCA assesses, over a three year period, the extent to which

turbidity targets are being achieved by collecting information from pilot sites that are applying continuous turbidity monitoring, and, at that point in time, re-consider the targets and best management practices recommended in the Guide as needed.

BACKGROUND

The *Greater Golden Horseshoe Area Conservation Authorities ESC Guideline for Urban Construction* was published in December 2006, received TRCA board approval, and was adopted by nine conservation authorities in the Greater Golden Horseshoe Area. For the past 13 years the Guideline has been used as the basis for review of ESC submissions at TRCA. Since its release there have been many significant and fundamental changes in the field of ESC, including greater availability of professional training programs, new policies for the protection of species at risk and other legislative changes, emergence of new products and techniques, and advancements in our knowledge of optimal application of best practices. The new ESC Guide for Urban Construction has been developed in order to address this evolution, providing current, concise, relevant and solution-oriented ESC guidance. The information contained in the new Guide details TRCA expectations for ESC submissions, the review of which is a mandated CA responsibility.

The Guide was scoped in co-operation with an advisory committee comprised of representatives from various stakeholder groups, including the construction and development industry, product suppliers, federal, provincial and municipal government, conservation authorities, and academia. The draft Guide completed in March 2019 was thoroughly vetted through senior technical and planning staff, and was widely circulated to external stakeholders. Following an announcement at TRIECA 2019, the guide was circulated to the advisory committee and then disseminated to key CA and municipal stormwater contacts by Conservation Ontario, the Municipal Stormwater Discussion Group and the Municipal Engineers Association. The draft was downloaded over 1,300 times during this review period. During the public review period staff offered a training webinar and provided presentations to BILD, the Ministry of Environment, Conservation, and Parks (MECP), the Municipal Stormwater Discussion Group, and other stakeholder groups. Based on the feedback received through this external review process, TRCA staff have now revised and finalized the Guide for staff use in the review of ESC submissions under planning, environmental assessment and TRCA permit processes.

It is anticipated that other CAs will adopt this Guide in their jurisdictions as a replacement for the 2006 Guideline, as many have indicated their intention to do so. During consultation with the development industry, representatives often expressed their desire for a more consistent approach to the review of development applications among CAs. In order to facilitate the adoption of the new Guide by other CAs, the information contained therein was intentionally kept general enough to be applicable in other jurisdictions in Ontario. Through consultation with MECP, it was also determined that adherence to the Guide will be listed as a criterion for pre-approval of stormwater management projects in the MECP's forthcoming linear consolidated permissions initiative, which will see the establishment of system-wide environmental compliance approvals for stormwater infrastructure.

RATIONALE

Ontario CAs are responsible for reviewing, commenting on and approving ESC plans as regulators issuing permits under section 28 of the Conservation Authorities Act, and also as part of their delegated responsibilities under the Ontario Planning Act. On sites that are determined to be within the CA's area of interest, applications are circulated to the CA for comment. CA areas of interest include, but are not limited to: features and hazards governed under the

"Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses" regulations, areas requiring special stormwater management controls, Areas of Natural and Scientific Interest, Environmentally Significant Areas, and CA property. CAs are required to provide technical review and commentary regarding how the proposal would impact natural hazards or natural heritage features and functions. In the absence of appropriately designed, installed and maintained ESC measures, construction activities can result in de-stabilized land, increased erosion risk, and the transport of sediment offsite and into natural features and other private property.

Among Ontario's conservation authorities, TRCA has for over a decade acted as a leader in the field of construction site erosion and sediment control, serving to advance the state of practice by conducting research, offering professional training programs (e.g. Canadian Certified Inspection of Sediment and Erosion Control), and developing resources and guidance to educate the industry on best practices. Having also led the development of the 2006 Guideline, TRCA has continued to show leadership by developing the new Guide, in partnership with Credit Valley Conservation, which advances the conversation around ESC further by advocating for more progressive approaches, such as the adoption of performance-based targets for turbidity levels in construction runoff, and the use of erosion risk assessment outcomes to inform ESC plan design.

By establishing clear and consistent turbidity targets for construction sites, and a protocol for how compliance with those targets is measured, both the development industry and regulatory agencies stand to benefit. The adoption of turbidity (or suspended solids) targets for construction site runoff is seen in many other jurisdictions in North America, including locally through the *Silt Smart Protocol* established by Credit Valley Conservation, the Ministry of Natural Resources and Forestry, the Ministry of Environment, Conservation and Parks, and Fisheries and Oceans Canada. The approach represents a shift towards performance based monitoring and away from being prescriptive in terms of the specific types of controls that should be applied on the construction site. This performance based approach emphasizes the continuous assessment of ESC performance and promotes more rigorous inspection and timely response to elevated sediment releases because they are being identified in real time.

Further, the turbidity targets and continuous monitoring guidance set out in the Guide will be applied as the foundation of a streamlining initiative for review and approval of ESC submissions. A voluntary program will be established to provide streamlined and expedited review on construction projects where the proponent agrees to institute continuous real-time turbidity monitoring to evaluate their compliance with the turbidity targets defined in the Guide. This addresses strategy #4 in the Updated TRCA Strategic Plan, which specifically speaks to identifying opportunities to facilitate more timely reviews as part of the development review process.

Content of the Guide

The Guide provides practitioners, developers and regulatory agencies with up-to-date, relevant, clear and practical information on the effective application of erosion and sediment control measures. The Guide addresses the following specific objectives:

- Defines key terms and concepts necessary for understanding the science of erosion, sediment transport and sedimentation
- Defines erosion risk assessment methods and how risk assessment outcomes can aid in the selection of best management practices
- Details strategies for effective application of ESC through all stages, including plan design, installation, inspections, maintenance, and decommissioning

- Provides guidance on protecting certain vulnerable features from impacts of nearby construction, such as low impact development areas and natural water features
- Clarifies ESC plan submission requirements and approvals processes
- Clarifies the roles and responsibilities of all parties involved in ESC
- Outlines expectations for ESC inspections and performance monitoring on construction sites, including turbidity targets for receiving water systems and construction effluent
- Provides updated guidance on best management practices for erosion prevention, erosion control, sediment control, and isolation of in-water works
- Provides a summary of relevant legislation and how it governs construction activities

Feedback received during draft review
During the comment period, representatives from BILD and the Greater Toronto Sewer and Watermain Contractors Association provided feedback on the new construction site turbidity targets in the Guide, expressing some concern that they would be challenging to achieve using current best practices. TRCA staff re-considered the targets in light of past research on construction sites and experiences with the *Silt Smart Protocol*, and developed revised targets that will provide more flexibility for proponents while still promoting a performance based approach that encourages more rigorous site inspection and quick problem response.

Written and verbal comments submitted by conservation authorities, provincial ministries, municipalities, and other private sector practitioners were addressed through several fairly minor revisions made throughout the Guide. Feedback was generally positive and comments did not suggest the need for any fundamental changes to the content of the Guide.

Relationship to Building the Living City, the TRCA 2013-2022 Strategic Plan
This report supports the following strategies set forth in the TRCA 2013-2022 Strategic Plan:
Strategy 2 – Manage our regional water resources for current and future generations
Strategy 4 – Create complete communities that integrate nature and the built environment
Strategy 8 – Gather and share the best sustainability knowledge
Strategy 10 – Accelerate innovation

FINANCIAL DETAILS
The development of the ESC Guide was supported through capital funding to account 416-96 (Sustainable Technologies Evaluation - Clean Water) from the regional municipalities of Toronto, Peel and York. Staff secured additional funding (into account 416-96) for the development of the Guide from the Toronto and Region Remedial Action Plan. Credit Valley Conservation provided in-kind support to the development of the Guide by developing content and attending working meetings to help navigate key issues. Moving forward, costs incurred to develop and deliver the planned training events associated with the Guide will be recovered through participant registration fees.

DETAILS OF WORK TO BE DONE

The Guide will be rolled out over four months, with TRCA-wide adoption planned for September 2020. Leading up to this date, TRCA staff will hold at least one internal training workshop with all staff involved in review and approval of ESC plans and construction site enforcement. This workshop will help to establish how the adoption of the new Guide will change the review and approval of ESC submissions, and contribute to defining the key aspects of the voluntary program that will be established to offer streamlined approvals for continuously monitored construction sites. Following this internal workshop, training will also be offered to development industry professionals and municipal staff, with the number of events or webinars to be determined based on demand. The training offered will focus primarily on new aspects of the Guide, providing the information necessary to allow practitioners to develop ESC submissions that adhere to the Guide. Providing this internal and external training to all the practitioners involved in ESC plan development, review and approvals, and enforcement will ensure a seamless transition when the new Guide is adopted in September 2020.

The second aspect of the roll out is the establishment of the voluntary program to provide streamlined and expedited review on construction projects that institute continuous real-time turbidity monitoring. The parameters of the program will be established by TRCA staff in the various groups involved in development review and enforcement. It will be finalized and published prior to the September 2020 adoption date for the Guide. As proponents sign on to this voluntary program, monitoring outcomes and practitioner experiences will be thoroughly documented to help inform program improvements and future updates to the Guide.

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Attachment 1: Erosion and Sediment Control Guide for Urban Construction (TRCA, 2019)

Sustainable Technologies
EVALUATION PROGRAM

Erosion and Sediment Control Guide

For Urban Construction

Prepared by:
Toronto and Region Conservation Authority

2019

www.sustainabletechnologies.ca

The water component of STEP is a collaborative of:

Lake Simcoe Region conservation authority

Credit Valley Conservation
inspired by nature

Toronto and Region Conservation Authority

PUBLICATION INFORMATION

This guide represents a major update to the *Greater Golden Horseshoe Area Conservation Authorities Erosion and Sediment Control Guideline for Urban Construction* (2006), and supersedes the earlier document. It has been prepared by the Toronto and Region Conservation Authority (TRCA) under the Sustainable Technologies Evaluation Program (STEP).

Citation: Toronto and Region Conservation Authority (TRCA). 2019. *Erosion and Sediment Control Guideline for Urban Construction*. Toronto and Region Conservation Authority, Vaughan, Ontario.

Documents prepared by the Sustainable Technologies Evaluation Program (STEP) are available at www.sustainabletechnologies.ca. For more information about this or other STEP publications, please contact:

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THE SUSTAINABLE TECHNOLOGIES EVALUATION PROGRAM

The water component of the Sustainable Technologies Evaluation Program (STEP) is a partnership between Toronto and Region Conservation Authority (TRCA), Credit Valley Conservation and Lake Simcoe Region Conservation Authority. STEP supports broader implementation of sustainable technologies and practices within a Canadian context by:

- Carrying out research, monitoring and evaluation of clean water and low carbon technologies;
- Assessing technology implementation barriers and opportunities;
- Developing supporting tools, guidelines and policies;
- Delivering education and training programs;
- Advocating for effective sustainable technologies; and
- Collaborating with academic and industry partners through our Living Labs and other initiatives.

Technologies evaluated under STEP are not limited to physical devices or products; they may also include preventative measures, implementation protocols, alternative urban site designs, and other innovative practices that help create more sustainable and liveable communities.

ACKNOWLEDGEMENTS

The content herein was provided by the following contributors:

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Funding support for this document was generously provided by:

- Toronto and Region Remedial Action Plan
- City of Toronto
- Region of Peel
- York Region

NOTICE

TABLE OF CONTENTS

1.0 INTRODUCTION

Change is inherent to the land development process; the removal of vegetation, stripping of topsoil and alterations to topography and drainage patterns are common practices during the construction of infrastructure like buildings, roads, bridges and sewers. Without careful planning and oversight focused on minimizing these changes and mitigating their impacts, construction projects can have adverse impacts on adjacent and downstream natural features and other private property.

The release of sediment laden runoff and dust from construction sites can have a range of adverse impacts, including but not limited to the following:

- Excessive levels of deposited and suspended sediment in lakes, rivers and wetlands decreases the productive capacity of aquatic habitats and increases the frequency of dredging in reservoirs.
- Sediment deposited on gravel stream beds compromises spawning and alters the habitat of bottom-dwelling organisms and young fish.
- Elevated concentrations of suspended sediments in natural water features can cause abrasion of gills, a reduction in visibility required for breeding and feeding, and decreased sunlight penetration, which inhibits photosynthesis by algae and aquatic plants.
- Sediment can also carry other contaminants into receiving waters, including heavy metals and nutrients, which tend to bind to these particles.
- Vehicle tracking of sediment offsite results in sediment laden roads, and increased sediment loads to the storm sewer system and ultimately, to the receiving waters to which they discharge.
- Wind blown dust from construction sites can impair air quality and become deposited onto adjacent areas, including natural features, roads, residences and other private property.

Erosion and sediment controls (ESC) are technologies, practices and procedures that are applied to prevent the release of sediment from construction sites. They may include installed structural measures, like sediment control ponds and erosion control blankets, or improved design practices, like phased land stripping and riparian zone preservation.

As many previously rural municipalities in Ontario undergo rapid urbanization and growth, the adoption of effective and innovative approaches to ESC is of paramount importance. Moving forward, the application of effective ESC measures that are properly installed, inspected and maintained will be essential to mitigating sediment discharge from construction sites and protecting our natural features.

2.0 OBJECTIVES

The practice of erosion and sediment control in Ontario has progressed in significant ways since the release of the 2006 *Greater Golden Horseshoe Area Conservation Authorities Erosion and Sediment Control Guideline for Urban Construction.* As awareness of the importance of mitigating construction related environmental impacts has also continued to grow there have been many significant and fundamental changes in our knowledge and understanding of ESC best practices. Some of the more significant changes include:

- Expanded availability of ESC training programs and greater numbers of professionals engaging in training;
- Introduction of new policies to ensure protection of species at risk;
- Introduction of new legislation and changes to existing acts and regulations;
- Emergence of new ESC products and techniques;
- Improved understanding related to the application of ESC products for optimal effectiveness; and
- Recognition of the limitations of some older and more conventional ESC approaches.

The overarching objective of this document is to provide ESC practitioners, developers and regulatory agencies with up-to-date, relevant, clear and practical guidance on the effective application of erosion and sediment control measures. Specific objectives include:

- Define key terms and concepts necessary for understanding the science of erosion, sediment transport and sedimentation
- Define quantitative and qualitative erosion risk assessment methods and how risk assessment outcomes can aid in the selection of best management practices
- Detail strategies for effective application of ESC through all stages, including plan design, installation, inspections, maintenance, and decommissioning
- Clarify ESC plan submission requirements and approvals processes
- Clarify the roles and responsibilities of all parties involved in ESC
- Outline expectations for ESC inspections and performance monitoring on construction sites, including turbidity targets for receiving water systems and construction effluent
- Provide updated guidance on best management practices for erosion prevention, erosion control, sediment control, and isolation during in- or near-water works
- Provide a summary of relevant legislation and describe how they govern construction activities related to ESC

3.0 APPLICATION

This guide supersedes information provided in the 2006 *GGHA Conservation Authorities ESC Guide for Urban Construction*. While its intended application is for the control of erosion and sediment release from urban construction projects in Ontario, many of the best practices described herein can be applicable to other types of projects where ESC is required.

Who should use and become familiar with this document?

- Any ESC practitioners, including consulting engineers involved in ESC planning, contractors and inspectors / environmental monitors
- Regulatory agency personnel involved in the review of ESC plans or those who issue other construction related authorizations / approvals. This includes representatives from relevant federal and provincial ministries, municipalities and conservation authorities.
- Individuals / groups who develop land or manage the development of land on behalf of land owners
- Manufacturers, suppliers and distributors of ESC products
- Other interested parties, including environmental conservation groups and academics

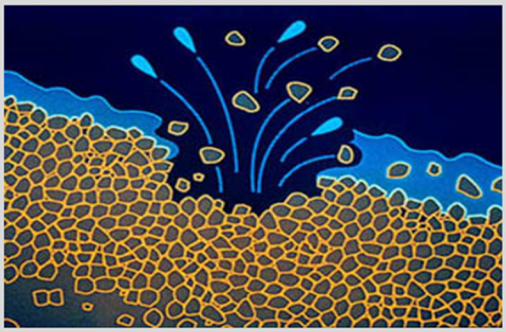
4.0 THE BASICS: EROSION, SEDIMENT TRANSPORT AND SEDIMENTATION

4.1 Understanding erosion

Erosion is the process by which a material becomes dislodged and worn away due to the force of an erosive agent. Land erosion is often caused by mobile agents such as water (e.g. stormwater) and wind. Natural erosion rates are accelerated by land use activities that leave soils exposed, like agriculture and land development. As erosion is accelerated, soil particles – often referred to as sediment - are suspended and carried away by rain water, flowing into receiving water bodies like streams and wetlands.

TYPES OF EROSION

Splash erosion is caused by the impact of raindrops on the land surface. This is the first step towards more extensive erosion as it impacts the surface soil structure and leads to reduced infiltration and increased surface runoff.



Sheet erosion occurs when the soil erodes in a thin, uniform sheet or layer. Water moves in broad sheets over the soil surface rather than concentrating in small depressions, as it does during rill erosion.

Rill erosion *occurs* when water running over the soil surface concentrates in small depressions and erodes the soil to form small channels (< 30 cm deep) known as rills.

Gully erosion is a more advanced and extensive form of erosion. It occurs when rill erosion progresses, causing the rills to increase in size (> 30 cm deep) and become gullies.

Gravitational erosion refers to the mass movement of soil downslope due to the force of gravity. Steep and/or unstable slopes are the most susceptible, particularly when saturated with rainfall. It may be a slow process, often referred to as creep, or occur quickly as in the case of mudslides and avalanches.

Channel erosion occurs when the banks and/or bed of an existing natural or constructed channel is eroded by water flowing within it. While channel erosion is a natural process, it may be accelerated during land development due to increased flow rates, alterations to flow regimes, and scour from increased sediment loads.

Wind erosion occurs when wind carries soil particles away from the land surface. This results in air pollution as well as the transport and deposition of sediment into other unintended areas.

Figure 4.1: Rill (left) and gully (centre and right) erosion on construction sites.

The potential for soil erosion is influenced by several factors, including:

- **Rainfall characteristics** │Droplet size, intensity, frequency, duration
- **Climate** │ Soil temperatures, types of native vegetation, time of year
- **Soil erodibility** │ Soil texture, structure, permeability, organic matter content
- **Topography** │ Slope length and steepness
- **Ground cover** │ Type and quality/areal density of cover

4.2 Understanding suspended sediment and sedimentation

Eroded soil particles – often referred to as sediments - are suspended and carried away by rain water until they have an opportunity to settle out, which occurs when the energy in the flowing water dissipates. While larger, heavier suspended sediment particles can settle out readily when the water slows, the finer, lighter particles can remain suspended for much longer. These fine particles may only settle after a significant detention period or with the aid of sediment controls (discussed in the next section).

The process by which suspended sediment settles out and becomes deposited on a surface is referred to as sedimentation. Sedimentation that occurs in undesirable locations, such as watercourses and wetlands, is one of the primary risks associated with construction projects. Sedimentation can also occur in intended areas, like within sediment control measures (e.g. detention ponds, sediment filter bags) within the construction site.

Figure 4.2: Unintended sediment deposition in natural areas.

4.3 The impacts of construction activities

When land is developed, existing vegetation is removed, topsoil is stripped, and natural drainage patterns are altered to facilitate the earth moving and grading activities necessary to construct buildings and infrastructure like roads and sewers. On many construction projects, which can be years long, most of these stripped areas remain bare until final site stabilization, which often only occurs near the end of the project.

Without the stabilizing effect of vegetation, erosion rates are accelerated, resulting in sediment laden stormwater runoff flowing into natural features like woodlots, streams and wetlands. Monitoring in the Greater Toronto Area shows that total suspended solid (TSS) concentrations in untreated runoff from construction sites can be up to 30 times greater than that of stabilized residential areas (SWAMP, 2005; TRCA and U of G, 2006; TRCA 2006). One study conducted at a construction site draining to Millers Creek in Ajax revealed that, based on in-stream monitoring of TSS concentrations during 9 rainfall events, the average event mean TSS concentration downstream of the construction site was 5 times higher than upstream. For events monitored, the downstream sediment concentrations ranged from 53 to 2290 mg/L. The observed increase in stream TSS levels from upstream to downstream occurred even though runoff volumes from the construction site comprised less than 25% of total stream flow and the planned erosion and sediment controls had been implemented on the site (Greenland International and TRCA, 2001).

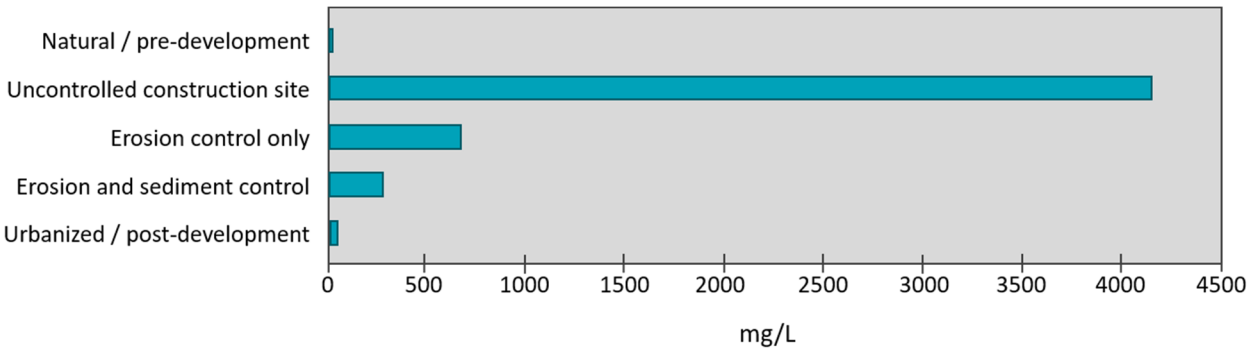


Figure 4.3: Stormwater sediment concentrations. Modified from: California Regional Water Quality Control Board Erosion and Sediment Control Field Manual (1999).

Sediment laden water may be released from a construction site through an intended discharge location (e.g. sediment control pond outfall) when controls on the site are insufficient, or it can sometimes occur elsewhere along the site perimeter where there is a failure of the controls in place (e.g. slope failure, breach of silt fencing). Inadequate vehicle tracking controls can also result in sediment transport offsite and deposition onto public roads. When this sediment is released to a natural water body like a stream, lake or wetland, it will increase the turbidity of the water and/or settle out of suspension and become deposited on the bed. Both outcomes can harm aquatic ecosystems, as many studies have documented (e.g. Waters, 1995; Newcombe and MacDonald, 1991; Robertson et al., 2006).

In addition to accelerated erosion rates and elevated suspended sediment levels in runoff, grading and earth moving activities cause changes to the local water balance, resulting in altered hydrological regimes for the water features to which the site drains. The regime may be altered in a variety of ways, including: (i) runoff volumes discharged to water features may increase or decrease, (ii) flow velocities may change, and (iii) the timing and duration of inflows may shift.

These construction impacts - soil erosion, increased sediment transport offsite, and altered receiving water hydrological regimes - can have significant negative effects on the surrounding environment as well as the success and profitability of the project itself. Consequences to the project may include:

- Unanticipated expenditures related to restoration of impacted natural features and/or clean up of sediment deposited on offsite infrastructure (e.g. roads, catchbasins, sewers);
- Delays related to the additional repair/restoration work as well as stop work orders that may be issued by regulatory bodies;
- Local community groups vocalizing concerns over wind blown dust from site and muddy infrastructure;
- Legal repercussions associated with violation of permits/approvals, including fines and delays to project progress; and
- Tarnished reputations for proponents or other project team members responsible for violations of permits/approvals that result in environmental impacts.

A summary of legislation relevant to ESC and the overall mitigation of construction sediment releases is provided in Appendix D. The potential environmental impacts associated with failing to provide and maintain appropriate ESC measures during construction are described in the following subsections.

4.3.1 Impacts to aquatic community health

Suspended sediment

When sediment levels are elevated above naturally occurring levels in a receiving water system, there are several direct and indirect effects to the fish, invertebrates and aquatic plants inhabiting the area. High levels of suspended sediment result can result in:

- clogging and damage of the gill apparatus
- behavioral changes (e.g. movement, migration, defense of territories, dominance hierarchies)
- higher vulnerability to toxins, infection and disease, and
- reduced feeding (Singleton, 1985).

As suspended sediment concentrations are elevated above natural levels, fish growth is impaired in several ways. For example, reduced visibility makes it harder for fish to find and secure food. Sigler et al. (1984) observed that the feeding behavior of Oncorhynchus mykiss (steelhead trout) and Oncorhynchus kisutch (coho salmon) was affected, and growth significantly impaired, during laboratory simulation of elevated turbidity levels using clays, kaolinite and bentonite. Fish were also observed to engage in avoidance behavior during this study, migrating away from experimental channels where turbidity was elevated.

With respect to aquatic invertebrate communities, suspended sediments can cause impairments by scouring streambeds, dislodging organisms, abrading respiratory surfaces, and compromising feeding in filter-feeding invertebrates (Singleton, 1985). In a review of research on the effects of suspended sediment on aquatic organisms, Newcombe and MacDonald (1991) concluded that invertebrates are at least as sensitive to elevated suspended sediment levels as salmonid fishes.

When total suspended solids (TSS) concentrations are increased above the natural regime, aquatic plants are also impacted, creating a domino effect and altering community composition in the ecosystem. Suspended sediment particles can reduce the amount of sunlight that reaches aquatic plants, thereby inhibiting photosynthesis. More direct physical effects are also possible, like scouring of periphyton.

Deposited sediment

An increase in the deposition of sediment in natural water features, often associated with upstream land use changes, can impact the health of aquatic organisms in several ways, including:

- coating of fish eggs;
- alteration of substrate;
- smothering of invertebrates; and
- burial of aquatic vegetation.

Figure 4.4: Stream bed substrate

When sediment settles out onto the substrate of a natural water body, it can compromise habitat by reducing substrate composition and permeability. As interstitial voids in the substrate are filled with fine sediment, fish may use avoidance behaviours and leave their spawning beds. Further, because the survival of fish eggs depends on adequate oxygen availability and the removal of waste, the substrate must allow unimpeded flow of oxygenated water to the eggs – a process which is compromised when sediment deposits on the substrate and/or the eggs themselves. Fish eggs are particularly susceptible since they cannot swim to avoid sediment laden areas (Anderson et al. 1996). The survival of young fish that do hatch can also be compromised as deposited sediment reduces intragravel dissolved oxygen levels (Shumway and Warren 1964; McNeil 1966; Garside 1959; Silver et al. 1963).

Due to their small size and bottom dwelling nature, benthic macroinvertebrates are vulnerable to harm by smothering when sediment settles onto substrates. Deposition also compromises their microhabitat, and because they are relatively immobile relative to fish, they are less likely to migrate to avoid unfavourable

conditions. Periphyton are similarly at risk of experiencing smothering and loss of habitat (e.g. stable substrates for attachment) from increased loads of deposited sediment (Nutall, 1972).

The settling of sediment in natural water features can also result in aquatic plant loss due to burial. As tolerance of sediment accumulation can vary among plant species, ongoing sediment deposition can over time lead to shifts in the pre-existing species composition (Terrados et al., 1998), which can have ripple effects on other organisms by causing changes in trophic interactions.

4.3.2 Water quality degradation

Elevated TSS also adversely affects water quality, as nutrients and metal compounds are bound to sediment particles being eroded into receiving water bodies. Increased nutrient loads to receiving water systems can result in eutrophication, excess algal growth and ultimately depleted oxygen levels. Some types of algae are also a human health concern (e.g. blue-green algae), as they cause the release of toxins that lead to restrictions on swimming and the consumption of fish. In drinking water treatment, excess algae and bacteria are one of the primary causes of odor and taste problems. Addressing water quality issues associated with elevated levels of sediment and associated contaminants increases the water treatment costs borne by municipalities.

4.3.3 Alterations to hydrological regime and geomorphology

Changes to the landscape associated with construction practices frequently results in increased runoff volumes and peak flow rates. These increases can result in significant alteration to the form and function of receiving water systems (Figure 4.5). Increases in flow rate and duration result in greater potential for stream erosion, which alters channel morphology, destabilizes banks, and increases the risk to public and private property due to flooding and flood damages. Sediment deposited in receiving water bodies can also create a sediment imbalance, resulting in altered flow patterns and conveyance capacities, which can impact the conveyance of flood flows and compromise recreational use and navigability.

Figure 4.5: Stream bank erosion.

4.4 What is Erosion and Sediment Control?

Erosion control practices ***prevent exposed soils from being entrained by a mobile agent*** such as stormwater or wind, while sediment controls address the ***removal of sediment suspended in stormwater***. Practices that reduce erosion rates include strategies to minimize the amount of land cleared, diversion of flows around high erosion risk areas, and the application of ground covers that stabilize soil and/or provide a physical barrier to soil particle detachment.

While erosion control is preventive in nature, as it is focused on keeping soil in place, sediment control measures are reactive in nature and meant to remove sediment that has already become suspended in stormwater. A ***multi-barrier approach*** to erosion and sediment control requires the application of both types of controls in series, to create a resilient system capable of protecting the natural environment from sediment impacts. This approach is defined in Chapter 7.0.

Figure 4.6: Erosion control blanket (left) and filter socks applied as sediment control check dams (right).

Sediment removal can be achieved in a variety of ways, but controls are generally focused on settling, filtration, or a combination of the two. Settling controls promote gravitational settling of suspended sediment by detaining stormwater and reducing flow velocities. They may be applied to treat concentrated flows (e.g. check dams) or sheet flows (e.g. sediment fence) and are often applied in conveyance systems (e.g. interceptor swales), at the site perimeter, or anywhere it is necessary to separate a significant sediment source from a protected receiver. Filtration controls are porous materials (e.g. geotextile fabric used for sediment bags) which hold back sediment from stormwater that passes through them, with the filter's apparent opening size dictating the size of particles it can filter out. Because filtration controls also reduce flow velocities, they can serve as settling controls as well. Table 4.1 provides a list of common erosion and sediment control best management practices (BMPs). Detailed guidance on the application of each of these BMPs is provided in Appendix B.

In-water isolation measures, also listed in Table 4.1, are often listed as a third category of practices that control the migration of sediment. This umbrella term encompasses structural sediment barriers – like turbidity curtains – but also includes broader isolation techniques like watercourse diversions and bypass pumping. Practices in this category are employed to achieve the following objectives:

(i) Isolate in-water or near water construction areas so that sediment generated in the work area is not released directly into the water flowing in the natural feature.
(ii) Minimize disruption and ecological risk to the natural feature.
(iii) Treat sediment laden water in a location away from the work area – using sediment control strategies like settling and filtration - to render the water suitable for release into the feature.

Table 4.1 Erosion controls, sediment controls, and in-stream

Erosion Controls (Appendix B1)	Sediment Controls (Appendix B2)	In-water controls (Appendix C)
Minimized or phased land clearing	Sediment control fence	Horizontal Directional Drilling
Vegetated filter strips	Filter socks	Sediment / Turbidity Curtains
Slope drains	Natural fibre logs and wattles	Temporary Stream Crossings via Temporary bridge or Culvert(s)
Interceptor swales	Rock check dams	Waterproof isolation barriers (e.g. cofferdams)
Outlet protection	Vehicle tracking controls	Diversion / bypass channel
Mulching	Sediment (dewatering) bags	Flume bypass
Seeding	Storm drain inlet protection	Bypass pumping
Surface roughening	Sediment traps	Dewatering
Rolled erosion control products	Sediment control ponds	
Chemical soil stabilization (e.g. tackifiers)	Weir tanks	
	Polymer flocculants	
	Active treatment systems	

Practicing effective ESC on construction sites is a process that goes beyond the physical controls themselves and starts even before topsoil stripping begins. The following are the key activities required to practice effective ESC from project start to finish:

- Preliminary site data collection (to document baseline conditions) and erosion risk assessment
- ESC plan design
- Installation of ESC measures on site
- Routine inspection of ESC measures, documentation of inspections, and prompt response to problems identified
- ESC performance monitoring (e.g. turbidity measurement)
- Re-evaluation, maintenance and replacement of ESC measures as needed
- Permanent site stabilization and decommissioning of ESC measures.

Guidance on each of these elements of ESC are discussed in the chapters that follow.

5.0 PARTICIPANT ROLES AND RESPONSIBILITIES

Practicing effective erosion and sediment control over the course of a construction project requires that all parties involved understand their roles and are equipped with the knowledge and resources they need to fulfill their responsibilities. Table 5.1 lists the key parties involved in ESC on construction sites and the typical distribution of roles and responsibilities among them. While the land owner ultimately holds responsibility for ensuring that the project remains in compliance with all applicable legislation, the parties involved all carry liability for their individual responsibilities for the following reasons:

- They have been retained and compensated for carrying out these activities on behalf of the land owner / developer; and
- They often hold a professional accreditation, certification or affiliation that compels them to practice in accordance with the code of conduct / ethics defined by the governing body.

Many of these professional associations have codes of professional ethics that are relevant to environmental protection. Examples of organizations that offer certification or accreditation of the types of professionals who practice ESC include:

- Professional Engineers of Ontario (PEO)
- Ontario Association of Certified Engineering Technicians and Technologists (OACETT)
- Association of Professional Geoscientists of Ontario (APGO)
- Canadian Certified Inspector of Sediment and Erosion Control (CAN-CISEC)
- EnviroCert International (which administers the Certified Professional in Erosion and Sediment Control – CPESC – certification program)

Liability and due diligence

Legal liability, as it relates to environmental protection, is directly tied to applicable legislation and associated permits, approvals and authorizations. More information on the legislative framework for ESC is provided in Appendix D. The extent to which an individual or company is in compliance with a given piece of legislation or the conditions of a permit / approval / authorization is typically assessed by considering whether they exercised ***due diligence*** in undertaking the activities in question. The demonstration of due diligence can mitigate both regulatory and civil liability in the event of a construction site incident that results in adverse impacts to aquatic and terrestrial communities, natural features or other private property.

What is due diligence?

Such a measure of prudence, activity, or assiduity, as is properly to be expected from, and ordinarily exercised by, a reasonable and prudent person under the particular circumstances; not measured by any absolute standard, but depending on the relative facts of the special case

- Black's Law Dictionary, 10th ed. (2014)

Due diligence means that every reasonable effort was made to remain in compliance with applicable legislation and the terms and conditions associated with any permits, approvals or authorizations issued for the project. One of the key questions that determines whether due diligence was exercised is the question of whether an incident (e.g. sediment release offsite) was foreseeable and preventable. Even if the incident is determined to have been unforeseeable or unpreventable, due diligence requires that corrective actions are undertaken in a timely manner to ensure that harm to aquatic and terrestrial

communities or natural features is prevented. One of the key ways of exercising due diligence is by taking a ***proactive approach,*** in which potential erosion or sediment migration problems are identified before they result in non-compliance.

Key actions that demonstrate due diligence with respect to ESC on construction sites include, but are not limited to, the following:

- Train all construction staff to improve their understanding of ESC best management practices.
- Maintain ongoing communication among project team members, including regular construction meetings with mandatory attendance requirements for key parties.
- Conduct erosion risk assessment and apply outcomes to help inform the selection and placement of ESC measures as part of the ESC design process.
- Document – through inspection reporting, field notes and date stamped photos – any ESC issues and the steps taken to resolve them. See inspections guidance in Chapter 10.0 for more information.
- Monitor the quality of construction site discharges and/or downstream receiving water systems, as detailed in Chapter 10.0.
- Apply established best practices specified in local guidelines and policies.
- Apply a multi-barrier or treatment train approach to ESC as much as possible, as described Figure 7.1.
- Ensure all permits, approvals and/or authorizations required are secured prior to the commencement of the regulated activities.
- Develop spills response and contingency plans prior to the start of construction.
- Retain specialized professionals as needed to address ongoing problems (e.g. ecologists, fluvial geomorphologists, hydrogeologists, environmental monitoring experts).
- Demonstrate that every reasonable effort was made to prevent impacts.
- Ensure tools and replacement materials needed to repair and maintain ESCs are readily available or able to be delivered on short notice.
- Modify ESC plan with contractor during construction to adapt to site conditions, and ensure changes are documented and distributed to all relevant parties.
- Retain a qualified ESC inspector and ensure they complete inspections at the recommended frequency, as described in Chapter 10.0.

Roles of key parties

The establishment of roles, responsibilities, communication protocols and reporting structures should occur prior to the start of construction so that all parties clearly understand expectations. The strength of an erosion and sediment control plan often lies with a thorough understanding of the undertaking. This comprehension is normally found in the contract administrator, who forms the core of the construction team. Traditionally the owner's representative on the project, the contract administrator liaises with all parties including the contractor, ESC inspector and regulatory agencies. Professionals involved in construction projects generally report directly to the land owner / developer or they are hired by the contractor (e.g. landscaping companies). Notably, the team size expands and contracts in response to project progress where specialized expertise is needed. Effective construction teams recognize when

there is a need for additional expertise and rapidly engage those services to allow adequate time for consultation among project team members and ensure the project proceeds on schedule. Examples of specialized experts often retained on construction projects include monitoring specialists, fluvial geomorphologists, aquatic biologists and hydrogeologists.

It should be noted that the defined roles summarized in Table 5.1 will often vary from project to project, and in many cases one company will be hired by the land owner to handle multiple roles. These details should not affect the success of the project provided that adequate staff are assigned to work on the project and that they possess the experience and qualifications needed to carry out their assigned responsibilities.

Figure 5.1: Professionals involved in construction projects

The ESC inspector has a particularly important role that can have significant impact on the success of ESC measures and overall compliance efforts. The role of ESC inspector is to conduct unbiased inspections of construction site activities, document findings, and report identified deficiencies to the relevant project team members. It should be kept distinct from other roles to ensure they are able to carry out their designated responsibilities. For example, the ESC inspector should not be responsible for handling other types of construction site inspections, carrying out construction work, or maintaining ESC measures.

Within Ontario, regulatory agencies commonly involved in ESC plan review are municipalities and conservation authorities. Chapter 9.0 details the approval process for ESC and provides more information on specific agencies involved based on site and project circumstances. For more information on the role of the ESC inspector, refer to Chapter 10 which covers inspections, monitoring and maintenance.

Table 5.1: Roles and responsibilities of key parties involved in construction site erosion and sediment control

Party	Defined role	Key responsibilities
Land owner / developer or builder (once building construction phase has begun)	Company or individual who owns the land being developed, or is working to develop the land on behalf of the land owner(s).	• Holds ultimate responsibility for ensuring that ESC is implemented so that the project does not adversely affect natural features and other adjacent lands. • Delegates responsibility to hired professionals (engineers, contractors, ecologists, inspectors) who design, install, inspect, monitor, maintain and decommission ESC measures. • Ensures agreement with contractor on protocol for payment/reimbursement related to ESC maintenance, such that ESCs can be kept in working order throughout the project. • Holds liability in the event of ESC failure or regulatory violation. • Remains engaged throughout construction to ensure effectiveness of ESC planning and implementation. • While the division of responsibilities and liabilities may vary from project to project, a builder will typically, upon transfer of ownership, become responsible for activities occurring on their lots.
Project manager / design manager / design engineer	Assists ESC plan designer in planning ESC as it relates to construction phases, schedules and site conditions.	• Oversees collection and analysis of pre-construction site data, as detailed in Section 6.1. • Conducts erosion risk assessment based on site data collected (see Section 6.2). • Provides information to support ESC plan design, e.g. site details, erosion risk and scheduling considerations. • Reviews and stamps ESC drawings and report. • Determines permits/approvals required and applies for them on behalf of land owner / developer. • Maintains awareness of consequences regarding ESC failures from a regulatory perspective and remains in regular contact with land owner / developer. • Remains aware of contingency plans and directs use when necessary.

ESC plan designer	Develops (or leads the development of) ESC plans for all stages of construction	• Specifies ESC measures, their sizing, and placement on site based on site conditions and erosion risk. • Designs ESC plans for each stage of construction (see Section 7.2), and includes instructions related to decommissioning of ESC measures. • Ensures ESC plans are designed in accordance with established policies and best practices guidance. • Ensures ESC plans, if implemented as designed, will prevent exceedance of turbidity targets (see Section 10.2.2). • Conducts site visits before designing the plan and during its implementation. • Designs ESC plans that are practical and implementable based on consultation with the contractor. • Revises ESC plans as needed if regulatory agency review reveals that modifications are required. • Reviews and approves of on-site ESC design modifications, communicates changes to appropriate approval agencies where required, and updates plans accordingly. • Develops contingency plans for certain stages or activities as needed (e.g. dewatering activities). • Directs implementation of the contingency plan if needed.
Contract administrator	Forms the core of the construction team and reports directly to the land owner/developer	• Provides construction specifics and schedules to the rest of the construction team. • Ensures the necessary permits and approvals have been obtained and keeps copies of approved ESC plans, permits and inspection reports in a central location on site. • Serves as the primary liaison between the project manager, plan designer, ESC inspector, and contractor(s). • Liaises with all parties including land owner, design engineers, contractors and regulatory agencies. • Makes recommendations for the requirement of specialists. • Receives ESC inspection reports from inspector and communicates necessary actions to construction staff. • Aid in spills response and reporting as defined in Section 7.7.

ESC Inspector	Carries out ESC inspections, reporting directly to land owner / developer and approval agencies Note: Inspector qualifications are detailed in Section 10.1.1.	• Understands the ESC plan, spills response and contingency plans, and construction methods. • Familiarizes him or herself with the landscape, drainage patterns and natural features prior to the start of construction, taking notes and pictures to document pre-construction conditions. • Conducts an initial site inspection to evaluate whether ESC measures are installed as per the approved plan. • Recognizes effective application of ESCs and communicates recommendations with the contractor. • Inspects all ESC measures every seven days at a minimum, before and after significant rainfall and snowmelt events, and at other times as detailed in Section 10.1.2 which provides guidance on inspection frequency. • Completes ESC inspection reports and circulates them to the contract administrator, contractor and (depending on project requirements) regulatory agencies like municipalities, CAs, and any other permitting agencies. • Establishes a protocol for communication with on- and off-site contacts and inspection report circulation. • Monitors site effluent and/or receiving water system based on project-specific requirements (see Section 10.2). • Understand the permits and approvals that have been secured for the project and any associated conditions.
Contractor	Undertakes construction and the implementation and maintenance of ESC measures	• Signs off on ESC plan to ensure it is practical and implementable on the site. • Installs/constructs ESC measures based on approved ESC plans and according to plan specifications. • Provides input on construction-related aspects of ESC plan implementation including labour, equipment and materials requirements, construction procedures and field constraints. • Informs ESC inspector, contract administrator and in some cases the ESC plan designer about any failures or ongoing issues with the effectiveness of ESC measures, and suggests ESC design modifications if needed. • Reads all ESC inspection reports and takes corrective actions recommended within the specified timeframes. • Ensures ESC measures remain functional and are maintained / repaired as needed.
Regulatory agencies	Protect human and environmental health from water, air and noise pollution related to construction activities through development review, issuance of permits / approvals, and enforcement.	• Responsibilities vary according to the agency but involve plan review, permitting and enforcement responsibilities per their regulatory mandate and/or agreements with their partner agencies • Establish best practices and disseminate through guidelines, training programs and other forms of advocacy. • Communicate instructions on the development review process and submission requirements in a clear manner. • Review ESC plans to ensure compliance with legislation and policies. • Issue permits / approvals / authorizations as needed to permit development activities that are otherwise restricted or limited by federal, provincial or municipal legislation. • Conduct site visits to assess effectiveness of ESCs and ensure compliance with conditions of permits/approvals.

6.0 ASSESSING EXISTING CONDITIONS AND EROSION RISK

The following subsections provide guidance on methods for assessing erosion risk on construction projects, how to determine when erosion risk assessment is most needed, and how the outcomes of the assessment should inform the development of ESC plans.

6.1 Collecting and analyzing site information

Development of an effective ESC plan requires an understanding of existing site conditions. In order to evaluate the varying levels of erosion risk, a site assessment should be carried out to collect the following information:

- Soil types and associated erodibilities for soils at the relevant grading level
- Topography
- Natural heritage features adjacent to the site and/or to which the site drains
- Local climate conditions
- Potential vegetation preservation areas, including buffer strips
- Surrounding infrastructure, such as public streets and buildings
- Areas where stormwater flows onto and off the site

Photographs, mapping and data collected should be applied to aid in the development of the ESC report and drawings required for submission as defined in Chapter 8.0.

6.2 Erosion risk assessment (ERA)

Understanding a site's erosion risk and specifically identifying potential problem areas is essential to developing an effective ESC plan. Once existing conditions data has been collected it can be used to determine the site's natural erosion susceptibility as determined by soil characteristics, rainfall and climate conditions, and topography. The primary purpose of an erosion risk assessment (ERA) is to clearly define the level of risk and the probability of erosion and sedimentation occurring above natural or pre-development levels as a result of construction activities within a given study area.

6.2.1 When to do an ERA

The ERA should be completed prior to preparing an ESC plan for the site. This is an important way that the ESC plan designer can demonstrate due diligence and show that the selection and placement of BMPs are directly tied to mitigating erosion, particularly in areas that have been identified as susceptible through the assessment. The ESC plan should follow logically from the risk assessment, such that enhanced controls and/or treatment trains (multiple controls installed in series, as defined in Chapter 7.0) are placed in the most erosion susceptible areas.

The ERA should be completed based on the planned condition of the site (i.e. grades and land cover) during construction stage 1 (topsoil stripping and grading), and should exclude any planned sediment control measures. The risk classifications of different parts of the site – as established through the ERA – should then inform which BMPs are selected and where they are placed in the stage 1 ESC plan. The erosion risk assessment can be repeated at each subsequent stage of construction (e.g. site servicing,

building construction) in order to help inform the optimal selection and placement of ESC measures based on changing site conditions. If these specific stages don't apply to a given project, then the risk assessment should be repeated only when the site grading significantly changes and a second ESC plan is needed. Essentially, the ERA should be carried out every time a new staged ESC plan is required to be submitted for approval, with the outcomes helping to inform the best practices applied at each stage.

6.2.2 Sites for which an ERA should be completed

While erosion risk should be considered during ESC planning on any projects where land stripping and grading is planned, a formal erosion risk assessment, as detailed in Section 6.2.3, is recommended on construction projects that meet any of the following criteria:

- Extent of land disturbance is greater than 10 ha ***and*** duration is longer than 30 days
- Construction activities are planned in or near natural water features (e.g. within CA regulated area)
- The site drains to species at risk habitat (as defined in O.Reg. 230/08)

Unless otherwise required by the overseeing regulatory agencies, the "hybrid qualtitative ERA approach" (section 6.2.3) should be method applied for ERA on these sites. A background discussion on other ERA approaches – including the Revised Universal Soil Loss Equation (RUSLE) for Application in Canada and the Ministry of Transportation's qualitative risk assessment approach – is provided in Appendix E.

6.2.3 Hybrid qualitative ERA approach

The approach detailed in this section represents a hybrid of the MTO approach and the RUSLE method described in Appendix E. While qualitative like the MTO approach (described in the 2015 *Environmental Guide for Erosion and Sediment Control During Construction of Highway Projects*), it differs in that it does not consider risk classification of consequences and is instead focused solely on estimating erosion risk. The hybrid approach involves the following steps:

1) Dividing the site into polygons of like erosion potential that are delineated by using topographical and soils maps and aerial photographs. The base map used to select polygons should be developed at a scale suitable to the size and topography of the study area. The scale should be sufficient to discern areas with different erosion risk levels. Polygon sizes between 0.5 and 10 ha are recommended.
2) For each polygon, compile data on soil characteristics (K factor), topography (LS factor), and anticipated ground cover, if any (C factor).
3) Using the risk classification tables provided below, rate each polygon as having a high, moderate, or low risk of erosion.
4) Select best practices most appropriate for mitigating erosion based on the estimated risk. See BMP selection guidance in table 6.6.
5) Prepare ESC plan, specifying best practices for each polygon based on what is determined through the hybrid ERA approach.
6) Repeat this process for each construction stage with a distinct ESC plan, e.g. topsoil stripping & grading, site servicing, building construction.

Risk classification – soil erodibility (K factor)

The key characteristics that determine the erodibility of a soil are:

- **Particle Size and Soil Texture** | Larger particle sizes (e.g. gravels with particles greater than 2 mm in diameter) are typically less susceptible to erosion, as these particles require higher energies for particle detachment and transport. Soils with high clay content also are less susceptible to erosion due to their cohesive strength. Soil texture also affects the rate and volume of runoff.

- **Soil Permeability and Soil Structure** | Generally defined as the extent to which a soil will permit water to flow through it. Soils with higher permeability will result in reduced runoff and onsite ponding following a storm or thaw event, therefore reducing the risk of erosion and sediment transport. Soil structure is indicative of the extent to which soil particles are bound to one another, which affects its erosion resistance. Where soils are compacted due to construction activities, permeability is reduced. This can be mitigated on construction projects by scarifying or roughening the soil surface, as described in Appendix B1.

- **Organic Matter** | Soils with high organic matter typically have a lower erosion susceptibility due to their moisture retention capacity and good soil structure. On construction projects that require extensive topsoil stripping, organic content in soils will typically be minimal.

Soil erodibility potential as it relates to soil texture is classified as shown in Table 6.2 below. ***It should be noted that determination of soil type for consideration in the ERA should be based on the soil present at the grading level of the works being conducted and not just the topsoil.***

Table 6.2 – Erosion risk classification according to soil type

Soil Type	Erodibility Classification	Soil Erodibility Rating
Well Graded Gravel	Least	Low
Poorly Graded Gravel		Low
Sand		Low
Loamy Sand		Low
Heavy Clay		Low
Clay		Low
Sandy Clay		Low
Silty Clay		Moderate
Sandy Clay Loam		Moderate
Silty Clay Loam		Moderate
Sandy Loam		Moderate
Silty Sand		High
Loam		High
Silt Loam		High
Silt	Most	High

Source: *Adapted from Guidelines on Erosion and Sediment Control for Urban Construction Site (MNRF, 1987)*

Risk classification – topography (LS factor)

The length, slope gradient and drainage patterns associated with an area of disturbance is one of the major contributors to erosion and sedimentation within a construction site. For the purpose of determining erosion potential, slope gradients can be separated into three classes: gentle (< 2%), moderate (2 to 10%) and steep (>10%). Slope lengths are divided into two categories – less than 30 metres or greater than 30 metres. Once the slope gradient, slope length and soil erodibility (as determined based on Table 6.2) are all known, the erosion risk classification can be determined as shown in Table 6.3. Because site topography is ever-evolving on construction sites, the risk assessment should be repeated for each distinct phase of construction, as described earlier in section 6.2.1.

Table 6.3: Erosion risk classification according to slope gradient, soil erodibility, and slope length

Slope gradient	Soil erodibility	Erosion risk classification	
		slope length <30 m	slope length >30m
<2%	Low	Low	Moderate
	Moderate	Moderate	Moderate
	High	Moderate	High
2-10 %	Low	Low	Moderate
	Moderate	Moderate	High
	High	High	High
>10%	Low	Low	Moderate
	Moderate	High	High
	High	High	High

Source: Adapted from *Guidelines on Erosion and Sediment Control for Urban Construction Sites* (MNRF, 1987)

Risk classification – ground cover (C factor)

The establishment of a soil cover on disturbed areas of a construction site can significantly reduce erosion risk in the following ways:

- Canopy cover shields the ground from erosive forces associated with rainfall.
- Soil compaction is reduced and permeability is enhanced, thereby promoting greater water infiltration and lower runoff volumes.
- Established vegetation contains root mass that improves the structure of soils, reducing the potential for soil detachment during larger, more intense storm events.

The highest risk of erosion due to the lack of sufficient vegetation coverage typically occurs immediately following topsoil stripping and/or rough grading activities. Establishing a hardy and uniform ground cover is one of the most effective methods of preventing erosion on an active construction site.

The erosion risk classification for a variety of soil cover types are provided in Table 6.4. For construction projects where extensive vegetation removal, topsoil stripping, and/or grading are required, the erosion potential (based on soil cover) should be rated as high. If a defined polygon area contains more than one type of ground cover, the different cover areas should be assessed as separate polygons, particularly if the ground covers have very different erosion risk classifications (e.g. bare soil vs. established vegetation) and they each represent a significant portion of the polygon. Alternatively if one cover type covers most of the area, the risk classification for that cover could simply be applied for the whole polygon.

Table 6.4: Erosion risk classification according to soil cover type

Cover Management	Erodibility	Erosion risk classification
Densely vegetated areas	Least	Low
Sodded/Established Vegetated Areas		Low
Soil Sealant and Rolled Erosion Controls		Moderate to Low[1]
Hydroseeded/Hydromulch Areas Prior to Significant Vegetation Growth		Moderate to Low[1]
Established temporary crop covered/vegetated lands[2]		Moderate
Seeded lands prior to significant vegetation growth		High
Sparsely vegetated lands		High
Bare lands (exposed soil) following topsoil stripping and/or grading	Most	High

[1] Depends on the quality of the cover (e.g. good ground preparation and coverage, even application, rolled erosion control products properly secured in place). [2] Assumes planting and growth occurs during optimum growing conditions.

Source: RUSLE for Application in Canada: *A Handbook for Estimating Soil Loss from Water Erosion in Canada* (Wall et al., 2002)

Overall polygon erosion risk classification

Based on the risk classifications from Tables 6.3 (slope gradient, slope length and soil erodibility) and 6.4 (soil cover type), an overall risk classification can be determined for each polygon, as depicted in Table 6.5. The risk classification for the polygon should be used to make decisions about the best management practices appropriate to mitigate erosion in that part of the site. The structural and non-structural best management practices recommended for different erosion risk classifications are discussed in section 6.2.4 and summarized in Table 6.6.

Additional considerations – rainfall duration and intensity

While the value of the rainfall-runoff erosivity (R) factor does not vary within a site, since geographical variations in R-factor are much broader in scale, it is still important to consider seasonal temperature and rainfall variations and their impact on erosion potential. Highly erosive rains associated with higher intensity storm events typically occur during the summer months (from June through September). Construction during the late winter/early spring can also be subject to high runoff volumes and erosion

risk due to the potential for snowmelt occurring on top of frozen soils. Further, areas disturbed over the winter months are challenging to stabilize due to unfavourable growing conditions. As a result, these areas may be highly susceptible to erosion once spring thaw occurs. When considering the polygon erosion risk classifications in Table 6.5, it would be appropriate to consider designating the erosion risk at the next level up for long duration projects that extend over multiple seasons.

Table 6.5: Overall erosion risk classification

Slope/soil erodibility classification (based on Table 6.3)	Cover classification (based on Table 6.4)	Overall polygon erosion risk classification
Low	Low	Low
Moderate	Low	Low
High	Low	Moderate
Low	Moderate	Moderate
Moderate	Moderate	Moderate
High	Moderate	High
Low	High	Moderate
Moderate	High	High
High	high	High

6.2.4 Selecting BMPs based on erosion risk

The key objective of the ERA is to inform decisions on the types and locations of both structural (e.g. double-row silt fence) and non-structural (turbidity monitoring) best management practices that should be applied on the site. Table 6.6 lists recommended BMPs to be applied in each polygon based on its risk classification. For sites where RUSLE calculations are used to estimate erosion, Table 1.1. from the *RUSLE FAC* document should be referenced to determine if the calculated soil loss value is classified as very low, low, moderate, high, or severe. In referencing Table 6.6, 'very low' and 'low' classifications should be considered 'low' and 'high' or 'severe' classifications should be considered 'high'.

The best management practices listed in Table 6.6 are described below for further clarification.

Procedural ESC measures | Procedural BMPs are nonstructural methods or procedures that can reduce erosion and sediment transport, such as site management and scheduling practices. Procedural BMPs include site management practices like minimizing exposed soils, careful control of site perimeter, and planning of site access points and signage for sensitive areas. Scheduling practices include examples such as working during dry seasons, abiding by fisheries timing windows and restoring the site as quickly as possible. *Procedural ESC measures should be applied on all construction projects.*

ESC Plan | This includes drawings, standard notes and reports depicting and describing the site conditions (e.g. grades, locations of natural features, soil stockpiles and other key points of interest) during a particular phase of construction, and the structural best management practices that will be applied to mitigate erosion and offsite sediment transport. ESC plans should be provided in stages

reflecting the distinct phases of construction, which are normally categorized as: (i) topsoil stripping and grading, (ii) site servicing, and (iii) building construction. *Individual ESC Plans should be generated for each stage of every construction project.*

Table 6.6: Best management practices recommended at different erosion risk levels

Minimum best practices recommended	Low risk	Moderate risk	High risk
Procedural ESC Measures	yes	yes	yes
ESC Plan	yes	yes	yes
Routine inspection of ESC effectiveness	yes	yes	yes
Flow/Runoff Diversion	optional	where possible	yes
Phased Construction and Progressive Rehabilitation	optional	where possible	yes
More intensive ESC measures[1]	optional	optional	yes
Turbidity monitoring	optional	Recommended after significant rainfall/snowmelt	Continuous recommended[2]

Source: Adapted from *Environmental Guide for Erosion and Sediment Control During Construction of Highway Projects* (MTO, 2015).

[1]As described in section 6.2.4. [2]See Chapter 10 for more information on turbidity monitoring requirements.

Routine inspection of ESC effectiveness | ESC inspections involve regular assessment of the effectiveness of individual ESC measures and the overall ESC plan through site inspections and monitoring. This allows for identification of areas where maintenance (e.g. sediment removal) and repairs (e.g. replacement of damaged sediment fence) of ESC measures are needed, and also reveals when ESC measures should be replaced or augmented due to repeated failures. Guidance on inspection and monitoring is provided in chapter 10. *Routine ESC inspections should be carried out on all construction projects.*

Flow/runoff diversion | For construction site areas susceptible to erosion, where stabilization is not feasible, it may be advisable to divert runoff around bare soil areas with practices like interceptor swales or slope drains. These practices are detailed in Appendix B1. *Flow diversion should be considered on any unstabilized area, but is particularly necessary where erosion risk has been classified as high due to soil types or slopes.*

Phased construction and progressive rehabilitation | Staging construction and land clearing is a practice that requires strategic planning to schedule clearing and re-stabilization so that the total amount of time that bare soils are left exposed is minimized as much as possible. Guidance on the implementation of phased land clearing is provided in Appendix B1. *Phased construction and progressive rehabilitation should be considered on all construction projects, but is particularly necessary where erosion risk has been classified as high due to soil types or slopes.*

More intensive ESC measures | This includes a range of practices that are considered more robust and effective than the most commonly applied sediment controls. Examples include: double row silt fence barriers (particularly adjacent to natural features), weir/settling tanks, active treatment systems (see Appendix B2), and other runoff detention measures (e.g. sediment traps, ponds). On high erosion risk sites, these types of measures can provide more assurance that sediment laden water will not leave the site, since they provide more opportunity for the removal of suspended sediment in runoff. *Intensive/ enhanced ESC measures should be considered on all construction projects, but are particularly necessary where erosion risk has been classified as high due to soil types or slopes.*

Turbidity monitoring | Beyond the routine inspection and repair of individual ESC measures, it is important to evaluate the cumulative effectiveness of all the controls installed on a construction site by monitoring the quality of site discharges or the quality of receiving water systems downstream of the site. On construction sites, turbidity is an important and easily monitored parameter that gives an indication of the amount of suspended sediment in site runoff. Guidance on selecting a turbidity monitoring approach according to site conditions and project circumstances is provided in section 10.2.1. *Turbidity monitoring should be considered on all construction projects, with more intensive efforts applied on sites where erosion risk has been classified as high due to soil types or slopes.*

6.2.5 ERA submission components

Documentation of the ERA process carried out and associated results can be provided as part of the ESC plan submission package described in Chapter 8.0. The following items should be provided to document the ERA process and its outcomes:

1) A site map showing (labelled) polygons of like erosion potential. The map should be developed at a scale suitable to the size and topography of the study area. The base map should be prepared from a detailed topographic map or air photo mosaic.
2) A table listing the erosion risk classification of each polygon and brief justification of the classification.
3) A description, in tabular or text form, of the BMPs that will be applied in each polygon, including a brief justification based on the risk classification. This may be combined with the polygon risk classification table described in #2 above if appropriate.
4) An ESC plan for the stage in question which includes BMPs that have been selected and located so as to best mitigate erosion in each polygon.

7.0 ESC PLAN DESIGN

7.1 Key principles

An effective ESC plan keeps construction sediment from migrating offsite by (i) preventing erosion and (ii) providing opportunities for removal of sediment from runoff before it leaves the site. It should provide protection strategies for the entire construction period, from the beginning of stripping through to final stabilization and decommissioning of ESC measures.

The ESC planning process should be…

COMPREHENSIVE | All stages of the construction period and all relevant geographic areas should be included in the plan. ESC measures selected should be robust and provide for redundancy in case any one measure fails. One important way to achieve this is to apply a multi-barrier approach wherever possible.

COLLABORATIVE | The ESC designer creates a plan, using their technical expertise to establish sizing, design and placement of ESC measures. To the extent possible, the contractor should provide input on the suitability, practicality and constructability of the plans, taking into consideration labour, equipment, materials, construction practices and site constraints. Collaboration should continue throughout the construction, such that plans may evolve based on changing conditions and input from on site personnel like construction staff and inspectors.

STRATEGIC | During early planning, identify opportunities to phase development whenever possible. Phasing development requires strategic planning to schedule clearing and re-stabilization so that the total amount of time that bare soils are left exposed is minimized as much as possible. See Appendix B1 for guidance on phased stripping.

DYNAMIC | Approved ESC plans must be considered dynamic rather than static, with measures upgraded and/or amended as needed to mitigate risk of sediment release. Even when measures are implemented according to approved plans, adjustments must be made as necessary when inspection identifies a risk of ESC failure and potential ecological impact.

Conventional ESC planning has often relied on sediment fences, check dams and temporary sediment ponds in a static ESC plan. More current approaches focus on better tailoring ESC measures to the specific project site and planned activities, and treating the plan as dynamic, evolving as needed to continuously mitigate impacts. Figure 7.1 summarizes the key design principles of comprehensive, collaborative, strategic and dynamic ESC planning. An ESC Planning checklist provided in Figure 7.2 lists the key activities involved in the ESC planning process. For checklists related to ESC plan submissions, see Chapter 8.0.

Figure 7.1: Principles of ESC planning

ESC Planning Checklist

Project Name	
Project Location	
ESC Plan Designer	Name, company, phone number, e-mail
Land Owner	Name, company, phone number, e-mail
Developer	Name, company, phone number, e-mail
Inspector	Name, company, phone number, e-mail
Municipal contact	
CA contact	

UNDERSTANDING THE SITE

- √ Conduct a site walk to make field observations about existing conditions before developing the ESC Plan.
- √ Collect existing site condition data (e.g., topographic survey, site photos, soils reports).
- √ Identify existing drainage patterns including internal and external flow routes. Identify areas with sheet flow, concentrated flow and receiving watercourses.
- √ Identify all natural heritage features and conduct surveys to delineate boundaries where required (e.g., watercourses, wetlands, woodlots, riparian zone, etc.).
- √ Establish baseline monitoring program if required.
- √ Carry out an erosion risk assessment (see Chapter 6.0).

CONSIDER THE GOALS OF ESC

- √ Protect all natural heritage features.
- √ Undertake construction in a way that minimizes soil disturbance and vegetation clearing.
- √ Aim to prevent erosion whenever possible.
- √ Suggest techniques that allow for sedimentation by slowing down the velocity of flowing water.
- √ Ensure that sediment is contained and managed onsite.
- √ Undertake earthworks in phases in order to minimize the amount of time that soils are left exposed.
- √ Manage internal drainage and convey or divert external drainage through or around the site.
- √ Coordinate and schedule any in-water or near water works with applicable fish windows and planting seasons.
- √ Select ESC measures appropriate to the season.
- √ ESC is a dynamic process and plan designs must reflect different stages of construction and their associated issues.

DESIGN THE ESC PLAN

- √ Prepare ESC plans that address each construction stage. Multiple plans are required.
  - Stage 1: Topsoil stripping, grading and re-stabilization
  - Stage 2: Site servicing
  - Stage 3: Building construction
- √ Select the types and locations of best management practices based on the outcome of the erosion risk assessment.
- √ Preserve existing vegetation and maintain vegetation buffer whenever possible
- √ Stabilize stockpiles and any other exposed soils on areas inactive for 30 days.
- √ Protect exposed soils, particularly on steep slopes
- √ Provide ESC practices to slow flow velocity and settle sediments
- √ Protect storm inlets and storm sewer system
- √ Conduct pre-construction meeting with the developer, contractor, environmental monitor and regulatory authorities to confirm constructability and practicality of the design.
- √ Ensure that all standard ESC notes are included on the drawings.
- √ Prepare an ESC report to accompany the drawings.

INSPECTING ESC MEASURES AND UPDATING ESC PLAN

- √ Inspection, monitoring and maintenance
- √ Revising ESC plan if needed due to changing site conditions or ineffectiveness of original measures.

Figure 7.2: ESC planning checklist

7.2 Staged ESC Planning

The term ‘staging” in relation to ESC plans refers to the technique of designing different plans for each stage of construction. This approach involves identifying the distinct stages of construction during which specific activities take place and then selecting the types and locations of ESC measures most appropriate for each stage. The primary purpose of developing staged ESC plans is to ensure that measures selected are the most effective and appropriate based on site conditions and construction activities planned.

While construction sites are by their nature constantly evolving, it is possible to define distinct construction stages largely based on the key activities that will be completed. The following are the stages of construction for subdivision developments:

1. Topsoil stripping, grading and re-stabilization
2. Servicing
3. Building construction
4. Final stabilization/rehabilitation and ESC decommissioning

For in-water construction and linear infrastructure projects like highways, railways and pipelines, the stages are slightly different but should still be defined based on distinct differences in the types of activities underway. In general, most construction projects will involve the first and last stages - stripping and grading and final stabilization/rehabilitation and decommissioning. The ESC designer should apply their professional judgement to establish what other distinct stages should be planned for based on the specific project. Regulatory agencies should be consulted to confirm that the defined stages are appropriate to the construction activities planned, and that they will capture the changing environmental conditions so that impacts can be mitigated at every stage. Additional information on erosion and sediment control during in-water construction is provided in section 7.5 and Appendix C.

Staged ESC plans should be prepared to show specific ESC techniques, drainage patterns and transitional site conditions at each stage. While there is no preset number of required ESC drawings, major modifications to drainage patterns should be used as a trigger for a new staged ESC plan. The following sections detail the typical conditions and key considerations during each construction stage.

Stage 1: Topsoil stripping, grading and re-stabilization

Figure 7.3: Construction site grading

During this stage, vegetation and topsoil are removed and the soils are moved around the site (cut and fill) to achieve the necessary pre-grade elevations. ESC measures like sediment control ponds and perimeter and conveyance controls are installed just before topsoil stripping begins to ensure adequate protection is in place as soon as the soil stabilizing effect of vegetation is removed. While this stage of construction is typically subject to the most appropriate application of ESC measures, there are several ways in which common practices can be improved or enhanced.

Of particular importance is the prevention of erosion through phased development. ***Clearing of smaller, more manageable sections of the site – leaving other areas undisturbed and vegetated for as long***

as possible – can be one of the most impactful strategies for mitigating sediment releases during earthworks and grading. When phasing is applied, topsoil stripping and grading activities are limited only to areas designated in that development phase. Phased clearing of lands during this stage should be based on the size of the site, the season and construction timelines, the cut and fill plan, and any requirements specified in permits and approvals. The grading plan and cut-fill analysis for the site must be available prior to phase planning. Detailed guidance on minimizing and/or phasing stripping on construction sites is provided in Appendix B1.

STAGE 1 – KEY CONSIDERATIONS

- Apply minimized clearing and development phasing
- Limit the amount of land stripped at a given time to the area that can reasonably be expected to be developed and stabilized within the same construction season
- Divert flows around unstabilized areas
- Install flow conveyance measures with proper spacing of check dams (see Appendix B2)
- Apply flow interception
- Reduce cut slope lengths and gradients where possible
- Maintain positive drainage to temporary sediment control ponds
- Use sediment traps to treat flows from smaller areas (< 2 ha) that don't drain to ponds
- Stabilize as you go, especially high risk areas and those inactive for 30 days or longer

Stage 2: Site Servicing

During stage 2 the installation of underground services, like storm sewers and water mains, and the construction of roads results in a significant alteration to the internal drainage patterns of the site. Pre-grading of building lots – such that the lot grade is lower than the roads and the sediment control ponds – can often result in localized ponding areas. Despite this, catchbasin inlet protection is still required, even after roads are paved, due to the large amounts of sediment tracked onto the roads from the still unstabilized lot areas. Inlet protection should be installed as soon as catchbasins start receiving runoff.

Figure 7.4: Site servicing

Careful consideration should be given to additional ESC requirements and flow control measures due to transitional grading during this stage. ESC measures applied in stage 1 should be re-assessed for suitability based on altered flow patterns and changes to construction activities during this stage.

STAGE 2 – KEY CONSIDERATIONS

- Redirect swales/ditches based on new grades and flow patterns
- Relocate ESC measures
- Stabilize inactive areas and steep slopes
- Install storm drain inlet protection (see Appendix B2) before storm drains start to receive runoff
- Provide for treatment of stormwater pumped out of excavated areas, and erosion protection/flow dispersion at the discharge location. See details under 'Pumping and dewatering' in this chapter.

Stage 3: Building construction

Figure 7.5: Building construction stage

During stages 1 and 2, construction activities are mostly undertaken by the main earthworks contractor. Once the site is ready for building construction it is often turned over to the builder, and there are often many new contractors and sub-contractors who begin work on the site. While the earthworks contractor may have established a good communication protocol with project team members, including the landowner, ESC designer and inspectors, this may be lost once the additional building construction contractors become involved. ESC plans must include measures that will provide protection during the activities specific to this stage of construction.

One of the most common risks encountered during stage 3 is the migration of sediment into rear lot and road catchbasins. During Stage 2, catchbasins are elevated above the rough lot grades, and as such localized ponding provides some opportunity for sediment settling. Once lots are at their final grades but have not yet been stabilized, lot runoff runs directly into the catchbasins. Applying and maintaining effective inlet protection (described in Appendix B2) is an important way to mitigate sediment migration during building construction, before vegetative stabilization can be established on the lot.

STAGE 3 – KEY CONSIDERATIONS

- Stabilize construction vehicle access points with stone or pre-fabricated mud mat in order to minimize tracking sediment onto roadways
- Install inlet protection on all catchbasin inlets
- Apply perimeter controls (e.g. sediment fence, filter socks) as barriers between unstabilized lots and newly constructed roads
- Apply erosion controls (e.g. blankets) and/or perimeter sediment controls to stockpiled material from basement excavations
- Do not locate stockpiles on top of or directly adjacent to catchbasin inlets
- Stabilize bare soil areas as soon as possible

Stage 4: Final stabilization and decommissioning

During the final stage of construction, home building has been completed and any remaining bare soil areas of the site can be stabilized. At this stage ESC measures are progressively removed as contributing drainage areas are effectively stabilized. Depending on the type of development, this may involve landscaping building lots and common areas like boulevard islands, recreational or parkland areas, and stormwater pond blocks.

Figure 7.6: Subdivision after final stabilization

The extent to which permanent vegetation is healthy and providing good soil coverage should be verified prior to the decommissioning of ESC measures. The stage 4 ESC plan should include decommissioning details for all ESC measures – including perimeter sediment control fencing – and provide information on the proper removal and offsite disposal of materials. Details should also be provided for restoration of areas from which in the ground ESCs have been removed (e.g. sediment fence). Restoration guidance is provided in Appendix G.

STAGE 4 – KEY CONSIDERATIONS

- Remove all accumulated sediment remaining on the site, with particular attention to sediment accumulated behind perimeter sediment controls, along roadways, and around catchbasin inlets
- For sites with low impact development (LID) measures that have been kept offline during construction, specify that all sediment accumulated in areas draining to the LID must be removed before it is put online. See section 7.6 for more detail on ESC for LIDs.
- Stabilize and/or restore all disturbed areas of the site
- Decommission temporary ESC measures as contributing drainage areas are effectively stabilized.
- Specify appropriate offsite disposal of ESC materials

7.3 BMP selection

Selecting the appropriate BMPs for a particular ESC application requires a clear understanding of how the BMPs function, their intended use, expected performance and what maintenance they will require. ESC designers who are familiar with a wide range of structural and non-structural BMPs – and how they are best applied – have more tools in their toolbox when it comes to addressing ESC challenges in construction projects. BMPs can be categorized according to their intended function as detailed in the following subsections. Detailed design, installation and maintenance guidance for all BMPs addressed in this section is provided in Appendix B.

7.3.1 Erosion prevention

Practices that prevent erosion are the most effective BMPs because they address sediment at its source. Erosion prevention measures include minimized or phased stripping and strategies that divert flows around or away from erosion prone areas. Minimizing clearing involves the identification of site areas where vegetation can be preserved throughout the entire construction period. Preserving vegetated areas not only prevents erosion but also helps to manage runoff, as the topsoil, vegetation and root systems are effective at intercepting and infiltrating stormwater. Minimized clearing can often be achieved on some parcels of land designated for later development (e.g. school blocks), and is particularly important at the site perimeter and around natural features. Guidance on appropriate buffers around natural features is provided in Appendix B1.

Practices that are meant to prevent erosion by diverting and controlling runoff include structures like slope drains and interceptor swales. Slope drains convey runoff down a slope without allowing it to flow across the slope face. On long, steep and/or unstabilized slopes in particular, slope drains are an important way to reduce the chance of rill and gully formation on the slope.

7.3.2 Erosion control

Erosion control measures are applied to bare or under-stabilized soils in order to improve resistance to erosion by water and wind. Key areas of the site where erosion controls should be applied include:

- areas inactive for 30 days or longer
- slopes
- soil stockpiles
- runoff conveyance channels (e.g. interceptor swales)
- areas immediately downstream of water outlets
- banks of detention ponds and sediment traps
- lay down areas for sediment (dewatering) bags
- other areas where erosion risk is high and runoff flows directly towards a sensitive area downstream (e.g. stream, wetland)

Figure 7.7: Soil stabilization with a rolled erosion control product

One of the most common and effective erosion controls – when properly applied and allowed to take root – is vegetative stabilization (i.e. seeding). An area may be seeded as a temporary/short term erosion control strategy or as part of the final site stabilization/restoration plan.

Other ground covers often applied to control erosion are rolled erosion control products (RECPs, as shown in Figure 7.7) like netting, blankets and matting. They serve as a physical barrier to erosive forces and, when applied over a newly seeded area, provide protection and insulation that can improve seed establishment. Detailed guidance on these and other erosion control measures, including mulching, surface roughening and chemical stabilization, are provided in Appendix B1.

On sites where dust is a concern, wind erosion is often mitigated by misting / irritating bare soil areas during dry weather periods. Due to the temporary nature of this control measure, application of more lasting stabilization techniques, such as the methods detailed in Appendix B1, should be pursued if wind-blown dust is anticipated to be an ongoing problem.

7.3.3 Stormwater detention

On construction sites, detention can be an effective mechanism for removing suspended sediment from stormwater before it can be released to the receiving system, as well as helping to reduce peak flow rates. End-of-pipe BMPs on construction sites - like detention ponds, sediment traps and settling (weir) tanks – provide extended detention of construction runoff on a large scale. Within the detention area, the flow velocities are reduced and sediment particles have the opportunity to settle out of suspension.

Temporary sediment control ponds (Figure 7.8) should be constructed to receive flows from any drainage areas larger than 2 ha, while sediment traps should be used for areas under 2 ha. While detention tanks can be useful in a variety of circumstances, they are often used to provide detention over the shorter term and where space to construct a pond is limited, such as during dewatering activities. Active treatment systems – which typically incorporate detention tanks and sometimes include polymer flocculants – are also useful for treating stormwater with elevated levels of sediment or other contaminants while occupying a comparatively small amount of space.

Figure 7.8: Temporary sediment control pond

The efficacy of detention ponds and sediment traps is largely dictated by (i) the extent to which they are properly sized and constructed as designed, (ii) whether the banks are stabilized immediately following its construction, and (iii) the extent to which they are regularly cleaned out / maintained. Even when detention BMPs are well designed and performing as intended with respect to sediment removal efficiency, effluent sediment levels can still be elevated above the thresholds required to protect aquatic habitat. Reducing the inflow sediment concentration ***and*** volume conveyed to detention BMPs is a key way to achieve lower effluent sediment concentrations. Techniques that prevent erosion and promote infiltration and evapotranspiration of stormwater are particularly effective in this regard. Practices such as development phasing, retention of existing vegetation, and provision of shallow soakaway / detention areas throughout the site are all good examples of how this can be accomplished.

7.3.4 Flow interruption

Flow interruption devices are barriers applied perpendicular to a flow pathway to reduce water velocity and erosivity and to provide opportunity for sediment settling. While often permeable, flow interrupters are not meant to serve as filters. Examples of this type of device included filter socks, wattles, logs and rock check dams. Sediment control fence can be used for flow interruption for sheet flows but not across concentrated flow paths. Flow interruption devices can also serve to redirect sheet flows towards a treatment area.

These devices should be applied perpendicular to flow in runoff conveyance channels, across slopes (perpendicular to sheet flows), around soil stockpiles, at site perimeter (usually sediment fence) and along the up-gradient side of natural water features.

Flow interruption can also be applied to mitigate wind erosion. Windbreak fencing, which often consists of mesh sheeting held by structural supports, can be applied like water flow interrupters: perpendicular to the prevailing wind flow path at regular intervals that are determined based on the height of the fencing.

7.3.5 Filtration

Filters used in ESC are typically fabric, and are defined by their apparent opening size (AOS), which is the largest opening available through which soil particles can pass. Manufactured geotextile filter fabric with a known opening size will filter out all particles that are larger than the AOS. In this way they differ from flow interrupting devices, although they do also provide the added benefit of reducing flow velocities and thereby increasing sediment settling. Examples of filtration BMPs include sediment (dewatering) bags and storm inlet filters.

7.3.6 Flocculation

Polymers flocculants are chemicals that encourage sediment particles to bind together to form larger aggregate masses. These larger, heavier masses are more susceptible to gravitational settling in water detention areas and more readily removed when passed through a filter. Flocculants can be used on construction projects to enhance removal of suspended sediment, particularly in situations where the sediment-laden water cannot be detained long enough to allow particles to settle. They are often applied in conveyance systems like interceptor swales or, in detention practices like weir tanks. Detailed guidance on the application, design and installation of polymer flocculant based sediment removal systems are provided in Appendix B2.

7.4 Dewatering protocols and best practices

Most construction projects will at some point require active water movement; applying effective ESC measures during these dewatering activities is an important way to reduce offsite sediment migration. Dewatering protocols define methods for carrying out water movement activities, whether planned or unforeseen, such that the water is treated as needed and discharged in a way that does not contribute to erosion. An effective ESC plan should include dewatering protocols that direct onsite staff on how to handle active and passive pumping discharges. A detailed drawing of the dewatering set up should always be included in ESC plans.

Common construction activities involving dewatering of sediment laden water include:

- Sediment control pond dewatering to facilitate re-grading, maintenance or cleaning/dredging;
- Pumping out stormwater that accumulates in excavated (e.g. excavations for basements or underground services) or low lying areas following a large storm event;
- Using a sump pump to remove groundwater in excavations that extend below the water table; and
- Repair or replacement of underground services (e.g. storm sewer).

For planned dewatering the ESC plan should be specific on the treatment and location of discharge. Advanced planning of these activities will ensure that potential ecological impacts have been addressed and mitigated. The following are key factors to consider during the development of a dewatering protocol.

- **Allowable water movement rates specified in permits.** In Ontario a Permit to Take Water (PTTW) or Environmental Activity and Sector Registry (EASR) registration may be required when taking more than 50,000 litres of water in a day from a surface or ground water system. If pumped water is being discharged to a municipal sewer, discharge permits are typically required. While specific permit requirements will vary by municipality, they typically specify a maximum allowable discharge rate and water quality standards.
- **Receiving system water quality standards.** Water discharged directly to a municipal sewer (either storm or sanitary) is often subject to the applicable municipality's sewer use By-Law and the relevant contaminant limits defined therein. When dewatering discharge is being released into a natural water feature, the turbidity targets detailed in section 10.2.2 are applicable.
- **Temperature standards for discharge to natural features.** Water released to natural features should fall within an appropriate temperature range based on the natural regime and types of aquatic organisms supported by that habitat. Groundwater may often be significantly cooler than the receiving water system, so ensuring a gradual initial release is important to allowing aquatic organisms to adapt. In cases where warmer water is being discharged to a receiving water system that supports cool water species, like the provincially endangered Redside Dace, discharge temperatures should not exceed 24°C, as currently required by the Ministry of Natural Resources and Forestry. More detailed guidance on mitigating thermal impacts associated with discharges is available in *Environmental Effects Assessment of Freshwater Thermal Discharge* (Environment Canada, 2014).
- **Proximity of groundwater dewatering to natural surface water features.** When groundwater is being dewatered near a surface water feature, the water level in the feature may be impacted by the dewatering, depending on the zone of influence and the amount of water being pumped out. It is important to understand the groundwater condition in the area, through borehole logging for example, in advance of preparing a dewatering plan. If a natural surface water feature is located within the anticipated zone of influence, the local conservation authority should be consulted to provide advice and help establish strategies for preventing impacts to the hydrology of the surface water feature.

Figure 7.9: A wetland

- **Erodibility at discharge locations.** Preventing erosion at the outlet of a dewatering system can be just as important as sediment removal/treatment methods used in the system. Erosion mitigation starts with stabilization of the discharge/outlet area and the entire flow path from the outlet to the

receiver. Stabilization with stone and geotextile, vegetation or rolled erosion control products (e.g. blankets) may be appropriate in this type of application, depending on the anticipated flow rates. Flow dispersion and energy dissipation should also be applied, particularly if flow rates are high or concentrated. Outlet protection is described in more detail in Appendix B1.

- **Requirements for quality and/or quantity monitoring.** Permits issued for dewatering activities – such as PTTWs, conservation authority permits (under the "Development, Interference with Wetlands and Alterations to Shorelines and Watercourses" regulations), MECP permits or authorizations under the Endangered Species Act (S.O. 2007) and sewer discharge permits – often include requirements for periodic or continuous monitoring of the quality and amount of water being moved. Guidance on turbidity monitoring of construction site discharges is provided in chapter 10.
- **Contingency plans.** Protecting natural features in the event that water treatment or erosion mitigation measures are failing during dewatering requires contingency planning. An effective contingency plan can be implemented on short notice, which means that the materials and equipment needed should be readily available to use if needed. A proactive approach to a potential water quality issue would be to have a plan to get a dewatering tank or active treatment system on site and installed quickly if needed. The preferred course of action in any situation where the treatment system in place during dewatering fails is to immediately cease dewatering activities until the issue is resolved.

The extent to which these factors will apply to a given dewatering activity depends largely on the volume of water being moved, where the water is coming from and where it is being discharged. Provincial permitting requirements related to water movement – known as the Permit to Take Water (PTTW) administered by the Ontario Ministry of Environment, Conservation and Parks – are detailed in Chapter 9.0. The following subsections detail suggested best practices to apply during dewatering activities.

Figure 7.10: A multi-barrier/treatment train approach to dewatering with a sediment bag

Dewatering bag

Geotextile dewatering bags are commonly applied to filter water during pumping activities. As water is pumped through the bag, sediment is removed through filtration and gravitational settling caused by energy dissipation. The bag also disperses the water from the pump hose, preventing erosion typically associated with concentrated flows.

The dewatering bag should be placed on a relatively flat surface - to ensure the bag doesn't shift downslope – and in an area at least 30 m away from any natural water feature. Vehicle accessibility should be considered to ensure that the bag can be transported away when full. The placement of the bag on a stabilized surface, such as a grassed area or rock pad, will help to mitigate erosion. For a ***multi-barrier approach*** to dewatering through a sediment bag, see TRCA ESC Design Drawings 1 & 2 in Appendix B2. Bags should be inspected regularly and replaced when full, or if water discharged from the bag remains turbid. If water contains a large proportion of fine sediments and remains turbid following treatment, it may be appropriate to use a polymer-based treatment train approach as described below.

Additional design and inspection guidance for sediment bags is provided in Appendix B2.

Polymer-based treatment train

In some circumstances it may be useful to promote greater settling during dewatering by using a polymer flocculant, which causes sediment particles to bind together. They are best applied to enhance sediment settling when turbidity levels are high and adequate detention times cannot be provided. This is often the case during dewatering, as space constraints typically don't allow for the construction of a large detention area. Flocculants can also be helpful when the water being moved contains a large proportion of fine sediments since these are difficult to settle out of suspension.

Figure 7.11: Polymer-based treatment train in a dewatering ditch

A common polymer-based treatment train is a dewatering ditch (Figure 7.11). Pump discharge is released into a ditch system designed to incorporate a polymer flocculant to optimize settling of suspended sediment particles. The ditch should be set up to provide opportunity for sediment removal by allowing for dosing, mixing, settling and final filtration. Appendix B2 provides more detailed guidance on the application of polymer flocculants for clarification of water on construction sites. Specific guidance on anionic polyacrylamide (PAM) is available in the *Anionic Polyacrylamide Application Guide for Urban Construction in Ontario* (TRCA, 2013).

Dewatering tanks

Figure 7.12: Weir tank

Weir tanks (Figure 7.12) can be an important treatment option during construction site dewatering, as these systems detain water to promote sediment settling. Large volume tanks are particularly useful when anticipated pump rates are high. Compared to other detention measures that are built on site, like basins or sediment traps, tanks can be a convenient solution for short duration dewatering activities, since they are readily transported on and off site.

In order to prevent erosion, stabilization measures and flow dissipation should always be applied in the area where the tank discharges. Optimizing sizing with consideration for sediment removal targets, particle size distribution of sediment, anticipated pump rates and tank rental costs is necessary to ensure the system will achieve the desired outcomes. Dewatering (weir) tanks are addressed in more detail in Appendix B2.

Active treatment systems

Active treatment systems (Figure 7.13) used on construction sites offer more intensive water treatment and are typically applied when:

- water contains elevated levels of certain contaminants of concern, or
- only sediment removal is required but simpler alternative practices cannot achieve the necessary removal rates.

Figure 7.13: Active treatment system

They can be particularly useful where effluent discharges directly to sensitive features (e.g. habitat for species at risk). These systems incorporate weir tanks, flocculants and filters in order to achieve a high contaminant removal rate while occupying a relatively small footprint. They differ from a passive polymer treatment train in that they offer more precise control of the treatment processes, such as flocculant dose metering and filter backwashing capabilities. They may incorporate hydrodynamic processes for physical separation of floatables and suspended particles from the water. Active treatment systems are highly customizable and can range from simple to complex, depending on the components included, the types of contaminants being removed and the removal rate required. Additional guidance on active treatment systems is provided in Appendix B2.

7.5 Protecting aquatic habitat during in and near water works

Watercourses are complex ecosystems that support a wide range of aquatic habitats and species. They can be flowing with water, intermittently wet, or dry, and include headwater drainage features, swales, creeks, streams, rivers, floodplains, lakes, ponds and wetlands. Some channelized creeks, constructed ditches or municipal drains may also be considered streams.

The *Fisheries Act* (s. 34) defines fish habitat as areas that fish rely on directly or indirectly, and include spawning grounds, nursery, rearing, food supply and migration areas.

Any proposed in-water or near-water works must protect fish and wildlife habitat. This includes the surface water feature, as well as the vegetated floodplain areas that provide nutrients and shade to the watercourse, wetland, etc. Fish habitat includes watercourse, streams, ditches, ponds and wetlands that provide water, food, or nutrients into a fish-bearing stream, even if they do not contain fish or if they have temporary or seasonal flows. Additional information on permitting and policies related to these activities, and guidance on the relevant agencies to consult, are provided in Chapter 9.0.

In-water works should be avoided if possible, and may be viewed as a last resort. The rationale behind this is to minimize potential ecological impacts, as in-water works are very intrusive to aquatic habitats and are considered high risk. In-water works can disrupt corridor function and linkages and result in temporary or permanent impairment or loss of aquatic and riparian habitat.

This section identifies standards and recommended best management practices for the planning, design and construction of both in-water and near-water projects. ***Detailed guidance and design drawings relating to best management practices for in and near water works are provided Appendix C.***

7.5.1 In-water work

In-water works refer to any works within a stream channel, wetland, lake or pond. This may include new construction, retrofits or any maintenance activity. Examples include:

- Installation or removal of temporary and permanent stream crossings – culverts, bridges, etc.
- Infrastructure construction (pipelines/conduits/etc.)
- Maintenance of stream crossings or other infrastructure
- Emergency works
- Installing or repairing stormwater outfalls or water intakes
- Spill clean-up
- Erosion protection works
- Stabilization of streambanks / shorelines
- Habitat enhancement and restoration
- Dredging
- Construction or repair of docks or dams

Figure 7.14: In-water worksite isolation

All machinery working in the water should have containment for spills and leaks, so that fuel, or other hazardous liquids do not contaminate the aquatic community. For example, excavators may require 'diapers' to prevent leaks and spills. It is also recommended that all refueling or maintenance of equipment occur outside of the watercourse, and a minimum of 30 metres from any surface water feature, in order to prevent spills.

Working in the dry

To effectively isolate in-water works, and to 'work-in-the-dry', a physical, water-proof barrier needs to be installed within the surface water feature, or between the work area and the surface water feature requiring protection. The entire work area needs to be completely isolated. Water from the work area must then be removed and treated prior to release to the environment. Only clean water should be discharged back to the environment. Typically, dewatering effluent should be treated, and released a minimum of 30 metres from any surface water feature. The discharge location and flow path should be well vegetated or otherwise stabilized so that erosion of soil does not occur at the discharge point, and treated water does not pick up any additional sediment along the flow path back to the receiver. For any excavations, groundwater or seepage may also need to be removed from the work area. All water from the work area must be treated before release to the environment. Please refer to Section 7.4 on dewatering protocols for additional information.

Working in the wet

On occasion, in-water works may be permitted to be completed 'in-the-wet'. In these instances a turbidity barrier or other method may be used to isolate the work area and keep sediment from moving into the rest of the waterbody. Under some circumstances, work may be carried out in-the-wet without isolation of the work area. This is considered when the installation and removal of isolation measures are deemed to be more harmful to the aquatic system than proceeding without work area isolation. Some of the factors

that come into play when deciding whether to work in-the-wet without isolation are: potential for risk to the aquatic community, existing aquatic habitat conditions, type of work proposed, and the duration and timing of the work.

As an example, works may be proposed that would occur more quickly and efficiently if isolation is not installed. In this case there may be a net benefit to getting in and out as quickly as possible, and putting in isolation measures could do more harm to the aquatic community than the work itself. Permissions associated with carrying out works without isolation measures are subject to approval by the local CA and other relevant regulatory agencies.

Figure 7.15: Turbidity curtain applied to isolate a work area when working in the wet

Work area isolation

When works occur in a watercourse, flows must always be maintained to downstream reaches. This may be achieved by limiting the work area to a portion of the width of the watercourse, so flows can continue unhindered around the work area. The amount of watercourse that may be blocked/restricted should be determined with input from the approval authority. Alternatively, on smaller watercourses the entire flow may need to be blocked, as long as clean creek water is effectively diverted from upstream to downstream of the work area. Stream flows do not require treatment, and can be directly discharged back into the creek, provided there is some erosion protection on the creek bed to prevent scour (see Appendix C for design guidance and drawings). Only the water removed from the work area requires treatment prior to release back to the environment.

Methods of creek flow diversion include dam and pump, by-pass with a temporary channel or flume, and others described in Appendix C. Dam and pump diversions are generally used for short term projects lasting a week or so. Pumps require a high level of inspection and maintenance, which is not efficient for longer term projects. Temporary by-pass channels and flumes are typically used for longer term projects of a few weeks, months or years. Sizing of any barriers and diversions should be determined by consultation between the consultants designing the measures and the approval authority. Guidance on sizing of barriers and diversions is provided in Appendix A, which describes the *Specified Flood Risk Calculation* and Appendix C, which details in water BMPs. The local CA or other relevant permitting agency must be consulted to determine the sizing of isolation measures such as cofferdams.

The *Specified Flood Risk* calculation, detailed in Appendix A, is recommended for sizing of in-water isolation measures such as cofferdams. The calculation considers the anticipated lifespan of the measure and the acceptable level of risk, which for in-water projects should be 5% or less, as recommended by the MNRF.

In-water works for which isolation measures are applied will often require a fish and wildlife rescue/relocation plan. As the in-water work area is dewatered, and the water levels decrease, any fish, amphibians, reptiles, or other organisms require rescue and relocation by a qualified biologist. The rescue and relocation of fish and wildlife may require collector's permits / authorizations from the MNRF or, if

species at risk are involved, the MECP and Fisheries and Oceans Canada. These agencies should be consulted to determine project and location specific requirements.

7.5.2 Near-water work

Near-water work refers to activities occurring in close proximity to a surface water feature, or activities occurring within its catchment and draining directly to the feature. They can include any works within a valley, ravine, or in a floodplain. Some examples of near water work include:

- Road works;
- Grading;
- Temporary and permanent stream crossings which avoid intrusion into the stream;
- Stormwater outfalls/channels that are set back from a stream;
- Ditching;
- Tree removals with grubbing/soil disturbance;
- Infrastructure installed on the floodplain, valley slope or tunneling under a stream (e.g. pipelines / conduits);
- Terrestrial habitat enhancement and restoration; and
- Groundwater dewatering.

These activities have the potential to impact the aquatic habitat, either directly or indirectly. Near-water works are usually assessed by their level of risk to the surface water feature. Some works may be immediately adjacent to the feature but due to the topography, may not drain directly to the feature, thereby involving a low level of risk. As a result, fisheries or construction timing windows or other restrictions may not apply. Alternatively, a work area that is further removed from the surface water feature but draining directly to it may be classified as having higher risk of sediment contamination. For example, roadwork or grading at the top of a hill, draining directly to a watercourse, may require additional mitigation or timing restrictions.

7.5.3 Effective design for in and near water works

Both in-water and near-water works should have a minimal footprint. Encroachment into the floodplain or surface water feature should be minimized to the extent possible. This will help to maintain stream capacity, floodplain processes, and to minimize habitat destruction. Fish and wildlife passage should also be maintained.

All in-water construction methods should be clearly defined on the plans and contingency plans should be provided to outline actions to take if issues arise during construction (e.g. ice jams, flood conditions). Works should be carried out in an efficient and timely manner to minimize the time in and around the water.

All in-water and near-water works should be scheduled such that works are completed outside of the restricted activity timing windows listed in Table 7.1. These timing windows ensure that aquatic habitats are protected during critical life stages, such as spawning, juvenile stages and migration. Fisheries timing windows can also be called construction timing windows, and indicate when work is to be conducted. If the proposed works cannot be completed outside of the indicated spawning times, a timing window extension may be required, or the work may need to be phased over more than one year. MNRF is responsible for all fisheries timing windows in Ontario, and may defer to a local CA for some or all timing

window applications and / or extensions. Proponents should consult with either the local CA or MNRF to determine all timing windows and if extensions may be granted.

Table 7.1: Ontario restricted activity timing windows for protection of fish and fish habitat during in-water and near-water works (source: Fisheries and Oceans Canada, 2013)

	Fish Species	Northwest Region	Northeast Region	Southern Region
Spring spawning species	Walleye	April 1 to June 20	April 1 to June 20	March 15 to May 31
	Northern Pike	April 1 to June 15	April 1 to June 15	March 15 to May 31
	Lake Sturgeon	May 1 to June 30	May 1 to July 15	May 1 to June 30
	Muskellunge	May 1 to July 15	May 15 to July 15	March 15 to May 31
	Large/ Smallmouth Bass	May 15 to July 15	May 15 to July 15	May 1 to July 15
	Rainbow Trout	April 1 to June 15	April 1 to June 15	March 15 to June 15
	Other/Unknown Spring Spawning Species	April 1 to June 15	April 1 to June 15	March 15 to July 15
Fall spawning species	Lake Trout	Sept. 1 to May 31	Sept. 1 to May 31	Oct. 1 to May 31
	Brook Trout	Sept. 1 to June 15	Sept. 1 to June 15	Oct. 1 to May 31
	Pacific Salmon	Sept. 1 to June 15	Sept. 1 to June 15	Sept. 15 to May 31
	Lake Whitefish	Sept. 15 to May 31	Sept. 15 to May 15	Oct. 15 to May 31
	Lake Herring	Oct. 1 to May 31	Oct. 1 to May 31	Oct. 15 to May 31
	Other/Unknown Fall Spawning Species	Sept. 1 to June 15	Sept. 1 to June 15	Oct. 1 to May 31

The type of isolation measures must also be appropriate for the proposed works, time of year, and sensitivity of the habitats. Isolation measures may require specific design considerations, depending on the type of waterbody in, or near, the work area. For example, if works occur within a large river system during the winter, ice build-up and ice flows should be considered. In this instance the coffer dam may require sheet piling or metre bags for support. Please refer to Appendix C for additional information, and some of the various isolation measures currently used.

An effective in-water or near-water work plan should consider the following:

- Erosion risk – carry out an erosion risk assessment and choose and place BMPs to mitigate erosion in the highest risk areas
- Minimize work area footprint – reduce encroachment into the natural feature and minimize habitat destruction
- Know your site – How could site conditions change during construction? Where are the ecological sensitivities? What requires protection?
- Plan how water is to be managed for each stage of construction including treatment and discharge pathway
- Begin the design with erosion controls, and follow up with sediment controls
- Phase stripping and construction to minimize extent and duration of exposed soils
- Prevent the release of deleterious substances, including sediment
- Multi-barrier approach – be proactive and have back up controls (redundancy) in place
- Completely isolate work area from the influence of surface water
- Stabilize exposed soils as you go
- Work in co-operation with regulatory staff
- ESC plan is dynamic – need to manage unexpected conditions and update plans accordingly
- Regular inspections, documentation, maintenance and follow-up

7.6 Protecting low impact development sites

As the practice of stormwater management in Ontario continues to move towards more decentralized approaches like Low Impact Development, it has become necessary to re-imagine the way sites are planned from a water management perspective. That also means rethinking stormwater management on construction sites where LID practices are planned. The following subsections provide guidance on protecting LID stormwater measures during the construction process. More detailed information on LID construction is available in Credit Valley Conservation's *Low Impact Development Construction Guide* (2012) and the Canadian Standards Association (CSA) Standard W201-18: *Construction of Bioretention Systems*.

LID practices that may be compromised as a result of inadequate protection during construction are those applied at or below ground level to infiltrate stormwater. They include, but are not limited to the following:

- Bioretention areas
- Permeable pavement
- Infiltration trenches and chambers
- Enhanced grass swales
- Tree cells
- Exfiltration systems
- Other landscaped areas designed to receive stormwater and infiltrate stormwater.

Figure 7.16: Infiltration LID practices that can be vulnerable to impacts from construction. Clockwise from top left – bioretention area, permeable interlocking concrete pavement, underground infiltration chambers, enhanced grassed swale.

If protection measures are not in place, the functionality of LIDs may be compromised during site construction in the following ways:

- Clogging with sediment
- Erosion of inlets and beds (for planted areas)
- Subgrade compaction by heavy machinery
- Contamination by substances in construction runoff

A lack of understanding of the system can also result in damage to components like pipes and geotextile fabric. The risk of damage to LID measures continues throughout the construction process – from topsoil stripping to building construction – until the site is permanently stabilized. As such, it is necessary to maintain LID protection measures from the start of construction until:

- construction is complete;
- contributing drainage area is stabilized; and
- construction vehicle mud tracking has ceased.

Because LID measures are vulnerable to construction impacts that can reduce their functionality and lead to costly future repairs, it is imperative that project team members – from designers to inspectors to contractors – communicate effectively to ensure a high level of protection is maintained at all times. The establishment of a builder's agreement can be useful in ensuring protection of LIDs during construction, as they secure the contractor's and sub-contractors' commitment to keeping the LID installations functional (CVC, 2012). Municipalities can also require a letter of credit from the developer, which is tied to LID assumption protocols, and as such only refunded post-construction once the LID measures are confirmed to meet the pre-determined performance criteria. This is similar to the letter of credit system used during municipal assumption of subdivisions once they have been constructed and stabilized.

7.6.1 General best practices for LID protection

- **Phase construction so that LID measures are constructed last.** Planning for the construction of LID measures late in the construction project, where possible, helps to mitigate the sedimentation of infiltration LIDs. If LID measures must be fully or partially constructed earlier, while much of the site is still bare and unstabilized soil, consider protection strategies described in Sections 7.6.2 – 7.6.4.

- **Identify and mark LID areas and increase awareness.** Ensure LID areas are properly identified on ESC plans as well as on the site. In new development sites, clear signage is critical to protecting LID areas, and signage indicating 'no heavy equipment' is particularly important for intended infiltration areas. Areas designated for LID installations should also be sectioned off (e.g. fenced) early in the construction process, when ESC measures are being installed. All staff should be aware of best practices for protecting these areas.

- **Keep LID perimeter controls in working order throughout construction**. Even short term failure of perimeter controls protecting LIDs can result in significant sediment deposition within the area and impacts to its functionality. Perimeter controls should be installed early and kept in place until the site is stabilized and vehicles are no longer tracking mud onto the pavement surfaces that drain into the LID measure. Examples of perimeter controls that are appropriate for protection of LIDs

are filter socks, sand or pea gravel bags, natural fibre logs and wattles, and sediment fence. Detailed guidance on application of perimeters BMPs is provided in Appendix B.

- **Protect LID inlets.** LIDs that are kept offline during construction, which is the best approach for ensuring protection of the area, require the installation and maintenance of an impermeable physical barrier at the inlet. For example, curb cuts that serve as inlets for bioretention areas can be blocked off from receiving flows with sand bags or wood. For LIDs that are receiving runoff, permeable barriers can be installed at the inlet to help settle and/or filter out suspended sediment before the water enters the infiltration area. If underdrains and inlets meant to connect to the LID have accumulated construction sediment, they should be cleaned and/or flushed before the LID is constructed and online.

- **Avoid heavy equipment on intended infiltration sites.** In order to avoid compaction of native soil in LID areas, heavy equipment routes should be established as part of ESC plans. Signage indicating 'no heavy equipment' should be installed early in the construction process to identify LID measures, which should be sectioned off to keep all vehicle traffic off these areas.

- **Inspect LID areas during ESC site inspections.** ESC site inspections should be carried out weekly and before and after rain or snowmelt events to determine whether ESC measures installed are in good working order and functioning as intended. LID areas should be included in these inspections to confirm that LID protection measures are adequate, or to flag any instances where ESC repairs or enhancements are needed.

- **Be mindful of stockpile locations relative to LID areas.** Stockpiles of construction materials should be stored down gradient of LIDs to the extent possible (≥ 30 m recommended), since they can be a significant source of sediment that may be washed into the LID area. Sediment controls (e.g. sediment fence, filter socks) should be installed around all stockpiles, particularly those that are located up gradient of LIDs.

7.6.2 Protecting filtration and infiltration LIDs – flow diversion

The best strategy for protecting ground level filtration (e.g. grassed swales) and infiltration (e.g. bioretention areas) LID installations is to keep them offline until construction is complete, the drainage area is stabilized, and vehicle mud tracking has stopped. Diverting flows around LID areas offers several benefits, including:

- Less risk of erosion and clogging with sediment;
- Greater opportunity for seeded/planted LID areas to become established; and
- Easier access to carry out additional construction, repairs or maintenance of the LID area

It is recognized that in some cases this cannot be achieved, and that the location of the LID area may require that it be used as a temporary runoff detention basin. Options for protecting LIDs that are being used for construction stormwater detention are provided in section 7.6.3.

Figure 7.17 provides a graphic depiction of methods used to protect an infiltration LID – a bioretention area in this case – in a situation where the LID can be constructed and then kept offline until drainage area construction and stabilization are complete. The top picture shows a sacrificial layer consisting of 10 cm of growing media or 5 cm of sand laid on a liner – geotextile fabric or an 8 mil poly sheet – over the final post-construction grade of the bioretention area. This sacrificial layer prevents the migration of

sediment down into the growing media and underdrain. The layer should not be much greater than the stated recommended thickness, as excessive material weight could contribute to substrate compaction.

The middle picture depicts a multi-barrier approach to protection of the bioretention area, with perimeter filter socks and vegetative stabilization added on the sacrificial layer. With multiple barriers in place – including flow diversion, perimeter control, a sacrificial layer and stabilization – this option would provide the highest level of protection against sediment deposition in the bioretention area.

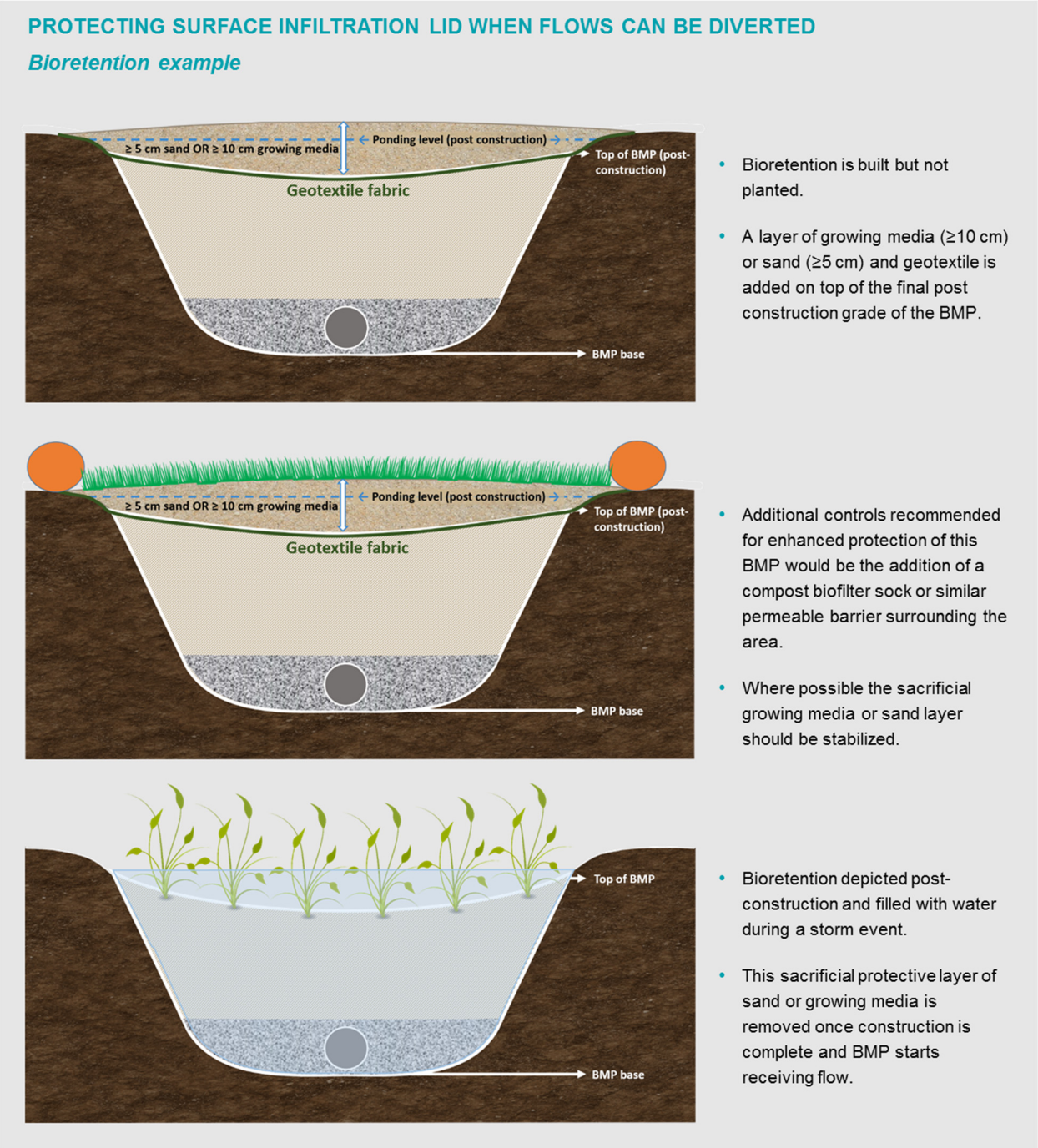


Figure 7.17: Methods used to protect surface infiltration LIDs that can be kept offline.

7.6.3 Protecting filtration and infiltration LID areas used for temporary stormwater detention

The use of ground level LID areas as temporary detention basins should be avoided if possible, as it is associated with a higher risk of subgrade clogging and compaction from construction vehicles used to remove accumulated sediment. In cases where LIDs must be used for construction stormwater detention due to site topography and the layout of the development, protection measures can be applied to prevent accumulated sediment from migrating into the subgrade.

Figure 7.18 provides a graphic depiction of the use of a bioretention area as a temporary detention basin for construction runoff. As shown in the top image, the LID is not fully constructed – rather it is only excavated down to 75 cm above the final post-construction base of the bioretention. Maintaining at least 75 cm of native soil between the base of the temporary detention basin and the final post-construction base of the bioretention area ensures that fine particles will not migrate down into the subsoils.

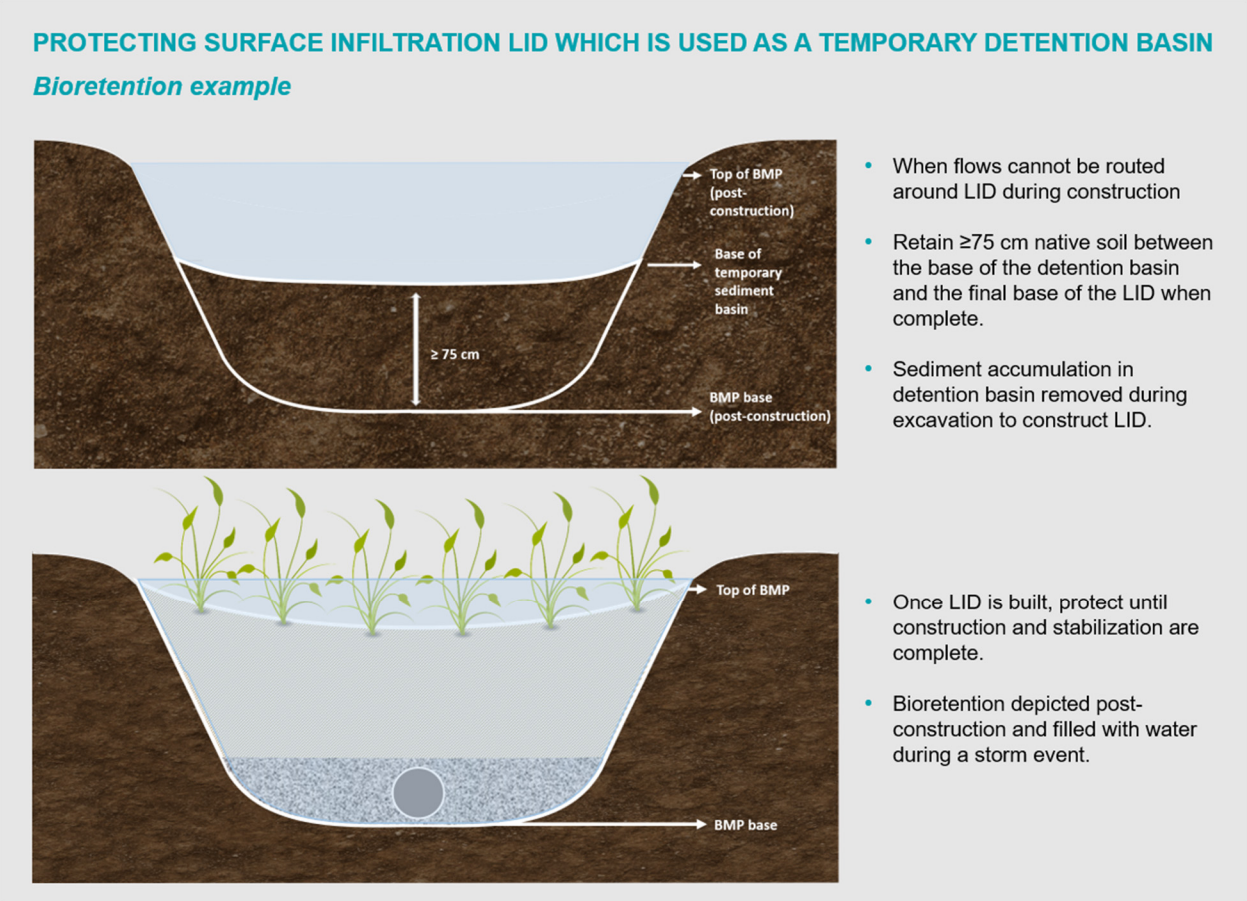


Figure 7.18: Protecting surface infiltration LIDs that are used as construction sediment detention basins

Sediment accumulated in the detention basin is ultimately removed as part of excavating to complete construction of the bioretention. The CSA Standard “Construction of Bioretention Systems” recommends scarification of any compacted native soil areas (CSA, 2018b). Once it is excavated and filled, ESC measures – such as perimeter controls, inlet protection and stabilization - should be put in place to protect it until all drainage area construction and stabilization are complete.

The same principles described above for protection of a surface infiltration LID can be applied in protecting a filtration LID – like a grass swale – when it is used as a temporary detention basin (Figure 7.19). In this case, the minimum depth of native soil between the base of the detention basin and the final base of the grassed swale LID should be 30 cm.

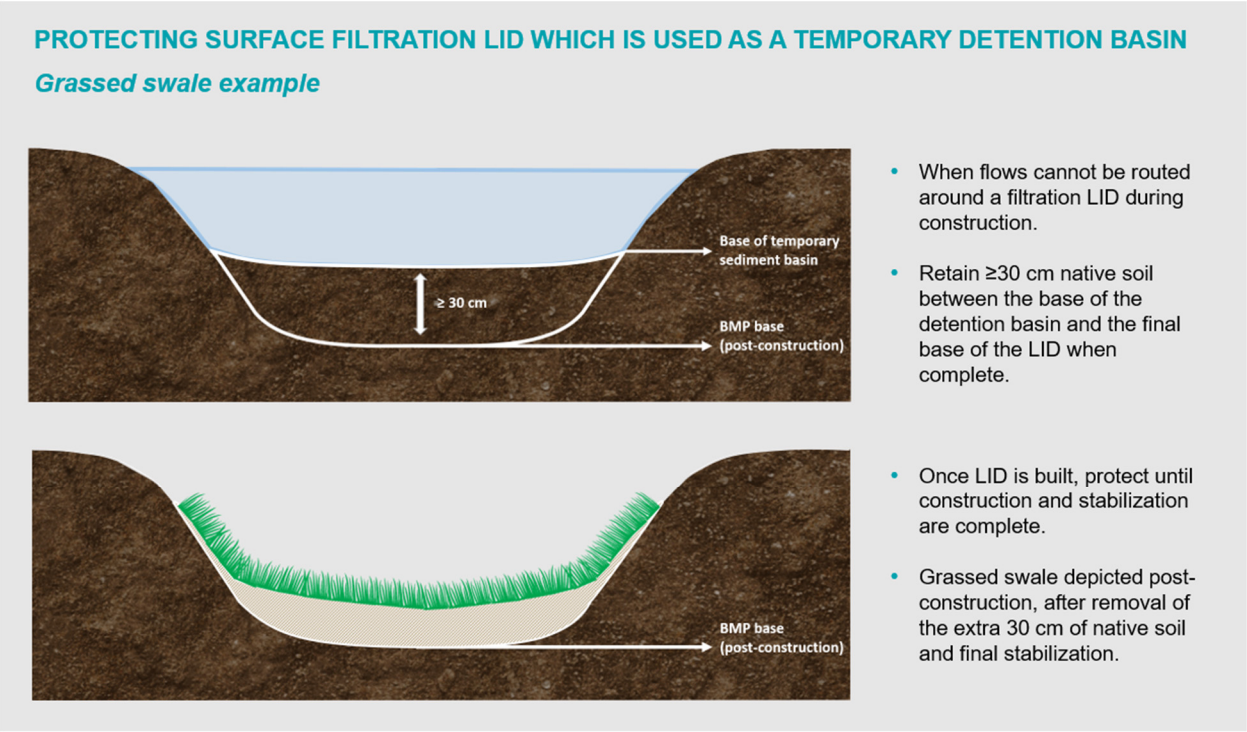


Figure 7.19: Protecting filtration LIDs that are used as construction sediment detention basins

7.6.4 Protecting underground LIDs

Underground infiltration LIDs, such as infiltration chambers and exfiltration systems, can be built early in the construction process (e.g. during cut and fill) provided that they are protected by a barrier preventing sediment laden construction runoff from entering the facility. A barrier, like a plug or bulkhead, should be installed to keep construction sediment from clogging the LID and an alternative flow route and/or detention area must be established. The underground infiltration facility should be kept offline until drainage area construction and stabilization are complete and vehicle mud tracking has ended. Figure 7.20 shows a schematic of an exfiltration system which has been kept offline with a temporary plug in order to keep construction sediment from clogging the system.

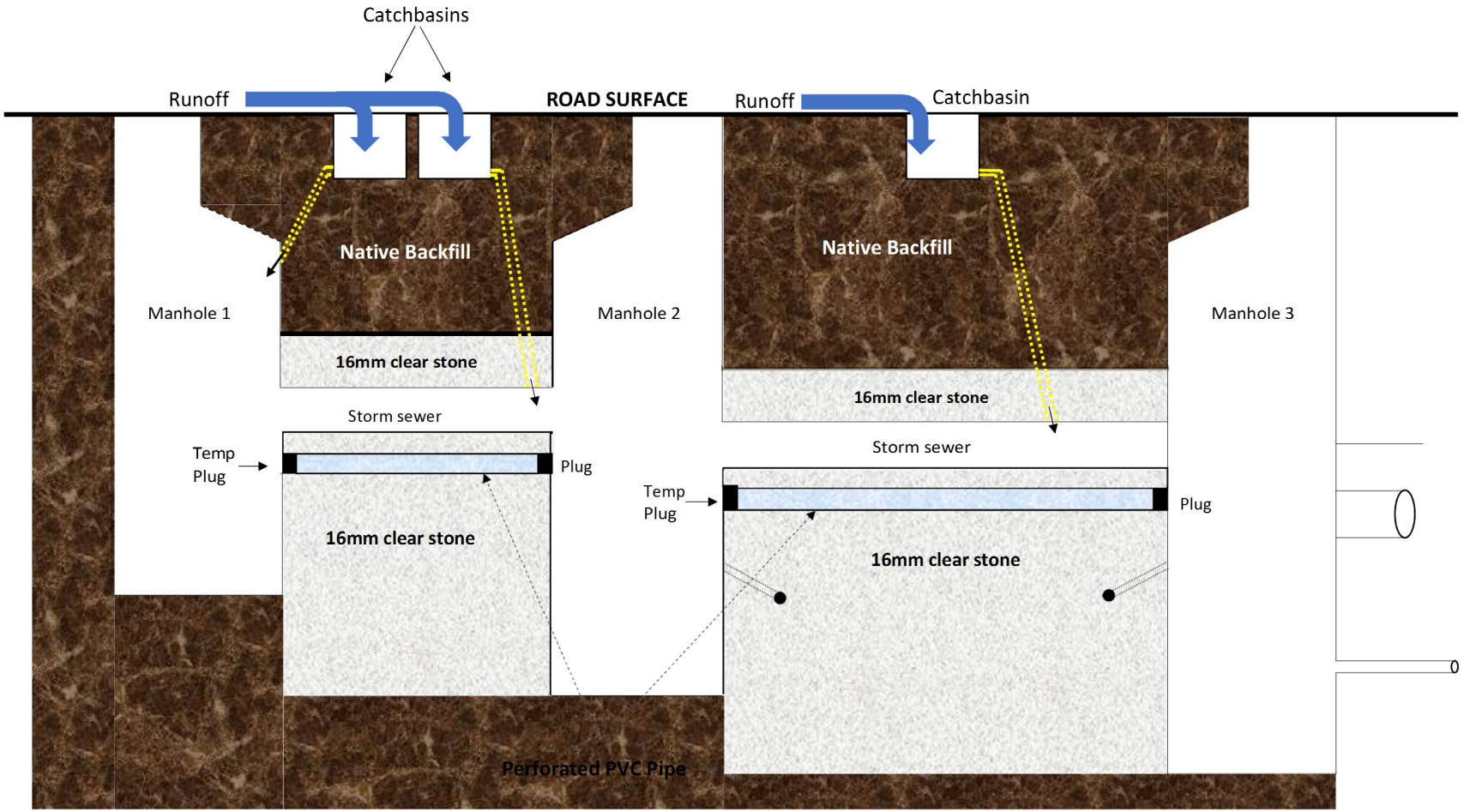


Figure 7.20: Exfiltration system schematic showing temporary plug keeping construction runoff out of the exfiltration area.

7.7 Spill response and control plan

Developing a plan for responding, controlling and reporting spills is an important component of ESC planning on construction projects. While spills may not be a routine occurrence, their impacts when they do occur can be substantial. Responding to these incidents quickly and effectively can greatly reduce the extent to which the natural environment is adversely impacted, and the resources needed for clean-up efforts. Having a spill response and control plan in place is also an important way to demonstrate due diligence in mitigating environmental harm.

What constitutes a spill?

In Ontario, a spill is a discharge of a pollutant into the natural environment that:

- is from or out of a structure, vehicle or other container; and
- is abnormal in quality or quantity in light of all the circumstances of the discharge.

While the level of detail and type of information needed in a spill response and control plan may vary based on project specific factors (e.g. location, activities planned, potential pollutants on site), the plan should, at minimum, including the following information:

- Relevant emergency contact numbers, including both project and external contacts (e.g. Spills Action Centre, municipal spills contact, land owner)
- Description of spills control equipment and materials that should be available on site, including quantities and locations
- Description of actions to be taken in the event of a spill, including procedures for responding, reporting, containment and clean up. If the required actions vary depending on the spill magnitude, all potential scenarios should be addressed.

7.7.1 Spills prevention

As in many cases, an ounce of prevention is worth a pound of cure. Best practices for preventing spills include:

- Be aware of all potential pollutants on the site. Some of the more common pollutants to be considered on construction sites include fuels, concrete wash-out, and silt/sediment, if it is released into natural features.
- Consider potential pollutants and assess spill risk according to the intended use, quantity on site, and their location relative to storm drain inlets and natural features. Materials Safety Data Sheets should be available for reference as needed. Understanding the risks in advance is a key step towards getting the appropriate protection measures in place.
- Plan to store pollutants in a secure area at least 15 metres away from natural water features, storm drains or drainage channels. Maintain buffers around natural features, as detailed in Appendix B1.
- Ensure pollutants brought on site are delivered directly to the designated storage area, and that deliveries are supervised by knowledgeable on site staff.
- Locate any designated vehicle maintenance areas at least 15 metres away from natural features and storm drains.
- Ensure that the machinery and equipment used during construction operations in sensitive environments is appropriately sized for the activity and also be well maintained.

- Keep a spill kit on site in a central location (e.g. near construction trailer) and in key vehicles, and ensure that staff understand how to use it to clean up minor spills. Major spills need to be reported as described in the next section, and mitigation and clean-up efforts may require the advice and involvement of regulatory agencies.
- Keep instructional information and key spills contacts in a central location known to staff, ideally with the spill kit.
- Inspect pollutant storage areas regularly and ensure that control measures around them are kept in good working order. Ensure that pollutant storage containers are properly sealed and undamaged.
- Maintain ESC measures and carry out regular inspections at the frequency detailed in Section 10.1.2. Ensure ESC measures are robust and capable of holding up during large rainfall events.
- Prioritize ESC in areas of the site that are highest risk, as identified using the erosion risk assessment methodology detailed in Chapter 6.0. Large sediment releases often occur as a result of a major ESC deficiency, such as a slope failure due to inadequate stabilization, or the breaching of sediment control pond banks. Identifying the high risk areas will allow for better placement of protection measures and greater preparedness in the event of a sediment spill.

7.7.2 Spill response

All ***minor spills*** should be immediately contained, cleaned up and removed from site. Documentation of the incident and clean-up actions should be kept with ESC inspection records and other key documentation.

Significant spills are those that have the potential for adverse impact on the water feature into which the spill occurred. They should be reported immediately to the contract administrator and ESC inspector. The contract administrator must notify the Ontario Spills Action Centre. The municipality, conservation authority enforcement officer for that area, and the landowner/developer should also be notified.

Monitoring efforts and documentation of incident details and containment/clean-up procedures should be initiated immediately upon detection of the spill. Documented details of the incident, as well as updates on site conditions and containment/clean-up efforts must be provided to the attending agency. The Ontario Spills Action Centre requests reporting of the following details when reporting a spill:

- Reporting individual's name and phone number
- The name and phone number of the person or company in control of the product spilled
- Date, time and location of the spill
- Duration of the spill (if known) and whether the spill is ongoing
- Type and quantity of pollutant spilled, including hazard level or toxicity information
- Source of the spill and information on the cause
- Description of adverse effects
- Environmental conditions that affect the spill (weather, traffic, etc.)
- Actions being taken to respond
- Other agencies and parties responding

Following reporting of the spill, an Environmental Officer from the Ministry of Environment, Conservation and Parks will gather information, assess conditions and impacts, and ensure clean-up is properly undertaken by coordinating with other regulatory agencies, providing advice and issuing orders if needed.

8.0 ESC PLAN SUBMISSION REQUIREMENTS

The submission requirements for erosion and sediment control strategies outlined within the Guide are organized based on three planning stages: early, intermediate and late, which align with both the land-use and infrastructure planning processes. The terminology used to describe the planning stages varies from municipality to municipality and between planning and environmental assessment processes. This method uses the terms **early**, **intermediate** and **late** stages to generalize them and accommodate all of these processes, as shown in **Figure 8.1**.

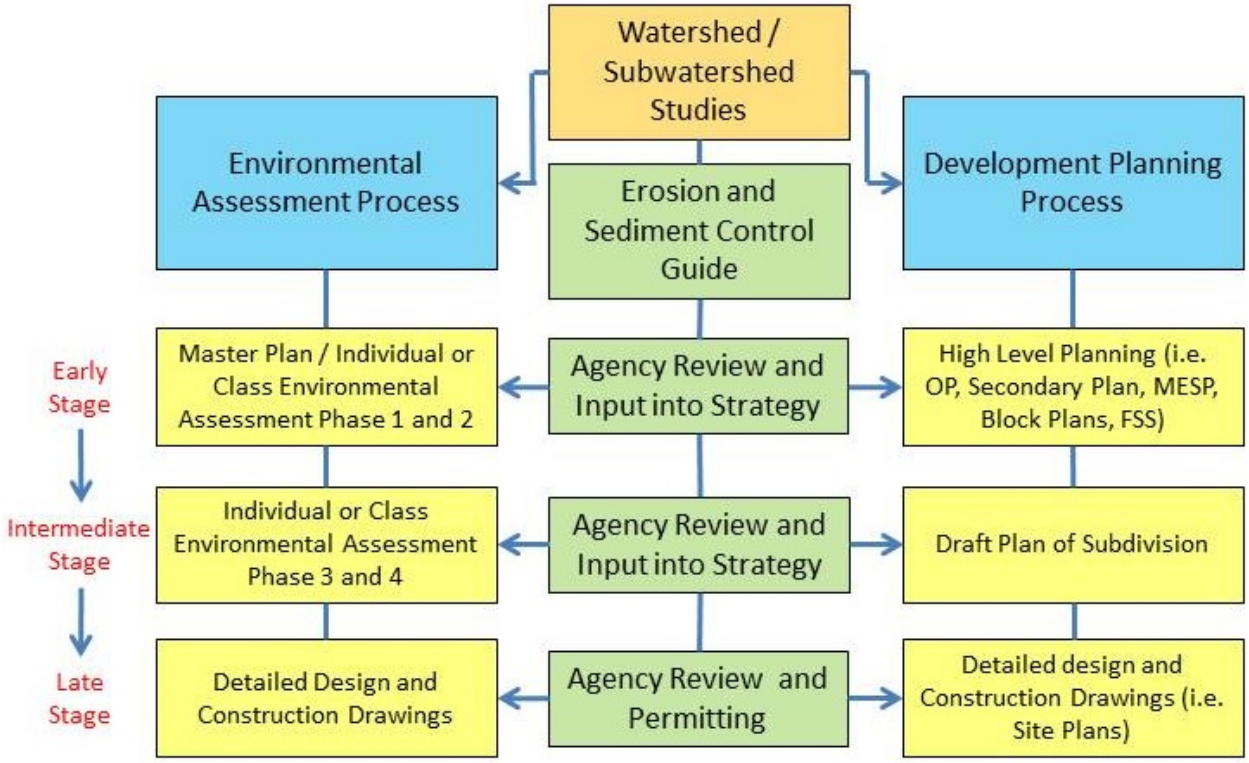


Figure 8.1: Agency plan review and permitting roles
Note: The planning instrument used to determine alternative alignments and the scale and level of detail of information provided for the early planning stages may vary by municipality.
OP = Official Plan, MESP = Master Environmental Servicing Plan, and FSS = Functional Servicing Study

Although these requirements are presented separately according to each stage, they build on each other, ensuring the required level of analysis is completed at the appropriate time to progressively inform planning and design. It is therefore important to understand the requirements within each stage to ensure a coordinated approach. The three stages are outlined below:

1. The **early stages** of planning refer to those activities in the environmental assessment and planning processes related to establishing the layout of the proposed development or the need for infrastructure and assessing alternative road or rail routing and alignments, as shown in Figure 8.1. The specific planning instruments adopted to undertake this stage, and the level of detail of the information provided varies by municipal jurisdiction. For example, for the planning process, the Master Planning stage may

provide input into the official plan, which is then further articulated in the secondary plan or official plan amendment stages. Master Environmental Servicing Plans, Block Plans, or Functional Servicing Studies may also be prepared at this stage. However, in some cases, impact assessment and conceptual design (intermediate stage) will also be undertaken through these studies. For the environmental assessment process, the early stage covers Phases 1 and 2 of the process relating to the identification of the problem / opportunity and the evaluation of alternative solutions.

Conservation Authorities will review and comment, working towards conditional approvals of applications at this stage based on efforts towards meeting the criteria as set in both conservation authority and provincial guideline documentation.

2. Once the infrastructure or development plan has been established, and the preferred layout determined, the activities in the intermediate stages of planning further refine the early stage planning decisions, including impact assessment and development of alternative conceptual designs. For example, the draft plan of subdivision phase and the Individual or Class Environmental Assessment Phases 3 and 4 represent intermediate stage planning activities. Conservation authorities will review and provide comments based on meeting the objectives outlined in guideline documentation.

3. The activities in the late stages of planning further refine the conceptual designs completed during the intermediate stages including development of the detailed design of the site. Conservation authorities will review and approve final designs, including construction and ESC drawings, through the permitting process.

8.1 Requirements for early stages of planning and design

During the early stages of planning and design, the focus of the erosion and sediment control works should coincide with the overall planning stage: high level conceptualization, strategizing, and an effort to understand the works to be conducted during subsequent design stages. In this manner, the efforts provided during this stage will feed into further studies, helping guide the ESC strategy to minimize impacts on the downstream receiving systems. It is understood that not all details of the proposed works will be known, and that only general guidance is requested at this point.

To meet this end, the early planning stages documentation should incorporate discussion on early strategizing for construction, using the engineering and ecological information at hand to determine the level of erosion and sediment controls required moving forward. High level documents, including Master Plans or Subwatershed Studies, can focus on the commitment for appropriate ESC strategies moving forward, where a more informed strategy can be investigated during Block Plans, Functional Servicing Studies or Individual or Class EA Phases. These strategies can include, but not be limited to:

- Discussion related to an ESC monitoring strategy and timing, if necessary based on site specific circumstances (see Chapter 10.0 for turbidity monitoring considerations);
- Conceptual construction phasing plans, if design has advanced to this stage; and
- Strategies to minimize unnecessary stripping of vegetation from the site.

These strategies can incorporate ecological and engineering information to determine the appropriate level of ESC plan necessary.

Submission Requirements

During the early planning stages, the following information should be provided with the appropriate documentation:

- Commitments to developing an ESC strategy during the various planning and design stages;
- Discussions related to the sensitivity of the downstream receiving systems and an estimated level of effort required during subsequent design stages; and
- If designs have advanced accordingly, a conceptual ESC strategy. Otherwise this can be provided at later stages.

8.2 Requirements for Intermediate Stages of Planning and Design

During the intermediate stages of planning and design, the focus of the erosion and sediment control works is on preparing site level strategies. The appropriateness of strategies prepared during previous planning and design stages will be verified based on consideration of advanced information available related to the site layout and grading requirements. Further, the works at this level will provide greater insight to the level of effort required in preparing the final ESC plans and reports during the final planning and design stages.

The level of detail expected during the intermediate stage would consist of preliminary site plans, rough grading requirements, and locations of required utilities, including stormwater management measures, with varying levels of ecological and geotechnical information provided. Working with this, ESC designers can determine the level of effort required at detailed design, including the following:

- If monitoring is determined to be required (see considerations in Section 10.2.1), a breakdown of the monitoring plan should be prepared, including:
    - What monitoring is required before and during construction (see section 10.2);
    - What parameters will be monitored and how;
    - Where the monitors will be located;
    - How long monitoring will continue; and
    - Who will conduct the monitoring.
- If infiltration LIDs are proposed as part of the SWM measures, a conceptual strategy to isolate the LID during construction (see Section 7.6) could be provided if that information is available at this stage in the project. Otherwise, LID isolation should be addressed in the detailed design submission.
- Investigations into construction phasing and stripping strategies can occur to reduce unnecessary stripping.

<u>Submission Requirements</u>

- If required, detailed monitoring plan describing the above, detailing when the monitoring plan will begin and outline a reporting scheme for the monitoring activity; and
- Preliminary level reporting discussing the current ESC strategy. If information on phasing and stripping strategies is available at this stage of the project, they should be included in the submission.

8.3 Requirements for Detailed Design Stages of Planning and Design

During the detailed design stage, a comprehensive ESC report and drawings are prepared using the strategies from previous design stages. The reports and plans need to clearly demonstrate the preferred strategy, including ESC measures in relation to construction phasing. The following sections provide more details for the report and drawing requirements.

Report

The purpose of the ESC report is to provide clarity to the ESC drawings, including discussion on specific areas of concern, erosion risk outcomes (including mapping), and overall direction for the ESC strategy during various construction phases. The report should be a stand-alone document that contains, at minimum, the following information:

- Site Location
- Existing Site Conditions
- Proposed Site Alteration
- Construction Phasing;
- Erosion Risk Assessment (section 6.2.5)
- Design Details for Erosion and Sediment Control Mitigation;
- Inspection and Maintenance;
- Monitoring Plan (if necessary); and
- Professional Engineer Seal, signed and dated.

Refer to **Table 8.1** for full details of the requirements of the ESC Report.

In specific circumstances, a monitoring plan may be required. In these instances, the information provided in the ESC Report will vary from site to site, and continuous communication with the permitting agencies will be necessary. In these instances, the monitoring plan information incorporated into the ESC Report will be outlined during the intermediate stage.

Table 8.1: ESC report content checklist – submission requirement during detailed design

Section	Content description	Reference	Section included?	If no, provide reason
Contact information / definition of roles	i. Identify, and define roles of, key personnel including but not limited to: • Site owner, project manager / design engineer, ESC inspector, 24 hour emergency contact ii. Outline chain of communication	Chp. 5.0, Table 5.1	☐ Yes ☐ No	
Site location	Location, key map and site area (ha) **provide in report or reference plan with this information		☐ Yes ☐ No	
Existing site conditions	Detail existing site conditions, including: i. land cover and use ii. vegetation iii. general topography iv. existing flow patterns and external drainage v. adjacent properties and their land uses, including identification of any protected natural heritage features[1] vi. soil characteristics.		☐ Yes ☐ No	
Receiving water system	Provide the following information about water system(s) that will receive runoff / discharge from the site: i. Identification / names of features/systems that will be receiving site flows, whether natural (e.g. streams) or other (e.g. sewer system). ii. Classification of natural receiving water body (coldwater, warmwater, species at risk habitat) iii. Summary of current aquatic habitat conditions iv. Identification of confined or unconfined valleys v. Physical description of receiver (e.g. critical erosion areas, channel dimensions, slope, etc.)		☐ Yes ☐ No	
Proposed Site Alteration	Provide a brief discussion of the proposed activities, including: i. description and location of permanent and temporary SWM measures ii. plans for using permanent SWM facilities for sediment control during construction iii. LID details if applicable, including types, locations, and any controls / methods applied to prevent sedimentation	LID protection measures (s. 7.6)	☐ Yes ☐ No	

Construction phasing	i. Provide a brief discussion on proposed construction phasing to minimize unnecessary stripping of the site and efforts to re-stabilize inactive areas where possible. ii. Describe boundary of work zone(s), work proposed during each stage, and approximate time to complete each stage. iii. Identify any applicable ecological timing windows that affect schedule.	Minimized or phased land clearing guidance (App. B, p. B1-2)	☐ Yes ☐ No	
Erosion Risk Assessment	For applicable sites, provide documentation and results of Erosion Risk Assessment (ERA) which are detailed in Chapter 6.0.	ERA (Chp. 6.0)	☐ Yes ☐ No	
Design details and calculations for ESC measures	Provide details on how ESCs will be implemented for each construction stage, including supporting calculations and design details. • For sediment ponds, include detailed calculations related to permanent pool and active storage volumes, pond outlet and emergency spillway • Where applicable, consider ERA outcomes when selecting and placing BMPs. • Describe plans for site restoration / permanent stabilization, including proposed seed mix with species and percentage composition.	ESC BMP design (App B) Sediment pond design (p. B2-32) Seeding & restoration (App. G) ERA outcomes for ESC planning (s. 6.2.5)	☐ Yes ☐ No	
Inspection, monitoring and maintenance	Describe the ESC inspection and monitoring program by detailing: i. inspection frequency ii. documentation and reporting protocol iii. chain of communication iv. anticipated repair / maintenance timelines and v. monitoring protocols	Inspection and monitoring guidance (Chp 10) Recommended protocols for continuous turbidity monitoring (s.10.2)	☐ Yes ☐ No	
Emergency Contacts	Provide list of emergency contacts (e.g. site supervisor, regulatory agency enforcement officer) and define the triggers (e.g. chemical spill, elevated stream turbidity levels) that constitute an emergency.	Turbidity targets (s. 10.2.2) Spills response (s. 7.7)	☐ Yes ☐ No	
Sealing	Report should be sealed, signed, and dated by a Professional Engineer.		☐ Yes ☐ No	
Supporting documents	If applicable, include: (i) soils report, (ii) sample ESC inspection form, (iii) monitoring protocol		☐ Yes ☐ No	

1 – Protected natural heritage features include: watercourses, wetlands, woodlands, valleylands, Areas of Natural and Scientific Interest (ANSI), Environmentally Significant Areas (ESA), habitat of endangered and threatened species, fish habitat, seeps and springs, and significant wildlife habitat

Drawings

The purpose of the ESC drawings are to provide a visual representation of the ESC strategy and measures for the purposes of construction. The drawing package will support the ESC Report, with the ESC drawings prepared to be able to provide all ESC information pertinent for the site. In order to convey the ESC strategy effectively, the ESC drawings should provide, at minimum, the following information:

- Existing site conditions;
- Proposed site alterations;
- Construction phasing; and
- ESC design and details, which would include:
  - A drawing for each stage of construction (see Section 7.2)
  - ESC construction notes
  - Emergency contact information

Refer to Table 8.2 for full details of the requirements of the ESC Drawings.

Table 8.2: ESC drawings checklist – submission requirement during detailed design. *Note: not all projects require all drawings detailed here*

Item	Description	Reference	Item complete?	If no, provide reason
General items				
Drawing formatting	• Site address and application number • Key plan including site limits • Drawing scale • North arrow • Legend which includes identification of standard drawing elements and ESC measures		☐ Yes ☐ No	
Emergency contacts	In the event of an emergency, the following contacts need to be provided in the ESC notes on all drawings: • The engineer responsible for the ESC drawings • Site supervisor • Pertinent agency enforcement officer		☐ Yes ☐ No	
Standard notes	Examples include: • The ESC strategies outlined on the plans are not static and may need to be upgraded/amended as site conditions change to prevent sediment releases to the natural environment. Any changes from the approved ESC plans will be documented and reported to the Enforcement Office. • Inspection of the proposed erosion and sediment control measures will occur at the frequency defined in section 10.1.2. • All damaged ESC measures will be repaired and/or replaced within 48 hours or sooner if environmental receptors are at imminent and foreseeable risk of adverse impact. • Disturbed areas left for 30 days or longer must be stabilized. • Temporary sediment conveyance systems and sediment pond to be immediately stabilized (include stabilization method if possible, and notes on seasonally appropriate stabilization practices) ***Notes provided are for general reference only. Additional notes will be required as necessary based on ESC measures and strategy employed.***	Consult with local CA for notes required	☐ Yes ☐ No	
Sealing	All drawings must be sealed, signed, and dated by a Professional Engineer.		☐ Yes ☐ No	

Stage 1: Topsoil stripping, grading, and re-stabilization				
Drawing 1: Existing Site Conditions	• Contour elevations at 0.5-1.0 m intervals; • Drainage boundaries and directions; • Vegetation locations • Highly erodible areas, with a plan provided for any downstream areas where erosion risk is a concern; • Water body locations; • Regional storm floodplain and regulation areas.		☐ Yes ☐ No	
CONDITIONAL REQUIREMENT: Proposed site alterations	*Include only if the submission does not include other engineering drawings (e.g. SWM plan, or stage 3 or 4 ESC plan) that would show these details.* • Show proposed site condition **excluding** ESC measures • A cut/fill plan showing existing and proposed contours and spot elevations • Clearing, grading, and site boundary limits • Proposed SWM measures and their locations, including LID		☐ Yes ☐ No	
Drawing 2: Stage 1 ESC Plan	• Based on existing conditions drawing	Staged ESC planning (s. 7.2) Minimized or phased land clearing (p. B1-2) ESC BMPs guidance (App. B) Dewatering protocols (s. 7.4) Buffers (p. B1-2) Perimeter controls (App. B) Vehicle tracking controls (p. B2-48) Interceptor swales (p. B1-9)	☐ Yes ☐ No	
	• Construction phasing details, including limits of disturbance, phasing boundaries and construction sequencing details.		☐ Yes ☐ No	
	• Drainage areas identification, including delineation of all external and internal drainage boundaries, labels for catchment sizes (ha) and runoff coefficients, and depiction of overland flow routes		☐ Yes ☐ No	
	• Location and details for all ESC measures, including dewatering protocols to ensure appropriate treatment of pumped water.		☐ Yes ☐ No	
	• Identification of appropriate buffers / setbacks from natural features.		☐ Yes ☐ No	
	• Placement of perimeter controls, with appropriate setbacks / buffers applied and consideration of more robust controls upslope of sensitive areas		☐ Yes ☐ No	

	• Vehicle access points - locations and ESC measures applied – and identification of internal haul roads.	Check dams (p. B2-8 to B2-17) Sediment control ponds (p. B2-32) LID protection during construction (s. 7.6)	☐ Yes ☐ No	
	• Details on stormwater conveyance measures, including interceptor swale dimensions and design flows, erosion prevention measures, and placement of check dams.		☐ Yes ☐ No	
	• Details for temporary sediment control ponds, including: i. Plan view of pond showing grading requirements ii. Cross-sections of the pond, including length, width, and outlet structure iii. Stage-storage tables showing adequate depth and volume iv. Details of storm inlet, outlet, emergency overflow and any associated drainage facilities v. Stabilization techniques vi. Plans for decommissioning or conversion to permanent SWM facility.		☐ Yes ☐ No	
	• Where applicable, LID locations and any measures applied to mitigate compaction of infiltration LID areas.		☐ Yes ☐ No	
	• Stockpiles and/or berm locations, sizes and ESC measures, including stabilization for stockpiles idle for > 30 days.		☐ Yes ☐ No	
	• Notes related to ESC requirements.		☐ Yes ☐ No	
Stage 2: Site servicing				
Drawing 3: Stage 2 ESC Plan	• Coordination with Stage 1 and Stage 3 Construction Activities		☐ Yes ☐ No	
	• Overlay of draft subdivision plan provided on ESC Plan (showing ultimate roadway and lot layout)		☐ Yes ☐ No	

	• Updated locations and details for all ESC measures, including dewatering protocols to ensure appropriate treatment of pumped water.	ESC BMPs guidance (App. B) Dewatering protocols (s. 7.4)	☐ Yes ☐ No	
	• Where applicable, LID locations and any measures applied to protect against sedimentation and compaction of infiltration LID areas.	LID protection during construction (s. 7.6)	☐ Yes ☐ No	
	• Updated drainage area details, including delineation of all external and internal drainage boundaries, labels for catchment sizes (ha) and runoff coefficients, and depiction of overland flow routes • Catchbasin inlet protection types and locations	Inlet protection (p. B2-21)	☐ Yes ☐ No	
	• Notes related to ESC requirements.		☐ Yes ☐ No	
Stage 3: Building construction				
Drawing 4: Stage 3 ESC Plan	• Updated drainage area details, including delineation of all external and internal drainage boundaries, labels for catchment sizes (ha) and runoff coefficients, and depiction of overland flow routes • Catchbasin inlet protection types and locations (e.g. all rear lot and street catchbasins)	Inlet protection (p. B2-21)	☐ Yes ☐ No	
	• Updated locations and details for all ESC measures, including dewatering protocols to ensure appropriate treatment of pumped water.	ESC BMPs guidance (App. B) Dewatering protocols (s. 7.4)	☐ Yes ☐ No	
	• Updated details on stormwater conveyance measures, including interceptor swale dimensions and design flows, erosion prevention measures, and placement of check dams.	Interceptor swales (p. B1-9) Check dams (p. B2-8 to B2-17)	☐ Yes ☐ No	
	• Plan for dewatering sediment control ponds during construction of permanent stormwater management facilities, including: i. details on discharge locations; ii. measures for treating sediment laden water; and iii. erosion prevention measures at discharge points.	Sediment ponds maintenance (p. B2-32) Dewatering protocols (s. 7.4)	☐ Yes ☐ No	

	• Where applicable, LID locations and updated details on any measures applied to protect against sedimentation and compaction of infiltration LIDs.	LID protection during construction (s. 7.6)	☐ Yes ☐ No	
	• Updated stockpiles and/or berm locations, sizes and ESC measures, including stabilization for stockpiles idle for > 30 days.		☐ Yes ☐ No	
	• Notes related to ESC requirements.		☐ Yes ☐ No	
Stage 4: Final stabilization and decommissioning				
Drawing 5: Stage 4 ESC Plan	• Planting / site restoration plan depicting all permanent stabilization measures and timelines	Erosion control BMPs (App. B1) Restoration guidelines (App. G)	☐ Yes ☐ No	
	• Plan for dewatering sediment control ponds during construction of permanent stormwater management facilities, including: iv. details on discharge locations; v. measures for treating sediment laden water; and erosion prevention measures at discharge points.	Sediment ponds maintenance (p. B2-32) Dewatering protocols (s. 7.4)	☐ Yes ☐ No	
	• Removal / decommissioning of ESC measures depicted in drawing and / or drawing notes.		☐ Yes ☐ No	
	• Where surface infiltration LIDs are planned for the site, provide details on LID planting / stabilization.		☐ Yes ☐ No	
	• Notes related to ESC requirements.		☐ Yes ☐ No	

9.0 APPROVALS PROCESS

The permits and approvals required for an urban construction project are dictated by relevant legislation and various project and site specific circumstances. Having a clear understanding of these requirements can save time and help to keep construction projects on schedule and on budget. A summary of the legislative framework related to ESC is provided in Appendix D.

The review and approvals process related to ESC on construction projects will vary to some extent depending on project details such as:

- Geographic location
- Whether the site is in a conservation authority regulated area
- Proximity to protected natural features (e.g. Environmentally Significant Areas, Provincially Significant Wetlands)
- Presence of Species at Risk in Ontario (based on O.Reg. 230/08)
- Development type and construction activities planned (e.g. drilling, in water works, dewatering)
- Scale of development and associated ESC measures

The flow chart shown in Figure 9.2. illustrates the key factors that should be considered when establishing which ESC permits and approvals will be required for a given project. Early consultation with regulatory agencies is encouraged in order to allow time for any necessary permits and approvals to be issued, and thereby avoiding costly delays. The following definitions are provided to clarify some of the references made in Figure 9.2.

Limit of Development

The development limit is defined as the point to which development can extend. For sites where CA permits are required, the limit is established and agreed to by CAs during the permit application process, based on the presence of natural hazards and features.

Approvals tip

Be sure to consult with the municipality and conservation authority to ***finalize the limits of development*** for your property ***before spending time and money*** developing an ESC plan.

In the case of a Planning Act application, the municipality makes decisions about development limits but consults with CAs if the proposed development affects CA regulated areas or CA delegated responsibility for natural hazards. It is important to finalize this boundary is early on in the ESC approvals process, as it may differ from the property boundary and affect the amount of land area that can be developed. For infrastructure projects, this is known as the *limit of disturbance*, because these projects typically require the disturbance of land that is outside the boundaries of the actual infrastructure.

Conservation Authority regulated areas

The set of regulations known as “Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses” (Ontario Regulations 42/06 and 146/06 to 182/06) allow CAs to regulate development and other activities taking place within valley and stream corridors, wetlands and associated areas of interference, and the Great Lakes and inland lakes shorelines. These areas are often referred to collectively as the ‘regulated area’, and specifically includes:

- valley and stream corridors;

- shorelines of the Great Lakes and inland lakes;
- watercourses;
- hazardous lands;
- wetlands; and
- other areas where development could interfere with the hydrologic function of a wetland.

The regulated area represents the greatest physical extent of the combined hazards plus a prescribed allowance as set out in the regulation.

According to the Conservation Authorities Act, ***Hazardous lands*** are those that could be unsafe for development because of naturally occurring processes associated with flooding, erosion, dynamic beaches, or unstable soil or bedrock.

In the context of the regulation, the regulated activities that are considered 'development' are:

- the construction, reconstruction, erection or placing of a building or structure of any kind,
- any change to a building or structure that would have the effect of altering the use or potential use of the building or structure, increasing the size of the building or structure or increasing the number of dwelling units in the building or structure,
- site grading, or
- the temporary or permanent placing, dumping or removal of any material, originating on the site or elsewhere.

Additional activities that are regulated are those that would result in the straightening, changing, diverting or interfering in any way with the existing channel of a river, creek, stream, watercourse or the changing or interfering in any way with a wetland.

For more information on how the regulated area is defined, what specific activities are regulated, and the requirements for obtaining a permit under the regulation, see *The Living City Policies for Planning and Development in the Watersheds of the Toronto and Region Conservation Authority* (TRCA, 2014) or contact the local conservation authority.

Conservation Authority commenting roles

Ontario CAs are required to comment on ESC plans as part of their delegated responsibilities under the Ontario Planning Act (RSO, 1990). Municipalities screen planning applications or circulate them to CAs to determine if a specific application requires CA review. If the location of the proposed development is determined to be within the CA's area of interest, the application is circulated to the CA for comment. CA areas of interest include, but are not limited to: features and hazards governed under the "Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses" regulations, areas requiring special stormwater management controls, Areas of Natural and Scientific Interest, Environmentally Significant Areas, and CA property. The CA is required to provide technical review and commentary regarding how the proposal would impact natural hazards or natural heritage features and functions.

Communication is key

Conservation authorities are committed to streamlining review and approvals processes and reducing the number of submissions and time required. This can be facilitated through ***early and improved communications*** between CA reviewers, consultant and landowners through working meetings.

Individual CAs also often have service agreements or memorandums of understanding with federal departments, provincial ministries and/or upper or lower tier municipalities. These agreements dictate the services the CA is required to provide based on their areas of interest and expertise. While these may vary, they often include requirements to undertake regulatory or approval responsibilities and/or provide technical review and comments.

For more specific information on conservation authority roles and policies related to review of ESC plans, contact the local conservation authority. Additional information on ESC submission requirements is provided in Chapter 8.0.

MECP Permit to Take Water

The Ontario Water Resources Act (R.S.O. 1990) requires that a Permit to Take Water (PTTW) be obtained for water taking/movement in excess of 50,000 litres per day. The PTTW, which is issued by the MECP, would be required during some dewatering activities common on construction projects, where more than 50,000 L/day is being moved from a ground or surface water system, which may also include sediment control ponds.

Exemptions to this permit requirement that may apply during construction projects involving in-water works are the active and passive watercourse diversion exemptions. Active watercourse diversions – in which water is moved by means of a pump – are eligible for exemption if: (i) the water is returned to the same water body and not stored or otherwise used, (ii) ESC measures are properly applied, maintained and decommissioned, (iii) any fuel sources or re-fueling activities are located at least 30 m away from the watercourse, and (iv) upstream and downstream water quality and quantity are unaffected by the diversion. Exemption for a passive diversion – where no pump is used – simply requires that the upstream and downstream water levels are unaffected, and that water is simply re-directed but never moved *out* of the water body.

Figure 9.1: Watercourse diversion during construction is exempt from requiring a PTTW.

Some construction-related water takings that are greater than 50,000 L/day can also be exempt from requiring a full PTTW, instead requiring only registry in the Environmental Activity and Sector Registry (EASR). These include (i) ground or storm water taking during construction site dewatering if the average taking is less than 400,000 L/day and (ii) taking from certain water bodies for a set of defined uses during road construction (e.g. hydro-demolition, landscaping).

Species at Risk in Ontario

As described in Appendix D, the Species at Risk in Ontario List (O.Reg. 230/08) contains all extirpated, endangered, threatened and special concern species that are protected under the provincial Endangered Species Act (S.O. 2007). If the project site contains species on the list, consultation with MECP is required to determine, based on the site and the activities planned, whether a permit or authorization is required. The need for authorization can be avoided where it is possible to work around protected species

and habitats so that they are not subject to any adverse effects. The MECP will provide direction on options available to best protect these species, such as ESC best practices.

DFO Self Screening

For construction projects involving in or near water works, determining whether a Fisheries and Oceans Canada (DFO) review and/or authorization is required must be done through a self-screening process. The types of water bodies and projects that are exempt from requiring review are listed on the DFO self-screening website. For projects that are subject to review, DFO will assess whether the activities proposed can be supported through a Letter of Advice, or whether they will result in death or fish or harmful alteration, disruption or destruction of fish habitat (as defined in the Fisheries Act), in which case a Fisheries Act authorization would be required.

Figure 9.2: ESC plan review and approvals process

10.0 INSPECTIONS, MONITORING AND MAINTENANCE

Inspection, performance monitoring and maintenance of ESC measures on construction sites are critical to ensuring that the ESC plan is effective at mitigating sediment release from the site. Beyond inspecting the condition and functionality of ESC measures on the site, an effective inspection and monitoring program requires ongoing assessment of adjacent natural features receiving runoff from the site. The following sections detail the most effective strategies for inspecting, monitoring and maintaining your site for the duration of construction.

Your ESC plan is only as good as your inspections and maintenance program!

Defining the three key activities that will keep sediment on your site.

INSPECTION

Routine walk through of construction site, carried out by a qualified ESC inspector, to identify and report on deficiencies in ESC measures.

MONITORING

Ongoing or periodic assessment of the quality of site discharge and downstream receiving water systems in order to identify potential changes/impacts associated with construction activities. Parameters often considered are water quality (mainly suspended solids or turbidity), water temperature, flow rates, and erosion.

MAINTENANCE

Repair, cleaning and replacement of ESC measures based on needs identified through inspections and monitoring.

10.1 Developing an Inspection Program

The effectiveness of construction site ESC inspection is dependent upon its frequency and the immediacy and robustness of actions taken to address any deficiencies. The objective of an inspection program is to:

- Regularly assess the effectiveness of individual ESC measures and the overall ESC plan
- Identify the need for maintenance (e.g. sediment removal) and repairs (e.g. replacement of damaged silt fence)
- Identify areas where ESC measures should be replaced or augmented due to repeated failures

As described in Figure 7.1, the ESC plan should evolve as necessary to ensure natural features remain protected. The efficacy of the inspection program is contingent on applying the information collected during inspections to adapt the ESC plan to the site conditions.

10.1.1 ESC inspector qualifications

The responsibility for ESC inspections typically belongs to the land owner of the site or their representative. The owner should retain the services of an inspector who:

- Has completed training on ESC inspection
- Has experience conducting ESC inspections
- Is an effective communicator

All ESC inspections should be carried out by a professional who meets the criteria of Qualified Erosion and Sediment Control Inspector (QESCI) or QESCI in training (QESCI-IT) as defined in the Canadian Standards Association *Erosion and Sediment Control Inspection and Monitoring* standard (CSA, 2018). Those who do not meet this criteria but who have obtained the Certified Inspector of Sediment and Erosion Control (CAN-CISEC) designation will also be considered qualified to carry out ESC inspections. The roles and responsibilities of the ESC inspector are detailed in Chapter 5.0.

10.1.2 Inspection frequency

During the initial installation of ESC measures on the site, the inspector should conduct an inspection to ensure that all the controls are installed as shown on the approved ESC plan, and that they are installed correctly. Once construction begins, a 'walk-through' inspection of the site should be undertaken in anticipation of rain, extended wet-weather periods, snowmelt events, or any conditions that could potentially yield significant runoff volumes or damage ESC measures. It is important to be aware of the predicted forecast for the week and plan inspections accordingly.

Regular ESC inspections should occur during all construction stages, starting when the first ESC measures are installed prior to topsoil stripping and ending when construction is complete and the site has reached 80% stabilization. Where possible, it is also recommended that the inspector visit the site before there is any activity to see the natural landscape, drainage and sensitive features. Notes and pictures should be taken to document the pre-construction site condition and establish an environmental baseline for future reference.

The following minimum frequency of inspection is recommended unless otherwise specified in site permits and approvals:

- On a weekly basis during active construction;
- Before and after significant* rainfall events;
- After significant snowmelt events;
- After any extreme weather (e.g. wind storms) which could result in damage to ESC measures;
- Daily during extended rain or snowmelt periods;
- Monthly during inactive periods (> 30 days);

- During or immediately following any spill event (see Section 7.7 for appropriate spill response procedures);
- Before construction is shut down for the winter to ensure the site is ready for freezing conditions and thaws; and
- At the end of construction to confirm that the site has achieved at least 80% stabilization (CSA, 2018) and that permanent vegetation areas are well-established and effectively preventing erosion.

*A rainfall event should be considered significant when either of the following criteria are met:

- An event during which ≥ 15 mm have been received within 24 hours; or
- An event with an intensity of ≥ 5mm/hr and during which at least 10 mm have been received.

Occasional inspections during rainfall or melt events are encouraged, particularly in areas where there are recurring problems. Visiting during wet weather can provide the inspector with a good understanding of how water is moving through the site and why ESC measures may be failing.

Refer to Appendix B for BMP-specific installation, inspection and maintenance guidance.

10.1.3 Inspection documentation and reporting

Maintaining up-to-date documentation on inspection activities is an essential component of effective ESC and the demonstration of due diligence. Documentation and reporting methods may be electronic, paper-based, or a combination of both. Electronic web-based reporting allows the inspector to complete an electronic inspection report on site and then save it, or upload it to a cloud-based storage platform. The advantage of cloud-based storage of inspection reports is that it provides a central location where files can be accessed online by all project team members. Moving toward electronic reporting is encouraged, as it facilitates timely communication of inspection outcomes to the appropriate project team members and governing agencies.

Inspection reports can become legal documents for a project site, as such it is recommended that they be kept by the landowner for at least 3 years after the end of construction. During construction, paper documentation should be kept on site, typically in the construction trailer, in addition to any electronic storage.

Regardless of whether reports are electronic or paper, the following elements form the basis of a thorough documentation system:

- Logbooks of completed inspection reports
- Notes on maintenance and repairs
- Date-stamped photographs from every inspection
- Any additional field notes and/or sketches necessary to best convey the inspector's observations and recommendations
- Dated records of any relevant conversations with project team members, including onsite construction staff.

Inspection report formats and recipients should be discussed with the project team prior to starting the inspection program. It is important that the inspector understand and establish a protocol for on-site contacts, inspection report circulation, regulatory agency communication and the roles and responsibilities of all parties involved.

The following information should be included in all inspection reports, regardless of format or layout:

- Date and time of inspection
- Inspector's name
- Site location information
- List of inspection report recipients
- Reason for the inspection (e.g. routine weekly, pre-rainfall, post-rainfall)
- A brief description of weather conditions during the inspection, during the 24 hours prior to the inspection, and forecasted for the next few days.
- A brief description of the activities occurring on site (e.g. servicing, building construction)
- Map or drawing with notes to identify the specific areas of the site that are discussed in the report
- Descriptions (with pictures) of areas that have been repaired since the last inspection report
- Descriptions (with pictures) of newly identified ESC deficiencies and recommended repairs or maintenance
- Descriptions (with pictures) of recurring ESC deficiencies, recommended repairs or maintenance, and the amount of time that has passed since the deficiency was first reported.
- Any turbidity or suspended solids monitoring data collected since the last report or, if more appropriate, a summary of the data.

An inspection report template and an example of a completed inspection report are provided for reference in Appendix F.

10.1.4 On-Site Reference Tools

Keeping key documents on site in the construction trailer is an important way to ensure any project team member can easily find up-to-date information in a central location. It is recommended that the inspector prepare a location in the trailer for storage of hardcopies of completed inspection reports, which will allow for easy access by the project team or governing agency representatives.

10.2 ESC Performance Monitoring

Beyond the routine inspection and repair of individual ESC measures, it is important to evaluate the cumulative effectiveness of all the controls installed on a construction site. This is best achieved by monitoring the quality of site discharges or the quality of the receiving water system downstream of the site.

On construction sites, total suspended sediment concentration (TSS) is the parameter typically measured to assess ESC effectiveness, but testing for other parameters may be advisable on sites where specific water quality concerns exist. In practice, water turbidity is often measured and used as a proxy for TSS, since turbidity can be measured onsite in real time with handheld or online (in-water) nephelometers (Figure 10.1). For this reason, and because duration of exposure to elevated turbidity is also a key factor in assessing aquatic impacts, ***the receiving water and effluent targets set out in this guide (section 10.2.2) are turbidity targets.***

Figure 10.1: An in-water turbidity monitoring station.

Table 10.1 summarizes the advantages and disadvantages of different approaches to turbidity monitoring on construction sites. Understanding these will help practitioners select the most appropriate option(s) based on project-specific circumstances.

Turbidity vs. Total Suspended Solids (TSS) concentration

The turbidity of a liquid is a measure of its transparency – the degree to which light is scattered by substances that are dissolved or suspended within it. While elevated water turbidity can be caused by the presence of suspended sediment particles (e.g. silt and clay), it can also be attributed to dissolved organic matter, algae, microscopic organisms, and any other dissolved or suspended substance that affects the transmission of light through the water. When measured by a nephelometer in Nephelometric Turbidity Units (NTUs), turbidity is the intensity of scattered light detected at 90° from the incident light passing through a water sample.

TSS concentration differs from turbidity in that it is a measure of the amount of solids (both organic and inorganic) suspended in water. It is usually measured as a weight (milligrams) per unit volume (litre). While turbidity and TSS concentration are positively correlated, the relationship between them is not direct and will vary from site to site. Despite this, turbidity is often accepted as a satisfactory proxy for TSS concentration, since turbidity can be measured onsite in real time by handheld or online nephelometers (i.e. turbidimeters) while TSS concentration must be determined through laboratory analysis.

For frequent or continuous monitoring of water quality on construction sites, turbidity is a useful metric, allowing for quick onsite assessment and identification of potential problems with excess sediment release. Studying fluctuations in turbidity readings over time can help to identify areas of potential contamination. When there is a need for a more absolute and accurate assessment of the amount of suspended sediment in the water, it must be sampled and submitted for laboratory analysis.

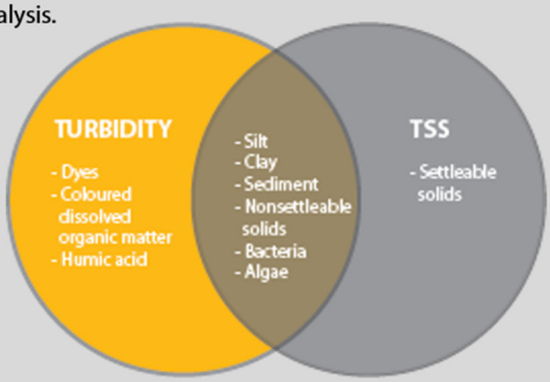


Table 10.1: Advantages and disadvantages of different approaches to turbidity monitoring on construction sites.

Method	Location	Advantages	Disadvantages
Handheld turbidity measurement of grab samples	Site discharge points	• Straightforward • Low equipment cost • Direct measurement of site runoff = greater accountability • Problem areas can be pinpointed • Can be carried out even in the winter	• Staff costs for sampling • Limited to locations where grab sampling is possible • Potential for error due to poor sampling technique • Duration is not assessed
	Receiving water D/s and U/s of site	• Low equipment cost • More readily comparable to existing CWQG for aquatic life • Can be carried out even in the winter	• Need to determine pre-construction background turbidity • Staff cost for sampling
Continuous online turbidity measurement	Outlet of sediment control pond	• Concentration & duration = more accurate assessment • Convenience - data logged at all times of day and night • Set location means higher precision and comparability	• Equipment costs may be higher • Site visits required to retrieve data – delays problem response • Only pond effluent is assessed • Not operational during winter • Challenges associated with equipment maintenance and calibration to avoid false exceedances
	Receiving water D/s and U/s of site	• Concentration & duration = more accurate assessment • Convenience - data logged at all times of day and night • Set location means higher precision and comparability • Readily comparable to existing CWQG for aquatic life	• Equipment costs may be higher • Site visits required to retrieve data – delays problem response • Not operational during winter • Challenges associated with equipment maintenance and calibration to avoid false exceedances
Continuous online turbidity measurement with remote real-time access to data	Outlet of sediment control pond	• In addition to those listed above: • Convenience of remote access • Opportunity for faster problem response	• Additional cost for remote access, which may be offset by reduced staff costs for site visits • Only pond effluent is assessed • Not operational during winter • Challenges associated with equipment maintenance and calibration to avoid false exceedances
	Receiving water D/s and U/s of site	• In addition to those listed above: • Convenience of remote access • Opportunity for faster problem response	• Additional cost for remote access, which may be offset by reduced staff costs for site visits • Not operational during winter • Challenges associated with equipment maintenance and calibration to avoid false exceedances

CWQG: Canadian Water Quality Guideline for Aquatic Life. D/s: downstream, U/s: upstream

10.2.1 Site specific turbidity monitoring protocols

The extent of turbidity monitoring and methods used on a given construction project should be based on consideration of the following site specific factors:

Figure 10.2: Redside dace, a species at risk in Ontario

- **Erosion risk.** Determined based on site characteristics (e.g. slopes, soil type) and the work planned (extent of disturbance, project duration). This should be determined for all projects prior to the initiation of any work, as described in Chapter 6.0.
- **Receiving water flows.** Because online turbidity sensors typically need to be kept submerged in order to work effectively, consider whether the site discharges to a perennially flowing water feature and whether the low water level is deep enough to keep the sensor submerged. The type of receiver should also be considered – whether natural feature or municipal sewer system – as different water quality thresholds and monitoring requirements may apply.
- **Presence of species at risk.** As detailed in *Silt Smart - Erosion and Sediment Control Effectiveness Monitoring and Rapid Response Protocol for High Risk Construction Projects version 1.3* (MNRF et al., 2012). The *Protocol* defines sensitive streams as those which are known or potential habitat for species at risk in Ontario – as listed in Ontario Regulation 230/08 – as well as those serving as spawning or nursery habitat for coldwater species. Sensitive streams are identified in the *Protocol* as requiring more intensive turbidity monitoring. Specific monitoring requirements for construction sites draining to sensitive streams are established by MECP and DFO, as they administer species at risk legislation at the provincial and federal level, respectively.
- **Type and location of discharge points.** The location where site effluent is discharged into the receiving water system can sometimes dictate whether suitable in-water turbidity monitoring stations can be established. On sites that are not accessible by monitoring staff or where there are safety concerns, effluent monitoring may be the only option. Conversely, effluent monitoring in which online turbidity sensors are installed at pond outlets could be cost prohibitive on sites with several ponds. In these cases receiving water turbidity monitoring upstream and downstream of the site, where possible, may be more cost-effective.

On projects where turbidity monitoring will be limited to handheld turbidity measurement of grab samples, sampling should be undertaken during any activities or events that result in discharges of water from the site. In addition to rainfall events, this should include thaw events and any pumping and dewatering activities that result in discharges to the receiving water feature.

10.2.2 Turbidity targets for construction runoff and downstream receivers

When evaluating turbidity levels in construction site runoff or downstream receiving water systems, it's important to first establish the target turbidity or TSS concentration that will prevent adverse impacts to receiving water ecosystems. This section outlines targets that support a performance based approach to the assessment of ESC measures. In a performance based approach, the cumulative effectiveness of

the ESC plan is assessed by evaluating whether water leaving the site meets set turbidity targets, and there is less focus on individual controls.

The 'Total Particulate Matter' guideline within the *Canadian Water Quality Guidelines (CWQG) for the Protection of Aquatic Life* (CCME, 2002) is one of the primary guidance documents that detail target suspended sediment concentrations for preventing impacts to aquatic organisms. The CWQG for total particulate matter provides maximum allowable increases in TSS concentration above the receiving water's background concentration, and provides separate thresholds for dry weather (clear flow) and wet weather (high flow) conditions.

The *Guidelines* include thresholds for both TSS concentration and the duration of exposure to that concentration, as do other key research studies that are often cited when considering the impacts of sediment on aquatic ecosystems. One such study is Newcombe (1986), which puts forth a fisheries impact framework which is depicted in a modified form in Figure 10.3.

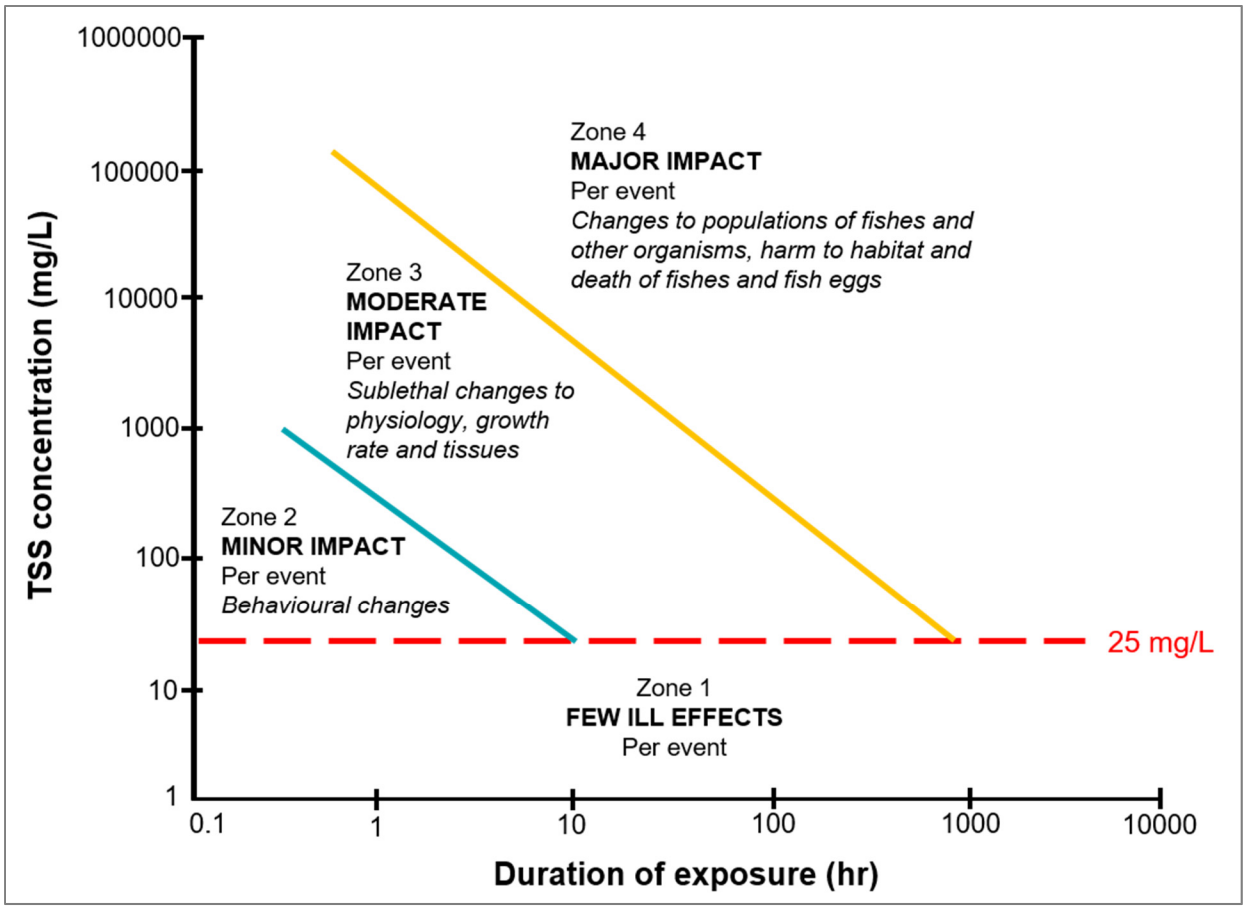


Figure 10.3: Impacts to fish and habitat health based on TSS concentration and the duration of exposure (modified from Newcombe, 1986)

Receiving water target

A receiving water target applies downstream of the construction site, in the water body to which the site drains. The framework described in this section has been established to define turbidity targets for receiving water systems downstream of construction sites based on the CWQG, the fisheries impact framework in Newcombe (1986), and past construction site monitoring in the Greater Toronto Area (TRCA and University of Guelph, 2006). It is based on an assumed TSS to turbidity correlation of 1:1. While TSS-turbidity correlations can vary greatly from one site to another, a 1:1 correlation approximates that which has been observed during instream turbidity monitoring downstream of a construction site in Markham, Ontario (TRCA and University of Guelph, 2006) and monitoring of effluent from a flow balancing system that treated stormwater runoff and combined sewer overflows at the Lake Ontario shoreline in Scarborough, Ontario (SWAMP, 2005).

THE BENEFITS OF A PERFORMANCE BASED APPROACH TO ESC

Applying a performance based approach to ESC means that the effectiveness of the ESC plan is determined by the extent to which certain performance metrics – or targets – are being achieved. Where there is an established turbidity (or suspended sediment) target applicable to construction runoff (or downstream receiving water systems), monitoring can be carried out to assess the extent of compliance with these targets.

A performance based approach is beneficial because it:

- **Provides context for monitoring efforts by establishing a set target to be achieved;**
- **Focuses on the desired outcome – less sediment leaving the site – rather than the performance of individual controls;**
- **Promotes more rigorous and frequent inspection and monitoring of the site; and**
- **Is more appropriate to the dynamic nature of construction projects, as it allows for the ESC plan to evolve as necessary to achieve the set targets.**

Figure 10.4, which mirrors the Newcombe framework in Figure 10.3, identifies four impact classification zones based on the turbidity level and the duration of exposure. Some key thresholds to be noted are:

- At turbidity concentrations ≤ 25 NTU there are few adverse impacts, regardless of duration
- At turbidity concentrations of ≥ 1000 NTU, even short exposures (< 1 hr) result in moderate impacts

The turbidity target for receiving water systems downstream of construction sites is to maintain turbidity levels within the "few ill effects" or "minor impact" zones of Figure 10.4. Assessment is based not only on the turbidity level but also on the associated duration of exposure to that turbidity. ***Exceedance of the target should be determined by the extent of increase above typical (pre-construction) turbidity levels in the stream in order to ensure that construction projects are not held accountable for natural sediment fluctuations***.

The equation of the line dividing the "minor impact" zone from "moderate impact" zone is:

$$t = 324.1 \times d^{-1.232}$$

Where t = turbidity (in NTU) and d = duration (in hours)

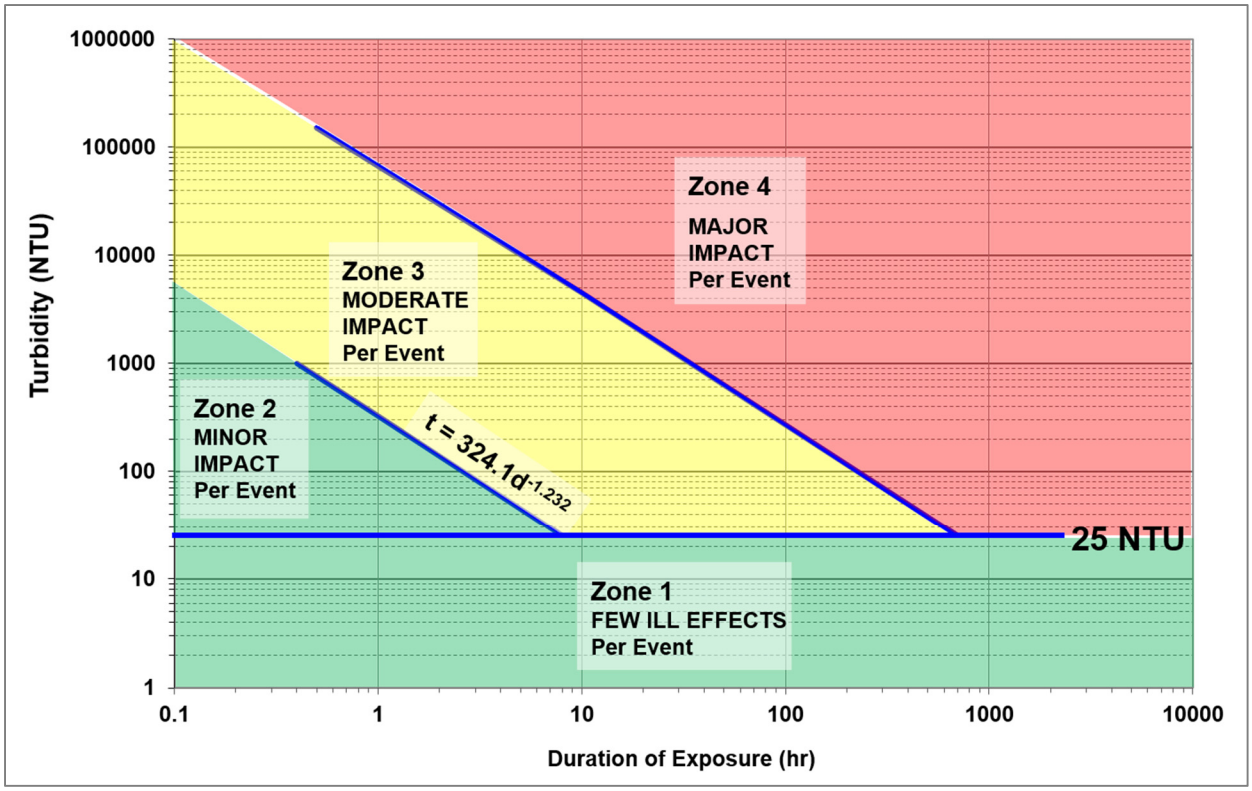


Figure 10.4: Receiving water ecosystem impact classification zones based on turbidity and the duration of exposure (modified from Newcombe, 1986).

In order to assess the extent of compliance with this target, continuous turbidity and duration data must be available. With this data and the equation of the minor-moderate impact dividing line, it is possible to continuously assess whether the receiving water exceeds the target. Table 10.2 provides turbidity and associated duration thresholds that define the target zones (few ill effects or minor impact). These values have been calculated using the equation of the line defined above ($t = 324.1 \times d^{-1.232}$).

Table 10.2: Maximum allowable construction-based turbidity increases in the receiving water system at different durations

Construction-based turbidity increase (NTU)	Duration (h)
≤ 25	Any duration
761	0.5
324	1
138	2
84	3
59	4
45	5
36	6
29	7

Continuous monitoring for assessing compliance with receiving water target

For sites where a receiving water turbidity target is most appropriate (see considerations in section 10.2.1), assessing compliance, including consideration of duration, requires continuous monitoring in the receiving water system immediately upstream and downstream of the construction site. The monitoring program for sites applying the receiving water target should include the following components:

- **One continuous online (in water) turbidity monitoring station downstream of the site.** The downstream station should be situated 5 to 15 m downstream of the last site discharge point. The location should be selected based on allowing enough distance for dispersion of the effluent into the stream, but not so much distance that additional sediment sources begin to impact receiver turbidity.
- **At least one continuous online (in water) turbidity monitoring station upstream of the site.** The upstream station is used to isolate and account for sediment contributions that are naturally occurring or which are coming from a sediment source upstream of the site. It represents typical (pre-construction) turbidity levels against which downstream levels are compared to determine compliance with targets. The upstream station should be located as close to the site as possible. If there are any flow contributions between the upstream and downstream stations (e.g. stream confluence, outfall from another site) which are not originating from the construction site, the other contribution should also be quantified. For stream confluences, an additional turbidity monitoring station should be set up, just downstream of the confluence but upstream of the next construction site discharge point.

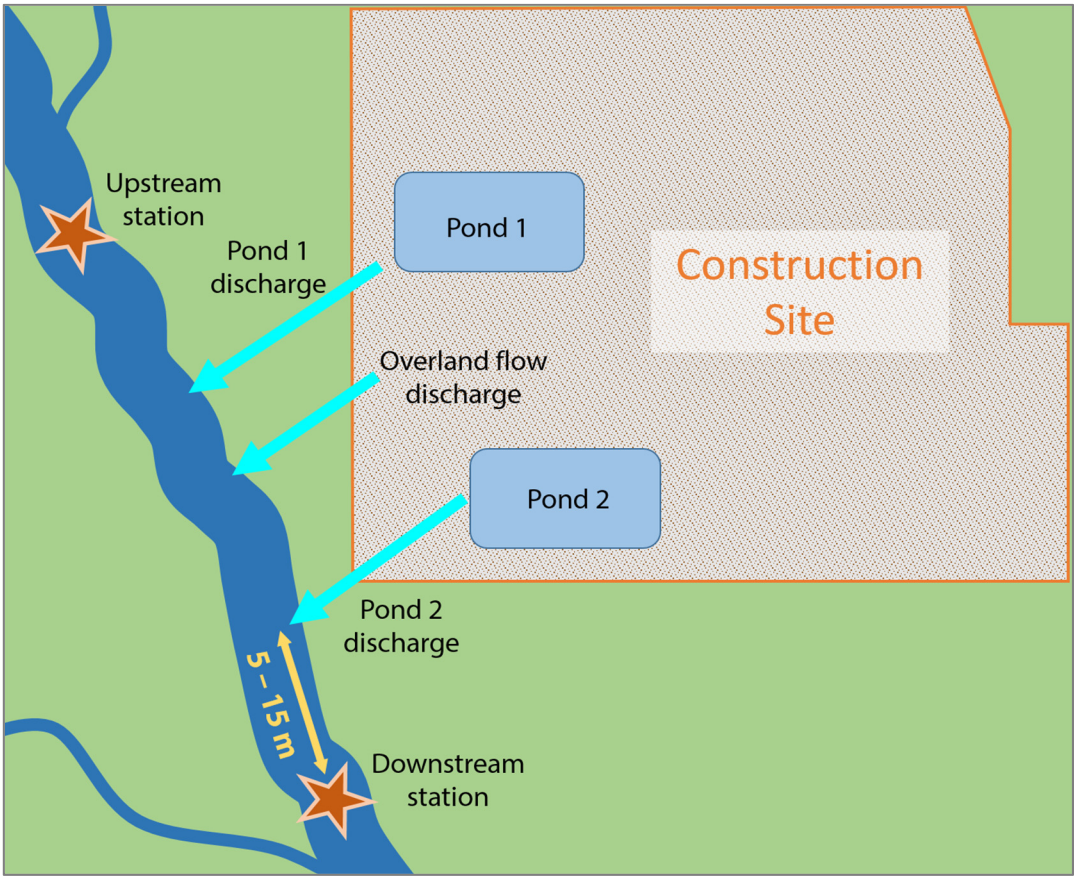


Figure 10.5: Turbidity monitoring station locations relative to construction site discharge points

- **Each turbidity monitoring station equipped with: (i) a turbidimeter (a sonde with a turbidity sensor), (ii) a data logger, (iii) power supply (e.g. batteries, solar panels), and (iv) an enclosure to protect equipment.** On sites where rapid response to address elevated turbidity levels is required (e.g. species at risk sites), monitoring stations should also be installed with telemetry equipment to allow remote data access. All equipment should be maintained and calibrated regularly in accordance with the manufacturer's recommendations.
- **Continuous turbidity monitoring throughout the construction period until the site achieves at least 80% *effective* permanent stabilization.** This is the threshold after which ESC inspections are no longer required, as described in the CSA *ESC Inspection and Monitoring Standard* (CSA, 2018). If otherwise specified by the overseeing regulatory agency and/or if turbidity issues are demonstrated to be an ongoing concern, despite reaching this threshold, monitoring may be required to continue.
- **Collection of data from a nearby rain gauge.** Precipitation data from a rain gauge no further than 5 km from the site will facilitate the interpretation of turbidity exceedances. Where real time systems are in place, rain data should also be available in real time. If not available from an existing nearby gauge, a new telemetered gauge should be established on site. If observed exceedances of turbidity targets are not occurring as a result of wet weather, active water discharges (e.g. pumping) should be considered as the potential cause of elevated turbidity.

LOCATION IS EVERYTHING!

Considerations for setting up monitoring stations

- Locate sensor where flows are not highly turbulent, as turbulent stream flows can impact the accuracy of turbidity readings
- Ensure site is accessible by personnel installing and maintaining equipment
- Locate so as to avoid areas where excessive debris could land on or accumulate around the sensor
- Locate in an area that is not at high risk of damage from construction activities or vandalism
- Attach sensor to a concrete block or existing structure so that it is firmly anchored in place.
- Install sensor at least 10 cm from the stream bed in order to prevent it from being buried in sediment, while also ensuring that the selected height will allow the sensor to remain submerged at all times.

- **Data analysis software / tool.** Analyzing and interpreting continuous turbidity data to assess compliance with the target requires the establishment of appropriate data management software and/or tools. The tools used may be relatively simple, like a spreadsheet set up with the relevant formulas, or more sophisticated, like a specialized application developed for interpretation of this type of data. Ideally, these systems should be set up to filter data such that false exceedances (e.g. passing debris) are excluded from consideration. Where real time systems are in place, the tool should also interpret the data in real time. It should be capable of processing and interpreting turbidity and duration data on a continuous basis to determine compliance with targets and push that information out to the pre-determined recipients (e.g. ESC inspector).

- **Grab sampling when continuous monitoring is infeasible.** During site conditions when continuous in-stream monitoring is not possible (e.g. frozen conditions), turbidity should still be monitored during

rainfall and snowmelt events by collecting grab samples and testing with a handheld device. In this case, receiving water and/or effluent samples may be appropriate depending on stream and site conditions, what activities are occurring on the site, and where high turbidity runoff is observed during inspections.

Example: Assessing compliance with the receiving water target

In order to assess the turbidity increase attributable to the construction site, it is necessary to account for typical (pre-construction) turbidity levels as well as turbidity increases from upstream activities. The following calculation can be carried out to isolate the construction-based turbidity increase:

Construction based turbidity increase = (measured DS turbidity) – (measured US turbidity)

Where:

DS = downstream station

US = upstream station

To illustrate the application of this equation for assessing compliance, the following sample calculation is provided:

Assuming:

Measured US turbidity = 50 NTU

Measured DS turbidity = 200 NTU

Then:

Construction based turbidity increase = (200 NTU - 50 NTU) = 150 NTU

Once this is determined, the turbidity-duration chart can be referenced to determine the duration at which this turbidity increase would constitute an exceedance of the target (i.e. enter the “moderate impact” zone). This method is demonstrated in Figure 10.6, which shows that if the construction site is causing a turbidity increase of 150 NTU from the upstream to the downstream stations, the duration of this elevated turbidity should be no longer than 1.85 hours (1 hr and 52 min). If it occurs for longer, the receiving water system is in the “moderate impact” zone and the site is not in compliance with the turbidity target. If this occurs, the reasons for the exceedance should be investigated on site. Once sediment sources are pinpointed, modifications, replacements, repairs and / or maintenance should be carried out on site as needed to prevent ongoing sediment releases.

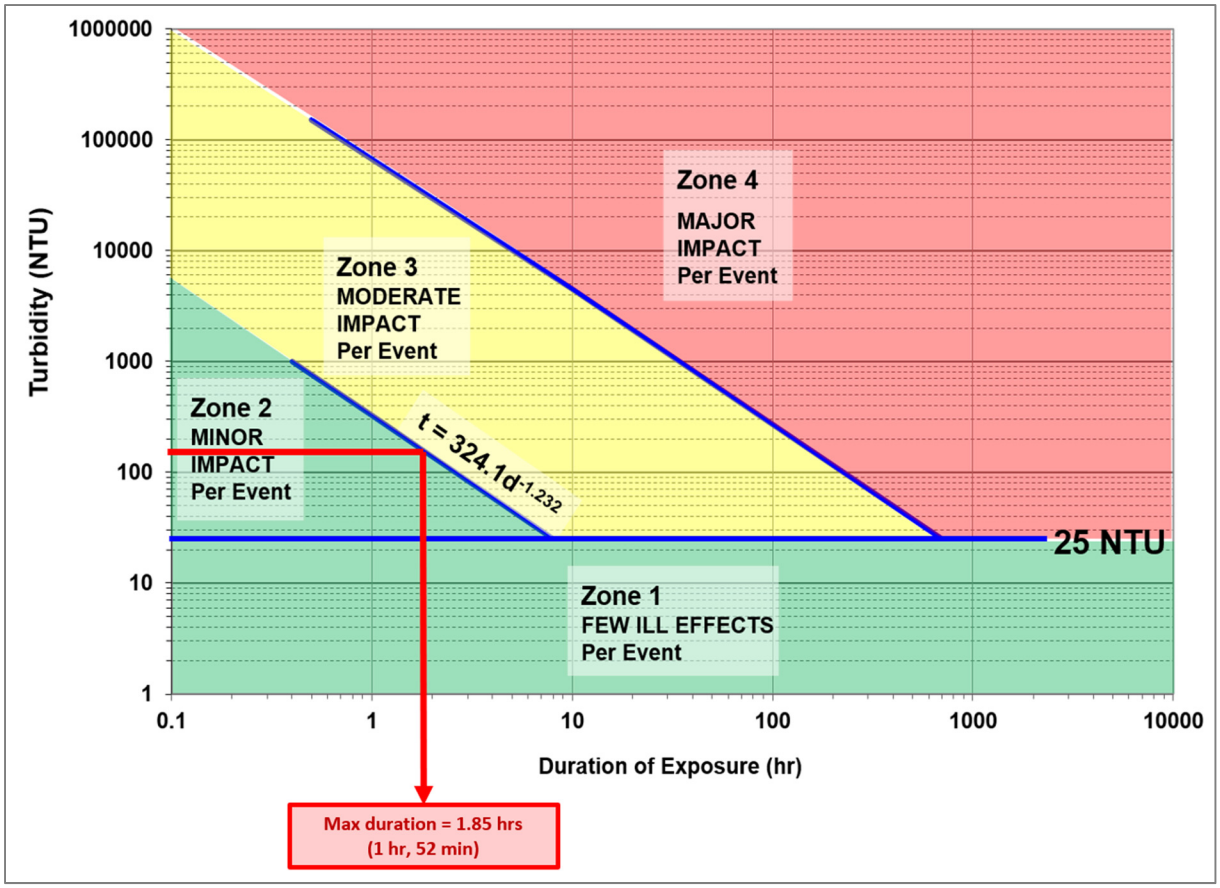


Figure 10.6: Example of the use of interpolation to determine the maximum allowable duration of a construction based turbidity increase of 150 NTU in a receiving water system.

Construction effluent target

A construction effluent target applies to ***any direct runoff/discharge from the construction site, before it is subject to any dilution in a receiving water system*** This includes both active and passive discharge. Measurement of effluent quality provides a very direct assessment of construction sediment releases and can facilitate the identification of specific problem areas on the site. It also makes it possible to conclusively identify instances when the construction site is not the source of elevated sediment levels in downstream receiving water systems, provided that all site effluent is being monitored.

Turbidity targets for construction effluent are also based on the framework shown in Figure 10.4. Like the receiving water target, the effluent target is based on the assumption that there is a 1:1 correlation between TSS and turbidity. The target is applicable where it is not superseded by other site-specific regulatory requirement governing discharges from the construction site (e.g. contaminant thresholds in sewer use by laws

The turbidity target for construction site effluent is to maintain turbidity levels within the "few ill effects" or "minor impact" zones of Figure 10.4. It differs from the receiving water target in that the typical (pre-construction) turbidity in the receiving system is not considered. The turbidity of the effluent itself (and the duration over which it occurs), should fall within the "few ill effects" or "minor impact" zones.

The equation of the line dividing the "minor impact" zone from "moderate impact" zone is:

$$t = 324.1 \times d^{-1.232}$$

Where t = turbidity (in NTU) and d = duration (in hours)

Table 10.3 provides turbidity and associated duration thresholds that define the target zones. These values have been calculated using the equation of the line defined above ($t = 324.1 \times d^{-1.232}$).

Table 10.3: Maximum allowable construction effluent turbidity at different durations

Construction effluent turbidity (NTU)	Duration (h)
≤ 25	Any duration
761	0.5
324	1
138	2
84	3
59	4
45	5
36	6
29	7

Continuous monitoring for assessing compliance with construction effluent target

For sites where an effluent turbidity target is most appropriate (see considerations in section 10.2.1), assessing compliance, including consideration of duration, requires continuous monitoring of effluent at any discharge locations where the sensor can remain permanently submerged. During a rainfall event, effluent from any site discharge locations can be sampled and subsequently analysed, but continuous online turbidity sensors can only be installed where they can be permanently submerged (e.g. in a sediment control pond). In ponds, a turbidity sensor is typically installed at the outlet if it is meant to measure effluent.

The monitoring program for sites applying the effluent target should include the following components:

- **Continuous online (in water) turbidity monitoring stations at all permanently wet discharge locations.** In most cases, these locations will be sediment control pond outlets. On sites where there are many ponds and establishing stations at all of them is impractical, priority should be given to monitoring of ponds that receive runoff from drainage areas that are larger and/or more vulnerable to erosion (i.e. minimal stabilization measures are in place).
- **Each turbidity monitoring station equipped with: (i) a turbidimeter (a sonde with a turbidity sensor), (ii) a data logger, (iii) power supply (e.g. batteries, solar panels), and (iv) an enclosure**

to protect equipment. On sites where rapid response to address elevated turbidity levels is required (e.g. species at risk sites), monitoring stations should also be installed with telemetry equipment to allow remote data access. All equipment should be maintained and calibrated regularly in accordance with the manufacturer's recommendations.

- **Continuous turbidity monitoring throughout the construction period until the site achieves at least 80% *effective* permanent stabilization.** This is the threshold after which ESC inspections are no longer required, as described in the CSA *ESC Inspection and Monitoring Standard* (CSA, 2018). If otherwise specified by the overseeing regulatory agency and/or if turbidity issues are demonstrated to be an ongoing concern, despite reaching this threshold, monitoring may be required to continue.
- **Collection of data from a nearby rain gauge.** Precipitation data from a rain gauge no further than 5 km from the site will facilitate the interpretation of turbidity exceedances. Where real time systems are in place, rain data should also be available in real time. If not available from an existing nearby gauge, a new telemetered gauge should be established on site. If observed exceedances of turbidity targets are not occurring as a result of wet weather, active water discharges (e.g. pumping) should be considered as the potential cause of elevated turbidity.
- **Data analysis software / tool.** Analyzing and interpreting continuous turbidity data to assess compliance with the target requires the establishment of appropriate data management software and/or tools. The tools used may be relatively simple, like a spreadsheet set up with the relevant formulas, or more sophisticated, like a specialized application developed for interpretation of this type of data. Ideally, these systems should be set up to filter data such that false exceedances (e.g. passing debris) are excluded from consideration. Where real time systems are in place, the tool should also interpret the data in real time. It should be capable of processing and interpreting turbidity and duration data on a continuous basis to determine compliance with targets and push that information out to the pre-determined recipients (e.g. ESC inspector).
- **Grab sampling when continuous monitoring is infeasible.** During site conditions when continuous in-stream monitoring is not possible (e.g. frozen conditions), turbidity should still be monitored during rainfall and snowmelt events by collecting grab samples and testing with a handheld device. In this case, receiving water and/or effluent samples may be appropriate depending on stream and site conditions, what activities are occurring on the site, and where high turbidity runoff is observed during inspections.

10.2.3 Response protocols for turbidity exceedances

Protocols for responding to and reporting turbidity exceedances should be established on all sites where effluent or receiving water turbidity is being continuously monitored. The protocol should outline the parties to be contacted when an exceedance occurs, including the project team members and relevant regulatory agencies, and identify necessary actions and when they should be undertaken. When an exceedance occurs, preliminary investigations should take place to confirm whether the exceedance is valid (e.g. not simply a result of passing debris) and whether the construction site itself is the source of elevated turbidity measurements.

The following actions are recommended when continuous monitoring reveals that construction site effluent (or the downstream receiving water system) has reached a turbidity level that is in the "moderate impact" zone (Figure 10.4):

Parties to be notified

- ESC inspector
- Contract administrator
- Contractor (once corrective actions are determined
- Overseeing regulatory agencies as defined by permits / approvals (if applicable)

Actions and reporting

Upon confirmation of the exceedance, and no later than 10 hours after the exceedance began (or 10 hours after first light if the exceedance occurs at night), a preliminary notification should be sent out to relevant parties. The ***preliminary notification*** should include the following information:

- Date and time of inspection
- Inspector's name
- Site location information
- List of report recipients
- Timing, location, magnitude and duration of turbidity exceedance
- Any information about suspected source of sediment
- If known, describe the repairs, maintenance and/or modifications of ESC measures planned in order to address the elevated sediment releases causing turbidity exceedances.
- If known, estimated timing for the completion of repairs, maintenance and/or modifications.

In the case that turbidity exceedances continue despite initial efforts to rectify ESC deficiencies, update reports should be sent to the listed parties daily until turbidity falls back below the applicable target. Depending on the site, the nature of the construction work, the magnitude and duration of the exceedance, and any relevant approval or permit conditions, stop work orders and other consequences may apply to ongoing exceedances that are not rectified in a timely manner.

All update and final reports - should include the following information:

- Reason for the inspection (e.g. routine weekly, pre-rainfall, post-rainfall)
- A brief description of weather conditions during the inspection, during the 24 hours prior to the inspection, and forecasted for the next few days.
- Map or drawing with notes to identify the specific areas of the site that are discussed in the report

Beyond this basic information the following should be included in specific types of reports:

Update report

- Provide information on the timing, location, magnitude and duration of the continued exceedance
- Explain the status and outcome of the planned remedial actions described in the preliminary assessment report, including why they failed to reduce turbidity back below the target.
- Provide a timeline and recommendations on strategies for reducing effluent turbidity and getting the receiving water turbidity back below the applicable target.

Final assessment report

- Provide a summary of the exceedance that occurred, including location, the total duration and range of turbidities measured.
- Explain the deficiencies that resulted in the turbidity exceedance and how they were addressed.
- Describe the actions taken to mitigate future turbidity exceedances.

10.3 BMP Maintenance

Carrying out maintenance of ESC BMPs in a timely manner is an important way to demonstrate due diligence on construction projects. For temporary ESC measures, maintenance and repair should continue until the measure is no longer needed. Some measures will require more regular maintenance (e.g. removal of accumulated sediment), while others may only require periodic maintenance when accumulated sediment levels reach a certain threshold (e.g. sediment control ponds). BMP-specific maintenance requirements are provided in Appendix B.

Figure 10.7: Maintenance of rock check dams

Repairs, maintenance or replacement of BMPs should be conducted as soon as possible upon issuance of an inspection, and the inspector should specify the priority level of maintenance needs based on the risk of impacts to natural features. In order to expedite maintenance activities, back up supplies of frequently replaced ESC materials should be kept on site where possible.

In general, BMPs requiring maintenance should be repaired / cleaned within 48 hours of notification or sooner if environmental receptors are at imminent and foreseeable risk of adverse impact. In the event of a spill, as detailed in section 7.7, immediate response is required.

A sample inspection report, provided in Appendix F, demonstrates the appropriate way to document the need for maintenance. This includes photos, location identification, description of maintenance needs, and details on how long the area in question has been in disrepair.

APPENDIX A: SPECIFIED FLOOD RISK CALCULATION

Specified flood risk calculation for sizing in water BMPs

The concept of ***specified flood risk*** is useful in determining the sizing of some BMPs that are temporary in nature, as it considers the accepted level of risk or BMP failure and its intended service life.

The Ministry of Natural Resources and Forestry recommends that sizing of certain BMPs applied during in or near water works, like cofferdams and temporary watercourse diversion channels, should be calculated based on consideration of the ***specified flood risk***, as described in *Hydrology of Floods in Canada: A Guide to Planning and Design* (National Research Council of Canada, 1989).

The design return period (T) which the BMP should be sized to accommodate is based on the anticipated service life of the BMP (L) in units of years and the specified risk (R), which is unitless. As per the National Research Council of Canada guide (1989), the level of risk commonly applied when sizing a temporary watercourse diversion or cofferdam is 0.05 to 0.1 (i.e. between 5 and 10 percent).

The equation for determining the design return period is:

$$T = \frac{1}{1-\sqrt[L]{1-R}}$$

Example: Calculation of design return period (T) of water surface elevation where a cofferdam should be designed that has service life (L) of 75 days (0.21 year) and specified risk (R) of 0.05.

$$T = \frac{1}{1-\sqrt[0.21]{1-0.05}}$$

The return period (T) is ~ 5 years.

A return period of 2 years should be assumed if the calculated return period is less than 2 years. In-water BMPs should not be sized to convey less than the 2 year flows unless approved by the relevant regulatory agency.

Calculation of return period for in-water BMPs (e.g. waterproof isolation barriers) should be based on a maximum risk of 5%. Once the return period is calculated, rainfall depths can be determined and, based on the drainage area, the maximum flow rate to be accommodated can be determined. In calculating maximum flow rates, the drainage area imperviousness (runoff coefficient) applied should be based on the anticipated site conditions during the service life of the BMP. If drainage area imperviousness is expected to increase during the service life of the BMP, the higher imperviousness (highest expected runoff coefficient) should be assumed in the calculation.

This type of calculation can also be applied to aid in the proper sizing of other conveyance BMPs on construction projects (e.g. slope drains), particularly if the BMP conveys water into a natural feature. In these instances, the specified risk (R) value chosen should be based on potential consequences if the measure was to fail / overtop. For example, a slope drain on a steep and / or long slope that drains to a sensitive feature should be designed based on a low specified risk (e.g. R= 0.05), since its failure could result in major slope erosion and sedimentation in the downstream sensitive area.

APPENDIX B: EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES

B1: EROSION CONTROL PRACTICES

Preventing erosion is the most effective means of keeping sediment onsite during construction projects. Practices that reduce erosion rates include strategies to minimize the amount of land cleared, diversion of flows around high erosion risk areas, and the application of ground covers that stabilize soil and/or provide a physical barrier to soil particle detachment.

Detailed guidance on the following erosion control practices are included in Appendix B1:

MINIMIZED OR PHASED LAND CLEARING

The preservation of vegetated areas on active construction sites is a practice that offers several advantages from an erosion control and runoff management perspective. The topsoil, vegetation and root systems that are part of pre-existing vegetated areas make them effective at intercepting and infiltrating rainfall and keeping soil in place.

Figure B1-1: Buffer of vegetation retained at site perimeter

Minimizing clearing involves the identification of site areas where vegetation can be preserved throughout the entire construction period. Areas cleared are smaller and more manageable with respect to control erosion and sediment migration. Phased clearing, by contrast, does not completely avoid stripping but instead requires strategic planning to schedule clearing, development and re-stabilization of the site so that the total amount of time that bare soils are left exposed is minimized as much as possible. When development is phased, only a portion of the site is stripped and developed at any given time, and the next parcel/phase is only initiated once the earlier phase is complete, including re-stabilization.

Application

- Parcels designated for later development (e.g. school blocks, parks).
- Any areas of a site where construction activity is not planned for an extended period of time. On stripped areas that are inactive for 30 days or longer, stabilization measures should be applied.
- Phasing is most appropriate for larger sites (>10 ha), where it is more feasible to divide the development into smaller phases.
- It is particularly import to retain a buffer of vegetation along the site perimeter and around natural features.

Prioritizing ***Sustainability***

The preservation of existing vegetation is a highly sustainable practice as it does not generate significant solid or liquid waste or air pollution, nor does it require the consumption of natural resources.

Design

- Consider minimizing stripping first. Early in the planning process, identify areas where vegetation can be retained. Where minimized clearing can be planned and executed efficiently, it can be more cost-effective than stripping vegetation that must later be re-established.
- The maximum amount of land stripped at a given time should be limited by the area that can reasonably be expected to be developed and stabilized within the same construction season (before freezing conditions set in).
- Identify any areas that will be inactive in the long term (longer than one construction season) for designation as vegetation preservation areas.
- Avoid using vegetation preservation areas for soil stockpiling. If these areas are used for stockpiles or other materials storage, their erosion control and infiltration benefits cannot be fully realized.
- Vegetated buffers, as established in the approved draft plan of subdivision or site plan for the subject property, should be preserved around the site

DON'T FORGET TO STABILIZE!

Any areas of the site where no active construction is planned for 30 days or longer should be stabilized

perimeter and adjacent to natural features. For specific requirements on buffers around natural features and hazards, consult with the local regulatory agency (i.e. municipality, CA). Recommended buffers applicable within the TRCA jurisdiction are detailed in *The Living City Policies for Planning and Development in the Watersheds of the Toronto and Region Conservation Authority* (TRCA, 2014), and within the CVC jurisdiction in *Credit Valley Conservation Watershed Planning and Regulation Policies* (CVC, 2010).

- Preserved areas should be fenced off to provide protection from vehicle tracking.
- Plans should identify trees and shrubs that have been designated for protection. Trees should be surrounded by sturdy tree protection fencing (Figure B1-2), which should be placed far enough from the trunk that the root systems are also protected. Root systems can extend more than 3 times the dripline distance (City of Toronto, 2016). Local municipal policies and bylaws on tree protection should be referenced prior to creating topsoil stripping plans in order to establish appropriate tree protection zones. A tree inventory / preservation plan may be required for removal and preservation of species. Consultation with a qualified arborist is recommended.
- Where phasing is being implemented it should be considered at the early stages of planning and design. Co-ordination of workplans, construction schedules and permitting/approvals timelines is key.
- Identify effective, low-cost temporary stabilization options and implement on areas that have already been subject to stripping and earth moving, and which are expected to remain inactive for longer than 30 days.

Inspection and maintenance

- Inspect vegetation preservation areas and re-stabilized areas on a weekly basis, and before and after significant rainfall (see definition in Section 10.1.2) or snowmelt events, and keep a record of the inspection. Beyond this routine inspection, additional inspections of seeded areas may be needed when the seed is newly planted as well as during periods of drought.
- Ensure vehicles and equipment are not driving over vegetation preservation areas or other areas that have been re-vegetated.
- Inspect vegetation protection fencing to determine if maintenance is required (Figure B1-2).
- Visually evaluate the condition of vegetation preservation areas, including buffers, trees and shrubs.
- Identify any observed decline in vegetation health that could be attributable to construction activities and recommend ESC improvements to mitigate any further harm. Common impacts to trees can include structural damage, root cutting and soil compaction, while other vegetated areas may be subject to erosion and/or sediment deposition due to altered site hydrology and vehicle tracking.
- If re-stabilization measures have been implemented (e.g. seeding, rolled erosion control products, mulching), refer to the BMP specific guidance in this chapter for detailed inspection and monitoring requirements.
- Look for any evidence of erosion on vegetation preservation areas or re-stabilized areas. Where erosion is occurring, determine whether the areas should be reinforced with additional erosion control measures (e.g. seeding, blankets, mats), or if flows should be re-routed around the area.
- Any repair or maintenance needs identified should be repaired within 48 hours or sooner if natural receptors are at imminent and foreseeable risk of adverse impact. If buffers around natural features are compromised due to erosion or sediment deposition, their restoration should be set as a high priority, particularly when they are failing to protect the natural area from construction activities.

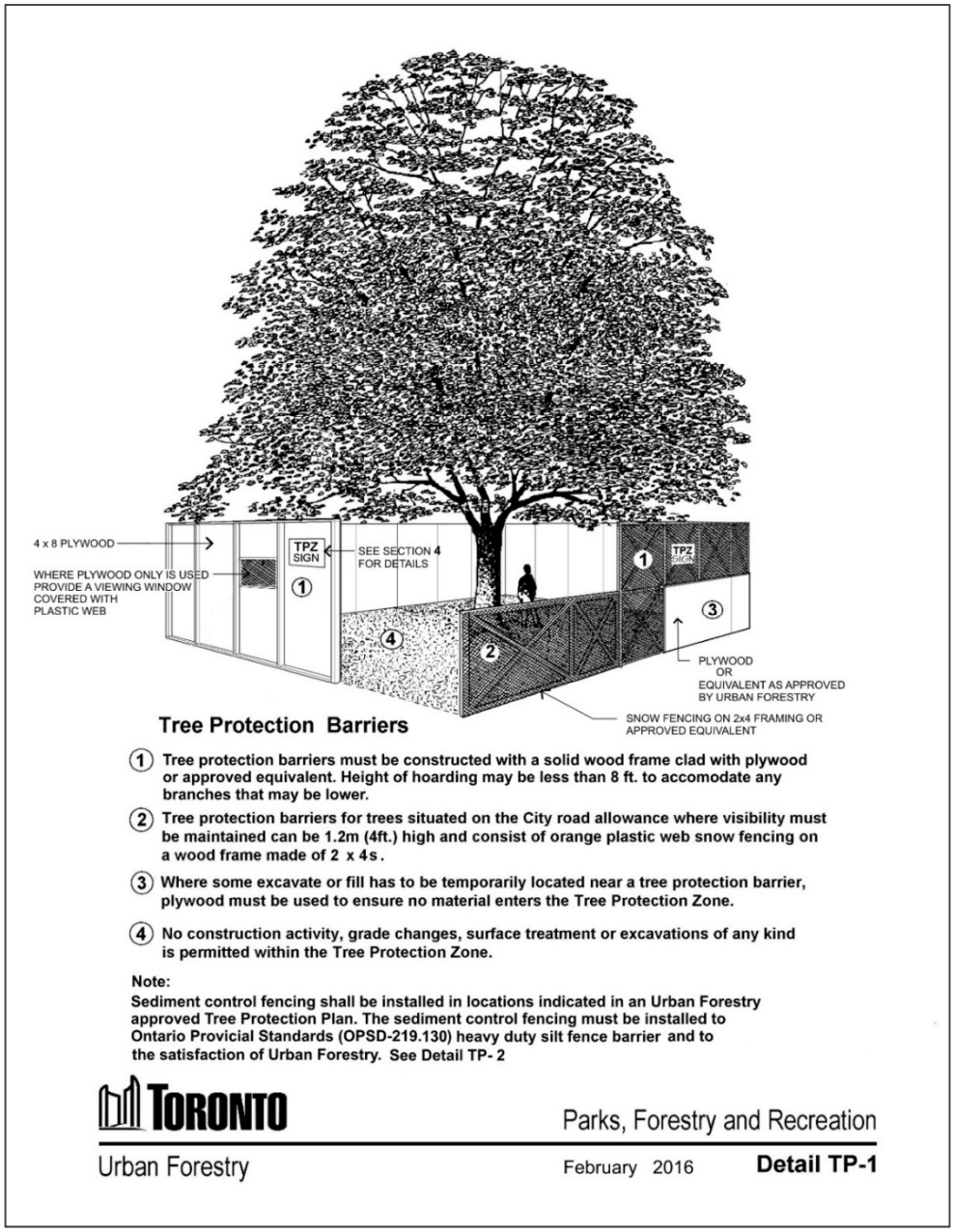


Figure B1-2: City of Toronto tree protection barrier detail (City of Toronto, 2016)

VEGETATED FILTER STRIPS

(a.k.a. vegetated/vegetative buffer strips)

Vegetative filter strips are areas of vegetation that are left in-situ in order to act as temporary or permanent, low-cost and effective erosion and sediment control measures. Well-established, existing vegetation can reduce the velocity of surface runoff, promote infiltration and reduce discharge by capturing and holding sediment and other pollutants.

Application

- Determine areas and construction activities that may benefit from leaving vegetation in place such as diversion swales, adjacent to buffers, and identify the locations on the construction drawings.

Existing grass that is **thick** and **matted** is the ***most effective*** type of vegetative filter.

Design and Installation

Vegetative buffer strips to be provided down gradient of sediment fencing according to the following criteria:

  - 3 m for perimeter fencing
  - 15 m for fencing adjacent to a warm water watercourse
  - 30 m for fencing adjacent to a coldwater watercourse supplemented with a second row of fencing 2 metres beyond the initial row

- Avoidance of the area will be required in order to ensure that the vegetation is not trampled and killed.
- Climate conditions and seasonal variability may influence the effectiveness of the vegetation and additional ESC measures may be required during times of vegetation die-back.
- Additional ESC measures upslope of the filter strips may be required if excessive sedimentation is anticipated.
- It may be necessary to delineate the vegetation to remain so that the area can be protected from excavation, grading, foot and vehicular traffic.
- Space will be required to store equipment, vehicles, material and soil stockpiles away from areas where soil compaction and/or vehicle tracking may damage vegetation and tree roots.
- Vegetative filter trips aren't effective at filtering high velocity flows from paved areas, steep slopes or hilly areas without additional ESC measures.

Inspection and maintenance

- Inspect weekly, and before and after significant rainfall (see definition in Section 10.1.2) or snowmelt events, and keep a record of the inspection.
- Repair any damage to fencing within 48 hours and remove, by hand, and dispose of any mounds of accumulated sediment or debris.

SLOPE DRAIN

Slope drains are heavy duty, often flexible, pipes that convey runoff from the top of a slope to the bottom of a slope. This runoff diversion practice is used to prevent concentrated runoff from flowing directly over the bare face of the slope thereby reducing erosion and, in some cases, slope failure.

Slope drains are installed with water containment or diversion structures, such as interceptor/diversion swales, berms, or barriers that help collect and convey upslope runoff towards the slope drain

On long slopes the installation of terraces across the slope face will also mitigate erosion from sheet flow over the bare soil of the slope. The terraces intercept runoff and direct them to the slope drain pipe, thereby preventing the formation of rills and gullies on the slope.

Prevent erosion on susceptible bare soil areas by ***diverting*** and ***intercepting*** runoff using practices like:

- Interceptor swales
- Berms
- Barriers
- Slope drains

Application

- Exposed slopes where runoff is being conveyed from top to bottom
- Where it is anticipated that concentrated flows will flow over the slope face
- Particularly important on long and/or steep slopes
- In conjunction with a multi-barrier approach that includes water detention and/or diversion measures.

Figure B1-3: Slope drain

Design and installation

- Calculate the pipe size based on maximum flows to be conveyed in the drain and provide on ESC plan drawings. The “Specified Flood Risk” calculation detailed in Appendix A may be applied for calculating return periods when sizing slope drains, particularly where the drain conveys water into or close to a natural feature. The calculation considers the acceptable level of risk (if the drain was to be overtopped) and the anticipated service life of the swale in determining the return period. This may be useful where there is a low tolerance of risk of failure and/or the slope drain will be in place for a long time.
- Once the return period is established, determine maximum flow volumes to be conveyed based on the size and runoff coefficient of the contributing drainage area.
- Ensure proper securement of the pipe ex. stakes, grommets, stones, etc. and securement spacing along the length of the slope drain.
- Ensure that pipe will extend beyond the toe of the slope to a flat area.
- Anticipate using more than one slope drain pending site drainage area and anticipated runoff flows.

- Inlet should include a berm and inlet protection. Install the slope drain and construct a compacted inlet berm (in 150 mm soil lifts) or barrier with a minimum of 0.45 m compacted soil cover above the top of the pipe to secure inlet.
- Direct the flows from the top of the slope to the proposed location of the slope drain.
- Place slope drain(s) on undisturbed soils or compacted fill per locations on construction drawings.
- Anchor pipes along the slope.
- Ensure erosion doesn't occur at the inlets and outlets by installing erosion mitigation pads at the inlet and energy dissipaters at the downstream end.
- Position outlet so that it does not discharge to unprotected soils a receiving waterbody without flowing into a multi-barrier sediment control measure.

Inspection tip

Always look out for seepage and scour to ensure your slope drain doesn't fail

Inspection and maintenance

- Inspect weekly, and before and after significant rainfall (see definition in Section 10.1.2) or snowmelt events, and keep a record of the inspection.
- Table B1-1 lists slope drain components to inspect and how common problems should be addressed.
- Inspect the length of the top of slope to ensure that runoff is being directed to the slope drain and is not flowing down slope face.
- Any repair or maintenance needs identified should be repaired within 48 hours or sooner if natural receptors are at imminent and foreseeable risk of adverse impact.

Decommissioning

- Ensure that areas receiving runoff are well-stabilized. If the final grading will result in runoff that was conveyed through the drain flowing over the slope, ensure that the slope is fully stabilized. If it has been seeded, vegetated, ensure that the seed/vegetation is fully established.
- Remove slope drains with as little disturbance of the slope as possible.
- Stabilize and restore all disturbed areas.

Prioritizing ***sustainability***

Reducing waste | Slope drain pipes can be reused elsewhere if not clogged with sediment and debris.

Preventing erosion | With runoff diverted, a dense vegetative cover can be more readily established on

Table B1-1: Recommended inspection and maintenance of slope drains

Items to inspect	Inspection findings	Maintenance/repairs needed
Inlet	Erosion and seepage around the inlet	- Consider re-grading to reduce the inflow angle. - Repair erosion, compact soil - Stabilize inlet area with flared end section, rolled erosion control or filter fabric and riprap. - Ensure pipe connections are watertight and that pipe is well secured.
	Sediment accumulation at the inlet	- Remove sediment when it begins to impede flow rates and compromise the ability of the pipe to convey all the water from the drainage area. - Sediment accumulation greater than one-third the height of the berm should be removed. - Consider stabilization of drainage area where possible.
Outlet	Erosion	- Repair erosion, compact soil. - Consider incorporating outlet flow dispersion (e.g. flared pipe end) and/or energy dissipaters. - Stabilize outlet (e.g. filter fabric and rip rap, rolled erosion control, vegetation)
	Sediment accumulation at the outlet	- Remove sediment when it begins to impede flow rates and compromise the ability of the pipe to convey all the water from the drainage area. - Consider stabilization of drainage area where possible.
Pipe	Detachment and/or seepage	- Ensure pipe is re-secured and well-anchored to the slope. - Consider improving anchoring methods to increase stability. - If pipe seepage is noted, inspect pipe connections and repair/replace sections that area leaking.
	Clogging	- When sediment accumulation in the pipe leads to clogging and impeded flow, the pipe should be flushed out. - If clogging is occurring too often, consider stabilization of drainage area and/or the installation of an inlet screen or grate to keep out larger debris.
	Overtopping	- Overtopping not caused by clogging indicates that the drainage area is too large of the flow velocity is too high for the pipe size used. - Address overtopping by reducing drainage area, increasing pipe size, or slowing flows. - Reducing drainage area requires re-grading and installing additional slope drains. - Where flow velocity is the issue, consider re-grading and installation of barriers (e.g. check dams) to slow down runoff conveyed to the drain.

Adapted from: “Pipe slope drains” in *Storm Water Management BMP Handbook* (South Carolina Dept. of Health and Environmental Control, 2005)

INTERCEPTOR SWALES

(a.k.a. diversion swales, cut-off swales)

Interceptor/diversion swales are conveyance systems that intercept, collect and convey runoff away from bare soil areas and towards sediment control measures. They may be used along or constructed with compacted earthen dikes alongside.

The purpose of these types of swales – which may be installed on a temporary or permanent basis - is to reduce erosion on susceptible areas by collecting and transporting runoff around a construction site in a defined and (ideally) stabilized flow path. They also facilitate site drainage after a wet weather event, preventing storm flows from accumulating in unwanted areas (e.g. adjacent properties, site areas where construction is underway).

Application

While interceptor swales can be an effective erosion prevention practice for conveying runoff through any unstabilized areas, they are particularly important in the following circumstances:

- When the upslope drainage area is greater than 2 ha, and in particular in areas with highly erodible soils.
- When the following is true:

  $(S^2 \times L) \geq 0.75$ m

  Where S is the slope of the upslope drainage area (dimensionless), and L is length of the upstream slope (m).

Figure B1-4: Stabilized interceptor swale

Priority areas where interceptor swales should be applied include:

- Along the top of unstabilized long or steep slopes (in conjunction with slope drains).
- Along the perimeter of the site.
- Along the toe of slopes.
- Adjacent to valley and stream corridors.
- Where flows are being diverted around an area that is being stabilized/restored, in order to allow vegetation to become established.

Design and installation

- Interceptor/diversion swales and dikes are intended to convey small flows along low-gradient channels. They should be directed towards a suitable sediment control measure, like sediment traps or sediment control ponds.

- Calculate the appropriate capacity of the swale and provide on ESC plan drawings. Sizing should consider the expected service life of the swale and potential consequences if it is overtopped.
- Calculate the gradient of the swale and provide on ESC plan drawings. Gradient should be calculated based on the intended capacity of the swale and the desired flow rate within the swale. In general, slopes should be the minimum possible that will maintain positive drainage. Velocities greater than 1.2 m/s will erode the invert of a grassed swale.

Making the Grade

Interceptor swales should have a grade of at least ***1%*** to maintain positive drainage, but grades steeper than ***2%*** could cause erosion.

- Dikes/berms greater than 1 m in height should be designed by a geotechnical engineer. The consequences of failure must be considered. Use a multi-barrier approach if swale overtopping would result in sediment release to natural features or other private property.
- Swales should be shaped like an inverted trapezoid, with side slopes no steeper than 2H:1V (Figure B1-5). Where dikes are used, they should be compacted and also constructed with side slopes no steeper than 2H:1V.
- An interceptor swale should be stabilized with a suitable erosion control BMP (e.g. vegetation, RECP, stone), particularly if it will be in place for more than 30 days. Swale inlets and outlets are important to stabilize due to their susceptibility to erosion. Unstabilized swales contribute to suspended sediment loads in runoff being conveyed, ultimately resulting in more sediment accumulation in downslope sediment control measures.
- In order to reduce the potential for swale erosion and provide opportunity for sediment settling, flow interruption devices (e.g. check dams, filter socks, coir logs) should be installed within the swales. See individual flow interruption BMPs for guidance on spacing in swale applications.

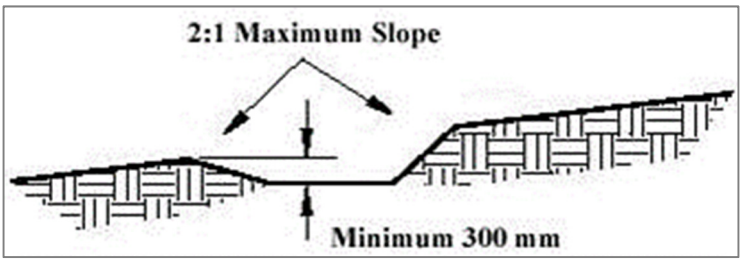


Figure B1-5: Cross-section of recommended interceptor swale design.

Inspection and maintenance

- Inspect weekly, and before and after significant rainfall (see definition in Section 10.1.2) or snowmelt events, and keep a record of the inspection.
- Look for any signs of erosion, in the swale and/or dike, particularly at the inlet and outlet.
- Where stabilization measures are already in place, fill and re-stabilize eroded areas. Consider whether stabilization measures should be upgraded to hardier materials.
- Where erosion is observed and stabilization measures are absent or inadequate, consider adding stabilization measures as described under “Design and installation” above.

- Determine whether high flow rates are causing excessive erosion and if so, consider adding flow interruption devices, reducing the size of the area draining to the swale, or re-grading the swale to a flatter slope.
- Inspect all flow interruption devices to ensure they are properly installed and functioning as intended. Sediment and/or debris accumulation behind the device should be removed before it reaches approximately 30% of the device height.
- Any repair or maintenance needs identified should be repaired within 48 hours or sooner if natural receptors are at imminent and foreseeable risk of adverse impact.

Decommissioning

- Ensure flows are re-routed appropriately prior to decommissioning of the swale, to mitigate erosion or flooding issues.
- Fill swale, stabilize and restore the disturbed area.
- Ensure flow interruption devices are properly disposed of.

SURFACE ROUGHENING
(a.k.a. scarification)

Surface roughening of bare soil areas is a technique that creates uneven surfaces and depressions that minimize erosion by reducing runoff velocities, providing greater opportunity for infiltration, and encouraging sediment trapping. In areas being seeded, these depressions can also help to keep seed in place and improve the establishment of vegetation.

Typically, surface roughening is done by tracking equipment to create horizontal depressions that are parallel to site contours and perpendicular to the runoff flow path. Surface roughening methods include: dimpling, track walking (Fig. B1-6), stair stepping and grooving.

Figure B1-6: Track walking applied to bare soil

Application

- Can be applied to any inactive disturbed surface that will be left exposed on a temporary basis (less than 30 days). Areas exposed and inactive for longer than 30 days should be stabilized with vegetation and/or RECPs.
- Useful on exposed slopes and any other areas susceptible to erosion.
- Should be applied on any slopes steeper than 3H:1V, where vertical height is more than 1.5 metres.
- Useful where vegetation cannot be immediately established due to the season.
- Effectiveness is limited on very sandy or rocky soil.
- Should only be used alone on a temporary basis.
- Most effective when used with other stabilizing practices such as mulching and seeding.

A roughened slope is better able to ***catch and retain seed, mulch and moisture***, and **reduce runoff velocity**.

Design and Installation

- Should be applied after grading activities have ceased (temporarily or permanently) in an area.
- The selection of an appropriate method depends on slope grade, mowing requirements after vegetative cover is established (if any), whether the slope was formed by cutting or filling, and type of equipment available.
- Roughening tracks should be made parallel to the site contours (perpendicular to runoff flow path). Applying tracks in the incorrect direction encourages the formation of rills and gullies.
- Surface is considered roughened if depression depths are 50 to 100 mm deep, and 100 to 150 mm apart.

- A chisel or ripping instrument can be used in most soil conditions.
- On slopes steeper than 2H:1V, the tracks left by a bulldozer driving perpendicular to the contour can leave acceptable horizontal depressions.

Inspection and Maintenance

- Inspect scarified areas weekly, and before and after significant rainfall (see definition in Section 10.1.2) or snowmelt events, and keep a record of the inspection.
- Ensure vehicles and equipment are not driving over areas that have been roughened as this may result in the breakdown of the depressions and the creation of tracks which channel water down slopes and encourage erosion.
- Where roughening has been applied in conjunction with seed, inspect areas to determine the success of seed establishment and re-seed as needed.
- Identify any areas where roughening should be repeating or where it is providing insufficient erosion protection.
- Any repair or maintenance needs identified should be repaired within 48 hours or sooner if natural receptors are at imminent and foreseeable risk of adverse impact.

MULCHING

Mulch is a layer of organic material applied to a soil surface to help to retain moisture, regulate temperature and enhance soil health. Common materials used as mulch or as part of a hydraulic mulch mix are straw, shredded trees or bark, wood shavings, paper fiber and compost. When applied alone on bare soil it can reduce erosion by absorbing rainfall and acting as a protective physical barrier. It is often applied in conjunction with seed since it provides the added benefits of insulating the seeds and keeping them in place until they germinate.

Mulch is typically applied using one of the following methods:

- **Placement and spreading by construction equipment** | Dry mulch may be placed and spread using construction vehicles such as rubber-tired loaders or dozers. For smaller areas or those with no vehicle access, manual placement and raking may be suitable. Once applied, dry straw or hay can be kept in place by crimping it into the soil using a crimper (Figure B1-7).

Figure B1-7: Dry straw crimped into place (left) and hydromulched area (right)

- **Hydraulic application** | Hydraulically applied mulch, also referred to as 'hydro-mulch' is a slurry containing mulch materials (typically wood or paper based), water and a tackifier (Figure B1-7). Similar to a hydroseed mixture, it is stored in a tank and sprayed onto the soil surface using a hose. Helicopters with hydro-mulch sprayers are used when it is necessary to cover very large areas (e.g. following forest fires).
- **Pneumatically applied using a blower truck** | A blower truck can be used to apply dry mulch alone or with a tackifier. When applied as a dry mulch it is more appropriate for application on planted areas rather than on bare soil areas where it may not stay in place. Blower truck application of mulch with soil and seed is detailed in the 'Seeding' section.

Application

- Short term erosion control on bare soil areas that are not subject to concentrated flows.
- Dry mulch best used on areas that have been seeded.
- Hydro-mulch (with tackifier) should only be applied alone to areas requiring temporary erosion control, including areas that are not meant to be seeded at time of mulching.
- Mulch applied for erosion protection on slopes steeper than 2H:1V should be in conjunction with a tackifier and/or seeding.

Design and Installation

- Mulching is most effective for erosion control when it is applied in conjunction with seeding, so that it can insulate seeds, retain moisture and prevent erosion.
- Select a mulch material which is derived from organic matter, and is free of weeds, seeds and fragments of invasive species. Straw mulch should be oat or wheat straw, while a hydraulic mulch should consist of wood or paper fibres, water, and a tackifier (OPSS.PROV 804, 2014). Mulch should not be derived from chemically treated wood or contain any additives that could inhibit growth of vegetation. Guidance on tackifiers is provided under "Chemical Stabilization" in this Appendix.

Figure B1-8: Straw crimper

- Compost used as mulch should be stable, humus-like material produced from the aerobic decomposition of organic feedstocks, composted and cured until maturity. Compost quality should comply with mandatory Ontario MECP Compost Quality Standards for Category 'AA' or 'A' and be applied at rates that comply with Canadian Food and Inspection Agency (CFIA) regulations T-4-93 (CFIA, 1997a) and T-4-120 (CFIA, 1997b).
- Prior to application of hydro-mulch, the soil surface should be prepared by removing large rocks or other deleterious materials and filling in any rills or gullies. Roughening soil surface prior to application can help to keep mulch in place.
- Hydraulic mulch should be applied to the soil surface with good coverage. It should be applied with a uniform thickness, although slightly denser application may be warranted in erosion prone areas.
- Dry straw mulch should be kept in place by application of a tackifier or by crimping into place with a crimper (Figure B1-8).
- When applying hydro-mulch, consider the drying time and ensure that there will be an opportunity for the application to dry before the next rainfall event.
- Hydro-mulch should not be applied to frozen soil or during freezing or rainy conditions.
- For direction on the use of mulch in permanent/post-construction site restoration, see the guide entitled *Preserving and Restoring Healthy Soils: Best Practices for Urban Construction* (TRCA, 2012).

Inspection and Maintenance

- Inspect mulched areas weekly, and before and after significant rainfall (see definition in Section 10.1.2) or snowmelt events. Keep a record of inspections.
- Ensure mulch applied on-site is consistent with approved plans with respect to the type and quality.
- Ensure vehicles and equipment are not driving over areas that have been mulched.
- Look for any evidence of insufficient coverage, migration of mulch due to poor attachment or soil erosion (e.g. rilling). Where erosion is occurring, determine whether re-application is needed, if the area should be reinforced with additional erosion control measures, or if flows should be re-routed around the area.

- Regrade and re-apply mulch in areas where coverage was insufficient or where mulch has been removed due to erosion.
- Refer to inspection and maintenance guidance in ‘Seeding’ section (p. B1-17) for mulched areas that have also been seeded.
- Any repair or maintenance needs identified should be repaired within 48 hours or sooner if natural receptors are at imminent and foreseeable risk of adverse impact.

SEEDING

The term seeding covers a range of practices, all of which involve the application of plant seed to a soil surface in order to establish a vegetative cover. Seeding is an important means of stabilizing soil and reducing erosion during construction as well as at the conclusion of the project. An area may be seeded as a temporary/short term erosion control strategy or as part of the final site stabilization/restoration plan.

The most common seed application methods are:

- **Broadcast** | Applying seed by hand or with a seed spreader. Because this is labour intensive it is normally done for relatively small areas or those that are not easy to access with vehicles.
- **Mechanical** | Seed applied directly into the soil by mechanical equipment such as a seed driller (Figure B1-9). Only vehicle accessible areas can be seeded mechanically.

Figure B1-9: Mechanically seeded area (left) and mechanical seeding equipment (right)

- **Hydroseeding (a.k.a. hydraulic mulch seeding)** | A slurry containing seed, mulch, water and often a tackifier, stored in a tank and sprayed onto the soil surface using a hose (Figure B1-10). The mixture may also incorporate additives to improve vegetation growth, such as fertilizer. In very large scale applications, helicopters equipped with sprayers can be used for application.

Figure B1-10: Hydroseeded area (left) and application of hydroseeding (right)

- **Pneumatic (blown) seeding with growing media** | A calibrated mixture of seed and composted soil (or other growing media) that is applied onto bare soil surfaces with a blower truck (Figure B1-11). The one-step application of seed with growing media - and various optional soil amendments - results in seed that is planted the place where it's applied, rather than close to the surface where it could be vulnerable to erosive forces. This technique can be useful for any kind of stabilization, but may be cost-prohibitive to apply where only short term stabilization is needed.

Figure B1-11: Pneumatic seeding with growing media

Application

Seeding method	Soil stockpiles	Long term inactive areas (e.g. school blocks, rear yards)	Slopes	Interceptor swales	Sediment pond banks	Permanent stabilization areas (e.g. pond blocks, front/rear yards)	Riparian zones
Broadcast	For small areas	√	√	√		For small areas	√
Mechanical		√	√			√	
Hydroseeding	√	√	√	√	√	√	√
Pneumatic seeding with growing media		√	√	Cost-prohibitive unless long term or permanent	√	√	√

Design and Installation

- In addition to the seed application method, information on the species in the seed mix and application rates should also be provided to the local Conservation Authority for review.
- Seeding or other suitable stabilization should be applied on any stripped areas of the site that are inactive for more than 30 days.
- More detailed guidance on establishing a healthy soil and vegetative cover in permanent stabilization areas is available in *Preserving and Restoring Healthy Soil: Best Practices for Urban Construction* (TRCA, 2012). Download at: www.sustainabletechnologies.ca.

Pro Tip

Applying a rolled erosion control product or mulch will help mitigate erosion, improve moisture retention and protect your seeds from drying out in the sun.

Ground preparation:

- Vehicle track and remove larger obstacles.
- Ensure that the area to be seeded is not compacted, has been roughened or scarified to create a rough and loose surface.

- For more information on assessing soil compaction and de-compacting methods, see *Preserving and Restoring Healthy Soil: Best Practices for Urban Construction* (TRCA, 2012), section 5.0.

Topsoil (where applicable):

- Ensure the topsoil does not contain materials or contaminants at levels that would be harmful to plant growth, impair drainage, or adversely impact its intended use. Topsoil should:
  - Be free of refuse, stones, wood or debris larger than 50 mm in diameter;
  - Be free of deleterious substances, plant or soil pests, undesirable grasses, noxious weeds or weed seeds.
  - Meet topsoil specifications found in *Construction Specifications for Implementing Compost Amended Planting Soil in Ontario* (TRCA, 2017), available at www.sustainabletechnologies.ca.
- Topsoil should have a pH of 6.0 to 8.0 and contain 5 to 15% organic matter (by dry weight), depending on the type of vegetation to be established. A higher organic matter content is recommended for planting beds and tree pits, since larger, deeper rooting plants need deeper and richer topsoil to thrive.
- Ensure topsoil application at a minimum thickness of 200 mm. Where a pneumatic seeding application is used, topsoil may be substituted with the pneumatically applied growing media itself.
- Total uncompacted soil depth (topsoil + subsoil) should be at least 300 mm.

Seed:

- Consider whether you need a secondary erosion barrier during seed establishment:
  - Where broadcast or mechanical seeding is being used, additional erosion protection (e.g. rolled erosion control product) is required until seed is well established.
  - If hydroseeding is being used, the area can be considered stabilized as soon as the application is successfully completed, provided that a tackifier was included in the slurry. If no tackifier was included, additional erosion protection (e.g. rolled erosion control products) should be used until seed is established, particularly in high erosion risk areas.
  - Where pneumatic seeding with growing media is used, it can prevent erosion immediately after application.
  - Regardless of seeding method used, more intensive erosion controls (e.g. hard armoring, cellular confinement system) may also be necessary in high erosion risk areas (e.g. slopes steeper than 2H:1V).

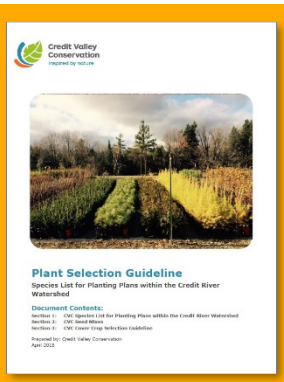
Optimal Seeding Times

April 15 – October 15

Late spring is ideal during drier conditions

Fall is best for dormant wildflower seeds

- For permanent stabilization areas (e.g. restoration areas, stormwater pond blocks), choose an appropriate seed mix based on site conditions, climate, surrounding vegetation community, topography, soil conditions, and adjacent land uses.
- Native seed mixes are required in CA regulated areas and recommended in non-regulated areas.
- For permanent stabilization areas, seed mix should be applied at a rate of 22-25 kg/ha or approximately 250g/90 m² for smaller areas.
- A nurse/cover crop should be added to every seeding application – to aid in the quick establishment of erosion and weed control – at a rate of 15-22kg/ha.



For plant lists and detailed guidance on selecting species for planting plans, seed mixes, and cover crops, see Credit Valley Conservation's *Plant Selection Guide* (CVC, 2018).

The Guide is available at www.cvc.ca or in the Sustainable Technologies Evaluation Program Resource Library at sustainabletechnologies.ca/resource-library/water.

- If cover crop is being used alone (e.g. temporary stabilization areas), application rate should be 25-60 kg/ha, depending on the density of cover needed to prevent erosion.
- For cover crops, ensure that the timing of the application coincides with appropriate growing windows as listed in Figure B1-12.
- If germination is not anticipated during the same growing season when seeding was carried out, additional erosion control measures (e.g. rolled erosion control products) are required to provide interim stabilization until vegetation is visible.

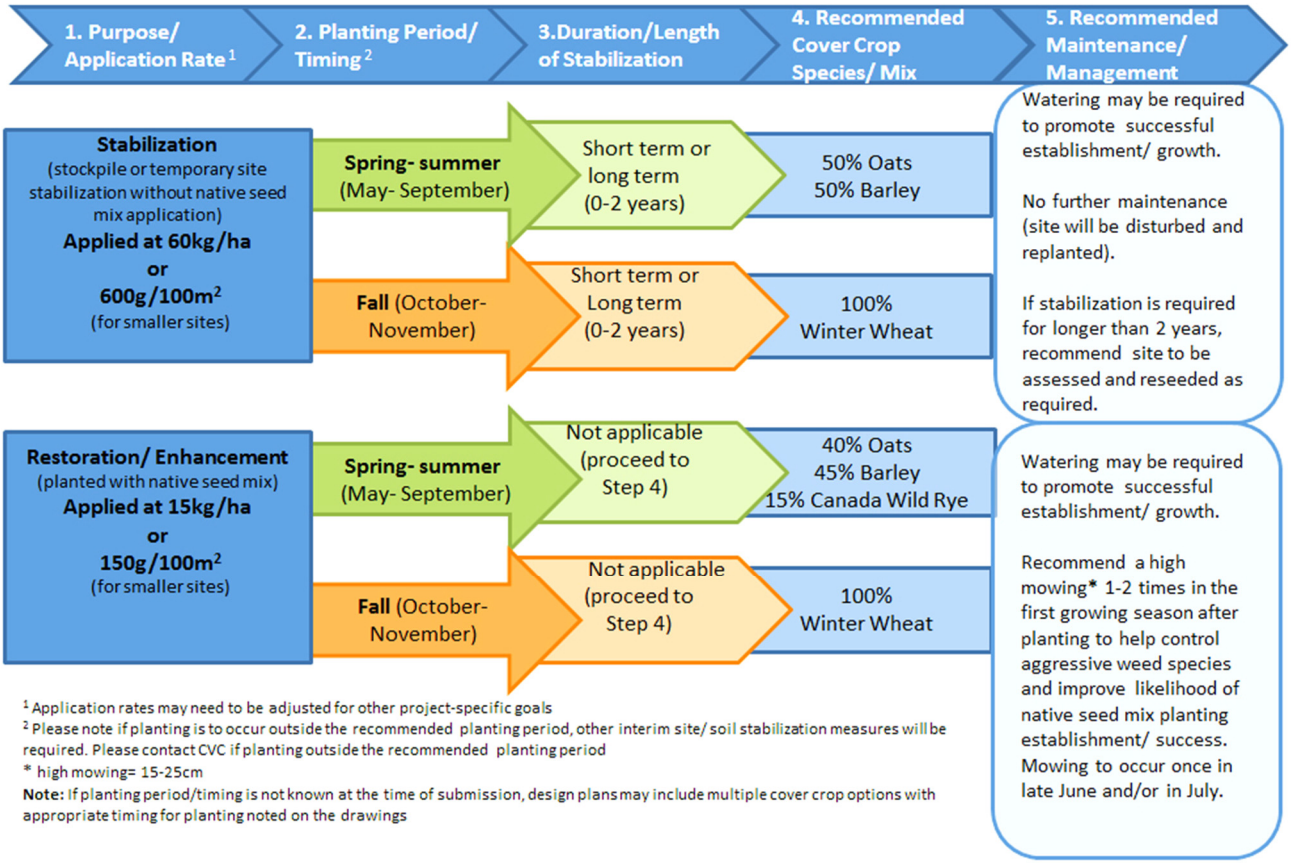


Figure B1-12: Decision guide for cover crop selection. Source: Plant Selection Guide (CVC, 2018).

Inspection and Maintenance

- During seeding, check seed tags to confirm that the correct (approved) seed mix is being applied.
- Inspect seeded areas weekly, and before and after significant rainfall (see definition in Section 10.1.2) or snowmelt events, and keep a record of the inspection. Beyond this routine inspection, additional inspections of seeded areas may be needed when the seed is newly planted as well as during periods of drought.
- Establish a plan to ensure seeded areas are irrigated as needed, particularly if application is occurring during dry weather periods.
- Ensure vehicles and equipment are not driving over areas that have been seeded. To prevent damage, seeded areas should be fenced off during vegetation establishment, particularly if it is a busy and heavily used area.
- During inspection, determine whether seed is well established with good coverage (>80%).
- Look for any evidence of erosion on seeded areas (rilling). Where erosion is occurring, determine whether a higher seed application rate is needed, if the area should be reinforced with additional erosion control measures (e.g. blankets, mats), or if flows should be re-routed around the seeded area.
- Regrade and re-apply topsoil and seed in areas that didn't take or that have been removed by erosion.
- Any repair or maintenance needs identified should be repaired within 48 hours or sooner if natural receptors are at imminent and foreseeable risk of adverse impact.
- Consider planning and budgeting for long-term as re-seeding may be required over time.

OUTLET PROTECTION

Outlet protection practices prevent scour erosion immediately downstream of pipe and channel outlets that discharge water from construction sites. They fall into the following two general categories:

- **Energy dissipation devices** │ These structural devices are placed downstream of outlets, in the path of concentrated flows, in order to interrupt flows, reduce water velocities and thereby lessen the potential for scour. Examples of common energy dissipating devices include check dams, wattles and baffle blocks (Figure B1-12). Level spreaders are also applied to dissipate energy and reduce water erosivity by forcing water to leave the outlet area as sheet flow.

- **Surface hardening / ground covers** │ Creating a more erosion-resistant surface is another important way to prevent scour from concentrated flows downstream of outlets. The greater and more concentrated the flow being discharged from the outlet, the more resilient the surface cover should be. Surface covers downstream of outlets can range from a soft-armored natural cover (e.g. RECP-reinforced vegetated area, thick and matted vegetative cover) to harder manufactured structures (e.g. concrete headwalls, riprap lining, flexible rubber mats).

Figure B1-12: Erosion blanket in an outlet area (top) and baffle blocks for energy dissipation (bottom)

Application

- At the base of any stormwater outlet releasing concentrated flow, including but not limited to: drainage tiles, detention facility outfalls, and piped or channel conveyance systems.
- Applied to mitigate scour erosion resulting from discharge ***leaving*** the site as well as discharges related to ***water movement within the active construction area*** (e.g. slope drain outlets, pumping and watercourse diversions).
- Need for outlet protection is greatest where flows are high and concentrated, and where discharge is being conveyed directly off the site and into a natural feature. In these cases, outlet protection is the last line of defense protecting the natural feature from erosion and sediment deposition.

Design and Installation

- Outlet protection measures should be designed to blend in with the surrounding natural environment as much as possible, incorporating vegetation and stone to create scour resistant surfaces. Where manufactured support structures are necessary due to high flow rates, they should be integrated with vegetation if possible.
- Providing adequate protection against scour at stormwater outlets typically requires at least some hard armoring, typically incorporating riprap. Riprap stone should be underlain with a geotextile (or graded aggregate filter), covered with a stone base, and be sized to resist the tractive forces of the flow from the outfall and, where applicable, the lateral flow of the receiving channel. Typically the minimum diameter of riprap stone should be 300 mm.

- Where stone (sub-angular recommended) is used for protection below an outlet in a natural feature, geotextile liners should not be installed below the stone, as this compromises the stream bed as a habitat for aquatic organisms.
- For outlets discharging to a flowing receiving channel, pipes and structures must be aligned to avoid erosion caused by lateral flows in the vicinity of the exposed structure.

A manufactured scour prevention and flow dissipation device that has been integrated with vegetation. The pictures depict the same area immediately following installation (left) and after vegetation has become established (right).

- Energy dissipation in the form of structural stilling basins, baffle (chute) blocks or other structural flow interrupters are often required for stormwater discharge velocities ≥ 3 m/s.
- Where the outlet discharges to a grass-lined ditches/channels, flow velocities should not exceed 1.2 m/s. Flows above this threshold will typically cause the channel to erode. If discharge velocities cannot be reduced or some of the flow diverted to a different outlet, then energy dissipation measures should be employed in the channel to slow down the water as it moves into and through the channel.
- Where level spreaders are applied they must be installed so that they are completely level, otherwise flows will concentrate at the low point instead of flowing uniformly over the spreader.
- Protection measures must be in place prior to any conveyance of runoff through the outlet structure.

Inspection and Maintenance

DISSIPATE AND DISPERSE

For temporary pipe outlets used during pumping and dewatering activities, consider using a ***sediment bag*** to ***dissipate*** and ***disperse concentrated discharge***.

- Inspect all stormwater outlets weekly, and before and after significant rainfall (see definition in Section 10.1.2) or snowmelt events, and keep a record of the inspection. Prioritize inspection and maintenance of outlets that discharge directly to natural features.
- Look for evidence of erosion downstream of the outlet and recommend options for either reinforcing/hardening the surface, dissipating energy through flow interruption, reducing flow from the outlet, or a combination of these solutions.
- Assess the degree of sediment accumulation behind energy dissipation devices. Sediment accumulated behind flow interrupters like baffle blocks, check dams, filter socks and wattles/logs should be removed when it has reached approximately 30% of the height of the device, or sooner if there is evidence that sediment is being re-suspended.
- If a sediment bag has been used to dissipate and disperse flow from an outlet, inspect the sediment bag to determine whether it requires changing or is damaged in any way. Additional guidance on sediment (dewatering) bags is provided in Appendix B2
- Assess whether there has been any shifting of structural components or structural damage to hard or soft armored surfaces downstream of outlets, and recommend the necessary maintenance and/or repairs.

- Any repair or maintenance needs identified should be repaired within 48 hours or sooner if natural receptors are at imminent and foreseeable risk of adverse impact.

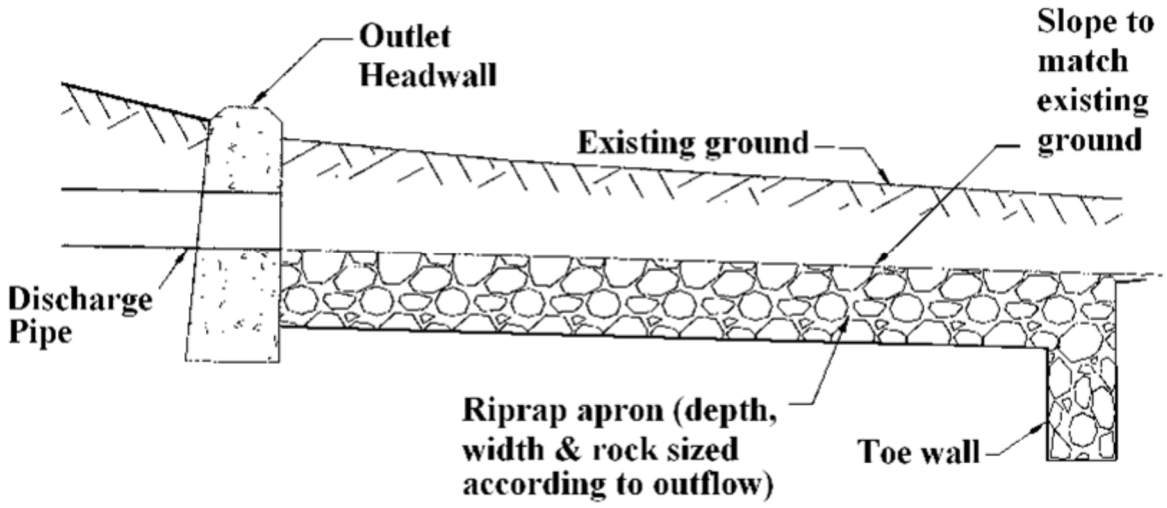


Figure B1-13: Storm drain outfall protection. Source: *Sediment & Erosion Control on Construction Sites – Field Guide* (University of Virgin Islands, 2003).

ROLLED EROSION CONTROL PRODUCTS
(abbr. RECPs)

Rolled Erosion Control Products (RECP) are prefabricated blanket-like ground covers, made up of organic and/or synthetic materials and designed to act as a physical barrier to erosive forces. RECPs are typically applied and stapled into place over bare soil areas or on newly seeded areas, but sometimes are set up for added long term stabilization of vegetated areas with high erosion risk. In addition to acting as a physical erosion barrier, RECPs promote the establishment of vegetation by allowing for water infiltration (resulting in higher soil moisture levels), protecting seed from being carried away or consumed by wildlife, and moderating soil temperatures.

Specific types of RECPs include:

- **Netting** | A woven degradable net composed of material like jute, straw or coir (coconut fibre), which provides temporary stabilization to aid in the establishment of vegetation. Highly erodible slopes may require application of a sub layer of straw mulch overlain with netting, which is stapled through to enhance ground contact.

- **Blankets** | Typically composed of coir, straw or wood fibre woven within a photodegradable netting to form a thick blanket. Often used as a temporary measure to protect against erosion during seed establishment, although some types can last up to 2 years. They have a lower tensile strength compared to mats, but are capable of better ground contact.

- **Turf reinforcement mats (TRM)** | Hardy materials, such as coconut husk fibers or synthetic polypropylene fibers, woven together to provide the highest tensile strength and most long term erosion control of any of the RECPs. Composite TRMs combine the protection of a blanket with the added reinforcement of netting in areas requiring long term or permanent stabilization.

Figure B1-14: From top to bottom - jute netting, coir blanket and a turf reinforcement mat

Application

- Un-vegetated areas that convey concentrated flows, including swales and ditches.
- Any slopes steeper than 2H:1V that have not been stabilized with other erosion control measures (e.g. vegetation).Newly seeded areas where germination/vegetation establishment has not yet occurred. See “Seeding” section for guidance on when seeded areas require secondary erosion controls.
- Riparian areas or within natural water features or watercourse diversions if conservation authority approval has been granted.
- Banks of sediment control traps or basins, on a temporary basis until they are seeded. RECPs should also be used on newly seeded banks if the seeding method does not provide immediate soil stabilization.
- Erosion scars.

To net or not to net?

RECPs that include biodegradable or photodegradable plastic netting can provide a significant erosion control advantage due to their higher tensile strength, but netting can also ***ensnare small wildlife like snakes, turtles and frogs***.

When choosing an RECP for application in areas frequented by wildlife – like riparian areas, natural features and stormwater pond banks - opt for ***100% biodegradable products*** that are ***free of plastic netting,*** like ***jute, sisal,*** or ***coir fiber.*** Products with a loose-weave design and movable joints are ideal. Where plastic netting must be used, remove it as soon as it is no longer needed, as long as its removal will not damage vegetation.

- Any other areas requiring erosion protection and where ground surface is not rocky.
- Not suitable for application when ground is frozen.

Design and Installation

Figure B1-15: RECP installed on a slope and anchored in place at the top

- Consult with RECP suppliers for information and guidance on selection of an appropriate product, with consideration for required longevity, slopes, and flow velocities.
- Site conditions and the required longevity of the RECP will inform which product is best suited for the application. Biodegradable RECPs should be selected where they are serving as a temporary erosion control. Non-biodegradable plastic components may be necessary in some permanent installations where long term heavy duty stabilization is required, but in general these types of plastics should not be installed and left in vegetated areas indefinitely.
- Consult the local Conservation Authority if the application is proposed within a water feature or watercourse diversion channel.
- Prepare the exposed surface by removing mounds, protruding objects that could cause punctures, etc. to ensure that there will be a firm, continuous contact between the RECP and the ground. Tenting must be avoided as it creates a drip zone that will lead to erosion of the soil under the blanket.
- Where RECP is protecting a seeded area, apply topsoil and seed prior to installing the RECP.
- RECPs should be installed vertically down slopes for slopes 3H:1V or steeper. On slopes with a lower grade, RECPs can be installed horizontally across the slope where necessary. (see Figure B1-16)
- Ensure that sections overlap at edges and at the ends. The upslope segment of the RECP should always be on top as it overlaps with the next downslope segment. This prevents the RECP from being breached by water flowing over the surface. RECP segments overlapping parallel to the direction of flow should overlap at least 10 cm, while segments overlapping perpendicular to the direction of flow should overlap at least 30 cm. See Figure B1-16.
- For installations on either slopes or channels/swales, RECPs should always be installed starting at the top of the slope (or side slopes in the case of a channel/swale). Without protection the top of slope will

be highly susceptible to rill erosion, which could ultimately undermine the RECP.

- When applied on slopes or conveyance channels, the use of an anchor trench at the top and/or bottom ends can help to keep the RECP in place (see Figure B1-16). Anchor trenches should be at least 15 cm by 15 cm. If the RECP is not long enough to extend the full length or the slope of channel, a check slot (15 cm by 15 cm in size) should be constructed at the location where the RECP will overlap with the next downslope piece in order to help keep the downslope segment in place.
- RECPs should be attached to the ground surface with wire staples, metal geotextile stake pins, or triangular wooden stakes, all of which should be at least 15 cm long.

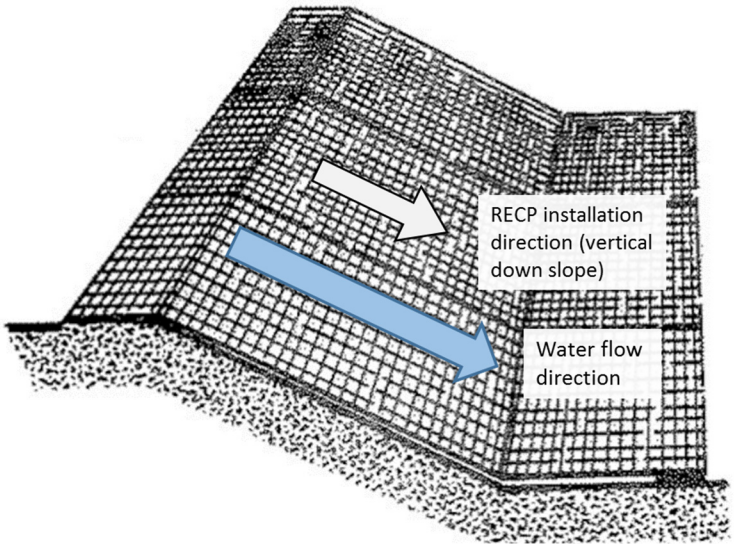
Seeding + RECP = *Success!*

RECPs work best as a support for vegetation establishment, and will often fail when underlying seeding is sparse or poorly established.

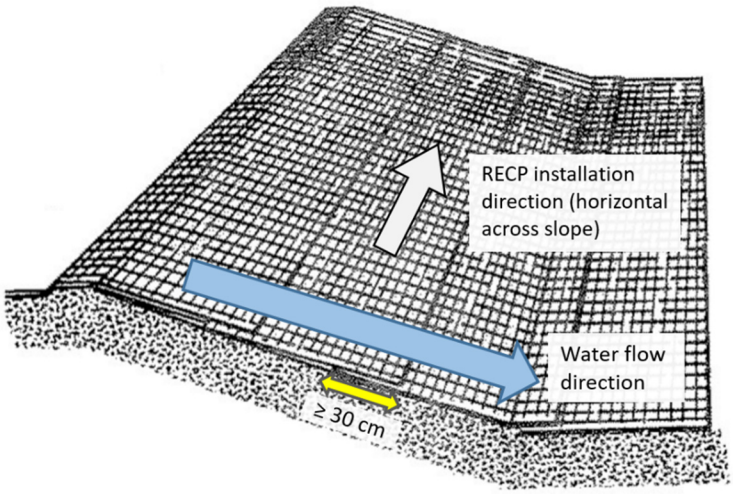
- Figure B1-16 provides some general guidance for installation, but the manufacturer should be consulted on the best method for application. Follow manufacturer's product specific application instructions, including anchoring and staple patterns.

Inspection and Maintenance

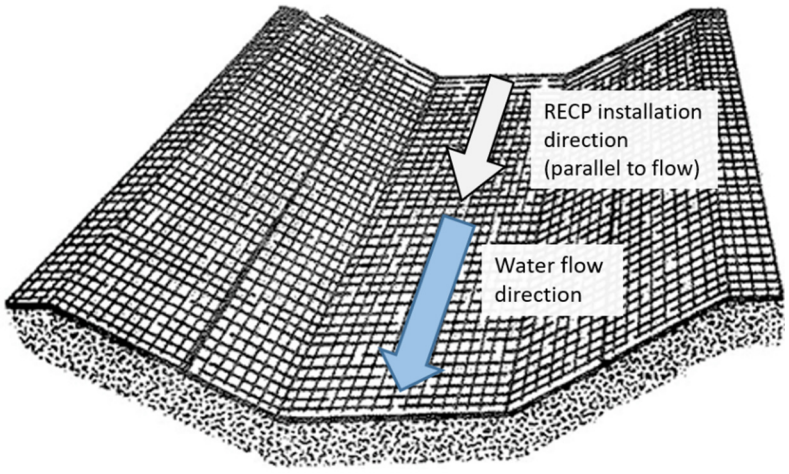
- Until vegetative cover is well established, inspect areas covered with RECPs weekly, and before and after significant rainfall (see definition in Section 10.1.2) or snowmelt events, and keep a record of the inspection. Newly seeded RECP-covered areas may warrant more frequent inspection. See pages B1-17 to B1-21 for guidance on inspection and maintenance of seeded areas.
- Ensure good contact with the ground and that there is no tenting of the RECP or erosion of the soil surface under the blanket.
- Inspect the condition of the RECP to ensure it has not been torn or detached.
- Re-attach or replace any RECP anchors (e.g. staples, stakes) that have come loose.
- Where anchor trenches or check slots are used, ensure RECPs are still firmly secured.
- Ensure vehicles and equipment are not driving over areas that have been covered with RECPs. To prevent damage, areas should be fenced off during vegetation establishment, particularly if it is a busy and heavily used area.
- Where erosion is occurring under the RECP, consider whether the blanket needs better contact with the ground, if a higher tensile strength RECP should be used, or if flows should be re-routed around the area.
- Repair eroded areas by removing RECPs, re-grading, re-applying topsoil and/or seed, and re-installing RECPs.
- Any repair or maintenance needs identified should be repaired within 48 hours or sooner if natural receptors are at imminent and foreseeable risk of adverse impact.



- RECPs should be installed vertically down slopes, particularly on slopes 3H:1V or steeper
- Anchor trench should be constructed at the top and bottom of slope
- Overlap of adjacent strips of RECP should be at least 10 cm.



- RECPs may be installed horizontally across slopes less steep than 3H:1V where necessary.
- Anchor trench should be constructed at the top and bottom of slope
- Upslope segments should be on top, overlapping downslope segments by at least 30 cm.



- In ditches and channels, RECPs should be installed vertically in the direction of flow.
- Anchor trenches should be installed at the beginning of the channel and along the tops of channel slopes.
- Down the side slopes, the upslope segments should be on top of the downslope segments and should overlap at least 10 cm.
- Down the length of the channel, upslope segments should be on top of downslope segments, overlapping by at least 30 cm.

Figure B1-16: Recommended orientation and overlap of RECPs on slopes and channels. *Adapted from: Keeping Soil on Construction Sites* (HRCA & HCA, 1994).

CHEMICAL STABILIZATION

(a.k.a. tackifiers, soil binders, polymers, soil stabilizers)

Chemical stabilization is an umbrella term that includes a variety of substances – ranging from natural to synthetic – that can be applied to increase the cohesion of soil surfaces by binding soil particles to one another, and/or to mulch. They are often applied for protection from both water and wind erosion on construction sites. Chemical stabilization can be particularly useful in areas where soil stabilizing vegetation has been difficult to establish.

While they can provide some erosion protection when used alone, soil stabilizers work most effectively when applied to keep soil in place during seed establishment, often as part of a hydroseeding or hydromulch mix. When added to these hydraulically applied products, they help to establish more long term or permanent vegetative stabilization. Because chemical soil stabilizers allow water to infiltrate while keeping soil, mulch and seed in place, they promote moisture retention and improved vegetation establishment. Some chemical stabilizers can also help to improve the consistency of hydraulic mixes, making them easier to apply.

Chemical soil stabilizers are often categorized as follows:

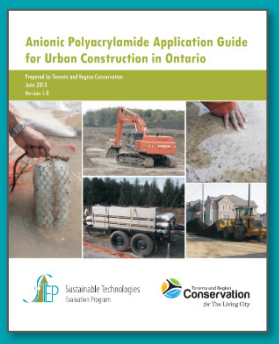
- Plant-based short term (e.g. guar, psyllium, starch), and long term (e.g. pitch and rosin emulsions)
- Synthetic petroleum-derived polymers (e.g. anionic polyacrylamide, polyacrylate)
- Cementitious binders (e.g. gypsum)

Figure B1-17: Application of hydroseed containing tackifier (left) and granular anionic polyacrylamide (right)

Application

- Use in and/or within 30 m of a natural water feature is subject to CA approval. Toxicity data as described under ‘Design and Installation’ must be available upon request.
- Best used in conjunction with seeding, such as within a hydroseeding or hydromulching mix in order to establish a more lasting stabilization.
- When used with seed, suitable for any areas requiring erosion protection, including slopes, interceptor swales and any other areas not subject to vehicle traffic.
- Only applied on bare/unseeded soil if the following criteria apply:
  - Regular reapplication at the supplier’s recommended frequency can be maintained.
  - The area is receiving only non-concentrated sheet flows
  - The area will not be subject to vehicle traffic or other earth disturbing activities
  - Stabilization is only needed on a short term basis

- Local policies on the use of chemical stabilization may differ from the information provided herein. Confirm local policies prior to including chemical stabilization on ESC plans.



For specific and detailed guidance on using anionic polyacrylamide on construction sites, see Toronto and Region Conservation Authority's *Anionic Polyacrylamide Application Guide for Urban Construction in Ontario* (TRCA, 2013).

The Guide is available in the Sustainable Technologies Evaluation Program Resource Library at:

sustainabletechnologies.ca

Design and Installation

- If the product is being mixed and applied by a third party, ensure that they are following the requirements listed herein.
- Chitosan and other cationic polymers (e.g. cationic polyacrylamide) should not be applied as soil stabilizers on construction sites due to their toxicity to aquatic organisms.
- Application rates vary according to the method of application and the specific type of chemical stabilizer. Ensure the product is applied at the manufacturer's recommended application rate.
- Ensure product labelling and/or packaging is available for the chemical stabilizer, which specifies the following:
  - product expiry date
  - use instructions, including application rates and mixing methods (if applicable)
  - recommended re-application frequency and other maintenance requirements
  - safe handling, storage and disposal information
- Any applications of anionic PAM-based products should meet the criteria detailed in *Anionic Polyacrylamide Application Guide for Urban Construction in Ontario* (TRCA, 2013).

Prioritizing ***Sustainability***

Always consider biodegradability when choosing a stabilizer.

Biodegradable products are the sustainable choice because they can **break down**, **safely** and relatively **quickly**, through **biological processes**.

- The chemical stabilizer must be safe at the expected application rate and based on the intended use. Evidence of this should be available in the product's Material Safety Data Sheet (MSDS) and/or toxicity reports. As a minimum, acute and chronic toxicity data, based on testing by an accredited third party, should be available for the following aquatic organisms: fathead minnow (Pimephales promelas), rainbow trout (Oncorhynchus mykiss) and water flea (Daphnia magna). The LC-50 concentrations (the concentration of polymer that is lethal to 50% of the sample population) listed in toxicity reports must exceed the maximum anticipated release rate of the product based on the way it's being used.

- Certain chemical stabilizer products, such as anionic PAM based products, are available in different formulations designed to bind different soil types. Where this type of product is being used, ensure that the formulation selected is effective for the specific soil on site. This is often done by submitting a soil sample to the supplier for testing. Chemical stabilizers that are ineffective at binding to soil will be easily washed away during a rainfall event, and could end up in undesired locations such as natural features.
- Prior to application of a chemical stabilizer, alone or as part of a hydraulic mix, the soil surface should be prepared by removing large rocks or other deleterious materials and filling in any rills or gullies
- When using a chemical stabilizer in conjunction with seeding, the top few inches of soil should be de-compacted to ensure good germination.
- Consider the drying time for the selected chemical stabilizer and ensure that there will be an opportunity for the application to dry before the next rainfall event.
- Avoid hydraulic application of chemical stabilizers during windy conditions in order to avoid having the product end up in unintended areas.
- Chemical stabilizers should not be applied to frozen soil or during freezing or rainy conditions.

Figure B1-18: Soil surface stabilized with anionic PAM

Inspection and Maintenance

- Inspect chemically stabilized areas weekly, and before and after significant rainfall (see definition in Section 10.1.2) or snowmelt events, and keep a record of the inspection. Beyond this routine inspection, additional inspections of seeded areas may be needed when the seed is newly planted as well as during periods of drought.
- Where the stabilizer has been applied in conjunction with seed, refer to guidance on inspection and maintenance of seeding on p B1-21.
- Confirm that the chemical stabilizer has been applied evenly with coverage of at least 80%.
- If the stabilizer has failed to adsorb to the soil particles, it can be easily washed away during a rainfall event and migrate downslope from the intended treatment area. If this is observed it may mean the stabilizer is ineffective for the soil type, and that a different formulation should be applied.
- Ensure vehicles and equipment are not driving over areas that have been treated. To prevent damage, chemically stabilized areas can be fenced off, particularly if it is a busy and heavily used area.
- Look for any evidence of erosion on chemically stabilized areas (rilling). Where erosion is occurring, determine whether a second application is needed, if the area should be reinforced with additional erosion control measures (e.g. blankets, mats), or if flows are too concentrated and should be re-routed around the treated area.
- Regrade and re-apply stabilizer in areas that have been subject to erosion or where the initial application was deficient.
- Re-apply at the frequency recommended by the product supplier/manufacturer to ensure area remains stabilized. If stabilizer was applied with seed, re-application of chemical stabilizer is needed (at the recommended frequency) only until vegetation is well established.

- Any repair or maintenance needs identified should be repaired within 48 hours or sooner if natural receptors are at imminent and foreseeable risk of adverse impact.
- Consider planning and budgeting for long-term as re-application may be required over time.

B2: SEDIMENT CONTROL PRACTICES

While erosion control is preventive in nature, as it is focused on keeping soil in place, sediment control measures are corrective in nature, meant to remove sediment that has already become suspended in stormwater. The multi-barrier approach to erosion and sediment control requires the application of both types of controls in series to create a resilient system to protect the natural environment from sediment impacts. Sediment removal can be achieved in a variety of ways, but controls are generally focused on settling, filtration, or a combination of the two.

Settling controls promote gravitational settling of suspended sediment by detaining stormwater and reducing flow velocities. While chemical flocculants can also be used to promote gravitational settling, they do so by agglomerating particles, making them heavier, larger, and more susceptible to settling or filtration. Settling controls may be applied to treat concentrated flows (e.g. check dams) or sheet flows (e.g. silt fencing). They are often applied in conveyance systems (e.g. interceptor swales), at the site perimeter, or anywhere it is necessary to separate a significant sediment source from a protected receiver. For example, controls may be applied around a storm drain inlet in order to prevent sediment from entering catchbasins, and eventually the receiving water system.

Filtration controls are porous materials (e.g. geotextile) which hold back sediment from stormwater that passes through them, with the filter's apparent opening size dictating the size of particles it can filter out. Because filtration controls also tend to reduce flow velocities, they can serve as settling controls as well.

Detailed guidance on the following sediment control practices are included in Appendix B2:

SEDIMENT CONTROL FENCE

(a.k.a. Silt fence)

Sediment control fence consists of geotextile material supported by posts and trenched in to the ground. It functions as a settling control by reducing velocity, ponding sheet flows and promoting gravitational settling of suspended sediment. It is also an effective means of redirecting sheet flows towards a treatment area (e.g. sediment control pond or trap). Despite the permeability of the non-woven geotextile fabric used in this type of fencing, it should not be used as a means of filtering sediment laden water as it does not effectively filter out fine particles (< 50 µm).

Figure B2-1: Sediment control fence

There are three primary components that make up sediment control fence: geotextile fabric, structural fencing support, and posts. The structural fencing support, often a page wire fence to which the geotextile is attached, keeps the geotextile fabric upright in between posts, while the posts keep the entire installation upright.

Application

- Along the perimeter of a construction site
- Along the up-gradient side of sensitive areas, streams and river corridors
- Around stockpiles of excavated material, such as topsoil
- Approximately 1.5 metre away from the base of moderate slopes
- Any other areas where sediment laden sheet flow requires treatment, provided that the fencing is installed parallel to the site contours.
- Sediment control fences should ***not*** be used perpendicular to flow in watercourses or other concentrated flow paths.
- Sediment control fence is meant to be used as a treatment measure for sheet flows and does not need to be installed as a means of delineating site boundaries if the area does not receive any sheet flow (e.g. high point). In these areas other types of fencing may be used if desired.
- For installation of sediment control fence on slopes, the grade and slope length must be considered to ensure that flows will not overwhelm the structural stability of the fence. The following are the maximum lengths of slopes on which sediment control fencing should be installed, according to grade.

Slope grade	Maximum slope length for sediment control fence
2H : 1V	15 m
3H : 1V	25 m
4H : 1V	40 m

Design and installation

SEDIMENT FENCE SHOULD NEVER BE…

- used as a filter
- used in a concentrated flow path or in the path of large overland flow volumes
- installed perpendicular to flow in a watercourse
- pre-fabricated with wooden stakes attached
- installed with snow fence as the structural (support) fencing

Materials specifications

- Posts used to support sediment control fence should be sturdy material such as steel t-bar with length ≥ 1.5 m.
- In areas where sediment control fence is being used as a barrier to protect a natural feature, wooden posts (recommended cross-section 10 cm by 10 cm) should be used instead of t-bars. Alternatively, a double row of t-bar supported sediment control fence (Figure B2-2) could be applied in these sensitive areas to provide multiple barriers and a high level of protection.
- Structural support fencing should be a high tensile strength galvanized page wire fence. Recommended specifications are 14 gauge wire thickness and opening size of 10 by 10 cm. Structural support fencing with similar strength, flexibility, and weather resistance is also suitable.
- Prefabricated sediment control fence products with wooden stakes already attached to geotextile should be avoided due to their lack of structural stability and inability to allow deep water ponding.
- Geotextile used in sediment fence should be non-woven and meet or exceed the following specifications:

Material property	Test methods	Minimum value	Type of value
Grab strength (machine direction)	ASTM D4632/D4632M	550 N[1]	Minimum ARV[2]
Grab strength (cross direction)	ASTM D4632/D4632M	450 N[1]	Minimum ARV[2]
Permittivity	ASTM D4491/D4491M	0.05 sec^{-1}	Minimum ARV[2]
Apparent Opening Size (AOS)	ASTM D4751	0.60 mm	Maximum ARV[2]
UV Stability	ASTM D4355/D4355M	70% after 500 hrs of exposure	

[1] Products with tensile strengths up to 10% less than specified minimum may also be considered.
[2] ARV: Average Roll Value

Fence installation

- Support posts should be no more than 2 metres apart and driven into the ground to a depth of at least 90 cm.
- Brace the fence posts diagonally in areas where deep ponding is anticipated.

- Geotextile fabric should be stretched tight across the structural fencing with no sagging and extend up from the ground to a minimum height of 60 cm. Fabric should be fastened to the structural support fencing and support posts with wire ties tied at the posts.
- Where the geotextile is joined to provide a continuous run, the ends should be overlapped at least 50 cm and securely fastened to posts.
- The bottom 30 cm of the geotextile should be tied into soil, using either static slicing or trenching methods, to ensure there is no space between the bottom of the geotextile and the ground. The trench should be constructed to be at least 20 cm deep an 40 cm wide (see Figure B2-3a).

Figure B2-2: Double row sediment control fencing

- The trench should be backfilled and compacted to ensure structural stability of the fence.
- In frozen soil conditions, if trenching cannot be achieved the geotextile should be secured with a filter sock (recommended diameter of 450 mm) staked into place along the upstream side of the fence (see Figure B2-3b)
- Double row sediment control fence should be installed with straw bales or a similar measure to provide structural support in between the fence rows.

Fence placement

- In sensitive areas (e.g. within or adjacent to natural features) consider whether sediment control fence installation will create excessive ground disturbance. In these cases, a different type of sediment control barrier may be advisable or recommended by the local Conservation Authority.
- Maintain a vegetated buffer of at least 3 m down gradient of sediment control fencing. Larger buffers are required adjacent to natural features based on defined limits of development, as described under “Vegetated buffer strips”.
- Consider installing additional sediment controls, double row sediment control fence, or sediment control fence supported by wooden posts in areas within or adjacent to natural features.
- Always install sediment fence:
  - along the contour and not on up and down slopes;
  - with end sections constructed up the slope to stop runoff from flowing around the ends of the fence; and
  - on the flat area at least 1.5 m away from the toe of a slope.
- Place wisely to avoid using more fencing than needed, resulting in additional waste sent to landfill. Installing sediment fence upgradient of sediment sources should be avoided if possible, with other simpler and more reusable types of fence used when the only objective is delineating boundaries.

Inspection and maintenance

- Inspect the entire length of sediment fence weekly, and before and after significant rainfall (see definition in Section 10.1.2) or snowmelt events, and keep a record of the inspection.
- Inspect the fence to look for any signs of damage to the geotextile or compromising of the structural integrity of the fence. Ensure the fence has been properly installed as defined under "Design and Installation" section above.
- Remove and properly dispose of sediment before it reaches approximately 30% of the height of the fence, or sooner if not functioning as intended.
- A supply of sediment control fence materials should be kept on site to allow for quick repairs or the installation of additional fencing as needed.
- Where fence continues to fail on an ongoing basis, consider reinforcing problem areas or replacing with an alternative sediment retention device. If failure is a result of concentrated flows being directed to the fence, consider re-designing surface water flow paths to reduce volumes being directed to the problem area.
- Any repair or maintenance needs identified should be repaired within 48 hours or sooner if natural receptors are at imminent and foreseeable risk of adverse impact. Higher priority should be assigned to repair of sediment fence installed upgradient of natural features.

Decommissioning

- Ensure removal and proper disposal of accumulated sediment.
- All materials associated with the sediment fence must be removed once the site has been restored and disturbed areas have been stabilized.
- All sediment fence materials should be removed from the site. Reusable components can be salvaged for future use and others should be disposed of at an appropriate waste facility.

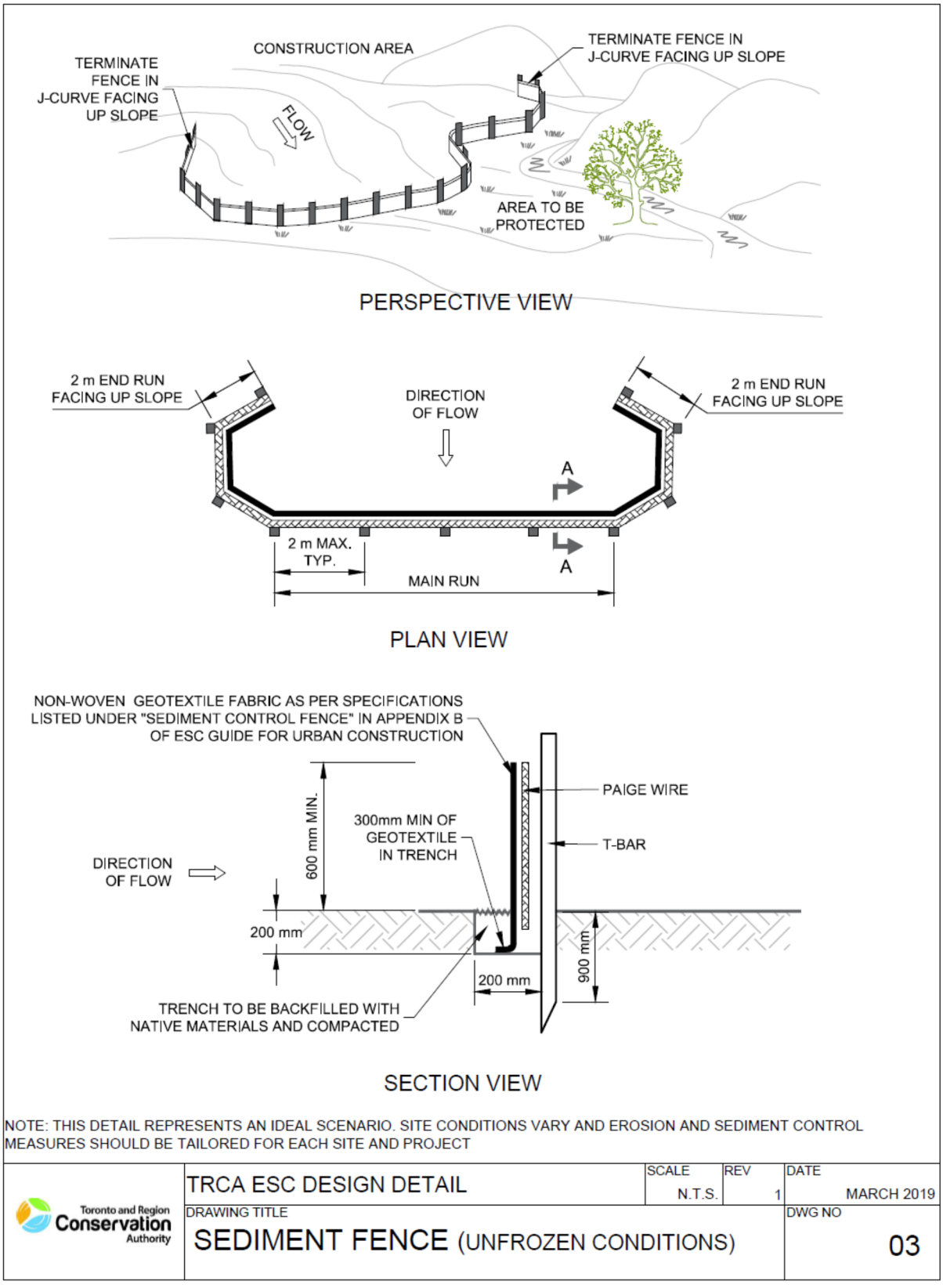


Figure B2-3a: Design detail for sediment control fence (unfrozen conditions).

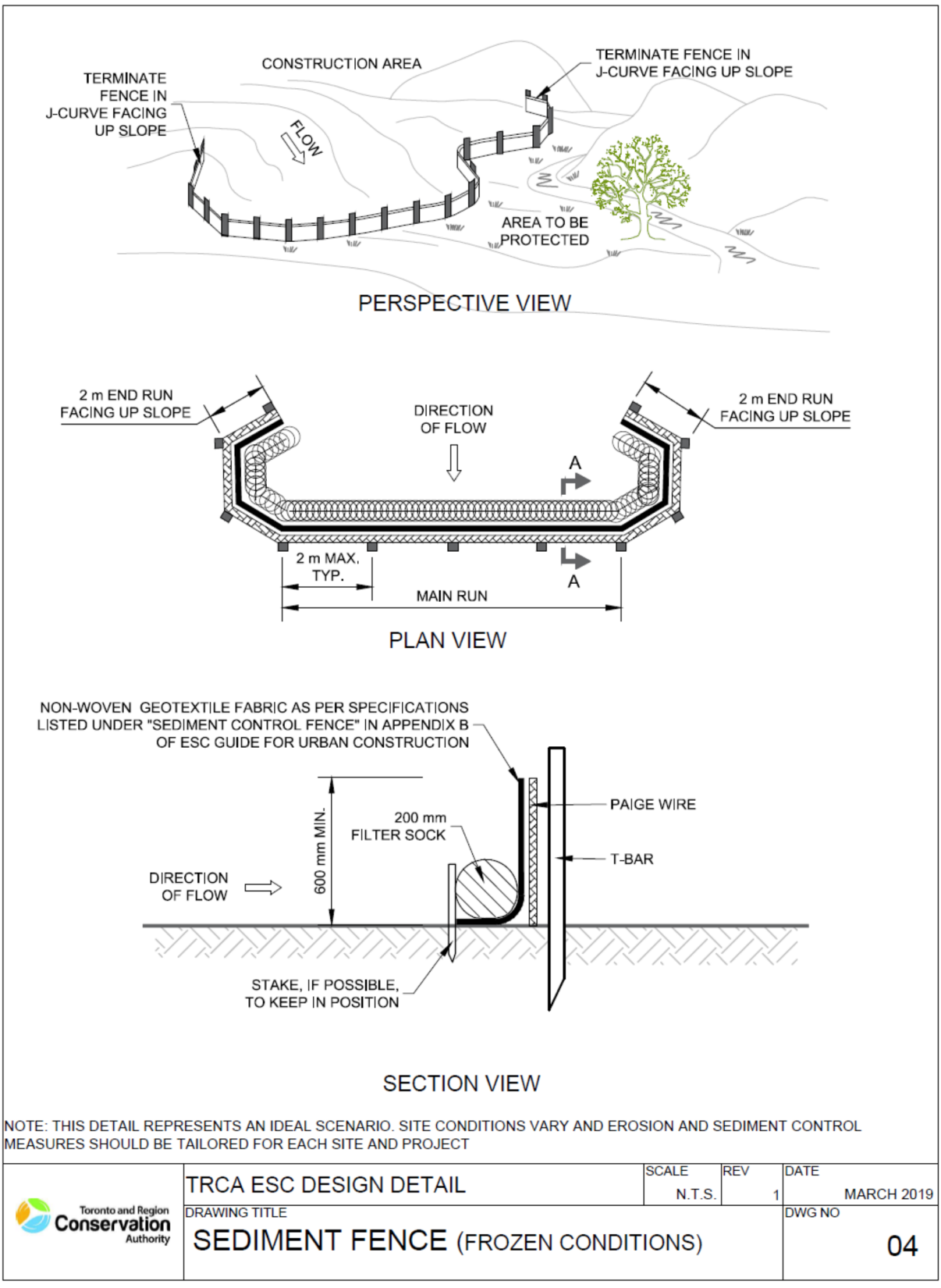


Figure B2-3b: Design detail for sediment control fence (frozen conditions).

FILTER SOCK
(a.k.a. biofilter sock)

A filter sock consists of a tubular mesh casing that is filled with a natural material, such as compost or wood chips. They are typically filled on site using a pneumatic blower truck (Figure B2-4). Filter socks function as settling controls, decreasing flow velocities to cause gravitational settling of suspended sediments behind and within the sock.

Figure B2-4: Filter sock being filled on site

Depending on the fill material used, contaminants other than sediment may also be attenuated and degraded through chemical and biological processes. For example, the microbial activity in compost – present at much higher concentrations than in soil – can degrade hydrocarbons and convert them to nontoxic by-products (Khan, et al., 2006). Despite the capabilities of filter sock variations, the guidance herein focuses on the removal of sediment (and sediment-bound contaminants) with compost and wood-chip filled socks, which occurs primarily through physical settling.

- **Wood chip fill** │ Socks filled with uncomposted wood chips can be an effective means of causing construction sediment to settle out of suspension. This process can also result in significant removal of other contaminants that adhere to sediment particles, such as metals and nutrients. Where sediment removal is the only objective, wood chip filled socks are often more cost effective than their compost filled counterparts.
- **Compost fill** │ The properties of compost - including its texture, porosity, water retention capacity and hummus content – make it an effective media for filtering out sediment and other contaminants, including those which do not adhere to sediment particle surfaces (e.g. petroleum hydrocarbons, soluble nutrients). Beyond this added contaminant removal benefit, socks filled with compost can also support vegetation, which means they can be seeded at the time of installation. Alternatively, compost from socks with biodegradable mesh can be spread around and seeded as part of their decommissioning.

Figure B2-5: Compost fill (left) and wood chip fill (right) used in filter socks.

Application

Filter socks can be used in a variety of sediment control applications depending on their circumference, length and how they are placed/positioned. Common sediment control applications of filter socks include:

- As flow interruption on level and sloped areas where they are applied along contours, perpendicular to runoff sheet flows;
- At the base of slopes, at a recommended distance of at least 1.5 m from the based in order to provide adequate space for sediment deposition;
- Along the site perimeter in areas of sheet flow;
- Perpendicular to channelized flow in swales and ditches where they function as check dams;
- Around storm drain inlets receiving sheet flows;
- At the base of topsoil stockpiles;
- Around sediment bags as part of a dewatering treatment train (see ‘sediment bags’ on p. B2-25);
- During frozen conditions in place of sediment fence that cannot be trenched in; and
- Any other areas where it is necessary to dissipate flow velocities and pond water to promote sediment settling.

Design and installation

Product specifications - casing

- Biodegradable and non-biodegradable casings are available depending on the intended application. Where filter socks are being used for permanent stabilization, particularly for construction projects in natural water features, biodegradable mesh casing can be a useful option. Confirm casing life span with the product manufacturer / supplier.
- Non-biodegradable mesh casing should be UV stable and durable. Typical thickness is approximately 5 mm and size of openings is approximately 3 mm.

Product specifications – wood chip fill

- Free of any refuse, weeds, contaminants or other materials toxic to plants, wildlife or humans.
- Material shall be relatively free (<1% by dry weight) of inert or foreign man made materials.
- Wood chip fill material must also meet the following specifications:
  - pH: 5.0 - 8.0
  - Particle size: 99% passing a 50mm sieve and a maximum of 40% passing a 9.5mm sieve
  - Moisture content: ≤ 60%

Product specifications – compost fill

- Free of any refuse, weeds, contaminants or other materials toxic to plant growth.
- Material shall be relatively free (<1% by dry weight) of inert or foreign man made materials.

- Stable, humus-like material produced from the aerobic decomposition of organic feedstocks, composted and cured until maturity.
- Certified to comply with mandatory Ontario Ministry of Environment Conservation and Parks (OMECP) Compost Quality Standards for Category 'AA' or 'A' and Canadian Food and Inspection Agency (CFIA) regulations T-4-93 (CFIA, 1997a) and T-4-120 (CFIA, 1997b).
- Analytical methods acceptable for the eleven regulated metals and the pathogen testing are described in the Sampling and Analysis Protocol of O. Reg. 267/03. Analytical methods that should be used for determination of mature compost respiration rate, moisture content, organic matter, foreign matter content and other relevant parameters are those referenced in the Bureau de Normalization du Quebec (BNQ) Industry Standard CAN/BNQ 0413-200/2005 "Organic soil conditioners – Composts".

Product performance

- Filter sock products should be capable of removing at least 70% of suspended solids.
- Removal performance should be based on testing by an independent third party.
- Testing should be carried out using American Society for Testing and Materials (ASTM) Standard D7351-13, which is the "Standard Test Method for Determination of Sediment Retention Device Effectiveness in Sheet Flow Applications".

Sheet flow applications

- For optimal performance, the upslope area draining to the sock should be stabilized.
- Filter socks applied as sediment control for runoff sheet flow - e.g. at site perimeter, along contours of sloping areas, around storm drain inlets - should be sized such that flows from most storm events will not overtop the socks.
- Consult with supplier for guidance on selecting appropriate sock diameter based on slope grades and lengths and the design storm which is meant to be treated by the filter sock. In general, the sizing should be based on the 5 year design storm, however sizing for a larger design storm may be necessary where socks are being applied to protect adjacent natural features.

Figure B2-6: Filter socks installed along contours of a slope

- Prepare the ground surface prior to filter sock placement to ensure good ground contact. Creating a shallow depression in which to place the sock can help to improve ground contact.
- Place filter socks on level contours to ensure they receive sheet flows rather than concentrated flows.
- Where filter socks are applied at the base of a slope, a distance of at 1.5 m from the base is recommended in order to provide adequate space for sediment settling.
- Install socks perpendicular to the sheet flow path and install with ends turned upslope to discourage water from flowing around the ends.
- For slopes steeper than 2H:1V, multiple parallel filter socks may need to be installed on the slope to dissipate runoff energy and reduce the risk of rill erosion.
- Secure filter socks by staking them into place with long wooden stakes driven into the centre of the sock, or alternatively on both sides of the sock if tearing of the mesh casing is a concern. Where ground below is paved, secure with heavy concrete blocks or other appropriate means.
- Stakes should be driven into the ground at least 20 cm and extend above the height of the sock.
- Stakes should be placed at regular intervals as needed to secure the sock, with intervals varying based on the sock diameter and the slope of the drainage area. Confirm appropriate spacing with supplier.
- Consult with supplier to confirm recommended staking procedures, including staking depths and stake placement.

Concentrated flow applications:

- Filter socks can be used as sediment control check dam structures to treat concentrated flows in small open construction site channels like interceptor swales (Figure B2-7).
- For use of filter socks as check dams, consult with supplier for guidance on selecting appropriate sock diameter based on the design storm to be treated by the filter sock. In general, the sizing should be based on the 5 year design storm, however sizing for a larger design storm may be necessary where there is a low tolerance of risk of failure.
- Treatment of larger flow volumes should be addressed by selecting the largest sock diameter that is recommended for the swale and reducing the spacing interval between socks. Stacking of socks may also help increase capacity but should be decided on based on supplier guidance.

Figure B2-7: Filter socks installed in a swale

- Spacing of filter socks in the swale is based on the swale gradient and anticipated flows. Consult with supplier for guidance on optimal spacing along the swale.
- Prepare the ground surface prior to filter sock placement to ensure good ground contact. The sock should be pressed in to the ground during installation. Creating a shallow depression in which to place the sock can help to improve ground contact.

- The filter sock should be installed in the swale in a U-shape with ends pointed slightly upslope to encourage water to pond and – during large events – overtop the sock in the middle rather than around the sides. The sock should be long enough to extent to the top of the swale.
- As a minimum, stake into place in the centre and at both ends. To avoid damage to the casing, stakes can instead be placed on either side of the sock to create a brace. Stakes should be driven into the ground at least 20 cm and extend above the height of the sock.
- For best results, swales in which filter socks are installed should be stabilized.

Inspection and maintenance

- Inspect all filter socks weekly, and before and after significant rainfall (see definition in Section 10.1.2) or snowmelt events, and keep a record of the inspection.
- Look for any signs of erosion and areas where water is undermining the sock and consider how positioning, ground contact or flow rates can be adjusted to prevent continued undermining.
- Inspect positioning and placement of filter socks to ensure they haven't shifted substantially. Re-position and re-stake as needed.
- Where flows are exceeding the retention capacity of the sock (e.g. frequent overtopping, water flowing around check dams), re-consider filter sock diameters used, add additional socks (for swale applications) or stack socks to create a higher barrier.
- Where socks continue to fail on an ongoing basis, consider replacing with an alternative sediment retention device. If failure is a result of concentrated flows being directed to socks being applied for sheet flow control, consider re-designing surface water flow paths to reduce volumes being directed to the problem area.
- Sediment and/or debris accumulation behind socks should be removed before it reaches approximately 30% of the sock height.
- Any repair or maintenance needs identified should be repaired within 48 hours or sooner if natural receptors are at imminent and foreseeable risk of adverse impact. Higher priority should be assigned to repair of filter socks installed upgradient of natural features.

Decommissioning

- Remove and properly dispose of accumulated sediment.
- Where desired, and if fill material is not contaminated, socks may be cut open so that fill can be used onsite as mulch for restoration works.
- Remove and dispose of any non-biodegradable material.
- Where socks will be seeded and left as a permanent part of the landscape (e.g. in restoration areas) ensure it is seeded with a weed-free, native seed mix. In these instances, only socks with a biodegradable casing should be used.

NATURAL FIBRE LOGS
(a.k.a. Natural fibre wattles)

Natural fibre logs are a category of sediment control devices encompassing several products that are, like filter socks, applied for sediment removal from sheet flow or concentrated flows in swales. By decreasing flow velocities they promote gravitational settling of suspended sediments and help reduce runoff erosivity. They differ from filter socks in their material composition and the fact that they are pre-fabricated and not typically filled onsite. They are composed of various biodegradable natural fibres and are typically uniform throughout. Lengths and diameters vary according to the product type and manufacturer. Examples of natural fibre logs / wattles commonly used for ESC include:

- **Coir logs** | Coconut fibre encased in a coconut fibre twine netting.
- **Straw logs** | Agricultural straw typically encased in a tubular synthetic netting
- **Wood fibre logs** | Wood excelsior fibre (wood slivers) logs, typically encased in a tubular synthetic netting.

Figure B2-8: Natural fibre logs

Application

Natural fibre logs can be used in a variety of sediment control applications depending on their diameter, length and how they are placed/positioned. Common sediment control applications of logs include:

- As flow interruption on level and sloped areas where they are applied along contours, perpendicular to runoff sheet flows;
- At the base of slopes, at a recommended distance of at least 1.5 m from the based in order to provide adequate space for sediment deposition;
- Along the site perimeter in areas of sheet flow;
- Perpendicular to channelized flow in swales and ditches where they function as check dams;
- Around storm drain inlets receiving sheet flows;
- At the base of topsoil stockpiles;
- Around sediment bags as part of a dewatering treatment train;
- During frozen conditions in place of sediment fence that cannot be trenched in; and
- Any other areas where it is necessary to dissipate flow velocities and pond water to promote sediment settling.

Design and installation

Product specifications

- Biodegradable and non-biodegradable casings are available depending on the product and intended application. Where logs are being used for permanent stabilization, particularly for construction projects in natural water features, biodegradable casing can be a useful option. Confirm casing life span with the product supplier.
- Fibre material should be free of any refuse, weeds, contaminants or other materials toxic to plants, wildlife or humans. It should also be relatively free (<1% by dry weight) of inert or foreign man made materials.

Product performance

- Confirm removal efficiency of any natural fibre log product prior to applying it on the site. It is recommended that products are selected that can demonstrate sediment removal efficiency ≥ 70% based on testing by an independent third party. Where this removal efficiency cannot be verified, the products should only be used in low risk applications, and not applied as the primary barrier protecting an adjacent natural feature.
- Sediment retention testing should be carried out using American Society for Testing and Materials (ASTM) Standard D7351-13, which is the “Standard Test Method for Determination of Sediment Retention Device Effectiveness in Sheet Flow Applications”.

Sheet flow applications

- For optimal performance, upslope area draining to the log should be stabilized, particularly if the application is on a slope.
- Logs applied as sediment control for runoff sheet flow - e.g. at site perimeter, along contours of sloping areas, around storm drain inlets - should be sized such that flows from most storm events will not overtop the logs.
- Consult with supplier for guidance on selecting appropriate log diameter based on slope grades and lengths and the design storm which is meant to be treated. In general, the sizing should be based on the 5 year design storm, however sizing for a larger design storm may be necessary if logs are being applied to protect adjacent natural features.
- Prepare the ground surface prior to log placement to ensure good ground contact. Creating a shallow depression in which to place the log can help to improve ground contact.
- Place logs on level contours to ensure they receive sheet flows rather than concentrated flows.
- Where logs are applied at the base of a slope, a distance of at 1.5 m from the base is recommended in order to provide adequate space for sediment settling.
- Install logs perpendicular to the sheet flow path and install with ends turned upslope to discourage water from flowing around the ends.
- For slopes steeper than 2H:1V, multiple parallel logs may need to be installed on the slope to dissipate runoff energy and reduce the risk of rill erosion.

- Secure logs by staking them into place with long wooden stakes driven into the centre, or alternatively on both sides if tearing of the casing is a concern. Where ground below is paved, secure with heavy concrete blocks or other appropriate means to ensure good ground contact and discourage shifting.
- Stakes should be driven into the ground at least 20 cm and extend above the height of the log.
- Stakes should be placed at regular intervals as needed to secure the log, with intervals varying based on the sock diameter and the slope of the drainage area. Confirm appropriate spacing with supplier.
- Consult with supplier to confirm recommended staking procedures, including staking depths and stake placement.

Concentrated flow applications:

- Natural fibre logs can be used as sediment control check dam structures to treat concentrated flows in small open construction site channels like interceptor swales.
- For use of logs as check dams, consult with supplier for guidance on selecting appropriate log diameter based on the design storm to be treated. In general, the sizing should be based on the 5 year design storm, however sizing for a larger design storm may be necessary where there is a low tolerance of risk of failure.
- Treatment of larger flow volumes should be addressed by selecting the largest log diameter that is recommended for the swale and reducing the spacing interval between logs. Stacking logs may also help increase capacity but should be decided on based on supplier guidance.
- Spacing of logs in the swale is based on the swale gradient and anticipated flows. Consult with supplier for guidance on optimal spacing along the swale.
- Prepare the ground surface prior to device placement to ensure good ground contact. The log should be pressed in to the ground during installation. Creating a shallow depression in which to place the log can help to improve ground contact.
- The log should be installed in the swale in a U-shape with ends pointed slightly upslope to encourage water to pond and – during large events – overtop the log in the middle rather than around the sides. The log should be long enough to extent to the top of the swale.
- As a minimum, stake into place in the centre and at both ends. To avoid damage to the casing, stakes can instead be placed on either side of the log to create a brace. Stakes should be driven into the ground at least 20 cm and extend above the height of the log.
- For best results, swales in which natural fibre logs are installed should be stabilized.

Inspection and maintenance

- Inspect all logs weekly, and before and after significant rainfall (see definition in Section 10.1.2) or snowmelt events, and keep a record of the inspection.
- Look for any signs of erosion and areas where water is undermining the log and consider how positioning, ground contact or flow rates can be adjusted to prevent continued undermining.
- Inspect positioning and placement of logs to ensure they haven't shifted substantially. Re-position and re-stake as needed.

- Where flows are exceeding the retention capacity of the log (e.g. frequent overtopping, water flowing around check dams), re-consider log diameter used, add additional logs (for swale applications) or stack them to create a higher barrier.
- Where logs continue to fail on an ongoing basis, consider replacing with an alternative sediment retention device. If failure is a result of concentrated flows being directed to logs being applied for sheet flow control, consider re-designing surface water flow paths to reduce volumes being directed to the problem area.
- Sediment and/or debris accumulation behind logs should be removed before it reaches approximately 30% of the log height.
- Any repair or maintenance needs identified should be repaired within 48 hours or sooner if natural receptors are at imminent and foreseeable risk of adverse impact. Higher priority should be assigned to repair of logs installed upgradient of natural features.

Decommissioning

- Remove and properly dispose of accumulated sediment.
- Where desired, and if fill material is not contaminated, some types of logs may be cut open so that fill can be used onsite as mulch for restoration works.
- Remove and dispose of any non-biodegradable material.

ROCK CHECK DAMS

Rock check dams are flow interrupters applied across low flow construction site conveyance channels to reduce flow velocities and thereby decrease the erosivity of the water and promote sediment settling. These temporary dam structures are constructed from granular material and geotextile fabric. They are applied in series at intervals determined based on the gradient of the conveyance channel.

Due to their limited capacity to pond water, they are ineffective at causing settling of fine particles. Other products that are also used as check dams are filter socks and natural fibre logs or wattles.

Figure B2-9: Rock check dam

Application

- Perpendicular to flows in low flow conveyance channels on construction sites (e.g. interceptor swales).
- Particularly important in long or steeply sloped (3H:1V or steeper) channels.
- In any concentrated flow path where flow interruption for erosion prevention or sediment settling is needed.
- Never installed in natural watercourses or other natural water features.

Design and installation

While check dams can be composed of other products and materials (e.g. filter socks, logs), only rock check dams are discussed in this section. Spacing guidance provided is applicable to other types of check dams.

- Rock check dams should be constructed with the following three layers:

Layer	Material	Thickness	Notes
Bottom	Granular material	50 mm diameter stone stacked 45 cm high	
Middle	non-woven geotextile	n/a	○ Trench in at upstream end extended beyond the check dam anchor to form an underlying “spill apron”
Top	Granular material	150 mm diameter stone in a layer ≥ 10 cm	○ Extend from the conveyance channel invert to the top of the bottom layer ○ Form a spillway 0.3 m below the top of the drainage ditch to prevent outflanking

- Construct check dam to create upstream gradient of 2H:1V, downstream gradient of ≤ 4H:1V and centre of the dam ≤ 1.0 m high

- Avoid undermining by making the outer sides approximately 0.5 m higher than the center and notch the center (~ 15 cm deep) to concentrate flow in low area
- Refer to Ontario Provincial Standard Drawings in Figures B2-10 and B2-11 for depiction of rock check dam designs in V-notch and flat bottom conveyance channels, respectively.
- Place multiple dams in series along long or steeply sloped (3H:1V or steeper) channels.
- Space check dams such that top of the middle (spillway) of each downstream check dam at the same elevation as the base of the previous dam.
- Ensure erosion control measures are applied in the area draining to the conveyance channel in order to minimize sediment loads to the channel. Ensure the flows from the channel are conveyed to a sediment control measures (e.g. sediment trap) for additional sediment removal as needed.

Inspection and maintenance

- Inspect weekly, and before and after significant rainfall (see definition in Section 10.1.2) or snowmelt events, and keep a record of the inspection.
- Look for any signs of erosion and areas where water is undermining the check dam and consider how spillway construction or flow rates can be adjusted to prevent continued undermining.
- Ensure check dams remain structurally sound. Replace and regrade the stone as required to maintain its shape.
- Where erosion is observed and stabilization measures are absent or inadequate, consider adding stabilization measures.
- Determine whether high flow rates are causing excessive erosion and if so, consider reducing the size of the area draining to the swale, or re-grading the swale to a flatter slope.
- Sediment and/or debris accumulation behind the check dam should be removed before it reaches approximately 30% of the device height.
- Any repair or maintenance needs identified should be repaired within 48 hours or sooner if natural receptors are at imminent and foreseeable risk of adverse impact.

Decommissioning

- When conveyance channel is no longer in use, remove and properly dispose of sediment, granular material and geotextile.

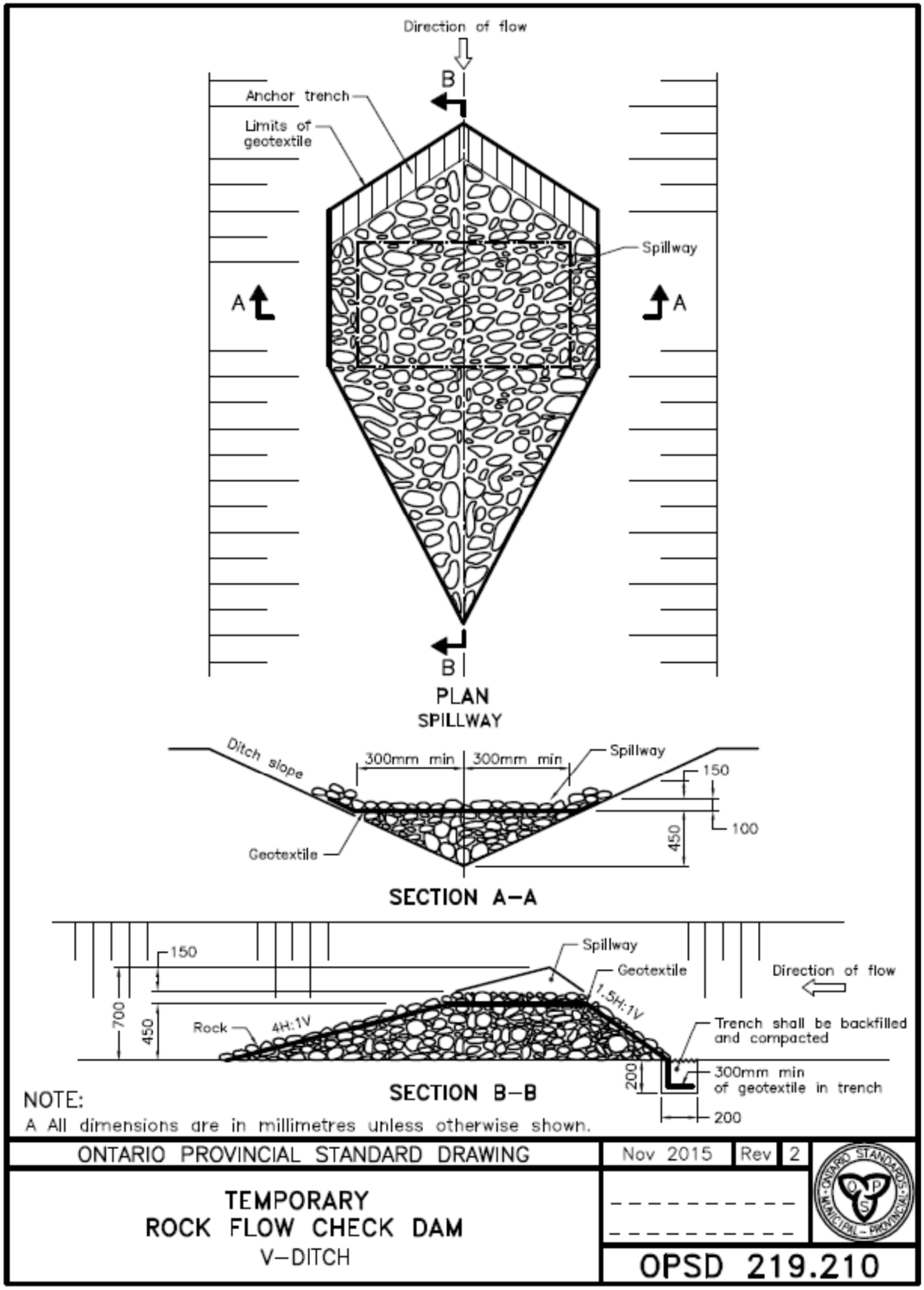


Figure B2-10: Ontario Provincial Standard Drawing (Nov. 2015) for temporary rock check dam in a v-shaped conveyance channel

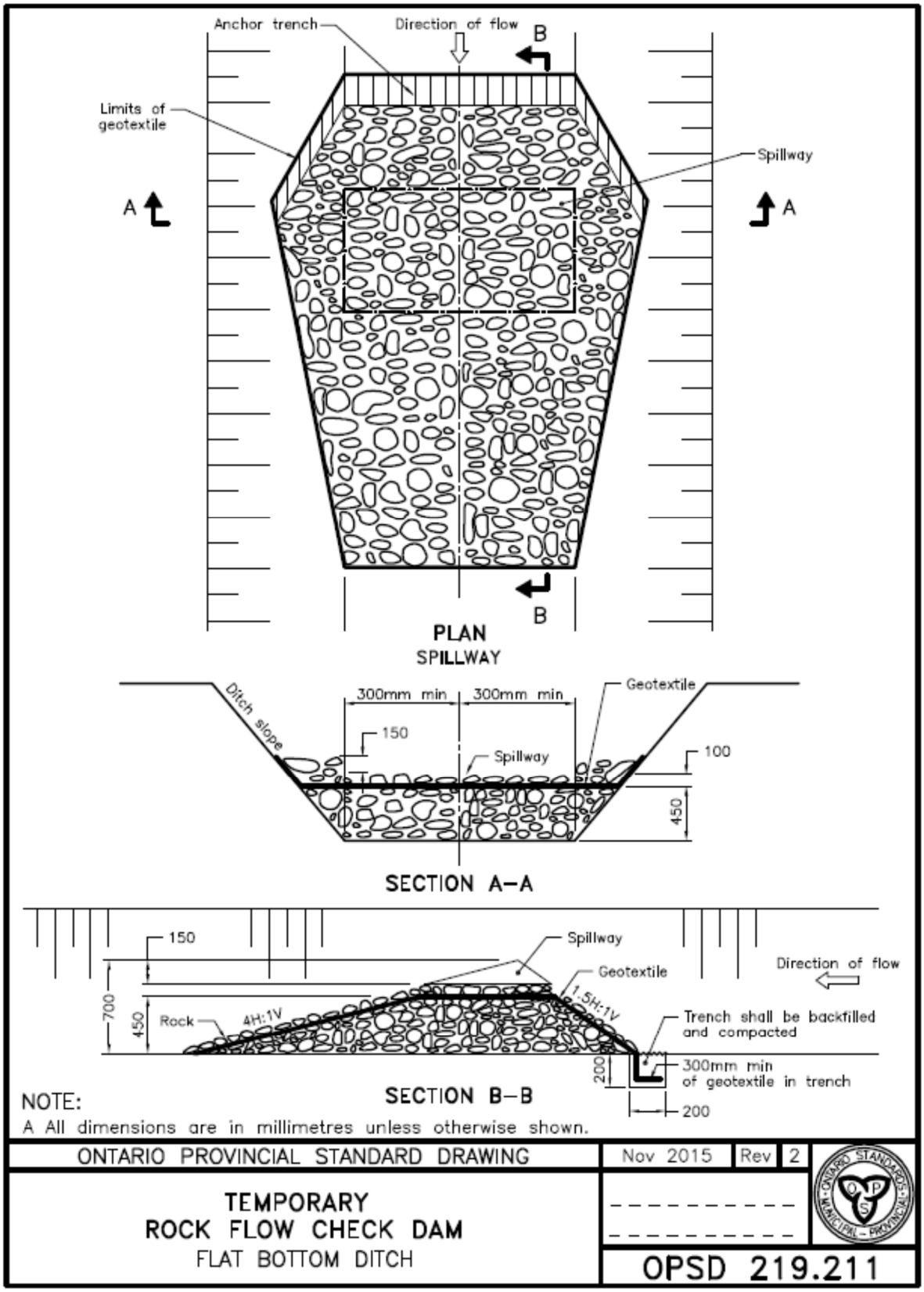


Figure B2-11: Ontario Provincial Standard Drawing (Nov. 2015) for temporary rock check dam in a flat-bottomed conveyance channel

STORM DRAIN INLET PROTECTION

The protection of storm drain inlets from sediment laden runoff can be achieved using various practices applied around or under the storm drain inlet. Protecting inlets is an important way to prevent high sediment loads to ponds, which in turn results in improved pond performance and less frequent sediment removal required in ponds and catchbasins. Flows entering storm drains may also be conveyed directly to a receiving water system without passing through an end-of-pipe control, in which case the necessity of reducing sediment entry into the storm drain is even greater.

The types of sediment control measures often applied to block sediment entry into these inlets are sediment retention barriers and filters. By applying these types of measures, the inlet still receives runoff but sediment is removed as the water flows in from the drainage area.

Figure B2-12: Storm drain inlet protection measures

Application

- Applied on all operational storm drain inlets on the site
- Applied at grade around or overtop the inlet or applied below grade inside a storm drain
- For drainage areas >1 ha, multiple barriers are needed and the inlet protection device should not be the only ESC measure installed.

Design and installation

- Install immediately once the connection of the storm sewer system is live.
- Determine the drainage area in order to properly size the inlet protection device.
- Common types of devices that provide effective inlet protection are filters in a bag/sack configuration that hangs below the inlet grate, sediment retention barriers that are applied around the outside of the inlet, and filter pads that are placed over the inlet grate. Some examples are shown in Figure B2-12.

Structural reinforcement options

- Cinder blocks
- Wood panels
- Stakes
- Granular materials
- T-bars

- Refer to manufacturer specifications (for the device being installed) to determine sizing and appropriate installation techniques specific to the product.
- Ensure there's structural reinforcement to prevent movement or shifting of the protection. For filter socks used for inlet protection, ensure sock is staked into place.
- Ensure that any inlet inserts have handles so that they can be easily removed with machinery and install so that the handles are easily accessed.
- Place any structural reinforcement used on the inside of the sediment retention device
- For protection devices installed around or above the inlet, ensure that it is not completely blocking the inlet grate and preventing flow through. Filters applied overtop of the inlet, like coir inlet filter pads, are an exception as they allow flow through.
- The use of geotextile fabric placed under the inlet grate as a standalone inlet protection measure is discouraged due to the frequent cleaning required in order to maintain effectiveness.
- For areas with heavy vehicle traffic, select below grade inlet protection in order to minimize risk of device damage and need for frequent repairs.
- Consider excavating the area around the inlet or installing a rock/gravel jacket around or in front of the inlet to allow more opportunity for ponding of water (see Figures B2-13 and B2-14). This should encourage localized ponding in the immediate area of the inlet, not flooding into the roadway or other adjacent areas.

Inspection and maintenance

- Inspect weekly, and before and after significant rainfall (see definition in Section 10.1.2) or snowmelt events, and keep a record of the inspection.
- Look for any signs that runoff is undermining or otherwise bypassing the sediment control measure and repair as needed.
- Remove any sediment accumulation that has reached approximately 30% of the height of the sediment retention barrier and ensure proper disposal.
- For below grade installations, like filter fabric sacks/bags, ensure that it is cleaned out at the frequency specified by the manufacturer/supplier. The sediment accumulation threshold at which clean out is needed may vary from one product to another, but is normally 50% accumulation. If there are signs of clogging causing impeded flow through and flooding, clean out immediately.
- Clean and/or replace the device if there is any evidence of clogging significantly impeding flow through and leading to flooding.
- Look for any signs of structural damage to the device. If it is being damaged due to vehicle traffic, consider substituting with a below grade device.
- If using granular material, periodically rake to reshape and remove and replace any granular material overloaded with sediment.

Maintenance is the key!

With inlet protection devices, maintenance is essential to ensure continued performance and the ***prevention of clogging and associated flooding***.

Inspect and clean them out regularly

- Any repair or maintenance needs identified should be repaired within 48 hours or sooner if natural receptors are at imminent and foreseeable risk of adverse impact.
- Ensure the inlet grate is not being unintentionally blocked by the protection device.

Decommissioning

- Remove accumulated sediment.
- Carefully remove inlet inserts by the handles. Remove all components of the inlet protection devices so as to minimize disturbance of the area and accidental release of sediment into the inlet.

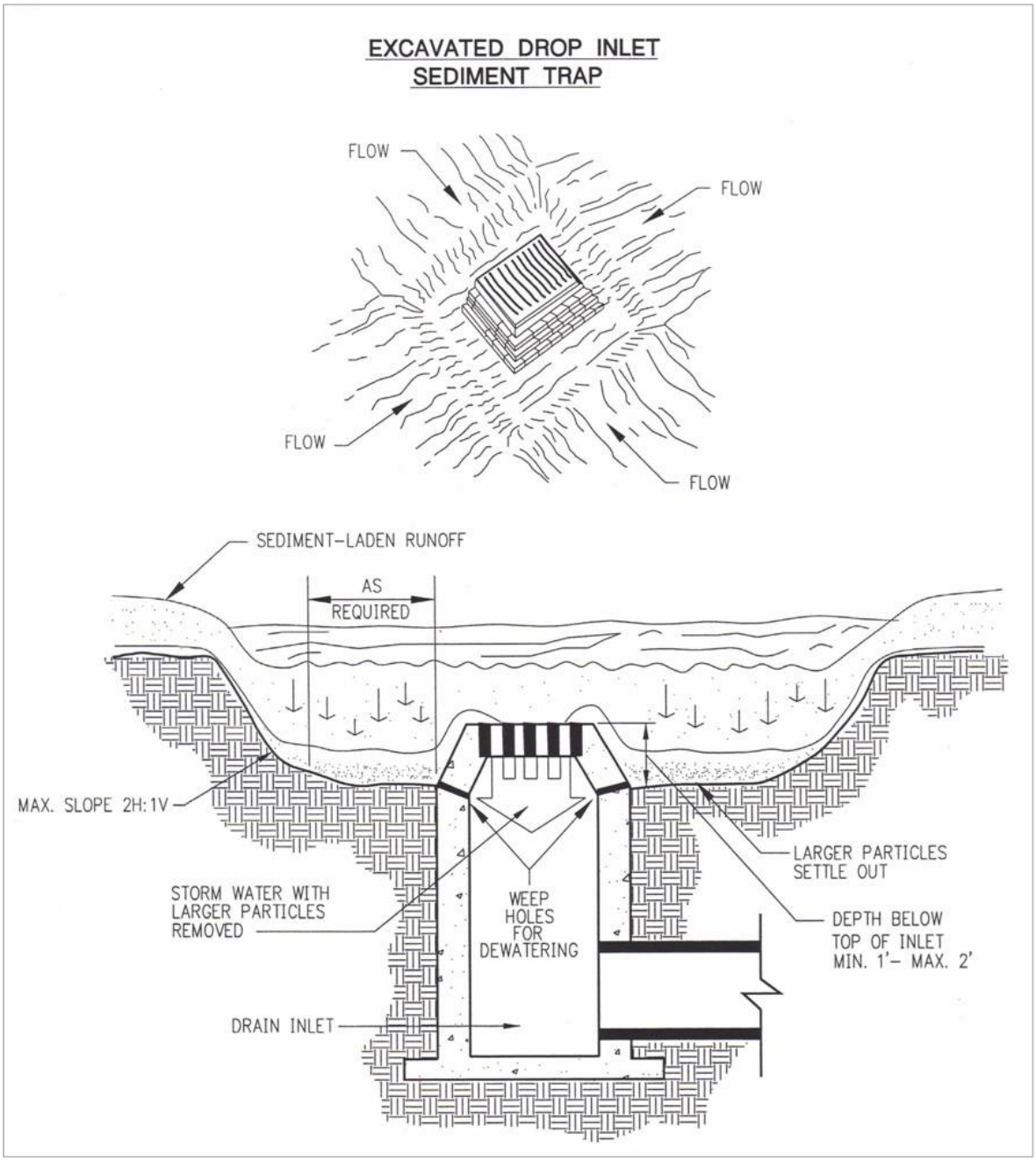


Figure B2-13: Excavated drop inlet structure for trapping sediment

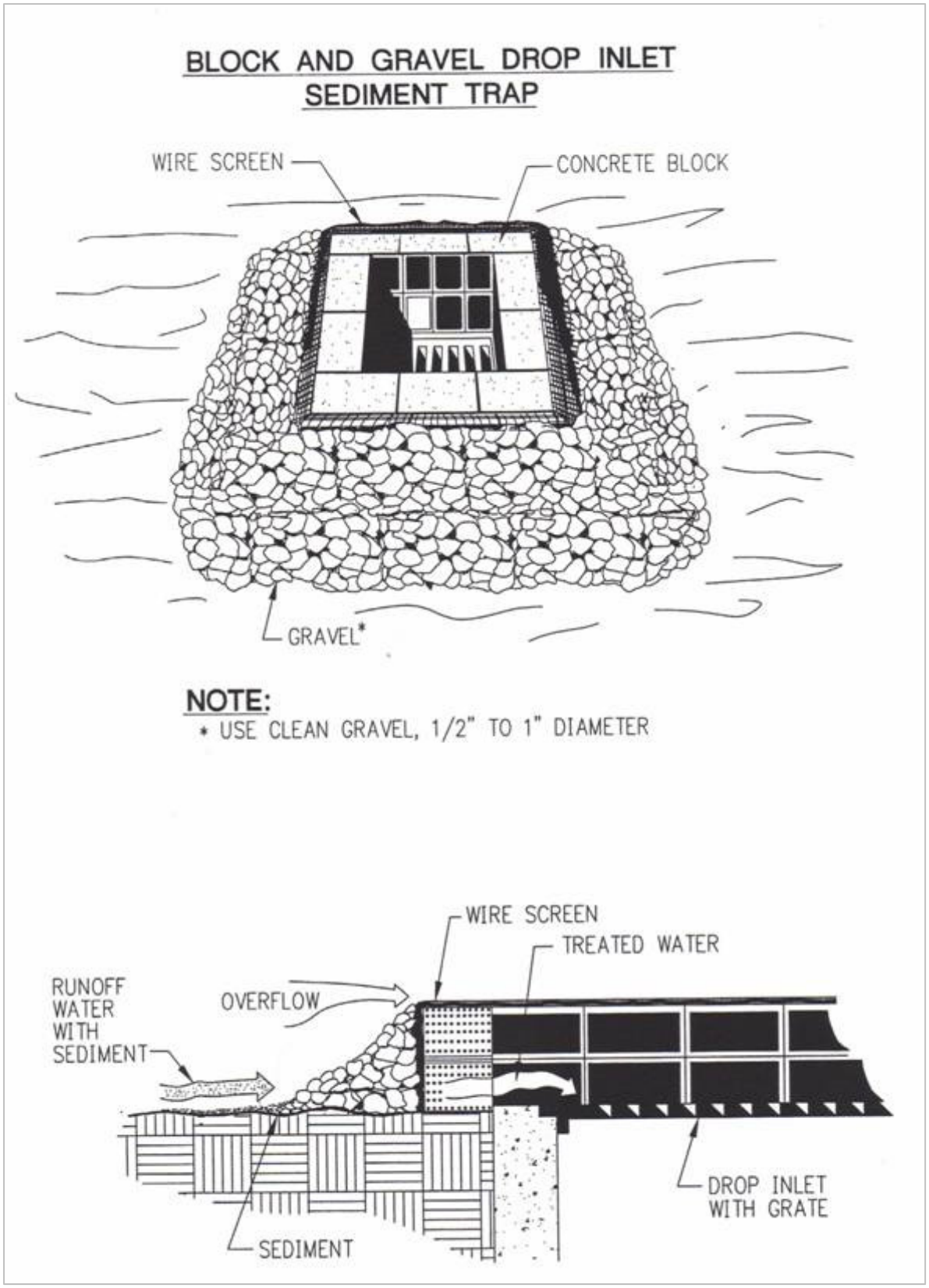


Figure B2-14: Gravel jacket installed around drop inlet.

SEDIMENT (DEWATERING) BAG

A sediment bag is a large geotextile bag that is used to filter sediment laden water from a pump hose. They are commonly applied to treat water during construction site dewatering activities. As water is pumped through the bag, sediment is removed through filtration and gravitational settling caused by energy dissipation. The bag also disperses the water from the pump hose, preventing erosion typically associated with concentrated flows.

Figure B2-15: Sediment bag surrounded by filter sock

While the apparent opening size (AOS) of the geotextile fabric determines the maximum size of particle is filtered out, a significant amount of sediment removal is attributed to the reduction in flow velocity and associated gravitational settling.

Application

- Suitable anywhere dewatering of sediment laden water is necessary to create a dry work area, and particularly where space is limited.
- Examples: dewatering of an isolated in stream work area, tunneling, excavating for a basement, or drawing down a sediment control pond to allow for maintenance.
- Applied where flow dispersion is needed to prevent erosion, as the bag receives concentrated water from the hose and disperses.
- Best used as a dewatering treatment train (see Figure B216- and B2-17).

Design and installation

- Sediment bags are manufactured in various sizes and are pre-sealed on all sides except for a small opening on one end, adequately sized for a dewatering hose. Refer to the manufacturer's specifications for capacity and sizing details as well as proper clamping procedure.
- Select sediment bag constructed from durable, non-woven UV stabilized geotextile with a high puncture and tear resistance.
- Ensure the manufacturer's specified water flow rate and apparent opening size are appropriate for the planned flow rates and the expected particle size distribution of the water being treated.
- Bag should be located at least 30 m from any natural water feature in order to minimize risk of a sediment spill into the feature if the bag ruptures. Where siting 30 m away is not possible, consult with the local CA for guidance on potential laydown areas and any additional measures (e.g. dewatering treatment train setup) and monitoring efforts that can be applied to mitigate risk.
- Bag should be located so that it is easily accessed for maintenance and removal purposes and so that water discharged from the bag doesn't cause or aggravate erosion.
- Place bags on a relatively flat surface to ensure the bag doesn't shift downslope.

- Place on stabilized ground (e.g. grassed surface, rock pad) and underlain with non-woven geotextile fabric to prevent erosion under and around the bag. Installing a rock pad or wood pallet below the bag can be beneficial as it make allow for better drainage out of the bottom of the bag.
- As part of a ***treatment train*** or ***multi-barrier approach*** to dewatering through a sediment bag, install a sediment control barrier such as a filter sock around the bag in order to provide more opportunity for sediment settling. See dewatering treatment train shown in Figures B2-16 and B2-17.
- Ensure the planned flow path from the bag to the ultimate receiver is stable, and where it is not, create a stable flow pathway to ensure the discharge doesn't cause erosion.
- During freezing conditions keep the bag elevated, such as with a rock pad, to prevent it from freezing to the ground and tearing when being lifted away for removal.

Inspection and maintenance

- Inspect daily during active pumping into the bag to ensure that there are no tears or leaks in the seals or the bag, and also check that the discharge from the bag is not causing erosion underneath it or anywhere along the flow path from the bag to the receiver. Keep a record of the inspection.
- Where there is evidence of erosion, re-consider whether stabilization is adequate to protect against erosion based on the flows coming out of the bag.
- Confirm that the pumps and bag size are continuing to provide the desired level of water treatment. Where sediment levels in discharged water remain elevated, consider adding or replacing with a different dewatering practice (e.g. weir tanks) to provide additional sediment removal.
- Inspect bag to determine whether it is full and requires replacement.
- Where the bag is damaged or no longer functioning, cease pumping immediately and replace or repair components.
- Replace the bag once it's not functioning and/or according to the manufacturer's instructions. If the flow through rate begins to decline significantly that may indicate the bags is full and requires replacement. The amount of sediment contained in the bag can also be confirmed once pumping is ceased and the bag is left to drain.
- Keep additional bag(s) on site so that replacement can be handled quickly when needed.
- Any repair or maintenance needs identified should be repaired within 48 hours or sooner if natural receptors are at imminent and foreseeable risk of adverse impact.

Decommissioning

- Allow bag to drain over time until the bulk of the water is gone.
- Remove bag with minimal disturbance to stabilized areas or nearly natural features. The full bag should never be lifted over a water feature or a person.
- Dispose of or reuse sediment based on its quality and the requirements stated in existing excess soil policy and legislation.
- Properly disposed of the sediment bag.
- Clean and restore the sediment bag lay down area.

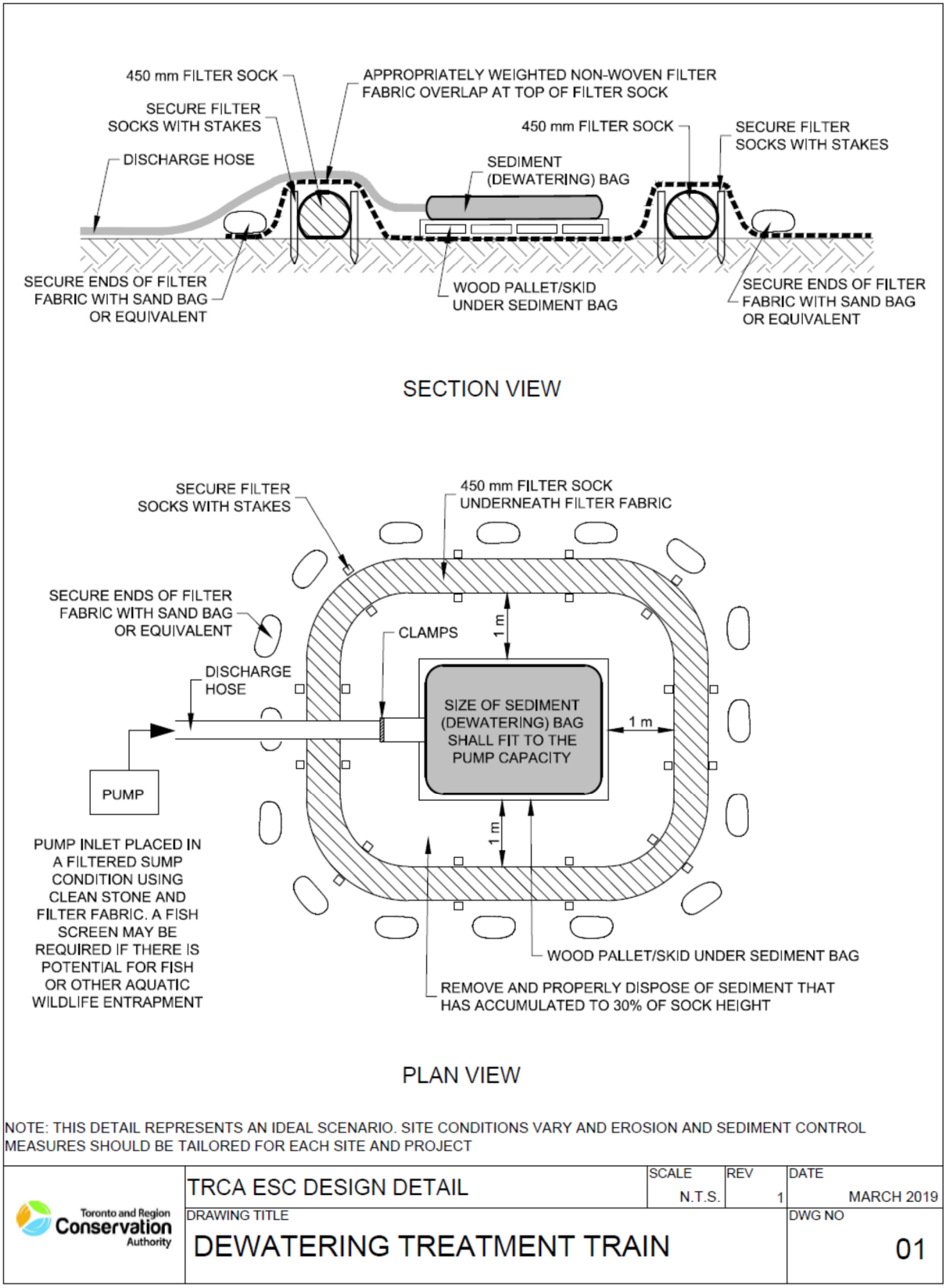


Figure B2-16: Dewatering bag treatment train (unfrozen conditions)

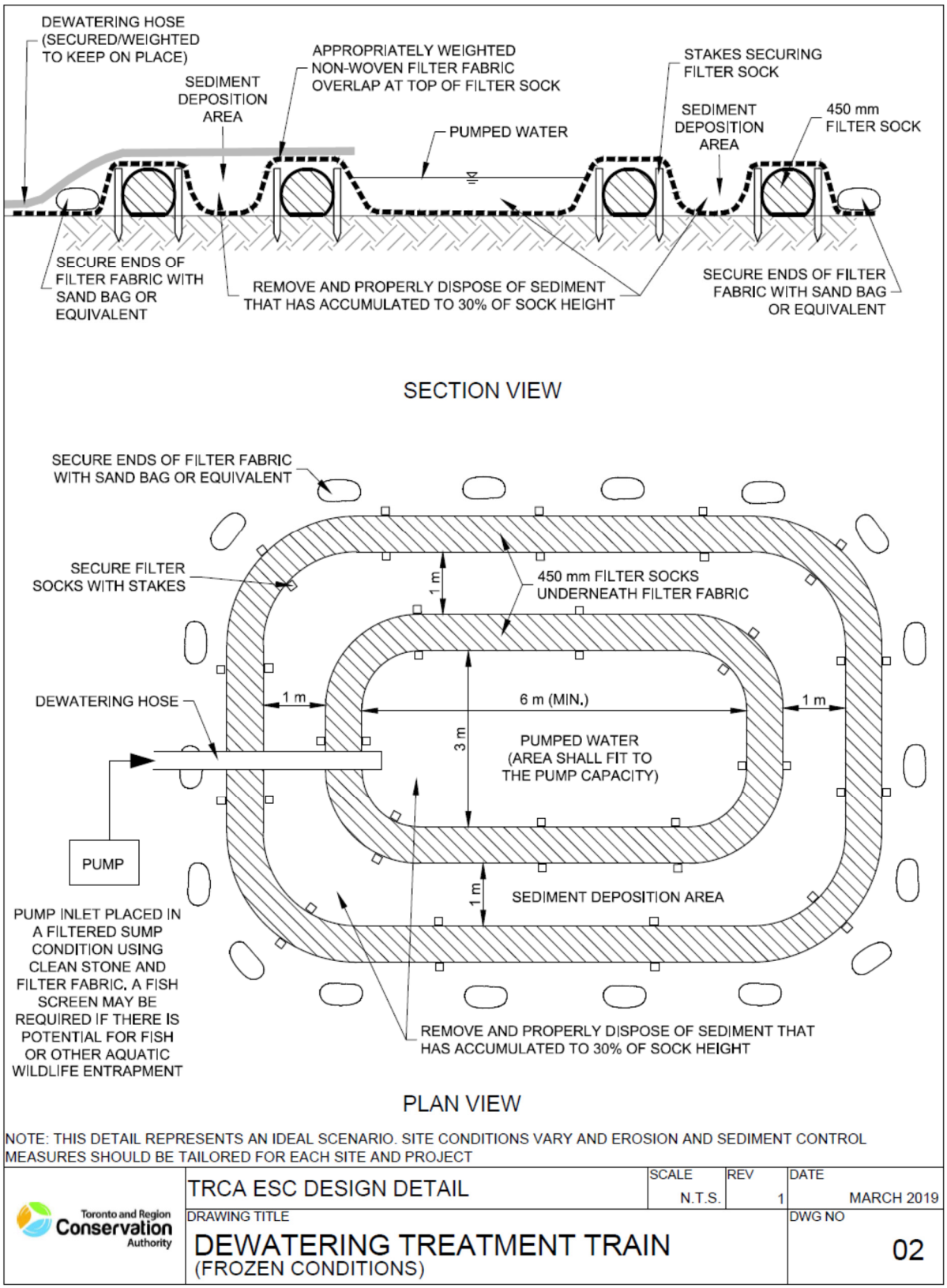


Figure B2-17: Dewatering bag treatment train (frozen conditions)

SEDIMENT TRAP

A sediment trap is a runoff detention area created by constructing an embankment across a runoff drainage/conveyance feature (e.g. ditch, swale) or by excavating below grade to create a depression. The purpose of the trap is to detain runoff and provide an opportunity for gravitational settling of sediment. Sediment traps are typically applied near the end of a treatment train (i.e. end of pipe measure) to provide sediment removal before water is discharged to the receiver. They are meant to receive flows from smaller drainage areas – less than or equal to 2 ha – that don't drain to a sediment control pond or other detention feature.

Application

- At or near the end of a treatment train (i.e. end of pipe) for sediment removal from stormwater (via detention) before it is discharged offsite.
- Typically installed across drainage/conveyance features.
- For ***drainage areas ≤ 2 ha*** that do not drain to another detention feature (e.g. sediment control pond).

Design and installation

- Construct the trap at grade by constructing berms or below grade by excavating.
- Design to provide at least 125 m^3 of storage for each hectare of contributing drainage area.
- Construct with stabilization on the bottom and all side slopes. Suitable stabilizations measures for sediment traps include well-established vegetation with turf reinforcement mats (if needed) or rock underlain with non-woven geotextile fabric.
- Trap should be designed to be between 1.0 and 2.0 metres deep. Minimum depth recommended is to avoid re-suspension of previously settled sediment. Maximum depth recommended is for safety reasons. Where a depth > 2 metres is unavoidable, the local municipality should be consulted to determine whether the trap needs to fenced off.
- Sediment trap should be ≤ 20 metres long and the maximum width should be half the length.
- Ensure proper grading of 0.5H: 1V side slopes and compaction to prevent slumping and slope failure.
- Recommended sediment trap side slope grade is 0.5H:1V
- Sediment trap outlet should be a stable open channel spillway located at the downstream end of the trap. Spillway construction is critical to prevent failure of the structure during high flows. All specifications provided by the plan designer should be implemented.
- Construct a check dam structure (rock or filter sock) at the outlet to provide additional detention and opportunity for sediment settling. Filter socks should be configured to form a pyramid for added stability and more opportunity for sediment retention. Any check dam structure should be lower in the centre and extend up the channel slopes to ensure that water leaving the trap flows over the centre of the check dam rather than around the sides.
- Erosion protection measures should be installed immediately downstream of the spillway outlet.
- Refer to design detail in Figure B2-18 for sediment trap design within a ditch.

Inspection and maintenance

- Inspect weekly, and before and after significant rainfall (see definition in Section 10.1.2) or snowmelt events, and keep a record of the inspection.
- Look for any signs of erosion at the inlet, outlet or side slopes. Repair eroded areas by filling in rills, smoothing out the surface and re-installing or augmenting the stabilization that was in place. Consider whether the stabilization measures in place are failing due to poor condition or because flows are higher than anticipated.
- Remove sediment that has accumulated to 50% of the height of the sediment trap.
- Observe and/or analyze (e.g. handheld turbidity testing) sediment trap effluent to assess whether the trap continues to effectively remove suspended sediment.
- Where effluent turbidity is elevated, consider sediment trap storage capacity and stabilization to pinpoint reasons for under-performance. Consider adding additional measures upstream (e.g. ditch/swale stabilization) and/or downstream of the trap to achieve greater sediment removal.
- Any repair or maintenance needs identified should be repaired within 48 hours or sooner if natural receptors are at imminent and foreseeable risk of adverse impact.
- Ensure spillway remains structurally sound and repair as needed when damage occurs. Replace and regrade the stone as required to maintain its shape.

Decommissioning

- When sediment trap is no longer in use, remove and properly dispose of sediment, granular material and geotextile.

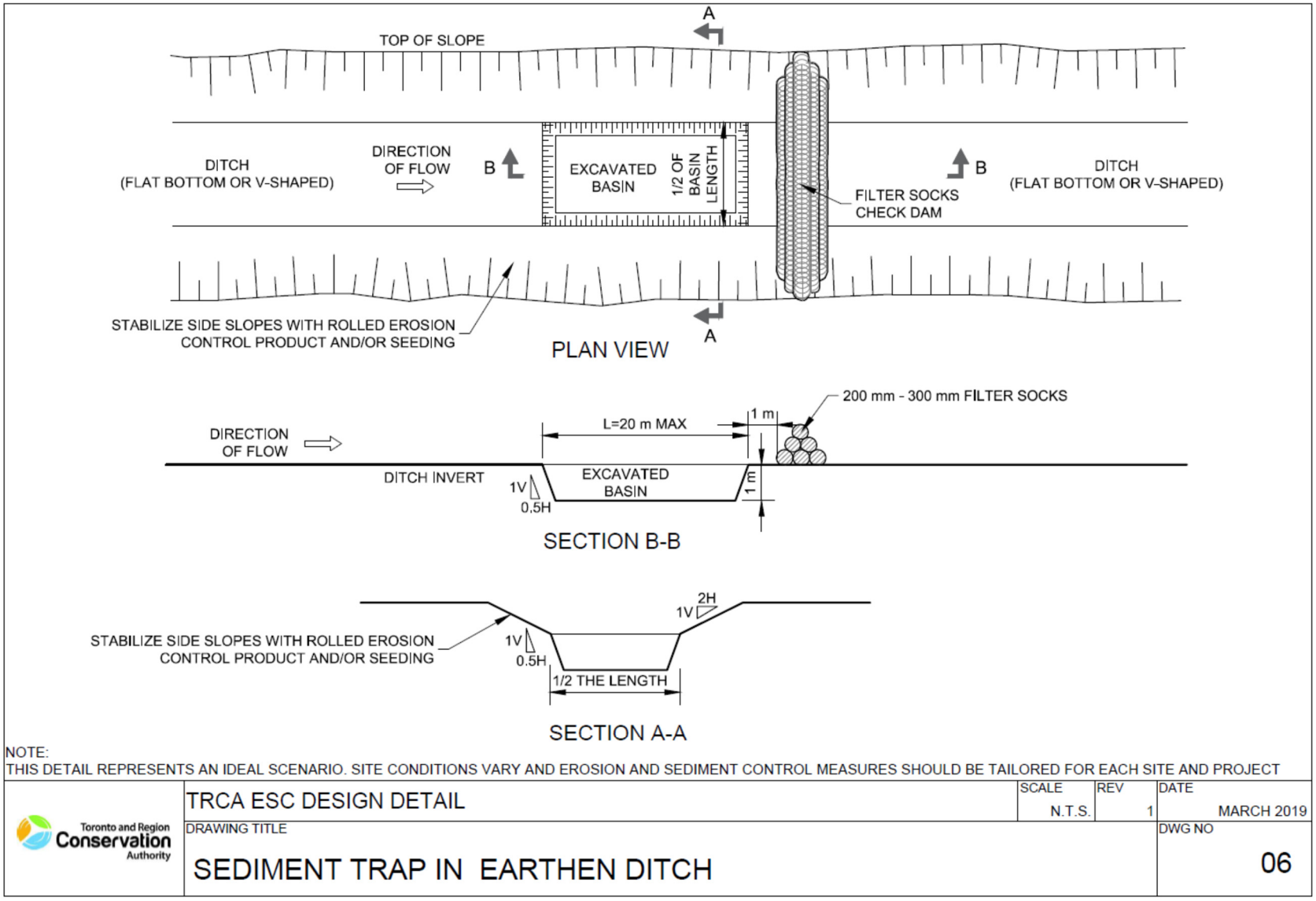


Figure B2-18: Design detail for sediment trap within an earthen ditch

SEDIMENT CONTROL PONDS

(a.k.a. Sediment basins, detention ponds or basins)

A sediment control pond is a large excavated area used to detain construction site runoff and promote settling of suspended sediment particles. They are wet ponds, which means they are designed to hold a permanent pool of water and provide additional storage – known as active storage – for detaining incoming flows. As such they are very similar to stormwater management wet ponds that are built as permanent detention facilities to treat runoff from developed areas.

Figure B2-19: Sediment control ponds

In addition to removing suspended sediment, sediment control ponds prevent downstream erosion by releasing water through an outlet structure at a fixed rate over an extended period of time. This protects downstream features from the erosive impact of storm event peak flows.

Several aspects of sediment pond design determine their capacity to improve water quality and reduce peak flows. These include permanent pool storage volume, active storage volume, length-to-width ratio, presence of a forebay or cells, and the location of the inlet and outlet

Sediment ponds are 'end-of-pipe' practices that are typically the final BMP through which stormwater flows before it is discharged offsite. They receive flows from all the other ESC measures installed in the contributing drainage area as well as overland flow, often from stripped land areas. As such they are particularly important components of ESC plans, providing the last line of defense against the release of excess sediment to natural water features.

Application

- Treatment of runoff from any construction site drainage areas > 2 ha.
- Applied as an end-of-pipe control.

Design and installation

- Sediment ponds must be constructed prior to any construction activities except for topsoil stripping and grading associated with the construction of the pond.
- Once excavation and grading is complete, pond banks must be compacted and stabilized with vegetation. An

Thinking beyond ponds

Studies has shown that while properly designed ponds have good removal efficiencies, high incoming runoff volumes and sediment concentrations often result in effluent sediment concentrations that exceed thresholds for the protection of aquatic organisms and their habitats.

Apply a ***multi-barrier approach*** and focus on ***stabilizing the site*** in order to keep sediment out of the stream.

RECP may also be needed until vegetation is well established and effectively preventing erosion.

- The maximum recommended contributing drainage area for a sediment pond is 10 ha.
- Consider whether there is a need to construct the pond with a liner to prevent interaction with groundwater. This is particularly important if there is a downward gradient and hydraulic conductivity of soils is greater than 10^{-7} m/s, or if the pond is to be located in a vulnerable area, which may include: (i) highly vulnerable aquifers, (ii) significant groundwater recharge areas, (iii) wellhead protection area A or (iv) wellhead protection area B (if the area has a vulnerability score ≥ 8).

Siting

- Install the sediment basin based on topography and in a low area allows the maximum control of sediment laden runoff from the disturbed areas.
- Consult with local CA if proposed location is the also the location of the ultimate (post-construction) stormwater management pond.

Pond and forebay design

The following design specifications should be applied in the design and sizing of sediment control ponds and their forebay areas:

Design component	Specifications	Notes
Forebay / berms	At least one forebay designed as follows: • ≥ 1 metre deep • Sized to ensure non-erosive velocities leaving forebay • ≤ 33% of permanent pool ***AND*** A submerged berm or turbidity curtain	Submerged berm/turbidity curtain applied across the width of the pond, half way between the initial forebay berm and the outlet structure.
Permanent pool volume	≥ 125 m^3 per hectare contributing drainage area	• 185 m^3/ha provided if length-to-width ratio or drawdown requirements are not met • Confirm volume with local CA
Active storage volume	≥ 125 m^3 per ha drainage area	
Drawdown time	≥ 48 hours	
Length-to-width ratio	≥ 4:1	A baffle may be required to increase length of the flow path and prevent short circuiting
Permanent pool depth	1 – 3 metres	• Refers to maximum depth (deepest point) • Minimum depth is applied to avoid re-suspension of previously settled sediment • Maximum depth is a safety precaution
Slope grades	• Interior side slopes graded no steeper than 4H:1V • Exterior side slopes graded no steeper than 2H:1V	

Inlet design

- For swale inlets typically in place before site servicing is complete, ensure structural stability and the application of erosion controls. Options include embedded stone, well established vegetation installed with turf reinforcement matting, or other hard or soft armoring techniques.
- Ensure stabilization selected will withstand erosive forces of the runoff flowing through the channel inlet.
- Install flow interruption devices in the swale upstream of the pond in order to dissipate the energy in the runoff and reduce its erosivity.
- A slope drain or similar structure is recommended to allow runoff to be conveyed down into the pond with minimal erosion risk.

Outlet design

- Include a perforated riser pipe outlet or approved equivalent to release effluent at a controlled rate. The riser pipe outlet should be covered with a layer of small clear stone (25 mm – 50 mm) over a layer of larger (150 mm - 200 mm).
- The orifice in the outlet structure should have a diameter ≥ 75 mm to prevent clogging.
- A vegetated filter strip (10 metres length recommended) should be planted at the sediment control pond outfall.
- The outfall should be constructed with an animal protection grate and a flow dispersion measure to prevent erosion.

Emergency spillway design

- Ensure that a stable, open channel emergency spillway is constructed to prevent overtopping or structural failure during high flows. Installation should adhere to all specifications provided by the ESC plan designer.
- The spillway must be designed to safely pass the 100 year design storm.
- Stabilize the spillway. Options include embedded stone, well established vegetation installed with turf reinforcement matting, or other hard or soft armoring techniques.
- Install erosion protection immediately downstream of the spillway, including both ground stabilization and energy dissipation measures as needed.

Calculations required

The following calculations should be submitted with associated ESC plan drawings and reports:

- Velocity calculations demonstrating that settling velocities can be achieved based on the proposed design
- Determination of permanent pool and active storage volumes
- Drawdown calculations

Inspection and maintenance

- Inspect weekly, and before and after significant rainfall (see definition in Section 10.1.2) or snowmelt events, and keep a record of the inspection.
- Ensure pond has been constructed prior to any construction activities except for activities associated with the construction of the pond, such as topsoil stripping and grading.
- Verify that pond and its specific components (i.e. inlet, forebay, berms, outlet, emergency spillway) appear to be constructed as per detailed drawings in ESC plan.
- Verify stabilization of pond banks and inlet and look for any evidence of erosion. Repair or augment stabilization measures as needed, i.e. fill rills, re-seed and apply RECP.
- Inspect inlet for signs of excess sediment accumulation and/or large debris. Remove sediment accumulation in the forebay before it reaches 50% of the forebay storage capacity.
- Measure sediment accumulation in the pond at least once every six months. Guidance on proper sediment depth measurement is available in Section 6.1 of the *Inspection and Maintenance Guide for Stormwater Management Ponds and Constructed Wetlands* (TRCA and CH2M, 2016).
- Remove sediment accumulation in the pond when it reaches approximately 30% of the permanent pool storage volume.

Figure B2-20: Sediment removal from a pond

- Observe and/or analyze pond effluent suspended sediment and/or turbidity levels to assess performance. This should be done before and after significant rainfall and snowmelt events or more frequently as needed. See Chapter 10.0 for addition guidance ESC performance monitoring.
- Where effluent turbidity is elevated, consider potential reasons for under-performance including:
  - Water short circuiting flow path due error in design or implementation
  - Erosion from banks or swale inlet
  - High sediment loads entering the pond due to inadequate ESC in the contributing drainage area.
  - Excessive sediment accumulation in the pond
- Address deficiencies and carry out follow up monitoring to assess whether actions taken have resulting in pond performance improvement.
- Ensure spillway remains structurally sound and repair as needed when damage occurs. Replace and regrade the stone as required to maintain its shape.
- For more detailed guidance on pond maintenance, refer to the *Inspection and Maintenance Guide for Stormwater Management Ponds and Constructed Wetlands* (TRCA and CH2M, 2016).
- Any repair or maintenance needs identified should be repaired within 48 hours or sooner if natural receptors are at imminent and foreseeable risk of adverse impact.

Decommissioning

- In the case where the sediment control pond is in the location of the ultimate (post-construction) pond, and construction is complete, accumulated sediment must be removed (and appropriately disposed of) and the permanent pool storage must be restored to the design level.
- Water pumped out of ponds that are being decommissioned should be treated with a sediment control measure prior to release to the receiving water system. Appropriate sediment removal BMPs for application during pond dewatering include sediment bags, weir tanks, or treatment trains that may incorporate these measures. See dewatering protocols (Section 6.4) and BMP details on p. B2-25 and B2-45 for guidance.
- Sediment and liner materials should be removed from the bottom of the pond and properly disposed of based on sediment quality. Refer to the *Inspection and Maintenance Guide for Stormwater Management Ponds and Constructed Wetlands* (TRCA and CH2M, 2016) for best practices related to pond sediment disposal / reuse.

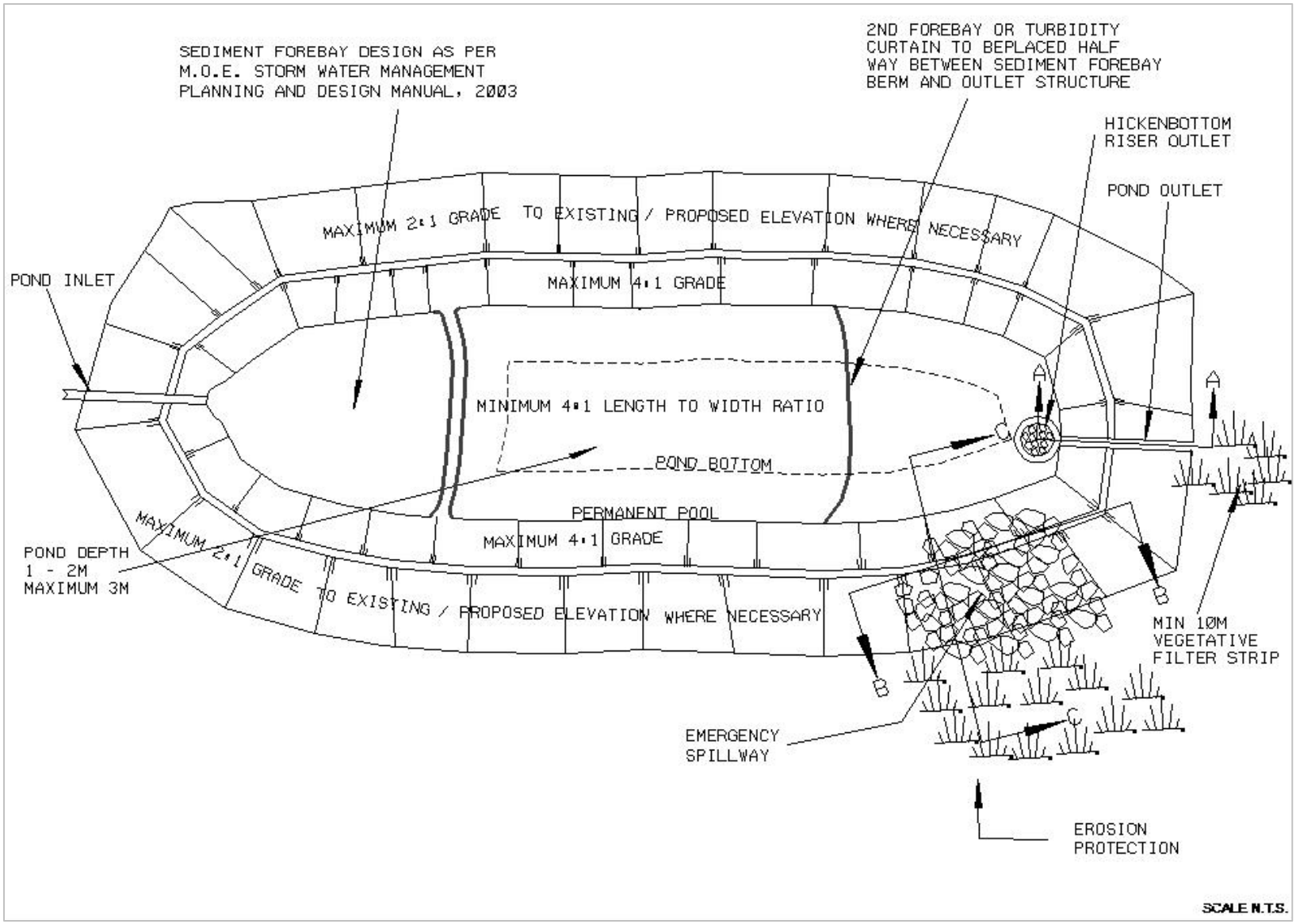


Figure B2-21: Plan view depiction of sediment control pond design specifications

WEIR TANKS
(a.k.a. dewatering tanks)

Weir tanks can be used on construction sites to detain stormwater runoff and promote sediment settling. Compared to other detention measures that are built on site, like basins or sediment traps, tanks can be a convenient and small footprint solution for short duration dewatering activities, since they are readily transported on and off site. The internal structure of the tank includes bottom weirs to help detain water and dissipate energy to aid in the settling of suspended solids.

Figure B2-22: Weir tanks

Application

Weir tanks are can be used alone or as the settling component of a larger water treatment system. Tanks can be particularly useful when:

- Sediment removal is required for short-term pumping / dewatering activities, such that taking the time to construct a BMP with similar sediment removal capacity (e.g. sediment control pond) would be impractical;
- Site specific requirements dictate more stringent effluent water quality standards than are achievable when applying other sediment control BMPs used during dewatering (e.g. sediment bags); or
- Planned pumping rates are high and require a large capacity BMP.

Design and installation

- Tank selection should be done in consultation with the system supplier and determined based on consideration of the anticipated pump rates and the target detention time and sediment removal efficiency. Sediment particle size distribution should also be considered, since finer particles are more difficult to settle.
- Determine the location where the system will be placed based on consideration of the following:
  - Stability of the ground surface.
  - Accessibility by vehicles that will be transporting the tank.

  - Distance from any natural water feature (≥ 30 m recommended where possible)
- The rate at which effluent is discharged from the tank should be based on the capacity of the downstream receiving area to accommodate those flow rates. Ensure the system discharges to a well stabilized area, with flow dispersion and interruption devices placed as needed. Consider the entire flow path to the receiver and apply stabilization measures along the path as needed.
- For a multi-barrier approach, add a sediment control barrier around the area where the active treatment system is placed. This will provide added protection in the event of any pipe leaks.
- Keep a spill response kit near the active treatment system and ensure staff are aware of spills response and reporting protocols.

Inspections and monitoring

- Inspect daily during active use of the system and keep a record of the inspection.
- Carry out routine inspection of sediment accumulation in the tank to determine when clean out is required and ensure previously settled sediment is not becoming re-suspended.
- Carry out routine effluent monitoring to verify performance and ensure that effluent quality meets any applicable standards. If performance declines, consider whether pump rates need to be adjusted or accumulated sediment needs to be removed. Consider enhancing removal efficiency through the use of a polymer flocculant based system.
- Ensure system is monitored daily during active pumping and that staff overseeing the use of the system have a thorough knowledge of proper operation.
- Where there is evidence of erosion at the discharge point or along the flow path downstream of the discharge locations, re-consider whether stabilization is adequate to protect against erosion based on the flows.
- Any repair or maintenance needs identified should be repaired within 48 hours or sooner if natural receptors are at imminent and foreseeable risk of adverse impact.

POLYMER FLOCCULANTS

Polymers flocculants have been used for in various industries for decades – including food processing, aquaculture and mining – as a means of facilitating the separation of solids and liquids. Polymer flocculants are chemicals that adsorb onto suspended particles to form bridges between them, as shown in Figure B2-23. As particles are bound together they form larger aggregate masses, which are then more readily removed from suspension through gravitational settling or filtration (Figure B2-24).

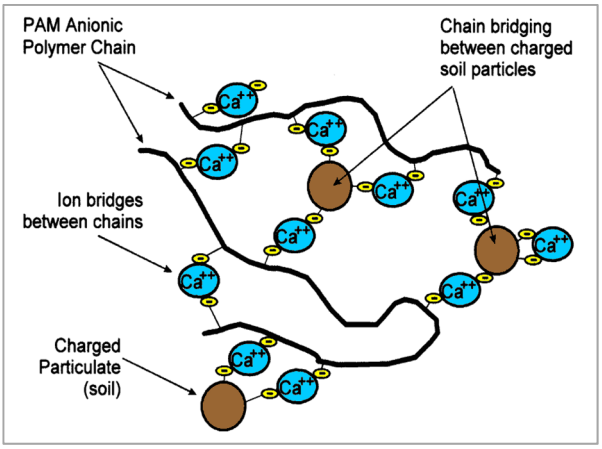


Figure B2-23: Interaction between anionic PAM and soil particles in the presence of calcium (Orts et al., 2002).

Polymer flocculants can be used on construction projects to enhance removal of suspended sediment, particularly in situations where the sediment-laden water cannot be detained long enough to allow particles to settle.

There are various polymer flocculants currently used to promote solid-liquid separations, but only some are suitable for ESC applications. Polymers used for ESC or other environmental applications should be:

- non-toxic to humans and other terrestrial and aquatic organisms;
- effective at reducing water turbidity and/or preventing soil erosion;
- practical for use in the outdoors; and
- otherwise safe.

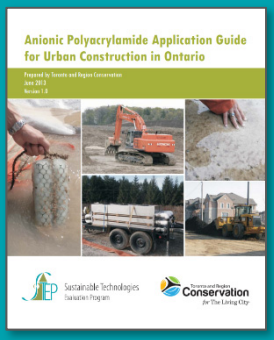
Two of the most common construction runoff clarification flocculants are polyacrylamides and chitosan.

Polyacrylamides (PAM) | PAMs are synthetic organic polymers created through the polymerization of acrylamide. PAMs used in construction stormwater clarification applications are water-soluble (having a linear chain structure) and negatively charged (anionic). Cationic (positively charged) PAMs are also effective flocculants but exhibit a higher toxicity to aquatic organisms than anionic forms. Linear anionic PAM products are typically available in the following three forms: (i) powders used for dry application or for mixing with water, (ii) emulsions that can be added to water, often as part of a hydroseed mix, and (iii) blocks which dissolve into flowing water.

Figure B2-24: Turbidity reduction in water sample following treatment with a flocculant. Before on the left and after on the right.

Chitosan | Chitosan is a cationic biodegradable biopolymer that is produced from a renewable source – chitin – which is found mainly in the exoskeletons of crustaceans and insects and the cell walls of certain fungi. Chitosan is biodegradable and derived from a renewable source. While chitosan is widely used in many commercial products and ingestible dietary supplements, its cationic nature may mean higher toxicity to aquatic organisms relative to an anionic polymer. While toxicity varies among products, in practice chitosan is often used in ways that eliminate

the risk of having residual chitosan in treated water released to natural features. One common example is chitosan-enhanced sand filtration, where sand filters are used at the end of a treatment train (often an active treatment system) as a polishing step which removes any flocculated sediment that remains in suspension. Chitosan residual can also be tested with portable kits that can be useful where effluent discharges directly to a natural feature.



For specific and detailed guidance on using anionic polyacrylamide on construction sites, see Toronto and Region Conservation Authority's *Anionic Polyacrylamide Application Guide for Urban Construction in Ontario* (TRCA, 2013).

The Guide is available in the Sustainable Technologies Evaluation Program Resource Library at:

sustainabletechnologies.ca

Application

Polymer flocculants are best applied to enhance sediment settling when:

- Treatment is required for short-term pumping activities, such that taking the time to construct a BMP with similar sediment removal capacity (e.g. sediment control pond) would be impractical;
- A high sediment removal rate is required but the area available for treatment is too small to accommodate a sediment control pond;
- Water being treated contains a large proportion of fine sediments (e.g. clay) since these are difficult to settle out of suspension
- Water being treated contains certain contaminants of concern that require removal through specific chemical and/or physical processes;
- Site specific policy requirements define more stringent effluent water quality standards than are typical and/or achievable when applying other conventional BMPs; or
- Other conventional sediment control measures have failed to achieve the necessary removal rates.

Design and installation

Product selection

- Selecting a flocculant and determining dosing rates should be carried out in consultation with the product supplier. Dosing rates vary according to the dosing method, product type and its physical form.
- Selection of a flocculant should be based on demonstrated sediment settling performance during bench scale testing using soil and water samples from the site.
- For any flocculants to be used, toxicity data must be available to demonstrate that the product is non-toxic at the intended dosing/application rate. Evidence of this should be available in the product's Material Safety Data Sheet (MSDS) and/or toxicity reports. As a minimum, acute and chronic toxicity data, based on testing by an accredited third party, should be available for the following aquatic

organisms: fathead minnow (Pimephales promelas), rainbow trout (Oncorhynchus mykiss) and water flea (Daphnia magna). The LC-50 concentrations (the concentration of polymer that is lethal to 50% of the sample population) listed in toxicity reports should significantly exceed the maximum anticipated release rate of the product based on the intended use.

- The use of any cationic polymer flocculant for treatment of construction runoff that is being discharged to a natural feature is subject to approval by the local municipality and CA and other agencies involved in regulated discharges from the site. Approval is based on product toxicity data and the intended application method and dosing rate.
- Ensure product labelling and/or packaging is available for the flocculant, which specifies the following:
  - product expiry date
  - use and maintenance instructions
  - safe handling, storage and disposal information
- Any applications of anionic PAM-based products should meet the criteria detailed in *Anionic Polyacrylamide Application Guide for Urban Construction in Ontario* (TRCA, 2013).

Polymers are not a magic bullet

Polymer flocculants can be an important ESC tool, but to be effective they have to be thoughtfully integrated as part of a ***treatment train*** that provides opportunity for ***dosing, mixing and settling.***

System design

- Any flocculant-based construction runoff treatment system should be designed by a qualified individual with knowledge of, and experience with, polymer flocculants.
- A construction runoff clarification system incorporating a polymer flocculant can come in a variety of configurations – such as an open ditch / channel or an active treatment system with tanks – but should always be designed to provide opportunity for the following key system functions:
  - **Dosing:** The flocculant is dissolved into the water being treated at a dosing rate determined based on manufacturer guidance. The dosing rate will vary based on several factors, such as product, type, the flow rate of water and water temperature.
  - **Mixing:** Physical mixing of the flocculant and water will increase opportunity for sediment particles to react and bind together. Passive mixing can be accomplished by allowing the water to flow through barriers that will create turbulence (e.g. rock check dams, baffles). Mixing time required should be determined based on manufacturer guidance.
  - **Settling:** Providing an area for sediment settling following mixing ensures that flocs (i.e. agglomerated particles) will settle out within the treatment system rather than in the downstream area or feature receiving the treated discharge.
  - **Final filtration:** Filtering effluent at the end of the system can provide assurance that flocs that have not settled out of suspension are removed before the effluent is discharged to the receiving area. Suitable filters may include geotextile fabric (e.g. sediment bag) or sand filters depending on the polymer flocculant used and the specific system design.
- Ensure the system discharges to a well stabilized area, with flow dispersion and interruption devices placed as needed. Consider the entire flow path to the receiver and apply stabilization measures along the path as needed.

- Consider air and water temperatures experienced during active use of the system and confirm that the product will be effective at the planned dose temperatures. Some polymer flocculants become less effective at colder temperatures. As a result the dosing rate may need to be increased or an alternative flocculant or treatment method may be required.
- Ensure pumping rates do not shift substantially from the rates estimated during flocculant and system selection and sizing, as the flocculant and filters may be less effective at different flow rates.
- For a multi-barrier approach, always incorporate final filtration for discharge and apply stabilization and energy dissipation in the downstream flow path.
- Keep a spill response kit near the polymer flocculant water clarification system and ensure staff are aware of spills response and reporting protocols.

System siting

- Flocculant based clarification systems should never be sited in natural areas, terrestrial or aquatic features. Where effluent from the system will be discharged to a natural water feature, the distance between the system outlet and the water feature should be at least 30 metres.
- Where siting 30 m away is not possible, consult with the local CA for guidance on siting and monitoring efforts that can be applied to mitigate risk.
- For large installations, like active treatment systems with weir tanks, ensure placement on a stabilized ground surface and consider accessibility by vehicles transporting system components.

Inspection and maintenance

- For systems where water is being pumped, such as in active treatment, inspect daily during active use and keep a record of the inspection. Guidance on active treatment systems is provided in the following section.
- Where flocculants are used in a passive way (e.g. in an interceptor swale), inspections should be carried out on a weekly basis as well as before and after significant rainfall or snowmelt events.

Figure B2-25: Polymer flocculant in gel-block form

- Carry out routine effluent monitoring to verify performance and ensure that effluent quality meets any applicable standards. If contaminant removal performance declines, investigate each system component – dosing, mixing, settling, filtration – to identify the potential source of the problem. If the system is treated pumped water that is being discharged to a natural water feature, cease pumping until performance issues can be resolved.
- The following components should be inspected, if applicable:
    - **Dosing area.** Ensure dosing is occurring as intended. Where solid block forms are used, ensure they are not being coated with sediment, as this can compromise their capacity to dissolve into the water. Also consider block positioning to ensure good contact so that water isn't short circuiting the dosing area.

  - **Filters.** Regular inspection is required to ensure filters remain effective. Where geotextile bags are used for final filtration, close monitoring is required to ensure that bags are replaced as needed. Because they can fill up quickly when used as part of a polymer system, caution should be exercised to prevent rupture.
  - **Sediment settling area(s).** Sediment accumulation should be removed at the appropriate trigger (e.g. 30% height of a sediment retention barrier).

- For ditch / swale systems, inspect for evidence of excessive sediment accumulation and / or erosion, and clean out or re-stabilize as needed.
- Ensure the flocculants are being stored and maintained as specified in guidance from the supplier / manufacturer to ensure ongoing efficacy.
- Ensure staff overseeing the use of the system have a thorough knowledge of proper maintenance.
- Where there is evidence of erosion at the discharge point or along the flow path downstream of the discharge locations, re-consider whether stabilization is adequate to protect against erosion based on the flows.
- Keep MSDS sheets and toxicity reports related to the flocculant used in an easily accessible location on the site.
- Any repair or maintenance needs identified should be repaired within 48 hours or sooner if natural receptors are at imminent and foreseeable risk of adverse impact.

Decommissioning

- Ensure flocculant-treated sediment and any leftover flocculant are properly disposed of.
- Where polymer flocculants left over are suitable for reuse elsewhere, ensure proper handling and storage in accordance with supplier / manufacturer guidance.

ACTIVE TREATMENT SYSTEMS

Active treatment systems incorporate weir tanks, flocculants and filters in order to achieve a high contaminant removal rate while occupying a relatively small footprint (Figure B2-26).

They differ from a passive flocculant-based treatment train in that they are more sophisticated, offering more precise control of the treatment processes, such as flocculant dose metering and filter backwashing capabilities. They may also incorporate hydrodynamic processes for physical separation of floatables and suspended particles from the water. Flocculants are often incorporated in the treatment process to promote sediment particle binding and settling, and filters (e.g. sand) are included as a final 'polishing' step before water leaves the system.

Figure B2-26: Active water treatment system for construction site runoff

Active treatment systems are highly customizable and can range from simple to complex, depending on the components included, the types of contaminants being removed and the removal rate required. Product suppliers typically rent out the system components for the desired duration and often provide installation and other operations support to ensure the system performs effectively.

Application

Active treatment systems should be considered for removing contaminants during pumping of construction site stormwater when:

- Treatment is required for short-term pumping activities, such that taking the time to construct a BMP with similar sediment removal capacity (e.g. sediment control pond) would be impractical;
- A high sediment removal rate is required but the area available for treatment is too small to accommodate a sediment control pond;
- Water being treated contains certain contaminants of concern that require removal through specific chemical and/or physical processes;
- Site specific policy requirements define more stringent effluent water quality standards than are typical and/or achievable when applying other conventional BMPs; or
- Other conventional sediment control measures have failed to achieve the necessary removal rates.

Design and installation

- Selection of system and sizing should be done in consultation with the system supplier. Consider what treatment level is needed and what contaminants should be removed in order to find the right system to achieve those goals.

- Typical system components may include:
  - Flocculant and associated dosing system (e.g. injection into water stream, passive dosing by allowing water to flow over and around water soluble flocculant blocks);
  - Detention tank with weirs or baffles to allow mixing and sediment settling; and
  - Filters with or without backwashing capability.
- Determine the location where the system will be placed based on consideration of the following:
  - Placement at least 30 m from any natural water feature in order to minimize risk of a spill into the feature. Where siting 30 m away is not possible, consult with the local CA for guidance on siting and monitoring efforts that can be applied to mitigate risk.
  - Placement on a stabilized ground surface.
  - The location must be accessible to the vehicles transporting the system components. Consider whether the largest component that will be brought on site can be transported and placed in the intended area.
- Where flocculants are used, refer to flocculant guidance. The proposed use of any cationic flocculant is subject to approval by the local municipality and CA, as well as any other agencies involved in regulating discharges for the site.
- Selection of a flocculant should be based on demonstrated sediment settling performance during bench scale testing using soil and water samples from the site.
- For any flocculants to be used, toxicity data must be available to demonstrate that the product is non-toxic to aquatic organisms at the intended dosing/application rate.
- Ensure pumping rates do not shift substantially from the rates estimated during flocculant and system selection and sizing, as the flocculant and filters may be less effective at different flow rates.
- Ensure the system discharges to a well stabilized area, with flow dispersion and interruption devices placed as needed. Consider the entire flow path to the receiver and apply stabilization measures along the path as needed.
- For a multi-barrier approach, add a sediment control barrier around the area where the active treatment system is placed. This will provide added protection in the event of any pipe leaks.
- Keep a spill response kit near the active treatment system and ensure staff are aware of spills response and reporting protocols.

Inspections and monitoring

- Inspect daily during active use of the system and keep a record of the inspection. Inspection of specific system components may be the responsibility of the supplier, depending on the terms of the contract. As a minimum the onsite inspector should look monitor sediment accumulation in the tank and effluent quality.
- Carry out routine effluent monitoring to verify performance and ensure that effluent quality meets any applicable standards.

Figure B2-27: Treated water from an active treatment system

- Ensure system is monitored daily during active pumping and that staff overseeing the use of the system have a thorough knowledge of proper operation.
- Where there is evidence of erosion at the discharge point or along the flow path downstream of the discharge locations, re-consider whether stabilization is adequate to protect against erosion based on the flows.
- Keep MSDS sheets and toxicity reports related to the flocculant used in an easily accessible location on the site.
- Any repair or maintenance needs identified should be repaired within 48 hours or sooner if natural receptors are at imminent and foreseeable risk of adverse impact.

VEHICLE TRACKING CONTROL
(a.k.a. track out control, mud tracking control)

Vehicle tracking control is an umbrella term for a variety of practices that are applied at construction site entrances to control vehicles tracking mud offsite. Tracking controls can also be applied within a site where there is a need to minimize sediment transport from active construction areas to other areas that area being protected (e.g. LID features, developed areas of the site). For example, during building construction, tracking controls can be applied at the lot exit so that vehicles don't track mud onto the roads and ultimately into storm drains.

Preventing vehicle mud tracking helps to keep sediment out of storm drains, end-of-pipe controls and natural features, and reduces the risk of dust pollution. Vehicle tracking controls generally fall into the following categories:

- **Mud mats** | Mud mats include rock/stone pads underlain with geotextile fabric or pre-fabricated products in various designs. They are used primarily for stabilizing site entrances, but some pre-fabricated mud mat products may also encourage some mud removal by providing an uneven or bumpy surface that digs into the mud caked onto the tires.
- **Shaker racks / grates / ridges** | These racks or grates are pre-fabricated products that are designed to (i) provide a stable entrance and (ii) dislodge mud from tires as vehicles bounce slightly while driving over the uneven surface. As their ability to remove mud relies on the bouncing/shaking action, they need to be long enough – at least one full tire rotation – to provide opportunity for dislodgment.
- **Wheel washers** | A well installed vehicle wheel washing system can provide the highest level of protection from offsite mud tracking. These types of devices are designed to spray water onto tires as the vehicle drives through them, essentially pressure washing mud from the tires. They typically include or are installed with a rack through which water drains and an area for capturing of dirty wash water, which is directed towards a sediment control measure. Wheel washers come is a wide variety of designs and configuration. Wheel washing can also be less sophisticated, such as passive washing – where the vehicle is simply driven through a pool of wash water in a contained area – and manual washing carried out with a hose by on site staff.

Figure B2-28: Vehicle tracking controls. From top to bottom: mud mat, shaker rack, vehicle wheel washer.

Application

Vehicle tracking controls should be applied when:

- The site is greater than one hectare in size;
- There will be grading and filling operations in close proximity to construction site entrances; or
- Weather and site conditions will result in saturated, muddy soils;

Wheel washing should be used as the vehicle tracking control if:

- Mud tracking is an ongoing issue and simpler vehicle tracking controls are not providing effective mitigation;
- Other tracking controls cannot be constructed due to site constraints
- The site contains contaminated soils; or
- The local municipality makes it a requirement.

Design and installation

Mud mats

The following are recommended design specifications for mud mats constructed with rock pads:

Design attribute	Specifications
Length	≥ 20 m
Width	Full width of the entrance
Rock / stone layer thickness	450 mm
Rock / stone details	For the first 10 m in from the road: 50 mm diameter clear stone Remaining length: 150 mm diameter clear stone
Bottom layer type	Non-woven geotextile fabric or graded aggregate filter

- See mud mat design detail in Figure B2-29.
- For pre-fabricated mud mat products, adhere to manufacturer specifications for design and installation.
- Where constructed over top of a culvert or ditch, a sediment control barrier (e.g. sediment fence, filter sock) should be installed along the edges of the pad to prevent sediment from being washed into the area below.
- Ensure that drainage from the mud mat is conveyed to a sediment control measure for removal of suspended sediment.

Shaker racks / grates / ridges

- For pre-fabricated products, adhere to manufacturer specifications for design and installation.
- Ensure that the device installed is long enough to allow for at least one full tire rotation so that the vehicle will bounce enough to dislodge mud.
- Ensure device installed is wide enough to accommodate the passage of any construction vehicle on site.
- The rack should be installed with space below to allow for sediment deposition.
- Install rock pads on either side of the shaker rack.
- Convey drainage from the shaker rack to a sediment control measure.
- Where constructed over top of a culvert or ditch, a sediment control barrier (e.g. sediment fence, filter sock) should be installed along the edges of the installation to prevent sediment from being washed into the area below.

Wheel washing

- Where a full proprietary system is used, ensure that product selection, placement and installation is consistent with guidance provided by the manufacturer / supplier of the product.
- The particular model of wheel washing system needed should be determined based on the number of vehicles cleaned daily and the amount of mud that needs to be removed from each vehicle
- Ensure all dirty wash water will be drained into a containment area below and then conveyed to a sediment control measure for removal of suspended sediment.

Inspection and maintenance

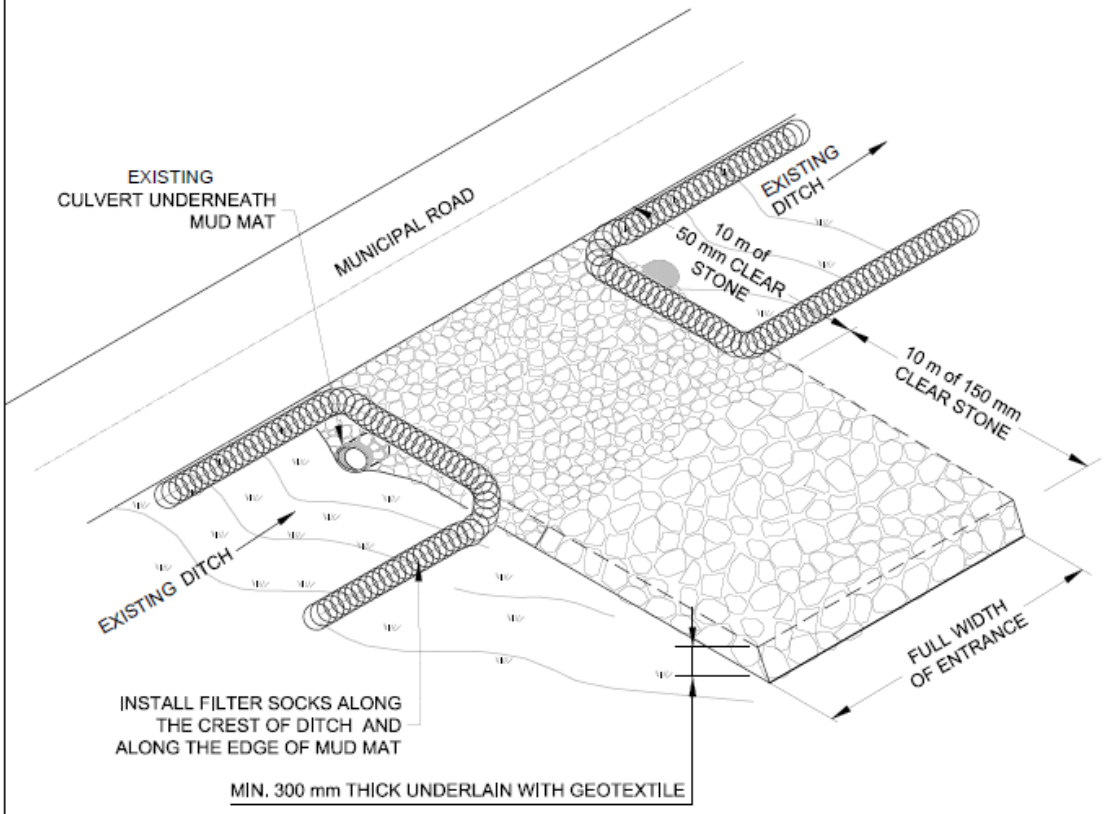
- Inspect vehicle tracking controls weekly, and before and after significant rainfall (see definition in Section 10.1.2) or snowmelt events, and keep a record of the inspection.
- Inspect mud mats for excessive sediment accumulation. For rock pads look for signs that the voids have been filled with sediment and replace granular material as needed.
- Clean up any sediment tracked onto public roads at the end of each day.
- Ensure the installation of storm drain inlet protection for inlets in roads that will be subject to street sweeping, since this can sometimes cause additional sediment to be swept into storm drain inlets.
- Any repair or maintenance needs identified should be repaired within 48 hours or sooner if natural receptors are at imminent and foreseeable risk of adverse impact.

Decommissioning

- Ensure all components are removed with minimal disturbance, and that waste materials are properly disposed of.
- Grade and restore the area as per the final stabilization plans.

MUD MAT DETAIL NOTES:

1. MUD MAT TO BE UNDERLAIN WITH A GEOTEXTILE CLOTH
2. SEDIMENT WILL BE CLEANED FROM PUBLIC RIGHT OF WAYS AS REQUIRED
3. STORM INLETS IN CLOSE VICINITY TO MUD MAT TO BE PROTECTED WITH INLET CONTROL MEASURES



NOTE: THIS DETAIL REPRESENTS AN IDEAL SCENARIO. SITE CONDITIONS VARY AND EROSION AND SEDIMENT CONTROL MEASURES SHOULD BE TAILORED FOR EACH SITE AND PROJECT

Toronto and Region Conservation Authority	TRCA ESC DESIGN DETAIL	SCALE N.T.S.	REV 1	DATE MARCH 2019
	DRAWING TITLE MUD MAT			DWG NO 05

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Figure B2-29: Design detail for mud mat for construction site vehicle access

APPENDIX C:

BEST MANAGEMENT PRACTICES FOR IN AND NEAR WATER WORKS

BMPs for in and near water works

In-water works should be avoided if possible, and may be viewed as a last resort. The rationale behind this is to minimize potential ecological impacts, as in-water works are intrusive to aquatic habitats and considered high risk. Where possible, selecting construction methods that avoid disturbance of water features, such as trenchless crossing methods for installing pipes, cables and other underground services, should be employed.

When it is necessary to carry out works in or adjacent to water features, preventing the release of sediment into the waterbody requires careful design and effective implementation of measures that isolate the work area from the rest of the feature. One of the best approaches to reduce the risk of sediment release into the waterbody is to phase the work such that the area of work is isolated to small sections that can be stabilized at the end of each work day. Planning of in water construction activities should always consider methods that minimize the construction footprint and duration of work, and are scheduled to ensure completion outside of spawning times in order to mitigate long-term negative impacts to the feature and aquatic ecosystem.

Construction timing

All in water and near water works should be scheduled such that works are completed outside of the restricted activity timing windows listed in Table C1. The regions defined in Table C1 are delineated in the map shown in Figure C1. These timing windows ensure pollution is minimized and aquatic habitats are protected during critical life stages, such as spawning, juvenile stages and migration. If the proposed works cannot be completed outside of the indicated spawning times, the work may need to be phased in over more than one year, or approval to work during the restricted activity timing window is required. In Ontario, MNRF and DFO should be consulted for permission to carry out any in or near water works during the restricted activity timing windows.

Figure C1: Ontario's Northwest, Northeast and Southern Region boundaries for determining application of restricted activity timing windows. Source: Fisheries and Oceans Canada, 2013

If species listed under the Endangered Species Act (S.O. 2007) or Species at Risk Act (S.C. 2002) could be impacted by the construction activities, additional approvals may be

required prior to initiating any in or near water works. The local conservation authority, MECP or DFO and their respective websites should be consulted to determine site specific requirements.

Table C1: Ontario restricted activity timing windows for protection of fish and fish habitat during in water and near water works (source: Fisheries and Oceans Canada, 2013)

	Fish Species	Northwest Region	Northeast Region	Southern Region
Spring spawning species	Walleye	April 1 to June 20	April 1 to June 20	March 15 to May 31
	Northern Pike	April 1 to June 15	April 1 to June 15	March 15 to May 31
	Lake Sturgeon	May 1 to June 30	May 1 to July 15	May 1 to June 30
	Muskellunge	May 1 to July 15	May 15 to July 15	March 15 to May 31
	Large/ Smallmouth Bass	May 15 to July 15	May 15 to July 15	May 1 to July 15
	Rainbow Trout	April 1 to June 15	April 1 to June 15	March 15 to June 15
	Other/Unknown Spring Spawning Species	April 1 to June 15	April 1 to June 15	March 15 to July 15
Fall spawning species	Lake Trout	Sept. 1 to May 31	Sept. 1 to May 31	Oct. 1 to May 31
	Brook Trout	Sept. 1 to June 15	Sept. 1 to June 15	Oct. 1 to May 31
	Pacific Salmon	Sept. 1 to June 15	Sept. 1 to June 15	Sept. 15 to May 31
	Lake Whitefish	Sept. 15 to May 31	Sept. 15 to May 15	Oct. 15 to May 31
	Lake Herring	Oct. 1 to May 31	Oct. 1 to May 31	Oct. 15 to May 31
	Other/Unknown Fall Spawning Species	Sept. 1 to June 15	Sept. 1 to June 15	Oct. 1 to May 31

Table C2: Common best practices for protecting natural water features during in-water construction

	Practices	Description	Page
	Sediment / turbidity curtains	Geotextile material vertically suspended in water to enclose an in-water work area and contain sediment transport to a limited area within the disturbed water body. Implemented around construction activities occurring “in the wet”, meaning the area where construction is occurring is not being dewatered. The sediment curtains act as a filter baffle and isolate/protect an important or sensitive in-water feature. Sediment curtains are also applied to enhance sediment settling in temporary or permanent detention ponds.	C-4
	Temporary stream crossings via temporary bridge or culvert(s)	Steel plate or other timber crossing placed above top of bank and anchored, or a raised stone embankment constructed across a watercourse to allow passage of construction vehicles. Water conveyance through the embankment is provided via culvert(s) incorporated within the stone. Temporary crossings are intended to allow access to both sides of a watercourse at a stable concentrated point thereby limiting disruption and erosion impacts to a smaller area.	
Construction in the Dry	Waterproof Isolation Barrier (WIB)	A sealed structural barrier applied to block the passage of water into and out of an in water construction area. The WIB, also known as a cofferdam, can be applied in any natural water feature to maintain a waterproof separation that prevents sediment from the work area from being transported into the larger water feature. WIBs that are designed to extend across the length of the watercourse to block all flows must be applied with one of the watercourse diversion or bypass methods described in this Appendix.	C-10
	Diversion / bypass channel	A secondary channel alongside the work area to passively divert flows around it and allow for work within the existing channel to proceed in dry conditions. Typically applied with temporary waterproof barriers / dams to keep flows out of the existing channel and route them into the bypass. All methods of temporary diversion help maintain water quality by containing sediment in the dry, isolated work area.	C-15
	Flume bypass	A passive watercourse diversion that concentrates flows to a pipe or chute where gravity then conveys them, unimpeded, around or through the work area. All methods of temporary diversion help maintain water quality by containing sediment in the isolated, dry work area. Isolation of work area is typically achieved by blockage of flow upstream and downstream with WIBs or other waterproof barriers / dams. Where dewatering of the work area is necessary, appropriate discharge treatment is required to remove suspended sediment prior to discharge. Flumes may not be suitable for sensitive streams.	C-17
	Bypass pumping	An active watercourse diversion method in which an electrical or fuel-powered generator is used to pump flows around the work area in order to create dry work area. All methods of temporary diversion help maintain water quality by containing sediment in the dry, isolated work area. Pump intakes are fitted with fish screens to prevent fish entry, and fish collection and relocation (with the appropriate permits) is often necessary as this method does not allow for fish passage. Bypass pumping may not be suitable for sensitive streams and is only appropriate for short duration projects.	C-20
	Dewatering	The removal of water within the immediate construction area to facilitate working in the dry. Dewatering effluent should be treated and released a minimum of 30 metres from any surface water feature, where possible. The discharge location and flow path should be well vegetated or otherwise stabilized so that erosion of soil does not occur at the discharge point, and treated water does not pick up any additional sediment along the flow path back to the receiver.	C-9

SEDIMENT CURTAIN

(a.k.a. turbidity curtain)

Sediment (or turbidity) curtains consist of a weighted, permeable or impermeable material that is secured and vertically suspended in water using a floatation device. While work is being conducted in the wet, the curtain keeps sediment contained to the area between the curtain and the bank and also slows the movement of water in the isolated area. Over the duration of the work, sediment settles out of suspension to the bottom of the water body.

Potential permitting requirements

- As work will be conducted in the wet, there is the possibility that work will negatively impact aquatic life present within the contained area of the curtain. Prior to construction, the proposed in-water works should be reviewed with the local CA, Fisheries and Oceans Canada and applicable provincial ministries.
- If necessary, obtain permits / authorizations to collect and relocate fish and other wildlife from the isolated work area.

Use sediment curtains in ***calm*** and ***predictable*** water bodies with relatively ***uniform water depths***.

Planning

- Plan works to occur outside of the restricted activity timing windows (spawning times) in Table C1.
- Consult the manufacturer of the sediment/turbidity curtain to determine the appropriate dimensions, curtain type, anchoring materials and buoyancy requirements for each application.
- Be aware that dynamic watercourses (like urban rivers) have the higher potential for changes in water velocities and levels which can displace the curtain.
- Avoid the times of year when there's a higher potential for debris, like ice, in the watercourse.
- Remember that periods of fluctuating water levels and seasonal changes will make installation difficult and can result in failure of the curtain.
- Consult with aquatic biologist or equivalent expert if fish rescue / relocation activities are necessary to carry out the work.
- Keep spill kit and spill response plan on-site in the event deleterious substances enter the water body.

Design

- Suspend geotextile curtains in the water with floatation devices/buoys and affix the base of the water body with an anchoring system (chains, concrete blocks, anchor, etc.).
- Ensure a freeboard of more than 50 mm above the floatation device.
- Customize the length of the sediment curtains for the job.
- Vary the anchors that weigh the curtain down to facilitate its contact with the water bottom for different bed materials (ex. muddy, sandy, rocky, uneven, etc.)
- Refer to Figures C3 and C4 – Ontario Provincial Standard Drawings for Turbidity Curtains (Nov. 2015) for design details.

Figure C2: Sediment curtain installed in a lake

Installation

- Refer to the manufacturer's installation instructions.
- It may be helpful to roll out the length of curtain on land before guiding into the water.
- When guiding the curtain into the water, ensure it does not become twisted and avoid sharp objects.
- Position the curtain at least 5 m outside of the perimeter of the work area.
- Hold the curtain parallel to the bank using cable or rope moorings affixed to the shore, typically at the upstream and downstream ends.
- Overlap curtains to form a continuous barrier.
- Attach t-bars to curtains and embed into the water bottom (if possible) to provide structure.

Inspection and maintenance

- Conduct daily inspections prior to starting work to ensure that the sediment curtain is functioning as intended and that it is not damaged.
- Look for turbid water outside of the area enclosed by the curtain, especially at the upstream or downstream limits where the curtain may not be properly secured to the native bank.
- Ensure that the floatation boom is visible and there's no evidence of overtopping.
- Remove any debris (logs, branches, garbage, etc.) that may be caught in or on the curtain.
- Malfunctioning components and damages should be repaired within 48 hours or sooner if environmental receptors are at imminent and foreseeable risk of adverse impact.
- Physical disruption of the curtain may result in the re-suspension of sediment in the water column and care should be taken to avoid hitting the curtain.

Decommissioning

- Proper and careful removal of the curtain and its components following the completion of construction activities is very important in order to prevent the re-suspension of sediment. Refer to manufacturer's instructions for proper removal procedures.
- Consult with regulatory agencies permitting the works to consider solutions to address accumulated settled sediment.
- Restore all disturbed areas using native plant species.

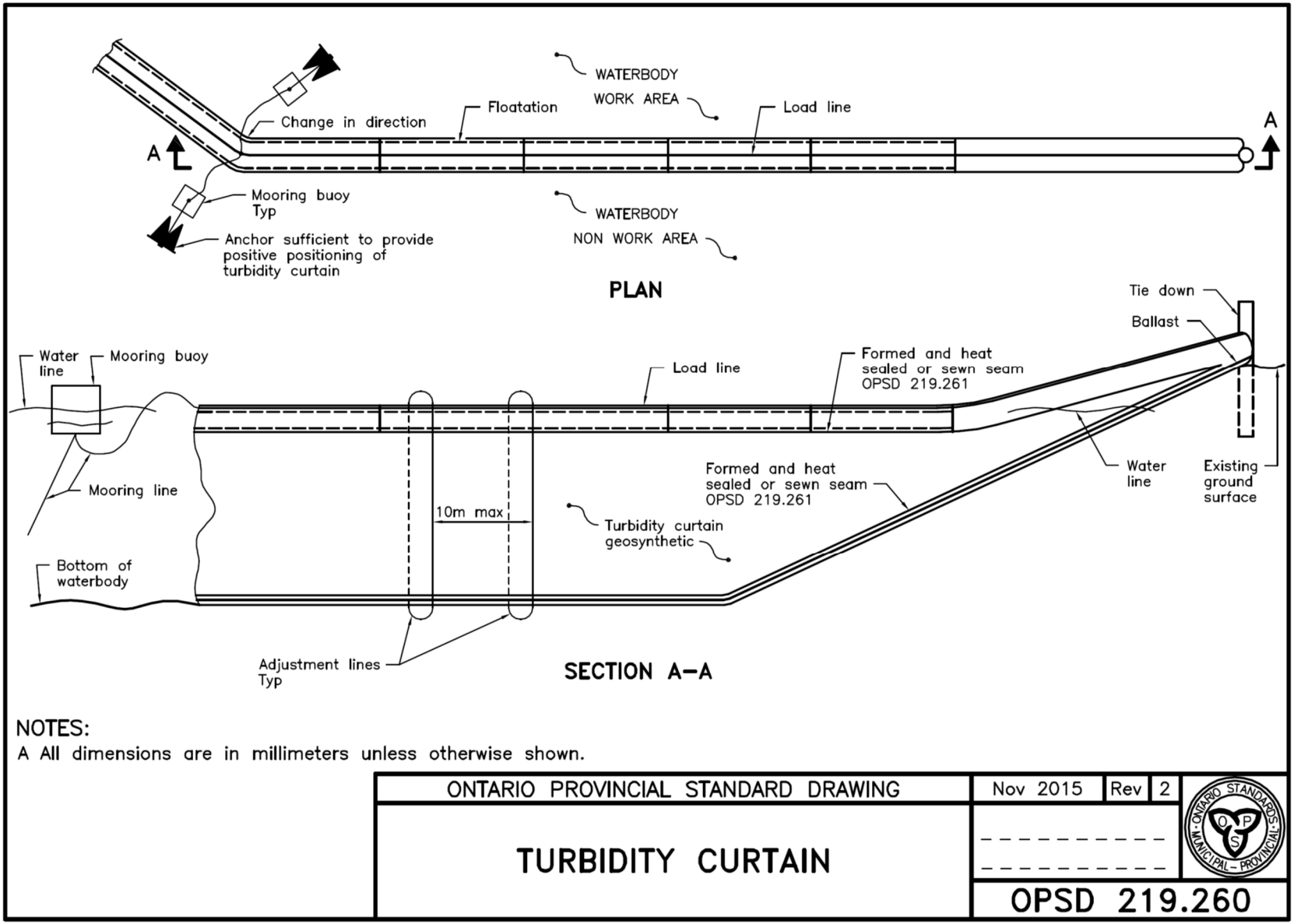


Figure C3: Ontario Provincial Standard Drawing for turbidity curtain in a water body

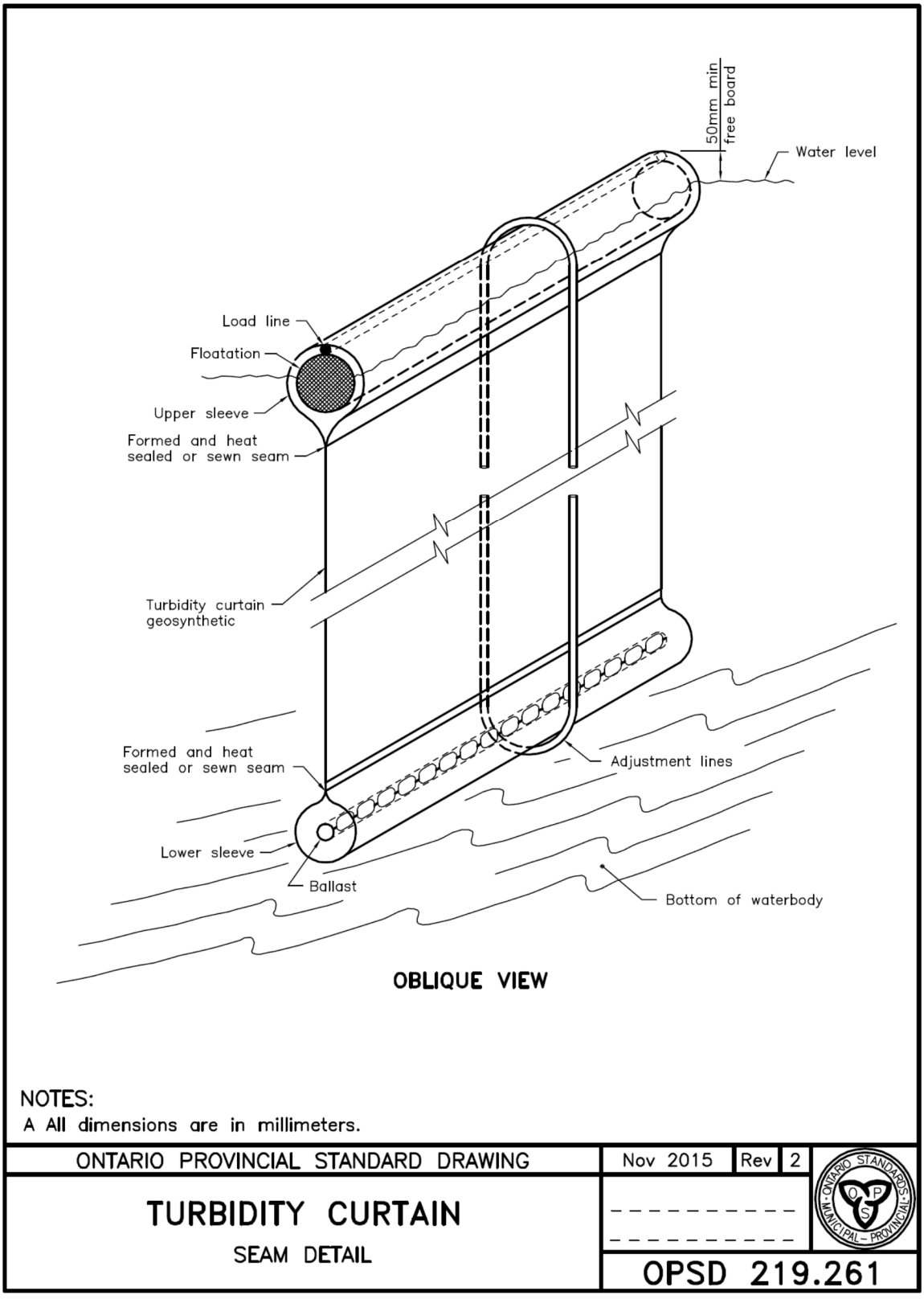


Figure C4: Ontario Provincial Standard Drawing for turbidity curtain in a water body - seam detail

DEWATERING AN ISOLATED WORK AREA

The removal and discharge of water from a work area to create dry working conditions is a necessity on many construction sites within waterbodies or where the water table is high and groundwater is anticipated. When sediment-laden water is being removed from the work area, the water must be treated using appropriate sediment control measures before it can be released into the environment (outside the work area). As the treated water is released, erosion mitigation measures must be in place to ensure the flows do not erode the discharge area or the flow path to the ultimate receiving water feature. Refer to Section 6.4 and Appendix B2 for additional guidance on dewatering best practices.

Please consider the following in conjunction with the in-water isolation measures described in this Appendix.

Check out Fisheries and Oceans Canada's *Freshwater Intake End-of-Pipe Fish Screen Guideline* (1995) for best practices related to fish screens during pumping activities.

- If necessary, obtain permits / authorizations to collect and relocate fish and other wildlife from the isolated work area (e.g. License to Collect Fish for Scientific Purposes, Wildlife Scientific Collector's Authorization). For species at risk sites, additional permits or authorizations may also be required through the MECP.
- Install, operate and maintain a pump intake with a fish screen in advance of the initial drawdown and in accordance with the requirements from pertinent governing agencies.
- Treat pumped water if required using a BMP described in Section 6.4 of the Guide or Appendix B2 (e.g. sediment bag). Refer to ESC Design Detail drawings #1 and 2 (Figures B2-16 and B2-17) for depictions of a dewatering treatment train system incorporating a sediment bag.
- Ensure the water is ultimately discharged to a well-vegetated located at least 30 m, if possible, from any waterbody, and that the flow path is stabilized. See Figure C7 (ESC Design Detail #9) for site isolation schematic, including dewatering details.
- Once initial drawdown is complete, create a filtered sump in the work area by digging a small pit below design elevations where water can collect and the pump intake can be situated.

WATERPROOF ISOLATION BARRIERS (WIB)

(a.k.a cofferdams)

Waterproof isolation barriers (WIB) are constructed structures applied on a temporary basis to block the passage of water into and out of an in water construction area. They can be applied in any natural water feature to maintain a waterproof separation that prevents sediment from the work area from being transported into the larger water feature. These barriers can be composed of a variety of materials but are often constructed with pea gravel filled bags and a waterproof sheet membrane.

Potential permitting requirements

- A License to Collect Fish for Scientific Purposes and/or Wildlife Scientific Collector's Authorization are required from the MNRF in order to carry out any collection and relocation of fish or wildlife stranded in the isolated area to the waterbody prior to dewatering, every time the isolation barrier is breached and/or when aquatic species are visible.
- The proposed works should be reviewed with the local CA and applicable permitting agencies, which may include DFO, MNRF and MECP (for species at risk sites or if water movement activities involved trigger permit to take water requirements).

Planning

- Plan works to occur outside of the restricted activity fish timing windows (Table C1).
- Phase works to ensure that disturbed areas can be stabilized at end of day.
- Stabilize or cover disturbed areas if left exposed and inactive longer than 3 days, and in anticipation of precipitation or snow melt events.
- Use hydraulic modeling to determine the height at which the WIB should be constructed. Refer to Appendix A for the specified flood risk calculation, which can be used to determine the design storm for sizing of WIBs, based on consideration of service life (i.e. how long the WIB will be in place) and the acceptable level of risk, which should be no greater than 5%. **As a minimum, WIBs should be sized to hold back flows from the 2 year event with some freeboard, unless otherwise approved by the relevant regulatory agency.**
- Have the impact to the local channel section assessed by a qualified person if more than one third of a watercourse is to be isolated during the planned work.
- Include a contingency or emergency response plan documenting which flows will overtop the WIB and outline the steps to take in the event that high flows breach the barrier.
- Keep spill kits and a spill response plan on-site in the event deleterious substances enter the water body.

Design

- Refer to ESC design detail for "Meter bag waterproof isolation barrier" in Figure C6 and "Site isolation layout" in Figure C7, which shows the set up for use of a WIB for partial stream isolation to facilitate work in the dry.
- Use meter bags made of durable material and capable of being moved at least twice for the installation and removal.

- Using sand to fill bags that are part of a WIB should be avoided, as sand, if released, will fill small voids in the substrate of the water feature and thereby compromise invertebrate habitat. Pea-gravel fill is recommended.
- Key in a waterproof membrane that overtops the isolation barrier to minimize leaks where a water-tight seal is difficult to achieve.
- Design the barrier using a double lined wall with a layer of impermeable liner secured in-between (refer to Figure C6).
- For construction during winter, consider substituting plastic bags for a more durable material, as the plastic is more likely to tear when frozen.

Figure C5: Waterproof isolation barrier (cofferdam)

Installation

- Use the dewatering techniques as described in Section 6.4 and Appendix B2 (see Figures B2-16 and B2-17 for dewatering treatment train) when pumping water out to establish and maintain a dry work area.
- Fill bags to varying capacities depending on site conditions and where they will be placed.

- Ensure that bags are not overfilled to allow for some malleability during barrier construction, and also to prevent the fill from falling out of the bag into the feature.
- Avoid excessive amounts of relocation as it increases the risk of the bag tearing.
- Ensure that the bottom of the barrier is in complete and continuous contact with the bed of the water feature.
- Use different sizes of bags in areas where there are irregularities in the water bottom, where the barrier needs to tie into native bank, and where voids within the barrier need to be filled. For example, gaps between meter bags may need to be filled with smaller pea gravel bags.
- Construct the WIB from the top of bank, where possible, and in sequence from upstream to downstream.

Inspection and maintenance

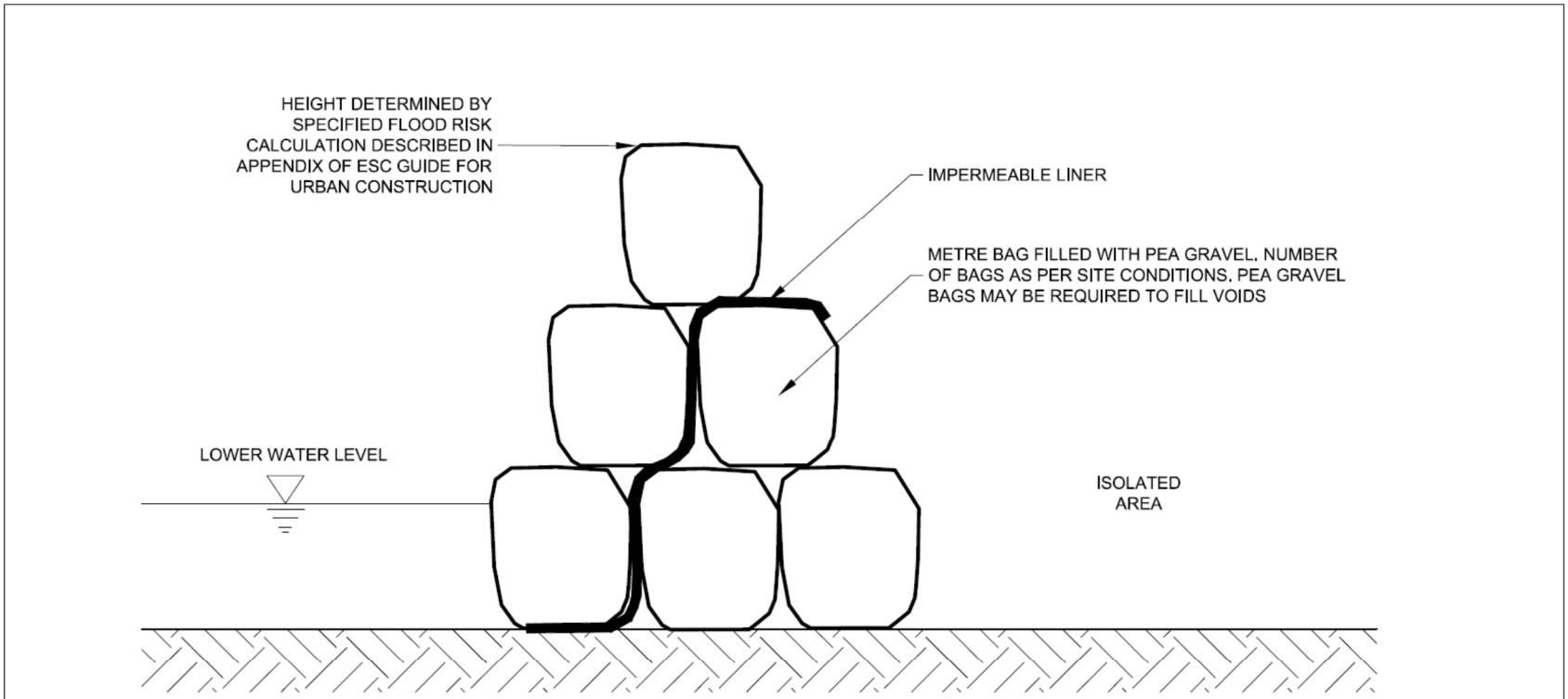
- Conduct an inspection of the WIB at the start of each day and document the findings.
- Repair leaks, holes, torn areas, etc. within 48 hours or sooner if environmental receptors are at imminent and foreseeable risk of adverse impact.
- Monitor the forecast as storm events, floating debris, ice, etc. can displace the isolation barrier or parts thereof.
- When possible, keep a surplus of materials (meter bags, pea gravel, etc.) on-site so that repairs and maintenance can be performed quickly.
- Dewater the site when barrier is breached and ensure the dewatering system is inspected and maintained in good working condition regularly.
- Avoid placing / storing fuel or other potential aquatic contaminants in the floodplain.

Decommissioning

- Remove all excess material, accumulated sediment and debris from the dry, isolated work area before removing the isolation barrier.
- Follow sequencing shown on the construction drawings for the decommissioning of the isolation barrier and in an upstream to downstream direction.
- Remove the isolation barrier carefully to minimize disturbance to the channel.
- Restore all disturbed areas using native plant species.

Consider sustainability and reuse

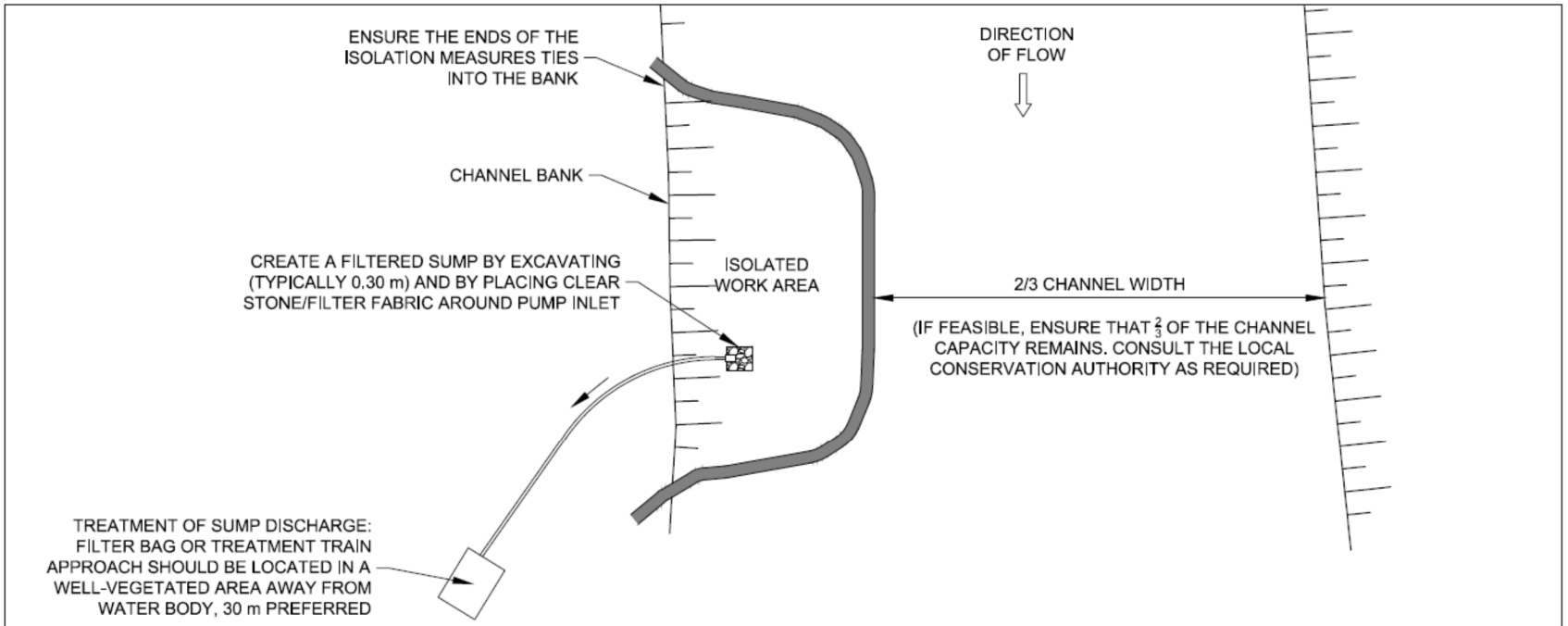
Meter bags filled with pea gravel can be transported to different work locations if they are in good condition.



NOTE:
THIS DETAIL REPRESENTS AN IDEAL SCENARIO. SITE CONDITIONS VARY AND EROSION AND SEDIMENT CONTROL MEASURES SHOULD BE TAILORED FOR EACH SITE AND PROJECT

Toronto and Region Conservation Authority	TRCA ESC DESIGN DETAIL	SCALE N.T.S.	REV 1	DATE MARCH 2019
	DRAWING TITLE METRE BAG WATERPROOF ISOLATION BARRIER			DWG NO 07

Figure C6: Design detail for waterproof isolation barrier constructed using metre bags



NOTES:

1. DETAILS FOR WATERPROOF ISOLATION BARRIER (WIB) SHOULD BE PROVIDED SEPARATELY
2. THE WIB SHOULD BE SIZED USING THE FLOOD RISK CALCULATION
3. EXCAVATION SHOULD NOT BE REQUIRED FOR THE INSTALLATION OF THE WIB
4. ENSURE THAT THE DOWNSTREAM AND UPSTREAM ENDS OF THE WIB CREATE A CONTINUOUS BARRIER WITH THE EROSION AND SEDIMENT CONTROL MEASURES ON THE TABLELAND
5. WIB SHOULD ONLY BE REMOVED ONCE THE ISOLATED AREA HAS STABILIZED
6. ALL PUMP INTAKES SHOULD BE FITTED WITH A FISH SCREEN IF THERE IS THE POTENTIAL FOR FISH OR OTHER AQUATIC WILDLIFE ENTRAPMENT

NOTE:
THIS DETAIL REPRESENTS AN IDEAL SCENARIO. SITE CONDITIONS VARY AND EROSION AND SEDIMENT CONTROL MEASURES SHOULD BE TAILORED FOR EACH SITE AND PROJECT

Toronto and Region Conservation Authority	TRCA ESC DESIGN DETAIL	SCALE N.T.S.	REV 1	DATE MARCH 2019
	DRAWING TITLE SITE ISOLATION LAYOUT			DWG NO 09

DISCLAIMER: TORONTO AND REGION CONSERVATION AUTHORITY (TRCA) IS NOT LIABLE FOR INFORMATION SHOWN ON THIS DRAWING. PLEASE USE IT FOR REFERENCE ONLY

Figure C7: Design detail for partial watercourse isolation using a waterproof isolation barrier (coffer dam)

TEMPORARY WATERCOURSE DIVERSION – BYPASS CHANNEL

A bypass channel is a secondary channel alongside the work area to passively divert flows around it and allow for work within the existing channel to proceed in dry conditions. All methods of temporary diversion help maintain water quality by containing released sediment to the dry, isolated work area.

Potential permitting requirements

- A License to Collect Fish for Scientific Purposes and/or Wildlife Scientific Collector's Authorization are required from the MNRF in order to carry out any collection and relocation of fish or wildlife as part of in water works.
- The proposed works should be reviewed with the local CA and applicable permitting agencies, which may include DFO, MNRF and MECP (for species at risk sites or if water movement activities involved trigger Permit to Take Water requirements).

Planning

- Plan works to occur outside of the restricted activity fish timing windows (Table C1).
- Chose the temporary watercourse diversion that will have the least amount of disturbance to the waterbody and the surrounding area.
- Sequence the work to minimize the length of channel that will be bypassed.
- Use hydraulic modeling to determine the size and shape of the bypass channel. Refer to Appendix A for the specified flood risk calculation, which can be used to determine the design storm for sizing of WIBs and bypass channels, based on consideration of service life and the acceptable level of risk, which should be no greater than 5%. **A temporary bypass channel should, as a minimum, be sized to convey the 2 year event, unless otherwise approved by the relevant regulatory agency.**
- Include a contingency plan on the drawings documenting which flows will overtop the system, the steps to take in the event of a breach and a plan to remove the equipment and other material from the floodplain.
- Keep spill kits and a spill response plan on-site in the event deleterious substances enter the water body.

Design

- Ensure watercourse diversion allows for fish passage.
- Store the material removed for the construction of the bypass channel 30 metres away from the water body where possible and contain the stockpile with sediment control measures.
- Tie the downstream end of the bypass channel into the existing channel beyond the work area.
- Protect the bypass channel from erosion prior to receiving flows using erosion netting/blankets/matting/geotextile fabric with an anchoring system, suitably sized riprap, or established vegetation.
- Ensure that there is no increase in the velocity of the flows in the bypass channel.

Installation

- Install the temporary bypass channel before starting other construction work.
- Sequence the construction of the bypass channel in a downstream to upstream manner while maintaining berms at both ends until ready to receive diverted flows.
- Install waterproof isolation barriers, if required, at the upstream and downstream ends of the work area to prevent water from entering the work area.

Inspection and maintenance

- Inspect the bypass channel weekly, after every rainfall and significant snowmelt event and keep a record of the inspection.
- Repair localized slope failures and erosion concerns within 48 hours of being identified or sooner if environmental receptors are at imminent and foreseeable risk of adverse impact.

Decommissioning

- Stabilize the new channel prior to the return of flows so as to minimize sediment released.
- Ensure any stranded fish or wildlife are collected and relocated in accordance with licenses / permits.
- Follow sequencing shown on the construction drawings.
- Restore all disturbed areas using native plant species.

TEMPORARY WATERCOURSE DIVERSION – FLUME BYPASS

A flume bypass is a passive type of watercourse diversion that concentrates watercourse flows to a point where they enter a pipe or chute for conveyance, by gravity, around or through the work area. All methods of temporary diversion help maintain water quality by containing released sediment to the isolated, dry work area.

Potential permitting requirements

- A License to Collect Fish for Scientific Purposes and/or Wildlife Scientific Collector's Authorization are required from the MNRF in order to carry out any collection and relocation of fish or wildlife as part of in water works.
- The proposed works should be reviewed with the local CA and applicable permitting agencies, which may include DFO, MNRF and MECP (for species at risk sites or if water movement activities involved trigger Permit to Take Water requirements).

Planning

- Plan works to occur outside of the restricted activity fish timing windows (Table C1).
- Choose the temporary watercourse diversion that will have the least amount of disturbance to the waterbody and the surrounding area.
- Sequence the work to minimize the length of channel that will be bypassed.
- Use hydraulic modeling to determine the size and shape of the flume bypass. Refer to Appendix A for the specified flood risk calculation, which can be used to determine the design storm for sizing of WIBs and flumes, based on consideration of service life and the acceptable level of risk, which should be no greater than 5%. **A temporary flume bypass should, as a minimum, be sized to convey the 2 year event, unless otherwise approved by the relevant regulatory agency.**
- Include a contingency plan on the drawings documenting which flows will overtop the system, the steps to take in the event of a breach and a plan to remove the equipment and other material from the floodplain.
- Keep spill kits and spill response plan onsite in the event deleterious substances enter the water body.

Design

- See example of site set up in Figure C8 and "Flume Bypass" design detail in Figure C9.
- Ensure flume allows for fish passage.
- Install WIB at the inlet and outlet of the flume to prevent the entry of water into the work area.
- Install the outlet of the flume such that it facilitates the gradual and safe re-entry of fish into the watercourse or, alternatively, install a ministry-approved fish screen at the inlet so as to prevent fish from entering the flume.

Splash pads *dissipate energy* and *reduce erosion potential* at discharge locations.

They can be as simple as a patio stone, just don't forget to remove during decommissioning!

- Attempt to minimize erosion and turbidity at the outlet by installing a splash pad.
- Ensure that the designer / engineer documents any deviation from the approved design and keeps the documented changes on site.

Figure C8: Application of a flume bypass to divert stream flows around a dry work area

Installation

- Secure the pipe at intervals based on its length and size.
- Install the WIB starting from the banks working inwards towards the center of the channel.
- Ensure a tight seal where the pipe and the WIB meet.

Inspection and maintenance

- Inspect the flume system weekly after every rainfall and significant snowmelt event and keep a record of the inspection.
- Immediately remove any debris collected at the upstream end of the system.
- Repair concerns, any displacements or failures within 48 hours of being identified, or sooner if environmental receptors are at imminent and foreseeable risk of adverse impact.

Decommissioning

- Stabilize the new channel prior to the return of flows so as to minimize sediment released.
- Follow sequencing shown on the construction drawings.
- Restore all disturbed areas using native plant species.

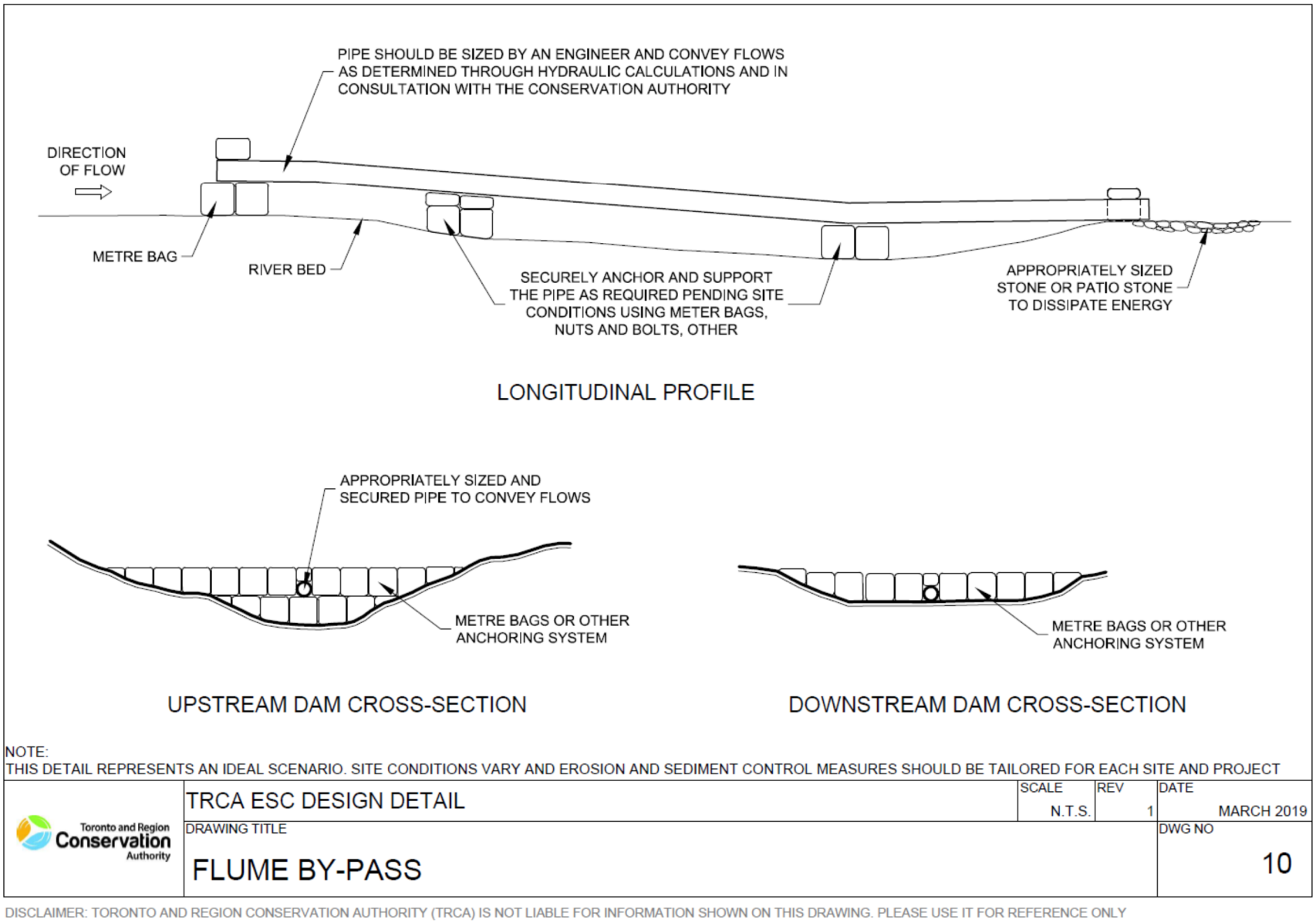


Figure C9: Design detail for application of a flume bypass to divert watercourse flows around a dry work area

TEMPORARY WATERCOURSE DIVERSION – BYPASS PUMPING

Bypass pumping is a type of temporary watercourse diversion that uses an electrical or fuel-powered generator to pump flows around the work area in order to create dry work area. All methods of temporary diversion help maintain water quality by containing sediment in the dry, isolated work area. Bypass pumping does not allow for fish passage and is most appropriate for short duration construction projects.

Potential permitting requirements

- Because this method does not allow for fish passage, fish collection and relocation activities are often necessary.
- A License to Collect Fish for Scientific Purposes and/or Wildlife Scientific Collector's Authorization are required from the MNRF in order to carry out any collection and relocation of fish or wildlife as part of in water works.
- The proposed works should be reviewed with the local CA and applicable permitting agencies, which may include DFO, MNRF and MECP (for species at risk sites or if water movement activities involved trigger Permit to Take Water requirements).

Planning

- Plan works to occur outside of the restricted activity fish timing windows (Table C1).
- Choose the temporary watercourse diversion that will have the least amount of disturbance to the waterbody and the surrounding area. Because bypass pumping does not allow for fish passage, it may not be appropriate in sensitive streams and should only be applied for short duration projects.
- Sequence the work to minimize the length of channel that will be bypassed.
- Use hydraulic modeling to determine the pump size and other system requirements. Refer to Appendix A for the specified flood risk calculation, which can be used to determine the design storm for sizing WIBs and determining capacity of pumps used during bypass pumping. The specified flood risk calculation is based on consideration of service life and the acceptable level of risk, which should be no greater than 5% for in water BMPs. **A temporary bypass pump system should, as a minimum, be sized to accommodate the 2 year event, unless otherwise approved by the relevant regulatory agency**.
- Include a contingency plan on the drawings documenting which flows will overtop the system, the steps to take in event of a breach and a plan to remove equipment and other material from the floodplain.
- Keep spill kits and a spill response plan on-site in the event deleterious substances enter the water body.

Design

- Refer to Figures C10 and C11 for examples of bypass pumping applications, and Figure C12 for a design detail for bypass pumping.
- The design should attempt to minimize erosion and turbidity at the outlet by installing a type of splash pad or by turning the discharging water upwards.

- In a fish-bearing stream, the pump intake must have a fish screen installed, operated, and maintained. Guidance on fish screens is available in Fisheries and Oceans Canada's *Freshwater Intake End-of-Pipe Fish Screen Guideline* (1995).
- Ensure that the designer / engineer documents any deviation from the approved design and keeps the documented changes on site.

Inspection and maintenance

- Back-up pumps may need to be on-site in the event of a pump failure.
- Pumps should be monitored regularly when they are running. If pumps are running continuously, a technician should be assigned to monitor the pumps – remotely or on site – after normal working hours.
- Any deficiencies should be rectified within 48 hours or sooner if environmental receptors are at imminent and foreseeable risk of adverse impact.

Decommissioning

- Ensure sediment removal and stabilization of work area is complete before the return of flows so as to minimize sediment released downstream.
- Follow sequencing shown on the construction drawings.
- Restore all disturbed areas using native plant species.

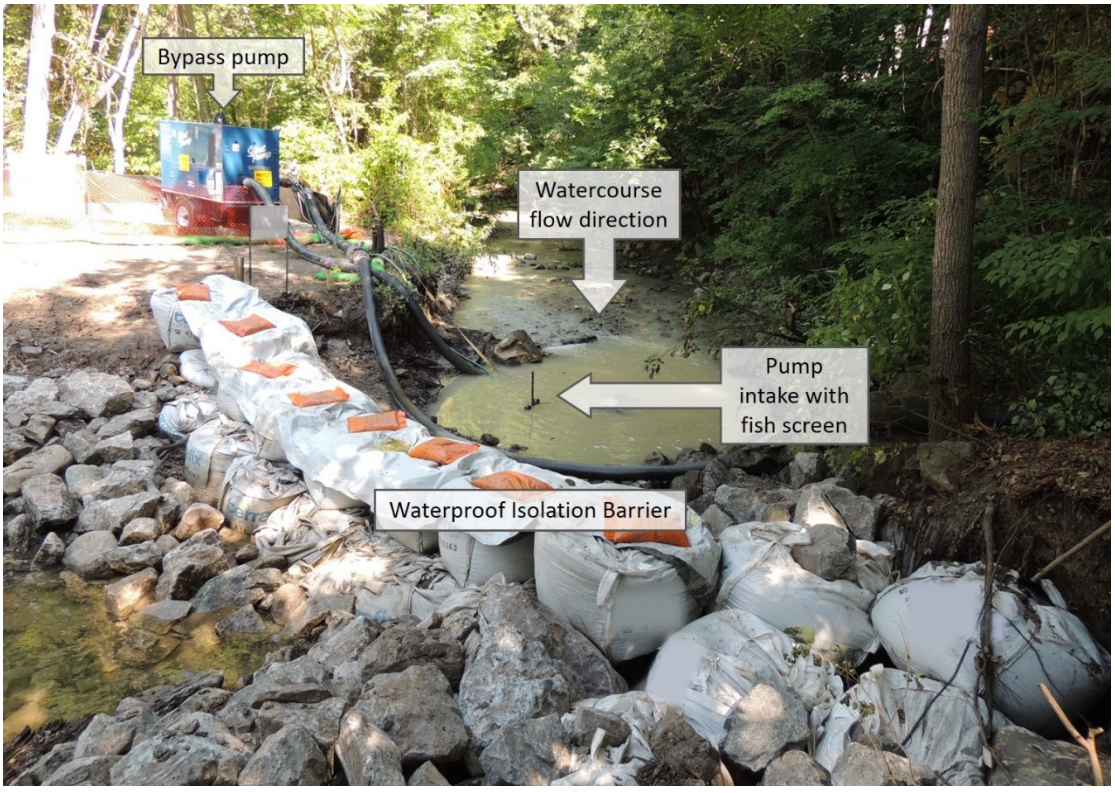


Figure C10: Bypass pumping to divert stream flows around an isolated work area

Figure C11: Energy dissipation at pump discharge location during bypass pumping

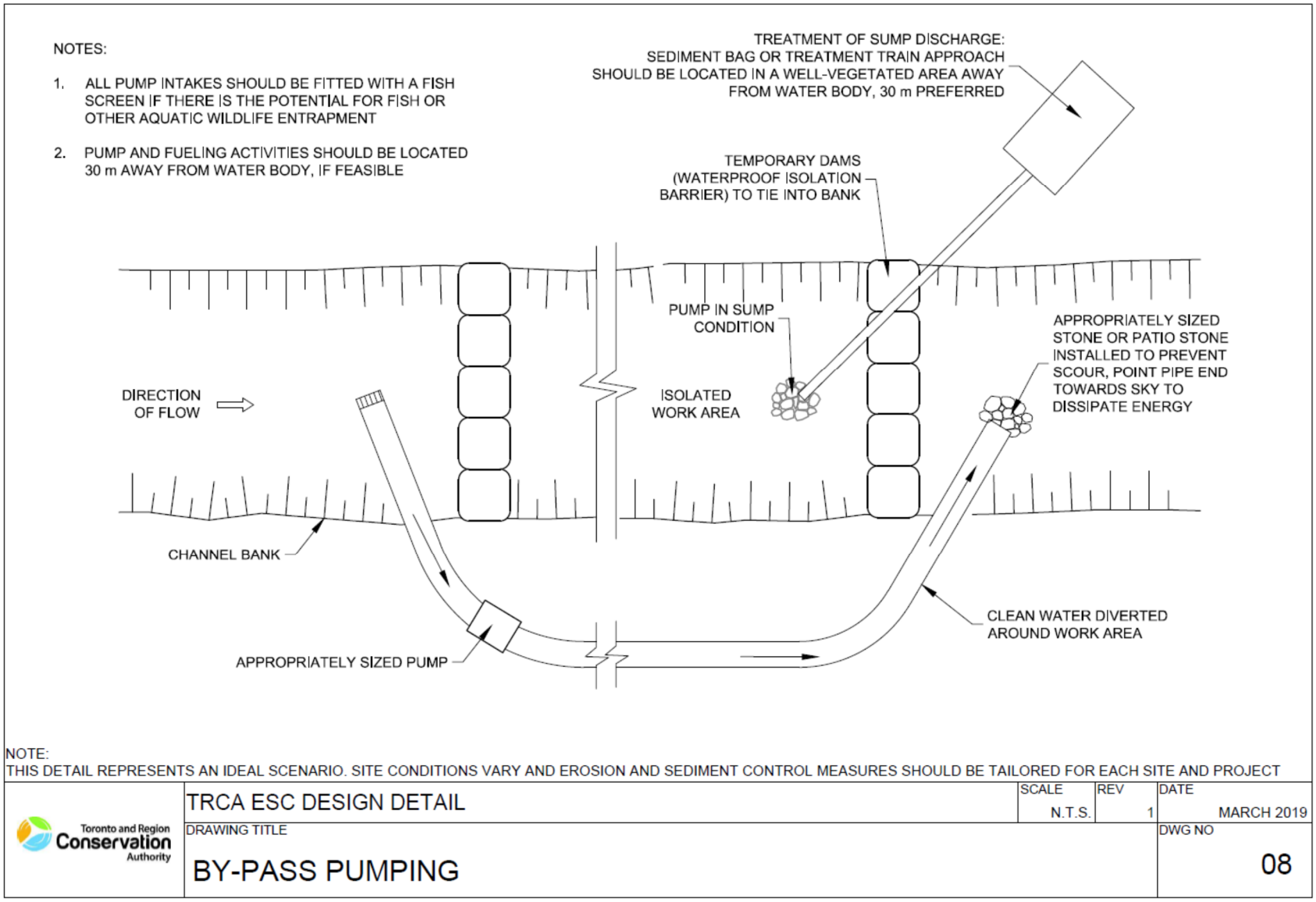


Figure C12: Design detail for watercourse diversion using bypass pumping and dewatering to maintain a dry isolated work area

SHEET PILE ISOLATION WALL

Steel sheet piles can be driven into the ground at the perimeter of an in-water work area to isolate it from the water body. Often times, sheet pile walls are used when major excavation is required such as for the construction of bridge abutments, piers and open cut installation. They are also installed when they will remain part of the structure and in smaller water bodies when the impacts of the installation and removal are predictable and there will be minimal disturbance.

Potential permitting requirements

- A License to Collect Fish for Scientific Purposes and/or Wildlife Scientific Collector's Authorization are required from the MNRF in order to carry out any collection and relocation of fish or wildlife as part of in water works.
- The proposed works should be reviewed with the local CA and applicable permitting agencies, which may include DFO, MNRF and MECP (for species at risk sites or if water movement activities involved trigger Permit to Take Water requirements).

Planning

- Plan works to occur outside of the restricted activity fish timing windows (Table C1).
- Use hydraulic modeling to determine the height of the wall. Refer to Appendix A for the specified flood risk calculation, which can be used to determine the design storm for sizing the wall, based on consideration of service life and the acceptable level of risk, which should be no greater than 5%. **A sheet pile isolation wall should, as a minimum, be sized to hold back flows from the 2 year event with some freeboard, unless otherwise approved by the relevant regulatory agency.**
- Include a contingency plan on the drawings documenting which flows will overtop the wall, the steps to take in the event of a breach and a plan to remove the equipment and other material from the floodplain.
- Anticipate a large staging area to stage the sheet piles, the wall components and the heavy machinery used to install it.
- Undertake a geotechnical investigation, if necessary, of the subsurface soil conditions and groundwater level elevations.
- Keep spill kits and spill response plan on-site in the event deleterious substances enter the water body.

Design

- See application of a sheet pile isolation wall in Figure C13.
- Consider using a brace on the inside depending on the height of the wall above grade and how deep the sheets will extend into the ground.

Installation considerations

- Ensure that the sheets are installed perpendicular to the ground.
- Use sheets that are in good condition.

Figure C13: Sheet pile isolation wall

- Confirm that the use of a vibratory hammer attachment is permitted as adjacent utilities or geotechnical constraints may prevent its use.
- Avoid pulling up or re-driving the sheets as this may compromise their shape.
- Ensure that the designer / engineer documents any deviation from the approved design and keeps the documented changes on site.
- Work from the top of bank and install in an upstream to downstream manner.

Inspection and maintenance

- Anticipate leaks if there were difficulties fitting sheets together.
- Inspect the sheet pile wall weekly, after every rainfall, significant snowmelt and during ice-out and keep a record of the inspection.
- Repair failures or breaches of the wall within 48 hours of being identified, or sooner if environmental receptors are at imminent and foreseeable risk of adverse impact.
- Keep additional erosion and sediment control measures on site.

Consider sustainability

Sheet piles can typically be reused on other projects, resulting in a significant reduction in waste generated on your project.

Decommissioning

- Remove the sheet piles in a downstream to upstream manner.
- Restore all disturbed areas using native plant species.

WATER-FILLED BLADDERS

(a.k.a. water-filled cofferdams, inflatable bladder dams)

Water-filled bladders are temporary barriers filled with available, on-site water that are placed within a water body to create a dry, isolated work area. They are best suited for use where flow velocities are low and water levels are not subject to large fluctuations.

Potential permitting requirements

- A License to Collect Fish for Scientific Purposes and/or Wildlife Scientific Collector's Authorization are required from the MNRF in order to carry out any collection and relocation of fish or wildlife as part of in water works.
- The proposed works should be reviewed with the local CA and applicable permitting agencies, which may include DFO, MNRF and MECP (for species at risk sites or if water movement activities involved trigger Permit to Take Water requirements).

Planning

- Plan works to occur outside of the restricted activity fish timing windows (Table C1).
- Use hydraulic modeling and manufacturer's recommendations to determine the size of the bladder. Refer to Appendix A for the specified flood risk calculation, which can be used to determine the design storm for sizing of water-filled bladders, based on consideration of service life and the acceptable level of risk, which should be no greater than 5%. **A water-filled bladder should, as a minimum, be sized to hold back flows from the 2 year event with some freeboard, unless otherwise approved by the relevant regulatory agency.**
- Use where flow velocities are low and water level fluctuations are predictable and insignificant.
- Provide a contingency plan on the drawings documenting which flows will overtop the barrier and outline the steps to take in the event of a breach including a plan to remove the equipment and other material from the floodplain.
- Keep spill kits and a spill response plan on-site in the event deleterious substances enter the water body.

Design

- See application of a water filled bladder shown in Figure C14.
- Adhere to design guidance provided by the product supplier.

Installation

- Install according to the manufacturer's recommendations.
- Ensure water bottom is level, free of debris or other material that may cause punctures or displacements prior to positioning.
- Fill any gaps with pea gravel bags to ensure a complete waterproof seal.

- Ensure that only one end of the bladder is anchored to the bank or shoreline at a higher elevation than the top of the bladder so that it doesn't obstruct flows during a high-flow event.
- Ensure there's room for water to expand if bladders are used during freezing conditions.

Figure C14: Work area isolation using water-filled bladders

Inspection and maintenance

- Inspect the effectiveness of the bladder prior to the commencement of works and thereafter weekly, after every rainfall and significant snowmelt event and keep a record of the inspection.
- Repair any displacements or failures within 48 hours of being identified, or sooner if environmental receptors are at imminent and foreseeable risk of adverse impact.
- Keep additional erosion and sediment control measures on site.
- Immediately remove any debris that has collected in front of the bladder.

Decommissioning

- Avoid releasing the water directly into the watercourse so as to avoid altering the temperature of the water body. Gradual release to an adjacent vegetated area is recommended in order to mitigate thermal impacts.
- Restore all disturbed areas using native plant species.

PORTABLE DAM SYSTEM

A portable dam system is comprised of a reinforced, impermeable liner anchored over top of a series of steel A-frames that are placed in the watercourse at pre-determined intervals. Through hydrostatic pressure, the system is held in place and a dry, isolated work area can then be created.

Potential permitting requirements

- A License to Collect Fish for Scientific Purposes and/or Wildlife Scientific Collector's Authorization are required from the MNRF in order to carry out any collection and relocation of fish or wildlife as part of in water works.
- The proposed works should be reviewed with the local CA and applicable permitting agencies, which may include DFO, MNRF and MECP (for species at risk sites or if water movement activities involved trigger Permit to Take Water requirements).

Planning

- Plan works to occur outside of the restricted activity fish timing windows (Table C1).
- Use hydraulic modeling and manufacturer's recommendations to determine the height of the portable dam system. Refer to Appendix A for the specified flood risk calculation, which can be used to determine the design storm for sizing of portable dams, based on consideration of service life and the acceptable level of risk, which should be no greater than 5%. **A portable dam system should, as a minimum, be sized to hold back flows from the 2 year event with some freeboard, unless otherwise approved by the relevant regulatory agency.**
- Provide a contingency plan on the drawings documenting which flows will overtop the structure and outline the steps to take in the event that high flows breach the barrier including a plan to remove equipment and other material from the floodplain.
- Keep spill kits and a spill response plan on-site in the event deleterious substances enter the water body.

Design

- See application of a portable dam shown in Figure C15.
- Adhere to design guidance provided by the product supplier.

Installation

- Install according to the manufacturer's recommendations.
- Ensure water bottom is mostly level and free of debris or other objects that may cause displacements. Generally the portable dam system is flexible enough to seal over irregular surfaces.

Inspection and maintenance

- Inspect the effectiveness of the portable dam system prior to the commencement of works and thereafter weekly, after every rainfall and significant snowmelt event and keep a record of the

inspection.

- Repair any displacements or failures within 48 hours of being identified, or sooner if environmental receptors are at imminent and foreseeable risk of adverse impact.
- Keep additional erosion and sediment control measures on site.

Decommissioning

- Decommission according to the manufacturer's recommendations.
- Restore all disturbed areas using native plant species.

Figure C15: Work area isolation with a portable dam system

APPENDIX D:

SUMMARY OF LEGISLATION RELEVANT TO EROSION AND SEDIMENT CONTROL

APPENDIX D: SUMMARY OF LEGISLATION RELEVANT TO ESC

The following subsections describe the primary federal, provincial and municipal legislation relevant to ESC during urban construction projects and how they regulate, or otherwise impact, sediment management activities. The list provided herein is not exhaustive, and additional legislation may apply to specific geographic areas or the regulation of certain activities occurring over the course of a construction project (e.g. fish collection during in-water projects).

Federal

Fisheries Act (R.S.C 1985)

The Fisheries Act is administered by the Federal Department of Fisheries and Oceans and has broad applicability to various activities that can impact fisheries and fisheries waters that (i) provide fish habitat or (ii) support fish habitat opportunities at any life stage. Canadian fisheries waters include "all waters in the fishing zones of Canada, all waters in the territorial sea of Canada and all internal waters of Canada." The Act was subject to significant changes in 2019, which resulted in the re-instatement of previously removed protections for all fish and fish habitat. The amended act also restored the prohibition of any harmful alteration, disruption or destruction of fish habitat (HADD), which had been removed in the last amendment to the Fisheries Act in 2013.

The Act requires that fish and fish habitat are protected during construction. With respect to construction activities and sediment management, some of the key sections of the Act are summarized below.

- **Section 34.4(1):** This section states that no person shall carry on any work, undertaking or activity, other than fishing, that results in the death of fish

- **Section 35(1):** This section states that no person shall carry on any work, undertaking or activity that results in the harmful alteration, disruption or destruction of fish habitat

The Act lists several exceptions to the prohibitions in sections 34(1) and 35(1), for example, section 35(2)(b) which allows the harmful activity to occur if it has been authorized by the Minister.

- **Section 36(3):** This section states: "No person shall deposit or permit the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where the deleterious substance or any other deleterious substance that results from the deposit of the deleterious substance may enter any such water." Deleterious substance is defined as follows:

  a) "any substance that, if added to any water, would degrade or alter or form part of a process of degradation or alteration of the quality of that water so that it is rendered or is likely to be rendered deleterious to fish or fish habitat or to the use by man of fish that frequent that water, or

  b) any water that contains a substance in such quantity or concentration, or that has been so treated, processed or changed, by heat or other means, from a natural state that it would, if added to any other water, degrade or alter or form part of a process of degradation or alteration of the quality of that water so that it is rendered or is likely to be rendered deleterious to fish or fish habitat or to the use by man of fish that frequent that water"

Construction site runoff could fall in line with this definition of deleterious substance if the concentrations of sediment and other adsorbed compounds (e.g. heavy metals, nutrients) were high enough to cause detriment to fish or fish habitat.

- **Sections 38(4) and 38(5).** These sections describe duties to notify the appropriate authority of any serious harm to fish – a violation of Section 35(1) – and any deposit of a deleterious substance – a violation of Section 36(3). The duty to notify applies to a person who owns, manages or has control of the work or a person who caused or contributed to the harm.

- **Section 38(6).** This section requires any person responsible for the harm in Section 38(4) or the deposit of deleterious material in Section 38(5) to take all reasonable measures to prevent the occurrence or to counteract, mitigate or remedy adverse effects resulting from the occurrence.

- **Section 78(6)**. This section describes the due diligence defence, stating "no person shall be convicted of an offence under this Act if the person establishes that the person (a) exercised all due diligence to prevent the commission of the offence; or (b) reasonably and honestly believed in the existence of facts that, if true, would render the person's conduct innocent. The concept of due diligence and a discussion of how it can be exercised is provided in Chapter 5.0 of the Guide.

Common construction activities that have the potential to result in violations of Sections 35(1) and 36(3) of the Act include:

- Realignment or intrusion into a stream channel;
- Restrictions to fluvial processes;
- Impacts to riparian corridors;
- Infilling of habitats, wetlands and coastal marshes;
- Channelizing and piping headwater inputs;
- Discharges of deleterious substances from construction sites, and
- Dewatering operations

For construction projects involving in or near water works, determining whether a Fisheries and Oceans Canada review and/or authorization is required must be done through an online self-screening process. This is discussed in Chapter 10.0.

Species At Risk Act (S.C. 2002)

Canada's Species At Risk Act (SARA) was created to "prevent wildlife species from being extirpated or becoming extinct, to provide for the recovery of wildlife species that are extirpated, endangered or threatened as a result of human activity, and to manage species of special concern to prevent them from becoming endangered or threatened." Environment and Climate Change Canada is responsible for the overall administration of SARA, however the Act gives Fisheries and Oceans Canada responsibility for the protection of aquatic species and habitat at risk.

The provisions in the Act that protect endangered, threatened or extirpated species apply automatically on federal lands and waters. On provincial, territorial or privately owned land, SARA applies only to the aquatic species and migratory birds (if also included in the Migratory Birds Convention Act) that are listed in Schedule 1 as endangered, threatened or extirpated. The Act does allow for other Schedule 1 species

to be protected on non-federal lands in cases where there is no provincial or territorial legislation in place that protects them, but it would require that an order be issued, which would require a public consultation process.

In addition to the protection of the individual species, SARA also contains provisions that protect their habitat. These provisions would apply to construction activities, and in water works in particular, occurring on sites that are known habitat for species at risk. The applicable provisions that protect habitat are:

- **Section 33.** No person shall damage or destroy the residence of one or more individuals of a wildlife species that is listed as an endangered species or a threatened species, or that is listed as an extirpated species if a recovery strategy has recommended the reintroduction of the species into the wild in Canada.
- **Section 58(1).** No person shall destroy any part of the critical habitat of any listed endangered species or of any listed threatened species — or of any listed extirpated species if a recovery strategy has recommended the reintroduction of the species into the wild in Canada — if:

    a) the critical habitat is on federal land, in the exclusive economic zone of Canada or on the continental shelf of Canada;
    b) the listed species is an aquatic species; or
    c) the listed species is a species of migratory birds protected by the Migratory Birds Convention Act, 1994.

In the Act, critical habitat is defined as: “the habitat that is necessary for the survival or recovery of a listed wildlife species and that is identified as the species’ critical habitat in the recovery strategy or in an action plan for the species.”

Fisheries and Oceans Canada has online mapping available that identifies aquatic species at risk habitat, and which can be used to determine whether a development site would be subject to SARA prohibitions. Where a development project requires the undertaking of activities prohibited under Sections 33 and 58(1) of SARA, approval is required from Fisheries and Oceans Canada. Construction activities that are being carried out in or near water can be screened using Fisheries and Oceans Canada’s online screening process in order to establish whether permits and/or authorizations under SARA or the Fisheries Act are required. The self-screening process should be undertaken prior to application for a SARA permit.

Environmental Protection Act (S.C. 1999)

Administered by Environment and Climate Change Canada and Health Canada, the Environmental Protection Act is defined as “an Act respecting pollution prevention and the protection of the environment and human health in order to contribute to sustainable development”. The Act also recognizes the importance of pollution prevention, and the management and control of toxic substances and hazardous waste, in reducing threats to Canada's ecosystems and biological diversity.

Section 64 of CEPA states:

“A substance is toxic if it is entering or may enter the environment in a quantity or concentration or under conditions that:

a) Have or may have an immediate or long-term harmful effect on the environment or its biological diversity;

b) Constitute or may constitute a danger to the environment on which life depends; or

c) Constitute or may constitute a danger to human life or health in Canada."

Navigation Protection Act (R.S.C. 1985)

The Navigation Protection Act regulates any interferences with navigation in Canada's navigable waters. Administered by Transport Canada, the Act was previously known as the Navigable Waters Protection Act until amendments came into effect in April 2014. Navigable water is defined as:

"A canal and any other body of water created or altered as a result of the construction of any work means a body of water, including a canal or any other body of water created or altered as a result of the construction of any work, that is used or where there is a reasonable likelihood that it will be used by vessels, in full or in part, for any part of the year as a means of transport or travel for commercial or recreational purposes, or as a means of transport or travel for Indigenous peoples of Canada exercising rights recognized and affirmed by section 35 of the Constitution Act, 1982, and

(a) there is public access, by land or by water;

(b) there is no such public access but there are two or more riparian owners; or

(c) Her Majesty in right of Canada or a province is the only riparian owner."

They are waterways that are able to be navigated by the public as a highway. When considering whether a waterway is navigable water, the Ministry takes into consideration its specific characteristics (e.g. whether it can accommodate a vessel based on size and dimensions) and any evidence that the waterway is, has been, or will be used for navigation by the public.

In the Act, some provisions are specific to navigable waters listed in the schedule, including lakes, rivers, riverines and parts of oceans that are known to be the busiest in Canada with respect to navigation. Works carried out in the water bodies listed in the schedule, require the Minister's approval if, after screening, it is determined that they will substantially interfere with navigation. In the Act, 'work' is defined as "any structure, device or thing, whether temporary or permanent, that is made by humans. It also includes the dumping of fill or the excavation of materials from the bed of any navigable water."

Water bodies not listed in the schedule do not require approval under the NPA, nor do works classified as 'minor works'. Minor works, which are defined in the Minor Works Order, are referred to as 'designated works' in the NPA. These projects may proceed without approval, even in scheduled water bodies, provided that the work is carried out in accordance with the legal requirements in the Order.

Under the Act, any construction activities that would interfere with navigation within scheduled navigable waters, and which cannot be classified as 'minor works', would require a 'Notice to the Minister' (of Transportation). The Ministry screens these projects to determine whether they should be allowed to proceed, whether they will require an approval, and what terms and conditions should be tied to the approval. The key sections of the Act that are the most relevant to construction site sediment management are provided below. The Act is most applicable to in water construction works, since these activities can directly interfere with navigation.

Section 3. It is prohibited to construct, place, alter, repair, rebuild, remove or decommission a work in, on, over, under, through or across any navigable water that is listed in the schedule except in accordance with this Act or any other federal Act.

Section 21. No person shall throw or deposit or cause, suffer or permit to be thrown or deposited any sawdust, edgings, slabs, bark or like rubbish of any description whatever that is liable to interfere with navigation in any water, any part of which is navigable or that flows into any navigable water.

Section 22. No person shall throw or deposit or cause, suffer or permit to be thrown or deposited any stone, gravel, earth, cinders, ashes or other material or rubbish that is liable to sink to the bottom in any water, any part of which is navigable or flows into any navigable water, where there is not a minimum depth of 36 metres of water at all times, but nothing in this section shall be construed so as to permit the throwing or depositing of any substance in any part of a navigable water if it is prohibited by or under any other federal Act.

Section 23. No person shall dewater any navigable water.

For construction activities that may interfere with navigable water, online self-screening through Transport Canada should be undertaken in order to determine if the works are permitted or whether they will require the issuance of a Navigation Protection Program approval.

Provincial

Water Resources Act (R.S.O. 1990)

The Ontario Water Resources Act (OWRA), administered by the Ontario Ministry of the Environment, Conservation and Parks (MECP), is the province's most significant legislation that regulates water quality and quantity. Its purpose, as stated in the Act itself is "to provide for the conservation, protection and management of Ontario's waters and for their efficient and sustainable use, in order to promote Ontario's long-term environmental, social and economic well-being".

The Act prohibits the discharge of polluting material in Section 30(1), which states:

"Every person that discharges or causes or permits the discharge of any material of any kind into or in any waters or on any shore or bank thereof or into or in any place that may impair the quality of the water of any waters is guilty of an offence."

To determine what is meant by impairment of the water, it is necessary to refer to Section 1(3) of the Act, which explains the circumstances under which water will be deemed to be impaired. It states:

"For the purposes of this Act, the quality of water shall be deemed to be impaired by the discharge of material if the material or a derivative of the material enters or may enter the water, directly or indirectly, and,

> (a) the material or derivative causes or may cause injury to or interference with any living organism that lives in or comes into contact with, (i) the water, or (ii) soil or sediment that is in contact with the water;

(b) the material or derivative causes or may cause injury to or interference with any living organism as a result of it using or consuming, (i) the water, (ii) soil or sediment that is in contact with the water, or (iii) any organism that lives in or comes into contact with the water or soil or sediment that is in contact with the water;

(c) the material or derivative causes or may cause a degradation in the appearance, taste or odour of the water;

(d) a scientific test that is generally accepted as a test of aquatic toxicity indicates that the material or derivative, in diluted or undiluted form, is toxic;

(e) peer-reviewed scientific publications indicate that the material or derivative causes injury to or interference with organisms that are dependent on aquatic ecosystems; or

(f) the material or derivative has a prescribed characteristic or is a prescribed material."

This definition is directly applicable to construction projects, since sediment and associated contaminants discharged from the site can cause injury to, and interference with, aquatic organisms and also cause degradation in the appearance of the water. The Act also requires, in Section 30(2), that the Ministry be notified when material that may impair the quality of the water escapes or is discharged.

The OWRA (section 34) also governs water taking/movement, which is a common occurrence during constructions projects, particularly when groundwater dewatering is required. Chapter 9.0 provides additional information on permits for water taking under the OWRA and when they are required.

Lakes and Rivers Improvement Act (R.S.O. 1990)

The Ontario Lakes and Rivers Improvement Act (LRIA) is administered by the Ontario Ministry of Natural Resources and Forestry. The Act regulates the management, protection, preservation and use of Ontario waters and the lands under them. It also provides for the management, perpetuation and use of the fish, wildlife and other natural resources dependent on lakes and rivers. One of its key focuses is the regulation of dams.

The LRIA requires an approval for the construction of a dam in any lakes and rivers in the province. As stated in Section 14(1), "No person shall construct a dam in any lake or river in circumstances set out in the regulations without the written approval of the Minister for the location of the dam and its plans and specifications."

This provision is highly relevant to in-water construction works which often require isolation of work areas through the damming and diversion of water in lakes and rivers. Because this approval requirement overlaps with the requirements for a Conservation Authority permit (see Chapter 10.0), the MNRF has determined that areas of the province that are within the jurisdiction of a CA do not have to apply for an LRIA section 14 approval. In areas of the province that are not CA jurisdiction, these kinds of projects would require Section 14 approval obtained directly form the MNRF.

The other LRIA provision that is relevant to construction activities is 36(1), which states: "No person shall throw, deposit, discharge or permit the throwing, depositing or discharging of any substance or matter in a lake or river, whether or not the lake or river is covered by ice, or on the shores or banks of a lake or river under circumstances that conflict with the purposes of this Act." Based on the stated purposes of the Act, which are primarily to protect and preserve lakes and rivers, the discharge of elevated concentrations of

sediment and associated contaminants from construction sites could be considered a violation of this section of the LRIA.

Environmental Protection Act (R.S.O. 1990)

The Ontario Environmental Protection Act (EPA), administered by the MECP, is one of the primary pieces of pollution control legislation in the province. It addresses various aspects of environmental protection, ranging from waste management to renewable energy. The EPA provisions that are most relevant to construction site sediment management are those that prohibit discharges of contaminants into the environment and those that address spills. The applicable provisions are:

Section 14(1). Subject to subsection (2) but despite any other provision of this Act or the regulations, a person shall not discharge a contaminant or cause or permit the discharge of a contaminant into the natural environment, if the discharge causes or may cause an adverse effect.

Section 92(1). Every person having control of a pollutant that is spilled and every person who spills or causes or permits a spill of a pollutant shall forthwith notify the following persons of the spill, of the circumstances thereof, and of the action that the person has taken or intends to take with respect thereto,

> (a) the Ministry;
>
> (b) any municipality within the boundaries of which the spill occurred or, if the spill occurred within the boundaries of a regional municipality, the regional municipality;
>
> (c) where the person is not the owner of the pollutant and knows or is able to ascertain readily the identity of the owner of the pollutant, the owner of the pollutant; and
>
> (d) where the person is not the person having control of the pollutant and knows or is able to ascertain readily the identity of the person having control of the pollutant, the person having control of the pollutant.

There are also several other provisions related to spills, including duties to have spills prevention plans – Section 91.1 – and to mitigate adverse effects arising from the spill and restore impacted areas - Section 93(1). Guidance on spills response and control plans is provided in Section 7.7.

Ontario Conservation Authorities Act (R.S.O 1990)

The Conservation Authorities Act, administered by the MNRF, was first passed in 1946 at which time it authorized the creation of Conservation Authorities (CAs) throughout Ontario. Under the Act, individual regulations have been passed for each CA entitled “Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses” (Ontario Regulations 42/06 and 146/06 to182/06). The regulations are meant to control flooding and to prevent property damage, erosion, pollution and loss of life. They allow CAs to regulate development and other activities taking place within valley and stream corridors, wetlands and associated areas of interference, and the Lake Ontario waterfront. These areas are often referred to collectively as the ‘regulated area’. The regulations made under the Act prohibit, regulate and require permission for:

- Straightening, changing, diverting or interfering in any way with the existing channel of a river, creek, stream or watercourse, or for changing or interfering in any way with a wetland.

- Development, if in the opinion of the authority, the control of flooding, erosion, dynamic beaches or pollution or the conservation of land may be affected by the development.

As such, construction activities that take place in an area regulated under the CA regulations require a permit, since these activities by their nature involve the movement and/or placement of fill and alteration of drainage patterns. These activities can have significant impacts on flooding risk, erosion, pollution and the conservation of land. Discharging stormwater into the regulated area may also require a CA permit even if the development itself is not being constructed in the regulated area, as these activities can increase risks of pollution, flooding and erosion.

Section 28(3) of the Conservation Authorities Act states that CAs, under their regulations, may issue permission that is subject to conditions that must be met, or the permit can be cancelled. Some examples of conditions that are typically applied include: the use of phased ESC plans, the implementation of inspections and maintenance programs, and adherence to construction timing windows.

Chapter 9.0 provides additional guidance on CA permits and regulated areas.

Ontario Endangered Species Act (S.O. 2007)

The Ontario Endangered Species Act (ESA) is administered by the MECP. Its purpose is to identify and protect species at risk and their habitats, and to promote recovery of these species and stewardship activities that will assist in their protection and recovery. Unlike the federal SARA, the Ontario ESA applies to any land – public or private – that contains, or provides habitat for, endangered species. Two regulations have been created under the Act: a general regulation under the ESA (O.Reg. 242/08) and the Species at Risk in Ontario List (O.Reg. 230/08). The latter lists all extirpated, endangered, threatened and special concern species in the province.

In the Act, the provision in Section 10 protects the habitat of species at risk, stating “No person shall damage or destroy the habitat of, (a) a species that is listed on the Species at Risk in Ontario List as an endangered or threatened species; or (b) a species that is listed on the Species at Risk in Ontario List as an extirpated species, if the species is prescribed by the regulations for the purpose of this clause.”

In Ontario development applications are screened to determine whether there are any at risk species on the site. If at risk species are believed to be on the site and/or have been observed on the site, the activities planned may require an Endangered Species Act permit or authorization. Permits and authorizations issued will often be subject to conditions and requirements based on MECP recommendations on procedures and protection measures that will best safeguard the species from harm.

In an effort to enhance the protection of aquatic species-at-risk during construction activities, the MNRF, in partnership with the Credit Valley Conservation Authority, MECP, and Fisheries and Oceans Canada, released a protocol titled *Silt Smart: Erosion and Sediment Control Effectiveness Monitoring and Rapid Response Protocol for Large Urban Development Sites (version 1.2)*. It outlines a consistent effectiveness monitoring methodology to protect the health of sensitive streams and habitats in areas undergoing large urban development. Based on this protocol, which was released in 2012, sensitive streams include those that support species-at-risk and coldwater species such as the provincially endangered Redside Dace, Atlantic Salmon and Brook Trout.

Planning Act (R.S.O. 1990)

The Planning Act, administered by the Ministry of Municipal Affairs and Housing, sets out the ground rules for land use planning in the province. It defines the parties who can control land use and how they can do so. It provides the basis for, among other things, preparing official plans, regulating and controlling land uses through zoning bylaws and minor variances, and dividing land into separate lots for sale or development through a plan of subdivision or a land severance. CAs are "public commenting bodies" under the Planning Act, which requires that they be notified regarding municipal policy documents and planning and development applications under the Act. As such, CAs provide comments to the municipality/planning approval authority on these documents and applications. The planning/development applications CAs are required to review and comment on often include ESC plans.

Section 3 of the *Planning Act* enables the province to issue policy statements on land use planning matters of provincial interest. The current Provincial Policy Statement (PPS), released in 2014, details several provincial interests that are relevant to ESC and environmental protection during land development in general. These include Natural Heritage (Section 2.1), Water (Section 2.2), and Natural Hazards (Section 3.1). Under each of these categories, the PPS lays out how these interests - the protection of natural heritage and water features and the protection of human health and infrastructure from natural hazards – must be addressed. All planning/land use decisions are required to be consistent with the PPS and provincial plans such as the Niagara Escarpment Plan (2017), the Oak Ridges Moraine Conservation Plan (2017), the Greenbelt Plan (2017), and the Growth Plan for the Greater Golden Horseshoe (2017).

Conservation authorities have been delegated the responsibility of representing the provincial interest on natural hazards encompassed by Section 3.1 of the PPS. As such, they are required to review and provide comments on municipal policy documents (e.g. Official Plans) and applications submitted pursuant to the Planning Act.

Municipal

Section 142 of the Municipal Act (S.O. 2001) grants municipalities the power to regulate "site alteration", and pass associated bylaws for activities and undertakings that disturb the natural ground conditions and alter soil sediment distribution. This section is comprehensive and proactive in controlling land-disturbing activities early in the development process. Bylaws require permits to be secured for site alterations that routinely require environmental assessments and as a condition of approval erosion and sediment control plan and/or Environmental Control Plan.

Each municipality has its own process to allow earthworks and the construction process to be initiated either through a top soil bylaw, tree removal bylaw, site alternation permit or pre-servicing agreements. The ESC plan forms a key component of this process and the land owner is required to meet the conditions of the identified municipal approval process. The conditions of the approval generally include a letter of credit for a predetermined percentage of the cost to implement, maintain and decommission the ESC plan.

APPENDIX E:

EROSION RISK ASSESSMENT APPROACHES

APPENDIX E: EROSION RISK ASSESSMENT APPROACHES

Revised Universal Soil Loss Equation (RUSLE) approach

A number of methods have been established to assess potential erosion (soil loss) within a defined geographic area, but the most common is the Revised Universal Soil Loss Equation (RUSLE). RUSLE evolved from the Universal Soil Loss Equation (USLE) - an empirical model which was developed in the 1960s by Walter H. Wischmeier and Dwight D. Smith. The revised version of USLE, released in 1992, is a computerized version of the model that incorporated improvements in many of the factor estimates.

RUSLE is used to calculate soil loss based on the five contributing factors described below, which are explained in detail in *Revised Universal Soil Loss Equation for Application in Canada (RUSLE FAC): A Handbook for Estimating Soil Loss from Water Erosion in Canada* (Wall et al., 2002). Guidance on performing RUSLE calculations for construction projects, including examples, are available in the City of Calgary Water Resources *Erosion and Sediment Control Guidelines* (2017).

The equation is:

$$A = R \times K \times LS \times C \times P$$

The factors/variables shown in the equation are defined as follows:

Soil loss (A) | Average annual soil loss for the defined geographic area, expressed as a weight per unit area (i.e. tonnes/hectare). This is the product of the other five factors described below.

Soil erodibility (K factor) | A quantifiable measure of how susceptible a soil is to erosion based on characteristics such as texture, structure, permeability, organic matter content, and the way the soil is affected by seasonal changes.

Slope (LS factor) | Based on site topography, this factor considers drainage patterns and the length, steepness and shape of the slopes in the study area.

Rainfall and runoff (R factor) | This factor considers the erosivity of rainfall and runoff, taking into account rainfall intensity and the volume of overland flow generated during the event. This factor also encompasses seasonal variations in the erosivity of rainfall events (e.g. high erosivity summer thunderstorms, high runoff generation during rain on frozen soils).

Crop and vegetation management factor (C factor) | Sometimes referred to as the 'cover' factor, this is a measure of how effective a given ground cover is at preventing erosion. While agricultural applications are primarily concerned with crop/vegetative cover, C factors have now been established for ground covers used in construction applications, like erosion control blankets.

Support practice factor (P Factor) | This factor considers practices applied to prevent soil loss by reducing runoff volumes and flow rates. In construction applications, support practices can be considered sediment control practices, particularly those that result in alterations of flow rates and pathways. Once potential soil loss is calculated based on the four factors above, the support practices are incorporated (as part of ESC plan development) in order to determine the extent to which they can help mitigate that anticipated soil loss.

Once soil loss is calculated for a defined geographic area using RUSLE, the values can be compared with those in Table E1 below from RUSLE FAC (2002). This allows for evaluation of the extent of soil loss/erosion expected and how it compares to the maximum tolerable soil losses defined in the

document. Based on the outcome of that assessment, additional support practices may need to be added if predicted erosion levels are too high. Alternatively, the C factor could be adjusted by increasing cover on bare soil areas to make them less vulnerable to erosion.

Table E1: Potential soil erosion classes

Soil erosion class	Potential soil loss (tonnes/ha/year)
Very low	< 6
Low	6 - 11
Moderate	11 - 22
High	22 - 33
Severe	> 33

Source: RUSLE for Application in Canada: *A Handbook for Estimating Soil Loss from Water Erosion in Canada* (Wall et al., 2002)

Ministry of Transportation's qualitative risk assessment approach

The Ontario Ministry of Transportation (MTO) has developed a qualitative approach to erosion risk assessment as part of their *Environmental Guide for Erosion and Sediment Control During Construction of Highway Projects* document (MTO, 2015). The approach is based on some of the factors defined in RUSLE and includes the following items:

i. An overview of the risk of a broad study area; and
ii. A detailed assessment of the construction project.

Overview risk assessment:

The overview risk assessment for erosion and sediment control is a general classification that can be applied to larger study areas or areas identified as having sensitive downstream receiving features. The overview risk assessment involves separating the study area into areas (polygons) of similar erosion potential and assigning an erosion potential risk rating (low, moderate or high) to each. The base map used to select polygons should be developed at a scale suitable to the size and topography of the study area. The scale should be sufficient to discern areas with different erosion risk levels. Polygon sizes between 0.5 and 10 ha are recommended. The method MTO outlined also involves determining a consequence rating for each polygon, which involves estimating the risk (low, moderate or high) of consequences occurring in the event of ESC failure within that polygon. The consequence rating is based on potential ecological, legal or project consequences. The assessment results are reported in a table where polygons are numbered and their associated erosion risk and consequence ratings are listed along with a brief justification for the ratings.

An overview report is also completed in support of the risk assessment and includes the following items:

i. Site Description
ii. Existing Conditions
iii. Anticipated Project Activities
iv. Considerations for ESC Plan Development

Additional guidance on how to establish polygons of like erosion potential is provided in Section 5.2 and Appendix B of MTO's *Environmental Guide for Erosion and Sediment Control During Construction of Highway Projects (2015)*.

Detailed assessment:

A detailed assessment is the final step within MTO's Risk Assessment and is done to determine the overall level of risk from construction activities and specifies the appropriate level of effort that is required as it relates to erosion and sediment control onsite. The detailed assessment is typically documented within a technical memo in support of the proposed construction activities.

Hybrid qualitative ERA approach

The approach detailed in this section represents a hybrid of the MTO approach and the RUSLE method described in Appendix E. While qualitative like the MTO approach (described in the 2015 *Environmental Guide for Erosion and Sediment Control During Construction of Highway Projects*), it differs in that it does not consider risk classification of consequences and is instead focused solely on estimating erosion risk. The hybrid approach involves the following steps:

1) Dividing the site into polygons of like erosion potential that are delineated by using topographical and soils maps and aerial photographs. The base map used to select polygons should be developed at a scale suitable to the size and topography of the study area. The scale should be sufficient to discern areas with different erosion risk levels. Polygon sizes between 0.5 and 10 ha are recommended.
2) For each polygon, compile data on soil characteristics (K factor), topography (LS factor), and anticipated ground cover, if any (C factor).
3) Using the risk classification tables provided in section 6.2.3 of the *ESC Guide for Urban Construction* (2019), rate each polygon as having a high, moderate, or low risk of erosion.
4) Select best practices most appropriate for mitigating erosion based on the estimated risk. See BMP selection guidance in table 6.6 of the Guide.
5) Prepare ESC plan, specifying best practices for each polygon based on what is determined through the hybrid ERA approach.
6) Repeat this process for each construction stage with a distinct ESC plan, e.g. topsoil stripping & grading, site servicing, building construction.

APPENDIX F: ESC INSPECTION REPORT TEMPLATE

ESC INSPECTION REPORT TEMPLATE

Date:_____ Weather/Time:_____

Project Site:_____ Reason for Visit:_____

Inspector Name:_____

Recipients:

List of report recipients and e-mail

ACTION ITEMS:

Item Number	Location	Description	Date	Completion Date	Weeks Recurring

a table listing active/ongoing maintenance, repair and replacement requirements can be used to summarize a detailed report. This can provide quick reference "Checklist/To Do" for the contractor.

Detailed ESC Report to Follow:

Item #:

Clear and concise description of what should be done…action item including a representative date stamped photo of the concern.

This should be done for each item every inspection.

MAP – *attach a site plan/drawing and note the action items (new and recurring) that appear on the corresponding inspection report to ensure locations of corrective/actions items are clear. This is particularly useful for large projects.*

Signature_____ Date_____

APPENDIX G:
RESTORATION GUIDELINES

APPENDIX G: RESTORATION GUIDELINES

A. Restoration Planning, Implementation and Monitoring

Through the planning and/or permitting of a project, areas are often identified for restoration to mitigate development impacts or to enhance the natural heritage system. These areas include sites outside the existing natural features including the buffer and sites within the natural heritage system where construction disturbance was deemed unavoidable. The goal of restoration work is to establish natural self-sustaining vegetation that contributes to the surrounding ecosystem function and provides valuable habitat. Many resources go into the design and implementation of restoration projects and these projects require thoughtful planning, proper implementation as well as post-construction monitoring and maintenance.

1. Planning

It is critical to the success of any restoration project that the site conditions are well understood by the designers and that appropriate plants are selected. Existing habitat conditions must be considered as well as post-development conditions which may affect plantings. Drawings must include a plan view showing planting locations, species (common and scientific names) and numbers. Soil preparation requirements, the type of planting stock, the appropriate timing of planting and seed application as well as any relevant planting details should also be included.

Plant selection and project design should be completed based on the following:

i. Soil type should be determined and the health of the soils should be assessed to properly plan for soil amendments or any site preparation that will be required. TRCA's *Preserving and Restoring Healthy Soil: Best Practices for Urban Construction* is a valuable resource regarding the creation a healthy soil environment following construction.
ii. As soil compaction from construction activities is a key limiting factor to the success and establishment of restoration plantings, the remediation of compaction must be considered at the design stage and outlined on the plans.
iii. Plants should be native species and suitable given the soil, moisture, and light conditions of the site as well as any site specific stressors. Cultivars of native species are generally not acceptable and invasive species are not permitted. Rare species should be avoided as well as species that are often mislabeled including *Viburnum trilobum* and *Celastrus scandens*.
iv. Planting plans should be based on natural vegetation communities found in the region and plant groupings should be selected accordingly. Designers should consider the natural features on the site and in the adjacent areas as well as have an understanding of existing vegetation communities and the landscape context. Plants should be arranged in a layout that mimics natural conditions.
v. A range of early successional plants should be used to provide the biodiversity necessary to support the development of a future natural self-sustaining community. Late successional species should be included in areas where a source of seed does not exist in order to promote succession but should not make up the majority of species in the plant list.
vi. Where possible, native species can be salvaged from the area to be developed and used as part of the restoration planting. If the area is composed of native plant species, it may also be possible to salvage sod mats as a source of seed and an effective erosion control measure.
vii. Planting densities should achieve full coverage of the site with shrubs planted at 1 metre on centre and trees planted at 5 metres on centre. Higher densities are required for live stake plantings and lower densities or nodal plantings may be acceptable depending on the targeted community and the size of the area to be restored.
viii. Predation and herbaceous competition can limit the growth and survival of planted material,

especially in the initial years following planting. The need for mulch and rodent guards must be assessed in order to protect young tree stems. In some cases, larger planting stock may be the only way to outcompete and ensure planting success.

ix. In areas where invasive species are a particular problem, eradication of these species may become a component of the restoration initiative.

x. To inhibit the establishment of invasive species within a restoration area, all exposed soils should be stabilized with a native seed mix that includes a nurse crop.

2. Implementation

Even with good design, proper implementation is necessary to ensure long-term success of the planted material.

i. Following construction, soil conditions should be reassessed prior to planting to evaluate the amount of soil compaction and/or the need for soil amendments. Soil compaction remediation as well as the addition of fertile soil or amendments will be needed if the area to be restored was part of the active construction site.

ii. The location of restoration work and the type of plant material will determine the timing of the planting. The following should be considered when scheduling the restoration work:
   - Bareroot stock and live stakes should only be installed while dormant in spring or after leaf fall in autumn.
   - Planting during wetter months (May and September) is ideal. Balled and burlapped as well as container-grown stock can be installed at any time during the growing season, if adequate water is supplied.

iii. Seeding should occur as soon as possible following the completion of work. Seed mixes should not be applied during the drought-prone season (i.e. June through August), unless adequate irrigation can be supplied. Works occurring during the summer and winter months should specify interim erosion control measures.

3. Post-Construction Monitoring and Maintenance

While properly selected native plant material will become resilient to climatic variations, all newly planted plants are sensitive until sufficient root growth has developed. Because planting is stressful on the plant material, a certain amount of mortality is expected in any restoration project. Monitoring and maintenance are integral to a successful project.

i. After seed has been applied to a restoration site, a follow-up monitoring visit should be conducted to ensure that the seed has been effective at stabilizing the site. Reseeding should be completed at this point, if required.

ii. While balled and burlapped or container-grown stock can be planted throughout the planting season, weather conditions must be monitored to ensure adequate rainfall once the planting is complete. Watering should be planned for any dry periods until plants become established. Plants are most susceptible in the first growing season but remain sensitive for the first 2-3 years after planting.

iii. The levels of invasive species should also be monitored. If invasive species begin to dominate the site or limit plant survivorship, invasive species control should be implemented.

iv. A two-year plant warrantee is standard at nurseries but is ineffective without monitoring of the restoration site. The restoration site should be monitored several times a year during the plant warrantee period and any dead stock replaced before the two year period expires.

B. Seed Mix Selection

An important part of almost all restoration work is the selection of an appropriate seed mix to stabilize the ground, deter the introduction of persistent invasive species and to contribute to the future biodiversity of the area being restored. Without proper stabilization of a site, adjacent natural areas may be negatively affected through sedimentation as well as through the invasion of aggressive exotic species. Proper stabilization immediately following construction will also limit erosion and promote slope stability.

Factors to consider in seed selection:

i. Seed mixes generally must be comprised of native species. Persistent non-native invasive species are not acceptable (see table below).
ii. Species should be compatible and complementary to the existing vegetation communities in the surrounding area. In urban areas or areas where invasive species are pervasive, the seed mix composition should include species that are able to establish quickly and outcompete unwanted vegetation.
iii. The seed mix must contain species that are suitable to the local soil type, moisture, and light conditions.
iv. An annual nurse crop that germinates easily and will not persist on the site should be selected to ensure quick soil stabilization.

The following species are aggressive exotic species and seed mixes containing these species should not be selected. Please note that this list does not represent all problem g species and species not listed here may also be deemed unacceptable. Contact the local CA for a list of species native to the area.

Scientific Name	Common Name	Scientific Name	Common Name
Agrostis gigantea	red top	*Poa pratensis ssp. pratensis*	Kentucky blue grass
Bromus inermis ssp. inermis	smooth brome grass	*Setaria faberi*	giant foxtail
Carex spicata	spiked or European meadow sedge	*Setaria glauca (S. pumila)*	yellow foxtail
Dactylis glomerata	orchard grass	*Setaria italica*	foxtail millet
Elymus repens (Agropyron repens; Elytrigia repens)	quack grass	*Setaria verticillata var. verticillata*	bristly foxtail
Festuca rubra	(creeping) red fescue	*Setaria viridis*	green foxtail
Glyceria maxima	giant or rough manna grass	*Trifolium arvense*	rabbit-foot clover
Juncus compressus	round-fruited or compressed rush	*Trifolium aureum (T. agrarium)*	hop-clover
Linum perenne	perennial flax	*Trifolium campestre*	large hop-clover
Linum usitatissimum	common flax	*Trifolium hybridum*	alsike clover
Lotus corniculatus	bird's foot trefoil	*Trifolium incarnatum*	crimson clover
Melilotus alba	white sweet clover	*Trifolium medium*	zig-zag clover
Melilotus officinalis	yellow sweet clover	*Vicia cracca*	cow, tufted, or bird vetch
Phalaris arundinacea	reed canary grass		

APPENDIX H: REFERENCES LIST

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Item 7.10

Section I – Items for Board of Directors Action

TO: Chair and Members of the Board of Directors
Meeting #3/20, Friday, April 24, 2020

FROM: John MacKenzie, Chief Executive Officer

RE: **PEEL CLIMATE CHANGE PARTNERSHIP TERMS OF REFERENCE UPDATE**

KEY ISSUE

Update on Toronto and Region Conservation Authority's continued participation in the Peel Climate Change Partnership and Board of Directors endorsement of the associated Terms of Reference Update.

RECOMMENDATION

THAT Toronto and Region Conservation Authority's (TRCA) continued participation, as a member of the Peel Climate Change Partnership, be endorsed;

THAT the Peel Climate Change Partnership Terms of Reference attached as Appendix I to the report, titled "Peel Climate Change Partnership Terms of Reference Update", be endorsed;

AND FURTHER THAT that a copy of this resolution be forwarded to the Partnership Member Organizations being the City of Mississauga, City of Brampton, Town of Caledon, Credit Valley Conservation, and the Region of Peel.

BACKGROUND

Since 2009, the Member Organizations of the Peel Climate Change Partnership (PCCP) have included the City of Mississauga, City of Brampton, Town of Caledon, Credit Valley Conservation, Toronto and Region Conservation Authority (TRCA) and the Region of Peel. Building upon the Region of Peel's Service Strategy Business Plan to address climate change adaptation and mitigation, the Region of Peel, together with the partners above, worked together to develop the Peel Climate Change Partnership ("the Partnership") in 2011. The Partnership built on ongoing and previous plans, policies and actions being undertaken by the six partners, intended to allow the scaling of practices within the region. Through the collaborative efforts of the Partnership, many of the priority actions outlined in the Region of Peel's Service Strategy Business Plan were implemented, including the development of a climate trends and futures report, cross sector community climate change vulnerability assessments, and a community greenhouse gas emissions inventory.

In 2017, the Partnership determined that a renewal of its original commitment was required in order to achieve greater collective impact over the next five years. The purpose of the Partnership is to identify those areas in which strategic collaboration will be most advantageous.

At Board of Directors Meeting #4/18, held on May 25, 2018, Resolution #A72/18 was approved in part as follows:

> *THAT the Region of Peel Community Climate Change Partnership Plan be approved, in principle;*

THAT staff be directed to continue to work with partners to achieve the desired outcomes established in the Plan;

The Partnership recently completed an update of its Terms of Reference to refresh its mandate and purpose, confirm ongoing value to members, review scope of priority work, and increase accountability. The Partnership Terms of Reference review occurred over several months in 2019, as a collective undertaking, and guided by a Working Group of executive leaders across the Partnership. The updated Peel Climate Change Partnership Terms of Reference (Attachment 1) and current Governance Structure (Attachment 2) were unanimously approved in principle by the Partnership's Steering Committee in December 2019.

RATIONALE

In order to focus member efforts, the Partnership has developed three strategies that partners align their work with: the Low Carbon Communities Strategy; the Green/Natural Infrastructure Strategy; and, the Flood Resiliency Strategy. TRCA has played, and continues to play, a key role in the development and implementation of these three strategies. By aligning work with Partnership strategies, TRCA ensures that staff efforts and resources support the needs and priorities of the Region of Peel and partner municipalities, while also maximizing the impacts of this work by coordinating with Partnership members. TRCA staff are working to enact the three current PCCP strategies through a variety of mechanisms and roles.

- **Low Carbon Communities Strategy** – TRCA is co-lead of the Low Carbon Communities Strategy, with the Town of Caledon. As part of this Strategy, TRCA is project managing the development of a Regional Zero Emission Vehicles (ZEV) Strategy to accelerate the adoption of ZEVs in Peel Region. This work includes policy review and alignment mapping (complete), research and data analysis (currently underway) and hosting an action prioritization workshop and focus groups, as well as report synthesis and supporting implementation (to be completed). The ZEV Strategy is complemented by a recent joint grant application that was made by Partnership members to the Natural Resources Canada Zero Emission Vehicle Infrastructure Program for partial funding to install electric vehicle charging stations across Peel Region over the next 18 months. By working through the Partnership, minimum requirements for grant eligibility were exceeded.

- **Green/Natural Infrastructure Strategy** - The goal of the Green/Natural Infrastructure Strategy is to increase tree canopy to mitigate extreme heat and provide multiple co-benefits in high priority neighbourhoods in Peel Region. This strategy is co-led by TRCA, with the Region of Peel. Planting of street trees and stewardship efforts are targeting communities within Mississauga (Derry Rd E/Airport Rd), Brampton (Mavis/Hwy 407) and Caledon (Mayfield Rd/Hwy 50). As part of this Strategy, TRCA has worked to create a heat vulnerability index to identify, and support the selection of, these heat vulnerable areas in Peel. TRCA and partner staff are now in the process of forming implementation teams that can undertake community consultation and tree planting. This work is also complemented by the development of urban forest best practice manuals, being developed in collaboration with relevant partners, including the Region of Peel, local municipalities and both Conservation Authorities

- **Flood Resiliency Strategy** – The Flood Resiliency Strategy aims to strengthen the integrated approach to water management for collective action in reducing flood risk in priority areas and is led by Credit Valley Conservation. TRCA's work in flood outreach and flood emergency management, in partnership with the municipalities of Caledon,

Brampton, and Mississauga, supports the objectives of this Strategy. As co-lead of the Emergency Preparedness component of the Flood Resiliency Strategy, TRCA staff conducted outreach efforts, including public open houses, in partnership with municipalities, for priority Flood Vulnerable Areas in Peel Region during Q1 2020. TRCA will be sharing lessons learned from this work with Partnership members and will also be initiating working groups to address technical, communications and training gaps identified by Partnership members related to emergency preparedness.

Relationship to Building the Living City, the TRCA 2013-2022 Strategic Plan
This report supports the following strategies set forth in the TRCA 2013-2022 Strategic Plan:
Strategy 1 – Green the Toronto region's economy
Strategy 2 – Manage our regional water resources for current and future generations
Strategy 7 – Build partnerships and new business models
Strategy 8 – Gather and share the best sustainability knowledge

FINANCIAL DETAILS
TRCA leverages the special levy climate change funding provided by the Region to further activities that are in-line with Partnership objectives. In addition, TRCA pursues external funding through grant or other programs, where applicable and appropriate.

DETAILS OF WORK TO BE DONE
The Partnership strategies and associated work described above extend until 2022.

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Date: March 13, 2020
Attachments: 2

Attachment 1: Peel Climate Change Partnership Terms of Reference
Attachment 2: Peel Climate Change Governance Structure

Peel Climate Change Partnership

Terms of Reference – Updated December 2019

2018 - 2022

1-9-2020

Peel Climate Change Partnership Terms of Reference

2018 - 2022

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Peel Climate Change Partnership Terms of Reference
2018 - 2022

1 Context

The Peel Climate Change Partnership (PCCP or Partnership) is designed to build and accelerate innovative climate solutions in the geographic region of Peel. By leveraging resources and expertise from the six (6) member organizations, the Region of Peel, Town of Caledon, City of Brampton, City of Mississauga, Toronto and Region Conservation Authority and Credit Valley Conservation, the Partnership embraces the opportunity to align with, and accelerate the outcomes of Member Organizations' climate change plans and initiatives; as well as pursue strategic actions that transcend political boundaries and collectively produce greater results.

In June of 2011, the Partnership produced a key document, the Peel Climate Change Strategy, a Strategic Plan for Climate Change for the geographic region of Peel. The strategy recognized the urgent need to respond to climate change at the local level and the importance of the leadership of all our Member Organizations to ensure that the Strategic Plan becomes reality. Over the past eight (8) years, significant outputs of the Strategic Plan's collective implementation include an inventory of greenhouse gas (GHG) emissions for the geographic region of Peel as well as analysis of vulnerability of various systems to climate change to guide priority actions.

In more recent years, the PCCP has developed three (3) key strategies/priorities to focus our shared efforts given the limited resources supporting the Partnership activities. They are: GHG emissions reduction through low carbon communities; increasing flood resiliency; and, increasing green infrastructure. Each strategy has a corresponding and Partnership-approved work plan. During this time, Member Organizations have also made significant progress on accelerating climate action by finalizing their own climate change plans[1] and recently declaring climate change emergencies locally and at the regional level[2].

While each Member Organization may have projects that also address these three (3) areas of activity, the specific actions under each of the three (3) are being pursued as shared priorities across the region. Increasing climate change knowledge and awareness of the public is an ongoing area of interest and will be an important consideration when the Partnership reviews its communication objectives and priorities in early 2020.

The PCCP has been guided throughout its tenure by a Steering Committee comprised of decision makers for each Member Organization and Technical Implementation Teams that develop and undertake the various strategies and actions. It has been several years since the Terms of Reference for the Steering Committee was developed and the PCCP recognized it was important to renew the document and further articulate the roles and responsibilities of the members in the context of the Partnership as a whole.

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[1] City of Brampton: Community Energy and Emissions Reduction Plan
Town of Caledon: Community Climate Change Action Plan
City of Mississauga: Climate Change Action Plan
Region of Peel: Climate Change Master Plan

[2] Climate change emergencies have been declared by the City of Mississauga, City of Brampton and Region of Peel

Peel Climate Change Partnership Terms of Reference

2018 - 2022

2 Mandate

Governed by pre-existing mandates of each Member Organization, the mandate of the Peel Climate Change Partnership is to courageously lead, communicate and work collaboratively with key stakeholders to drive local climate action and secure investment that enables the rapid and equitable transformation of municipalities and broader community, within the Region of Peel, to become low carbon and resilient.

3 Scope

The PCCP has developed the following three (3) key strategies/priorities to focus shared activities:

1. Reducing community GHG emissions;
2. Increasing flood resiliency; and
3. Increasing green infrastructure*.

4 Purpose

In the current term of the Peel Climate Change Partnership (2018 – 2022), the purpose of the PCCP is to amplify influence on policy reform and develop/implement best practice to:

1. accelerate the reduction of community GHG emissions within the portfolios of buildings and vehicles to support the GHG reduction targets of Member Organizations' climate change plans;
2. be better prepared for extreme weather and changing climate, specifically as it relates to increased flood risk and intense heat; and
3. measure, report and communicate progress towards achieving GHG reduction targets and increasing resiliency.

5 Membership

Member organizations of the Peel Climate Change Partnership are:

- City of Brampton;
- City of Mississauga;
- Town of Caledon;
- Region of Peel;
- Credit Valley Conservation; and
- Toronto and Region Conservation Authority

The Partnership will regularly assess the organizational composition to determine if broader representation from other sectors such as business, utility, not-for profit, broader public sector, etc. would be beneficial.

* Green Infrastructure, as employed by the PCCP, is defined in the PCCP's *Green and Natural Infrastructure Strategy*.

5.1 Value for Each Member

Region of Peel: *Influence and Alignment* - The PCCP offers the opportunities for elected or executive leadership participation in the celebration of milestones that inspires greater commitment and accelerates the shared climate change agenda; and that the PCCP pursues activities that cannot effectively be undertaken by any single member and are in clear alignment with achieving priorities of the Region's Climate Change Master Plan.

City of Brampton: *Share Knowledge and Accelerate Climate Change Actions* – The Partnership can support the development of municipal strategies, programs and plans through sharing knowledge and best practices in climate change adaptation and mitigation. The Partnership will also support local action through identifying opportunities and establishing partnerships to accelerate municipal climate change adaptation and mitigation actions that align with regional strategies.

Credit Valley Conservation: *Increased Technical Capacity* – A strategic venue to further protect watershed resources from flooding impacts; accelerate the transition from carbon-based fuel and reduce GHGs in order to slow the impacts of climate change on watershed resources; and further protect watershed resources and watershed residents from heat impacts associated with climate change.

City of Mississauga: *Support and Accelerate Local Climate Change Priorities* – To support the implementation of actions within Mississauga's Climate Change Action Plan that have regional opportunities: collective efforts that support research, strategies and shared services that cross boundaries (e.g. ZEV Strategy); create opportunities for bulk green procurement purchases (e.g. fleet, equipment); strengthen funding opportunities by taking regional approach and partnership model (multi-municipal and conservation authorities as applicants); and, for building a climate community of practice to share knowledge and influence.

Town of Caledon: *Enhanced Capacity* - This strategic Partnership allows the Town to enhance its ability to reduce community greenhouse gas emissions and adapt to changing climate patterns. Specifically, this Partnership allows for the development of consistent approaches that can be adopted across member organizations to decarbonize the transportation and buildings sector, fostering strategic decisions that increase impact Regionwide. In addition, the Partnership allows the Town to leverage the technical skills to inform climate change adaptation efforts, such as the development of stormwater and flood management programs.

TRCA - *Regional coordination to support and accelerate climate action* - Partnership offers a mechanism to support municipal partners with evidence-based science, policy development, and implementation mechanisms to accelerate collective impact on climate action. Facilitate connections on climate action work between Peel Region, CVC and other municipalities in the TRCA Region.

Peel Climate Change Partnership Terms of Reference
2018 - 2022

6 Governance

6.1 Structure

The PCCP shall be comprised of a Steering Committee, a Secretariat and an Implementation Team: Strategy Champions, Strategy Leads and Technical Support Teams. **See Appendix 1**. Updates to staff representation within the Partnership structure will be made, as needed.

6.1.1 Steering Committee

Includes one (1) Chairperson (see section 6.1.1.1) and one (1) or two (2) executive leadership representatives from each PCCP Member Organization as primary Steering Committee members.

Alternates for primary Steering Committee members are the Strategy Champions (see below).

It is expected that PCCP Steering Committee members are decision makers within their respective Member Organizations.

Each PCCP Member Organization may replace and/or substitute PCCP Steering Committee members at any time.

6.1.1.1 PCCP Chairperson

The Chairperson for the PCCP shall be one (1) of the primary Steering Committee members and will count as one (1) of the two (2) Steering Committee members from that Member Organization.

The Chairperson of the PCCP Steering Committee will rotate between the Member Organizations and each Chairperson will serve for one (1) year, starting each October, based on the following schedule:

Organization	Year
Town of Caledon	2019
Region of Peel	2020
City of Mississauga	2021
City of Brampton	2022
Credit Valley Conservation	2023
Toronto and Region Conservation Authority	2024

6.1.2 Secretariat

Includes one (1) Director and select staff from the Office of Climate Change and Energy Management at the Region of Peel.

6.1.3 Strategy Champions

One (1) senior staff person from each of the PCCP Member Organizations; alternates to Steering Committee members.

6.1.4 Strategy Leads

One (1) staff from a PCCP Member Organization for each strategy in any given PCCP term.

6.1.5 Technical Support Teams

Staff from various organizations, mainly, but not necessarily limited to, PCCP Member Organizations.

6.2 Decision Making Process

Decisions of the PCCP Steering Committee will be based on consensus of Member Organizations, with each Member Organization having one (1) vote. The aim will be to have general agreement from all Steering Committee members or alternates, and Secretariat Director and Strategy Champions, if present at Steering Committee meetings, on matters and direction of the Partnership. If there is no general level of agreement, a vote will be called to reflect the majority based on the following continuum:

a) Fully support the matter;
b) The matter is acceptable;
c) More information or discussion is still warranted;
d) Can neither support or accept the matter.

After this voting process, if there is no majority, the final decision will be determined by the PCCP Steering Committee or alternates **only** and reflect the majority based on the above exercise. Specifically, (a) fully support the matter, (b) the matter is acceptable, will be considered votes to proceed, and (c) more information or discussion is still warranted, and (d) can neither support nor accept the matter, will be considered votes to not proceed with the matter.

6.3 Quorum

Quorum for PCCP Steering Committee shall be based on a majority of Member Organizations (50% representation from Member Organizations plus one). For greater clarity, quorum will be achieved when at least four (4) Steering Committee members or alternates from different Member Organizations are in attendance.

PCCP Steering Committee members are expected to attend all regularly scheduled meetings or send an alternate on their behalf. In the event that a Committee member or alternate is unable to attend a meeting, the member must contact and advise the PCCP Secretariat. If a Committee member or their alternate has been absent for three (3) consecutive regularly scheduled meetings and has failed to advise the PCCP Secretariat in advance, the member shall be deemed to have abandoned his or her membership on the PCCP Steering Committee and the membership shall be considered vacant.

If a member of the PCCP Steering Committee abandons their membership, the Committee may continue to operate with a minimum of four (4) Member Organizations. If membership is reduced to less than four (4) Member Organizations, all PCCP meetings shall be cancelled until the minimum membership criteria can be met.

6.4 Delegated Authority

There is no delegated authority to the PCCP. Some PCCP recommendations may require approval from the corresponding Council/Board before the recommendation is implemented and/or funded.

Accordingly, consensus decisions of the PCCP Steering Committee will not dictate the work of any one (1) member or Member Organization, but rather the preferred approach to taking climate action. Member Organizations will support the decided priority action(s) as they are able to and see fit.

6.4.1 Funding/Grant Applications

Funding/grant opportunities, which support the mandate and purpose of the PCCP and are decided priorities of the Steering Committee, can be pursued by any single or multiple Member Organization(s) acting on behalf of the Partnership while adhering to the principles of transparency and accountability. Processing of any single or joint funding/grant application on behalf of the Partnership would leverage and adhere to the existing and proper processes within participating Member Organization(s).

6.5 Meeting Schedule

Steering Committee Meetings: The PCCP Steering Committee will meet quarterly. Additional meetings may be called as required. PCCP Strategy Champions are invited to attend Steering Committee meetings.

Implementation Team Meetings: The PCCP Strategy Champions AND Strategy Leads/Co-Leads will meet bi-monthly. Participation of Strategy Leads/Co-Leads or delegate is required. Participation by one or all Strategy Champions will be subject to agenda.

Additional meetings of the PCCP Strategy Champions Group OR Strategy Leads/Co-Leads may be called as required.

The PCCP Technical Support Teams will join the bi-monthly Implementation Team meetings or meet as required.

Meeting locations will rotate amongst the Member Organizations.

6.6 Compensation/Remuneration

All members of the PCCP will serve without remuneration and will not be reimbursed for any expenses by the PCCP. Remuneration and business expense reimbursements, if any, will be handled by the Member Organizations in accordance with each organization's policies and procedures.

Periodically, consultants and vendors may be used to supplement implementation teams. Financing decisions will be made independently through Steering Committee meeting agenda items and on a project basis. This will be subject to approval by the Steering Committee.

7 Accountabilities

The updated Terms of Reference for the PCCP will be brought to Member Organizations' Councils or Boards, as appropriate, seeking resolution to endorse the Terms of Reference, direct staff participation,

meet the stated mandate, achieve the defined purpose during the timelines associated with each PCCP term, and report back on progress at the end of each Partnership term.

Upon receiving endorsement by appropriate Councils and Boards, the PCCP Steering Committee members hold the accountability for meeting the PCCP mandate, achieving the purpose during the term timelines and reporting progress to appropriate Councils and Boards.

8 Roles and Responsibilities

8.1 Principles of Engagement

Partners are expected to represent the Partnership in a positive and supportive manner at public events. Furthermore, Partners are expected to promote the mandate and purpose of the Partnership when speaking at public events.

8.2 Steering Committee

The Steering Committee is a governance body that oversees the work of the Partnership. The Steering Committee will ensure that the Member Organizations are on board/supportive with/of the work and will allocate resources to it as appropriate. The responsibilities of the Steering Committee are to:

8.2.1 Champion, Represent and Influence

1. Proactively target and effectively influence policy makers and staff within the Partnership Member Organizations to secure the required investments and commitments
2. Represent the Partnership internally with each organization and externally in panels or other events
3. Broadly share knowledge and educate others on the Partnership and its activities
4. Assume the responsibilities of the Chair, when required

8.2.2 Strategically Plan and Drive Change

1. Establish common understanding of our shared purpose
2. Engage in long-term strategic planning to establish the Partnership's future priorities
3. Provide strategic direction and guidance to the Secretariat and Implementation Teams established to undertake defined activities
4. Receive recommendations and decide clear joint priorities and outcomes
5. Receive recommendations and decide shared targets and performance metrics
6. Receive and approve proposals for new activities/initiatives, including consideration for alignment, timelines, budget, resources

8.2.3 Find Resources

1. Ensure there is internal capacity within each organization to support the Steering Committee
2. Ensure effective organization of work and allocation of resources from the Partners to achieve the desired outcomes
3. Pursue, highlight and help influence the securing of funding opportunities to support shared actions and to facilitate the implementation of the actions at the local level

4. Receive and provide direction on recommendations from Champions or Strategy Leads to pursue joint funding/grant applications

8.2.4 Communicate

1. Approve and use timely, strategic and consistent climate change messaging
2. Communicate with respective staff, Boards of Directors or Councils regarding the priorities and achievements of the Partnership
3. Approve and deliver reports, briefs and memos to Boards and Council on results achieved
4. Endorse communications material for distribution

8.2.5 Special Events

1. Attend special events, including the stakeholder forum, workshops, professional sessions and participate on panels, where appropriate
2. Secure acceptance of invitations from peers to events
3. Help recruit speakers to events

8.3 Chairperson

The Chairperson is a member of the Steering Committee and presides over the Partnership to ensure the planning of Partnership activities is effective and aligns with its mandate and purpose. In addition to the responsibilities as a Steering Committee member, the responsibilities of the Chairperson are to:

8.3.1 Steering Committee Meetings

1. Meet with PCCP Secretariat Director to develop and confirm Steering Committee meeting dates and agendas, as needed
2. Preside over Steering Committee meetings by calling them to order, adjourning them, announcing items on the agenda as they come up and recognizing when members have the floor
3. Determine if quorum is present
4. Oversee the decision-making process, including calling votes to establish consensus
5. Ensure that meetings are planned effectively
6. Ensure that matters are dealt with in an orderly, respectful and efficient manner
7. Convene and cancel Steering Committee meetings, as required
8. Delegate Chairperson responsibility to other Steering Committee members, as needed

8.3.2 Communications

1. Represent the Partnership and serve as the media spokesperson during his/her term
2. Delegate the role of media spokesperson to other Steering Committee members as necessary

8.3.3 Facilitation

1. Guide Partnership members to make decisions through consensus building
2. Encourage input and collaboration between members
3. Seek commitments from Steering Committee members to support the mandate and purpose of the Partnership

8.4 Implementation Team: Strategy Champions, Strategy Leads and Technical Support

The Steering Committee is supported by individuals in each of their respective organizations who are themselves senior leaders and/or subject matter experts and/or technical staff with responsibilities to undertake the planning and execution of the priority strategies and actions on behalf of the Partnership. With support from the Secretariat, the Implementation Team will identify the resources and decision points needed and engage with key stakeholders from within the Member Organizations, to ensure effective implementation. The responsibilities of the Implementation Team are to:

8.4.1 Strategy Champions: Make Recommendations, Engage Other Leaders, Provide Oversight and Expertise

1. Make recommendations to the Steering Committee on new priorities and appropriate strategies and actions to undertake on behalf of the PCCP, including pursuing joint grant/funding applications or introducing new in-year initiatives
2. Monitor and update the Steering Committee on high-level progress in relation to priorities and outcomes
3. Make recommendations to the Steering Committee on when to move from planning to coordinated collective implementation of priorities
4. Participate in Steering Committee meetings (as regular attendees with decision making authority and/or alternates)
5. Participate, as appropriate, in bi-monthly Implementation Team meetings to receive progress updates, and provide feedback on idea generation and strategic approaches to implementation
6. Lead the engagement with key internal stakeholders from respective Member Organizations, such as Directors, Managers or other program leaders that are impacted by Partnership initiatives to support strategy implementation and help draw appropriate resources for achieving Partnership mandate and purpose
7. Maintain technical or expert knowledge
8. Endorse communications material for distribution, as needed

8.4.2 Strategy Leads/Co-Leads: Direct Technical Work

1. Lead and/or carry out the technical tasks in support of the strategy(ies) being pursued by ongoing engagement with key individuals/decision–makers across Member Organizations
2. Identify resources needed to carry out the tasks and seek through PCCP or individual organizational budgets or other grants
3. For approved projects requiring funding:
    a. Obtain resource/funding commitments, in writing, from participating Member Organizations;
    b. Undertake all procurement, tracking, financial reconciliation, invoice payments in accordance with his/her Member Organizations policies and procedures; and
    c. Ensure that there shall be no award of contracts/external expenditures until all funding committed by participating Member Organizations is actually received.

4. Report on progress in completing tasks in support of the strategy(ies) at monthly Strategy Leads meetings
5. Provide data to inform the metrics and indicators of the Partnership's strategies and priorities as identified in approved workplans
6. Provide updates and make recommendations on the Partnership's strategies to the Strategy Champions
7. Provide updates to the Steering Committee, upon request
8. Draft reports, briefs and memos for Steering Committee approval
9. Act as alternate to Strategy Champion, as required

8.4.3 Technical Support Teams: Undertake Technical Work

1. Undertake technical work as assigned by Strategy Leads/Co-Leads
2. Assist with the drafting of reports, briefs and memos

8.4.4 All Implementation Team Members: Communicate and Champion

1. Seek opportunities to communicate with internal and external audiences/stakeholders about the work of the PCCP
2. Provide results in communication briefs, using clear language that allows others to understand and convey messages
3. Identify gaps/issues and provide options for resolutions
4. Communicate Steering Committee comments, direction, decisions to the technical support teams, as appropriate.

8.4.5 All Implementation Team Members: Special Events

1. Attend the special events, including the Stakeholder Forum
2. Provide support to the Secretariat with the planning and delivery of events

8.5 Secretariat

The Secretariat is situated within the Region of Peel's Office of Climate Change and Energy Management. The Secretariat's role is to facilitate and support the strategic and operational work of the Partnership and ensure effective administration of group activities.

8.5.1 Secretariat Director

The responsibilities of the Secretariat Director are to:

8.5.1.1 Strategic Operations

1. Lead the development or update of PCCP Terms of Reference and other operating documents as required
2. Support all members understanding of the role and function of the Partnership as a whole and individual members
3. Support the selection and onboarding of all members and the Partnership's Chair

8.5.1.2 Steering Committee Support

1. Liaise with Partnership Chair and support quarterly Steering Committee meeting agenda setting and meeting minute approval
2. Liaise with members of the Steering Committee to provide support, as needed
3. Attend and participate in quarterly Steering Committee meetings
4. Organize, coordinate and facilitate long-term strategic planning discussions with the Steering Committee
5. Lead the development of a Terms of Reference Implementation Guide for Steering Committee members

8.5.1.3 Implementation Teams Support

1. Chair the bi-monthly Champions/Strategy/Co Leads meetings
2. Liaise with Strategy Champions and assist with preparation for quarterly Steering Committee meetings, as needed

8.5.2 Secretariat Staff

The responsibilities of the Secretariat staff are to:

8.5.2.1 Administration

1. Establish meeting dates and locations and coordinate meeting logistics
2. Prepare and distribute meeting agendas and packages in a timely manner
3. Record and share meeting minutes; seek approval of quarterly Steering Committee meeting minutes from Partnership Chair
4. Upload documents on the shared file storage system
5. Create templates for communications material to ensure that information is communicated to the Steering Committee consistently and in the appropriate amount of detail

8.5.2.2 Communications

1. Provide support with media relations, inquiries and marketing
2. In coordination with appropriate members, develop and/or share updates about strategies and priorities of the Partnership with all members
3. Review Partnership documents to ensure that language is consistent with agreed-upon terminology and branding
4. In coordination with appropriate members, create communication briefs and other strategic documents for broad dissemination to external stakeholders
5. Lead summary reporting of special events, including the Stakeholder Forum
6. Lead the drafting of the Partnership's achievement reports to member organizations' Councils or Boards at the end of each Partnership term

8.5.2.3 Special Events

1. Support the Partnership in developing goals and objectives for special events
2. Support the Partnership with the creation of special event budget(s) and manage budget(s), as appropriate
3. Choose and secure a venue and date, as appropriate
4. Identify collaboration opportunities with other organizations or industry partners
5. Research speakers and panelists, as appropriate

6. Develop and deploy a marketing campaign, as appropriate
7. Create agenda and schedule
8. Provide funding resources to cover venue (if needed), essential materials and light refreshments

9 Communications

9.1 Internal

Internal communications refer to communications that occur between individual members of the Partnership (i.e., Steering Committee members, Strategy Champions, Strategy/Co-Leads, Secretariat members).

9.1.1 Platform

Partnership documents for internal use will be managed via a secure platform for Member Organizations.

9.1.2 Meeting Minutes

Minutes from the quarterly PCCP Steering Committee meetings will be taken, approved and distributed in a timely manner to all Partnership members.

In order to ensure the timely communication of decisions and directions to the Implementation Team, PCCP Steering Committee members have two (2) weeks following the distribution of the minutes to note any corrections before decisions are communicated to the Implementation Team.

Formal meeting minutes of other Partnership-related groups or matters will be at the discretion of the participants. At a minimum, actions will be recorded, and action register(s) will be created and maintained.

9.1.3 Communication Briefs

Communication briefs will be used to explain Partnership activities (existing and proposed), process information and provide strategic analysis and context of meeting outcomes.

9.1.4 Reports to Council and Boards

The Partnership will update member organizations' Councils or Boards at the beginning of the Council Term on progress and future strategic priorities. Efforts should be taken by Member Organizations to coordinate the scheduling of communications to ensure consistency in messaging and enhance alignment.

The preferred approach for updating Councils or Boards is for the Region of Peel to update Regional Council first, followed by the conservation authorities updating their Boards and finally local municipalities updating their local Councils.

9.2 External

External communications refer to communications that occur between the Partnership Member Organizations and external non-member parties.

9.2.1 Platform

There is no current Partnership-specific platform to support external or general public access to Partnership information. The Partnership will periodically assess if a digital communication platform or equivalent would be beneficial.

9.2.2 Branding and Logos

When a document is supportive of Partnership objectives, all logos of Member Organizations shall be represented with the following statement:

"This work is in support of the Peel Climate Change Partnership's Mandate and Purpose."

9.2.3 Templates

Templates will be developed to ensure that the Partnership's external communications are consistent and audience appropriate.

9.2.4 Communication Briefs

Communication briefs that are audience appropriate will be used to share or explain Partnership achievements, activities and priorities (existing and future).

9.2.5 Media

Media refers to any print, broadcast (radio or television) or online source (website or social media site) that provides news and information to the general public or specific audiences.

9.2.6 Advocacy

The Partnership will develop unified advocacy communications for consideration by each Member Organization; any use or sending of such communications would be at the discretion of and via existing processes and protocols of each Member Organization.

9.2.6.1 Time-Sensitive Advocacy and Communications

At the discretion of the Chair, meetings will be convened, with representation from all Member Organizations, for the purpose of crafting time-sensitive, strategic and unified advocacy and communications content.

9.2.7 Special Events

The Partnership will host special events, subject to Steering Committee approval, to facilitate strategic and targeted engagement with the broader community in order to strengthen influence, share knowledge, showcase milestone achievements or profile an issue or opportunity to further the Partnership mandate and purpose. Included in the roster of special events is the Stakeholder Forum, which may be hosted one or more times per Partnership term as relevant initiatives and opportunities for deeper collaboration evolve, and resources allow. Invitation to special events, including the Stakeholder Forum, will be broad and present a key opportunity for elected leadership to participate.

10 Risks

While acknowledging the various benefits and potential to accelerate shared goals and impacts through the Partnership, participation also exposes Member Organizations to risks. Potential risks associated with participation in the Partnership are categorized as Shared Risks and Individual Risks.

10.1 Shared Risks

1. Implementation challenges: The Partnership is not achieving its desired outcomes and level of influence required to enable the changes needed to address the urgency of climate change.
2. Lack of support from Senior Leadership/Council: The Partnership does not command the support of senior leaders in each Member Organization of members of Council.
3. Future uncertainty: The future state of climate science, local, provincial and federal political climate, and the economy is unknown, unpredictable and uncontrollable and can therefore lower confidence in decision making.

10.2 Individual Risks

1. Conflicts of interest: Where a decision or action is right for the interests of the Partnership but does not align with the interests or priorities of Member Organizations.
2. Drain on resources: Commitment of time and energy of staff in addition to any additional financial or other resource contributions.
3. Negative reputation impact: If the Partnership does not meet its mandate, it could cause damage to the reputation of Member Organizations by association and their credibility as climate change leaders.

11 Review Process

Review of the PCCP is the process through which the Member Organizations seek to re-approve its collaborative commitment.

The review process shall be conducted prior to the end of the Member Organization's term (yearly) and in alignment with the start of a new Term of Council (every four (4) years).

The review process shall include both retrospective and prospective context in that it provides an opportunity for all Member Organizations to reflect upon the administration, function and progress of the Partnership and to also consider future priorities. While the emphasis is on the strategic direction of the Partnership, in reaching a consensus of re-approval, the review process will consider the management of the collaboration that anchors the efforts of the Partnership.

The review process is discrete from the annual monitoring and progress reporting procedures. It considers the operation of the Partnership at a higher level than that of the implementation team strategy development.

The review shall consider the following:

1. Whether the basis for the collaboration remains valid;

2. Potential impacts of upper level government decision-making that revises, cancels or introduces relevant policies and priorities;
3. The future of the Partnership in the light of Partners' strategic priorities;
4. Whether the collaboration remains appropriate in the context of the Partners' commitments;
5. Whether it continues to command the support of senior leaders in each Member Organization;
6. Whether it is achieving the desired outcomes and level of influence; and,
7. Whether the Member Organizations continue to recognize the value of the PCCP.

2018-2022 Peel Climate Change Partnership – Governance Structure

Steering Committee Members

Chair*
Andrew Farr (2020)

Region of Peel (ROP)
Kathryn Lockyer
Andrew Farr

City of Brampton (COB)
Michael Won

City of Mississauga (COM)
Paul Mitcham

Town of Caledon (TOC)
Fuwing Wong

Credit Valley Conservation (CVC)
Deborah Martin-Downs

Toronto & Region Conservation Authority (TRCA)
John Mackenzie

Secretariat Director
Christine Tu
Region of Peel

Secretariat

Coordinator
Joan Engineer
Region of Peel

Specialist
Iris Wagner
Region of Peel

Manager
Jeremy Schembri
Region of Peel

Strategy Champions

Region of Peel (ROP)
Christine Tu

City of Brampton (COB)
Michael Heralall

City of Mississauga (COM)
Jodi Robillos
Dianne Zimmerman

Town of Caledon (TOC)
Katelyn McFadyen (On Leave eff. Feb. 2020)
Allie Service

Credit Valley Conservation (CVC)
Gayle Soo Chan

Toronto & Region Conservation Authority (TRCA)
Victoria Kramkowski
Rehana Rajabali

Priority Strategies

Strategy Leads

Low Carbon Communities
Katelyn McFadyen, TOC
Nathaniel Magder, TRCA

Technical Support Team
ZEV Strategy Steering Committee
Leya Barry, COM
Chun Liang, COB
Katelyn McFadyen, TOC
Adam Vaiya, ROP
Daniel Call, Alectra (advisory role)
TBD, Hydro One (advisory role)
Bryan Purcell, TAF (advisory role)
Project Management Team
Nathaniel Magder, TRCA
Gil Amdurski, TRCA
(Consultants – TBD in 2020)

Flood Resiliency
Christine Zimmer, CVC

Technical Support Team
Staff from All Member Organizations

Green (Natural) Infrastructure
Heather Hewitt, ROP
Noah Gaetz, TRCA

Technical Support Team
Meaghan Eastwood, TRCA
Yvette Roy, CVC
(Consultants)
Staff from Municipal Urban Forestry Working Group

New Strategic Initiatives

Technical Support Team

Special Events

- Stakeholder Forum
- Knowledge Sharing/Webinars
- Leadership Panels
- Project Milestones/Recognition
- Media Releases

**PCCP Chairperson is an annual position*

Updated January 7, 2020

Item 7.11

Section I – Items for Board of Directors Action

TO: Chair and Members of the Board of Directors
Meeting #3/20, Friday, April 24, 2020

FROM: Darryl Gray, Director, Education and Training

RE: **FEDERATION OF CANADIAN MUNICIPALITIES' VISIONARY AWARD APPLICATION**

KEY ISSUE

Acknowledgement and endorsement for application to have SNAP Program considered for the Federation of Canadian Municipalities' (FCM) Visionary Award.

RECOMMENDATION

WHEREAS Toronto and Region Conservation Authority (TRCA) has delivered the Sustainable Neighbourhood Action Program in partnership with nine local and regional municipalities since 2009;

AND WHEREAS the Federation of Canadian Municipalities has released a call for applications to the Green Municipal Fund 20th Anniversary Visionary Award, which requires Board of Directors acknowledgement and endorsement of the application;

THEREFORE, LET IT BE RESOLVED THAT TRCA Board of Directors acknowledge and endorse an application for the Sustainable Neighbourhood Action Program to be considered for Federation of Canadian Municipalities' Green Municipal Fund 20th Anniversary Visionary Award;

AND FURTHER THAT staff be directed to report back to the Board of Directors before year end on the next phase of the SNAP Program and proposed opportunities to expand the program to inform municipal budgeting discussions.

BACKGROUND AND RATIONALE

As part of its 2020 Sustainable Communities Awards, the Federation of Canadian Municipalities (FCM) has created a Green Municipal Fund (GMF) 20th Anniversary Visionary Award. This award will be granted to an initiative that demonstrates how sustainability and innovation can generate long-term community change. Eligible initiatives must have been started or completed within the last 20 years and must demonstrate measurable environmental, social and economic benefits. Additionally, applicants must provide Board or Directors or Council acknowledgement and endorsement of the application.

Toronto and Region Conservation Authority's (TRCA) Sustainable Neighbourhood Action Program (SNAP) was launched in 2009 and is an excellent candidate to be recognized nationally by this award. TRCA developed SNAP in close collaboration with nine municipalities who would also be identified in the proposed award application. Staff from those municipalities are aware and supportive of the nomination. The nine municipalities include:

- City of Toronto;
- Region of Peel, City of Brampton, City of Mississauga and Town of Caledon; and
- Region of York, City of Richmond Hill, City of Markham and City of Vaughan.

SNAP is a neighbourhood model for sustainable urban renewal and climate action and was developed to help municipalities overcome the challenges of retrofitting and renewing older neighbourhoods. The success of SNAP is rooted in a collaborative approach that aligns municipal priorities with local needs and interests that improves efficiencies, draws strong community support and builds trusted implementation partnerships for initiatives in public and private realms. Working with local stakeholders, SNAPs address a broad range of sustainability objectives by advancing strategies for:

- Home retrofits *(e.g. tree planting, local flood protection, rainwater harvesting);*
- Infrastructure renewal *(e.g. integration of environmental and social outcomes into parks, stormwater management facilities, roads);*
- Multi-unit residential, commercial and institutional revitalization *(e.g .sustainable landscaping, urban agriculture, building retrofits);* and
- Community resilience and leadership capacity *(e.g. neighbour connections, skills building, emergency preparedness).*

Since the initial development of the neighbourhood action planning model in 2009, TRCA has worked closely with its municipal partners and a diverse range of stakeholders on pilot SNAP action plans, implementation projects, strategies for scaling the model's successes and laying the foundation for the longer term program. In 2016 TRCA's Board endorsed the transition from pilot projects to a SNAP Program. Significant accomplishments have garnered recognition locally, nationally and internationally. This short video provides an overview of the Program and perspectives from diverse partners - https://trca.ca/conservation/sustainable-neighbourhoods/

SNAP Program highlights include:

- Toronto Foundation's 2012 Vital Ideas Award;
- C40 Cities Award Finalist and named to Cities100's top 100 list of innovative climate action projects worldwide in 2016;
- Canadian Society of Landscape Architects' 2016 National Award for Bayview Glen SNAP;
- Growing network of SNAP neighbourhood projects – 8 SNAPs in TRCA's jurisdiction, 5 more SNAP's in Ontario, and starting in 2019 the Netherlands government supports 17 Dutch municipalities in adopting TRCA's SNAP model;
- SNAP neighbourhood model is being recognized with increasing collaboration with municipal programs – e.g. City of Brampton established Nurturing Neighbourhoods Program and City of Toronto is aligning neighbourhood resilience pilots with SNAP;
- FCM awarded TRCA and nine interested municipalities a Transition 2050 grant under the Municipal Climate Innovation Program to support knowledge transfer of the neighbourhood model as an effective strategy for low carbon mobilization.

TRCA SNAP neighbourhood project highlights include:

- Home retrofit programs have achieved deeper engagement and measurable action (e.g. 17% of Black Creek SNAP neighbourhood homes have implemented 1,229 significant environmental and resiliency retrofits, including on average 2 stormwater management retrofit actions and 1.2 trees planted per home).
- Planned infrastructure projects have incorporated resident-inspired design enhancements to achieve greater environmental function and community amenities. Eight significant green infrastructure projects have been completed on public land, including boulevard bioswales, quality control stormwater management ponds, wetlands and raingardens, complemented with 1000's of trees and pollinator plants, trails, meditation gardens, art installations, educational signage, seating, etc.

- Partnerships with private landowners and community groups have resulted in 32 green infrastructure and urban agriculture installations and other sustainability initiatives on 14 multi-unit residential properties and 18 commercial or institutional properties, with far-reaching benefits. In the San Romanoway towers in the Jane and Finch neighbourhood, for example, 70% of residents reported feeling more safe, >85% reported a positive impact on their mood, 61% confirmed they have been inspired to start a small business due to the project and 69% reported the project inspired them to fundraise for a community cause, as a result of SNAP's actions.
- SNAP projects have strengthened community resilience by fostering community connections and skills training, resulting in the resident-led formation of three formalized neighbourhood groups and a social enterprise.
- SNAP has built community capacity to sustain environmental work – at the San Romanoway tower revitalization project, every 1 hour of SNAP programming generated 19 hours of community volunteerism, totaling 35,000 hours of volunteerism over the past four years.
- Since 2009, over 11,400 people have been engaged toward sustainability actions across all SNAPs and 9,300 trees and shrubs have been planted, many on private land.
- Additionally, 264 skills training workshops have been delivered since 2009, representing over 1,000 learner hours of community learning.

Relationship to Building the Living City, the TRCA 2013-2022 Strategic Plan
This report supports the following strategy set forth in the TRCA 2013-2022 Strategic Plan:
Strategy 4 – Create complete communities that integrate nature and the built environment

In addition, the SNAP Program contributes to many of the other TRCA's corporate strategies.

FINANCIAL DETAILS
There is no fee associated with the FCM Visionary Award application, however there is a requirement for a representative of the winning entry to deliver a presentation at FCM's 2020 Sustainable Communities Conference taking place October 20-22, 2020 in St. John's, Newfoundland where award winners will be honoured. If the project is selected, funds to cover travel expenses may be available in SNAP Program budgets and if not, other budgets will be reviewed to ensure a TRCA representative is available to be present.

There is no cash remuneration for the winning entry, although the winning entry is automatically eligible for FCM's Inspire Award (voted upon by conference delegates) and this award comes with professional coaching and support to prepare a professional "Ted Talk" style presentation on the project.

The SNAP Program's core funding is derived from municipal capital support from the regions of Peel and York, and the City of Toronto. TRCA is also in discussion with Durham Region municipalities in our jurisdiction and will report back to the Board on this. By leveraging these municipal budgets, SNAP has attracted additional public and private funding of over $3 million dollars over the past 10 years, including grants from FCM, EcoAction, RBC Bluewater, CMHC and others, that have helped advance the innovative practices and approaches of SNAP at the neighbourhood level. Additionally, both municipal and non-municipal funding has helped contribute to the establishment of cost sharing arrangements with other partners, supported the development of community capacity and empowered volunteers to extend neighbourhood-scale efforts toward achieving TRCA's watershed objectives and strategic goals shared with our

municipal partners, such as community resiliency, ecosystem restoration and healthy communities.

DETAILS OF WORK TO BE DONE

FCM requires a Board of Directors resolution acknowledging and endorsing the submission of the application for the Green Municipal Fund 20th Anniversary Visionary Award. Following Board acknowledgement and endorsement, staff will submit the necessary documentation and application to FCM by the April 30, 2020 deadline.

Report prepared by: Sonya Meek, extension 5253
Emails: sonya.meek@trca.ca
For Information contact: Sonya Meek, extension 5253
Emails: sonya.meek@trca.ca
Date: April 8, 2020

Item 7.12

Section I – Items for Board of Directors Action

TO: Chair and Members of the Board of Directors
Meeting #3/20, Friday, April 24, 2020

FROM: Sameer Dhalla, Director, Development and Engineering Services
Moranne McDonnell, Director, Restoration and Infrastructure

RE: **LAKE ONTARIO RESILIENCE**
Update on water levels and proactive mitigation work

KEY ISSUE

This report outlines the factors that influence Lake Ontario water levels, reviews impacts and procedures developed through previous high water level events, summarizes the current activities and forecast for 2020, and provides an update on the ongoing mitigation and long-term resilience work across the Lake Ontario shoreline within the Toronto and Region Conservation Authority jurisdiction including efforts with partners to secure funding to advance resiliency initiatives in Toronto, Pickering and Ajax.

RECOMMENDATION

THAT staff be directed to continue to work with and assist the City of Toronto and Durham municipal partners with the implementation of the flood resilience alternatives identified in the Toronto Islands Flood Characterization, Risk Assessment Project and local waterfront projects, as well as the construction of proactive works to mitigate impacts from the high water levels anticipated for 2020;

THAT staff be directed to continue working with the City of Toronto and Durham Region/ Ajax and Pickering on the planning and implementation of flood and erosion mitigation projects along the Lake Ontario waterfront related to the 2017 and 2019 high lake events and 2018 windstorm event, as supported by Infrastructure Canada through the Disaster Mitigation and Adaptation Fund and any available municipal funds;

THAT staff be directed to continue to plan and implement flood and erosion mitigation projects as part of the Toronto and Region Conservation Authority's Toronto Waterfront Erosion Hazard Mitigation Project, as supported by the Disaster Mitigation and Adaptation Fund;

THAT staff be directed to continue to liaise with the Great Lakes Adaptive Management Committee, the International Lake Ontario-St. Lawrence River Board, and the International Joint Commission to share high water level flood and erosion impacts across all of TRCA's jurisdiction in order to inform regulation decisions and the assessment of regulation plans; and

THAT staff be directed to continue participation in the Lake Ontario Resiliency Working Group as identified in the Toronto City Council Report MM12.6 Promoting effective 21st Century Flood Mitigation and Resilience.

AND FURTHER THAT staff be directed to continue to send correspondence to senior levels of government to advise them of TRCA and municipal shovel worthy flood mitigation and resilience projects on the Lake Ontario shoreline that would benefit from

senior government investments.

BACKGROUND
At Board of Directors Meeting #6/19, held on June 21, 2019, Resolution #A108/19 was approved as follows:

> *THAT the Toronto Islands Flood Characterization and Risk Assessment Project report (May 2019) prepared by W.F. Baird & Associates Coastal Engineers Ltd. be received; and*
>
> *THAT staff be directed to work with the City of Toronto to secure funding, regulatory approvals, and assist the City with the implementation of the flood mitigation alternatives identified in the Toronto Islands Flood Characterization and Risk Assessment Project including advancing a Class EA to facilitate implementation of flood protection works.*

In the spring of 2017, water levels in Lake Ontario reached levels higher than had been measured since record keeping began in 1918. The effect of this flooding was significant on the Toronto Islands where over 800 residents, almost 30 businesses, and two schools were forced to adapt to rising waters and service disruptions. In addition to Toronto Islands, much of the Lake Ontario shoreline parks also experienced significant shoreline erosion, damage and debris accumulation over the spring and summer of 2017.

In response to the 2017 flood conditions the Toronto and Region Conservation Authority (TRCA) assisted municipal partners with flood forecasting, warning, and mapping products. TRCA also assisted the City of Toronto with the operational response, deploying thousands of sandbags, meter bags, and pumps.

In 2018, TRCA worked with the City of Toronto to repair damaged areas and install naturalized berms and sumps to protect strategic areas from potential future funding. On Toronto Islands, sand from sandbags was left in place, forming berms that were planted with native grasses. The installation of nine sumps was completed to collect surface flooding and drain low lying and saturated areas with a series of weeper tiles. The City also made significant alterations to the ferry docks, allowing for safe passenger embarkation/debarkation for a wider range of lake levels.

In 2019, water levels on Lake Ontario set new records. The operational frameworks and mitigation measures that were conceived in 2017 and installed in 2018 allowed for an effective response; parts of Toronto Islands remained open to the public in 2019, despite the persistence of even higher water levels.

In 2018, TRCA in collaboration with the City of Toronto, successfully secured $150,000 in grant funding from the federal National Disaster Mitigation Program (NDMP), with the City of Toronto matching $150,000 for a total of $300,000 for the Toronto Islands Flood Characterization and Risk Assessment Project. The resulting study was received by the Board of Directors at Meeting #6/19, held on June 21, 2019, through the passing of Resolution #A108/19 noted above. Amongst the outputs from this project was a Toronto Islands-specific flood characterization, which assessed the existing flood level values specified for Lake Ontario: a task whose extension to all the Great-Lakes has been identified as part of the Provincial Flood Strategy. Through TRCA’s technical plan review function, staff leveraged the best available information in order to assess risks to new development and infrastructure.

In 2019, the federal government announced $11.9 million in funding for repair and enhancement projects through the Disaster Mitigation and Adaptation Fund (DMAF), with the City of Toronto contributing more than $17.9 million. TRCA and City of Toronto Parks, Forestry, and Recreation are partnering in undertaking this work, with approximately $20 million flagged for TRCA project delivery. To date, three projects have been completed as part of this work at Bluffers Park, Colonel Samuel Smith Park and Humber Bay Shores, and another four are expected to be completed at Bluffers Park, Sunnyside Park, Ashbridges Bay Park and Palace Pier in 2020.

Also in 2019, the federal government announced $33.8 million in funding, with the City of Toronto contributing $50.7 million, in support of the Toronto Waterfront Erosion Hazard Mitigation Project which involves the monitoring, prioritization, planning and implementation of maintenance work along an extensive network of 231 TRCA owned shoreline flood and erosion control structural assets.

As a Conservation Authority located in Canada's highest populated and most heavily urbanized city, TRCA has been given a unique opportunity to become leaders in natural infrastructure design by finding innovative solutions that balance the needs between the built and natural environment, while considering the implications of climate change. TRCA's flood and erosion mitigation efforts are designed with this vision in mind, representing solutions that provide robust physical protection while at the same time enhancing the natural environment. For example, many of TRCA's current shoreline protection projects are utilizing unique natural infrastructure designs, including offshore reefs and dynamic cobble beaches, which provide aquatic habitat improvements and enhance the capacity of the natural environment to better adapt to hazards.

RATIONALE

Lake Ontario water levels depend primarily on three factors:

1) Inflows from Lake Erie, which are unregulated and account for approximately 85% of inflows into Lake Ontario. Lake Erie water levels are well above record high levels for this time of year and are projected to continue to be above previous record levels through the spring;
2) The runoff from watersheds, like those in TRCA's jurisdiction, that drain directly into Lake Ontario, and;
3) The outflow from Lake Ontario, which is regulated at the Moses-Saunders Dam by the International Lake Ontario St. Lawrence River Board (ILOSRB) of the International Joint Commission (IJC). Outflows are influenced by the spring peak flow of the Ottawa River as the ILOSRB is charged with regulating flows to balance both upstream and downstream risks.

As outlined by the IJC, the levels observed in 2019 were the result of several separate extreme weather conditions occurring in the same year:

a) Persistently high flows from Lake Erie into Lake Ontario, eventually exceeding record-highs by spring 2019
b) Above-average precipitation within the Lake Ontario-St. Lawrence basin from late-fall through spring, and;
c) A record-setting flood event on the Ottawa River that joins the St. Lawrence River near Montreal, the second in three years

Analysis by the IJC concluded that the ILOSRB "managed outflows during the unusual and extreme weather conditions from November 2018 through late-May 2019 according to Plan 2014 rules that were based on Board operations under the previous regulation plan, Plan 1958-D. During this entire period, water supplies coming into Lake Ontario were consistently high,

reaching record-breaking levels in May, and neither regulation plan would have been able to take significantly more water off Lake Ontario quickly enough to make a meaningful difference in water levels and prevent the flooding in 2019.
Throughout the high-level events of 2017 and 2019, TRCA staff pro-actively shared impact reports with the ILOSRB and the Great Lakes Adaptive Management (GLAM) Committee. These reports were shared via GIS impact tracking maps, in-person meetings, and most recently, a summary document of impacts and critical thresholds (Attachment 2). On March 3, 2020, the IJC announced that the GLAM committee would undertake an expedited review of Plan 2014. TRCA staff continue to engage with ILOSRB and GLAM staff to highlight impacts and risks to the shorelines within TRCA's jurisdiction, in order to help inform both outflow decisions and regulation plan updates. This is in-line with the intent in the Ontario Flood Strategy facilitate dialogues with water management partners, including the IJC, to provide opportunities to evaluate current policies.

As with riverine flood forecasting and warning activities, TRCA issues public flood messages based on local interpretation of forecasts. Lake Ontario water level forecasts are issued by the ILOSRB, while wave forecasts are produced by both Environment Canada and the Ontario Ministry of Natural Resources and Forestry. For reference TRCA issues Shoreline Hazard Watches and Warnings based on the following criteria:

a. Shoreline hazard **watch** at combined water level of 75.1 m AND forecast offshore waves of >2.0m (related to public safety and erosion risks)
b. Shoreline hazard **watch** for static water level between 75.5m – 75.7m
c. Shoreline hazard **warning** for static water level of >75.7m

The most recent water level forecast issued by the ILOSRB is provided in Attachment 1.

Since 2017, in addition to the short-term and long-term mitigation measures outlined below, TRCA staff have been supporting all municipal partners with mapping, technical information, local forecast updates, and impact tracking throughout the shoreline within our jurisdiction. While flood response activities will continue to assist in the short-term, the simultaneous advancement of long-term mitigation measures is paramount.

Long-term mitigation measures take into consideration general climate change implications and site-specific conditions including the infrastructure at risk, the primary hazard (flood and/or erosion), existing protection (if any), the physical shoreline characteristics and the coastal environment (wave action, nearshore substrate, etc.). Mitigation solutions are being designed to be resilient, with a projected lifespan of 50 years. In order to achieve this, structures are being built to higher elevations, rock "splash-pads" are being built in-land of the structure to prevent erosion from overtopping, heavier armourstone material is being used and multiple layers of armourstone are being implemented. This approach aligns with the Principles of Effective Flood Management outlined in Ontario's Flooding Strategy, which highlights the need to 'build back better' – implementing post-disaster recovery that reduces vulnerability to future disasters and builds community resilience.

Relationship to Building the Living City, the TRCA 2013-2022 Strategic Plan
This report supports the following strategies set forth in the TRCA 2013-2022 Strategic Plan:
Strategy 2 – Manage our regional water resources for current and future generations
Strategy 4 – Create complete communities that integrate nature and the built environment

FINANCIAL DETAILS

- Flood forecasting and warning related services are funded from account code 115-60.
- Planning and implementation of flood and erosion mitigation projects are funded by the City of Toronto, Infrastructure Canada and TRCA Capital funding and are tracked under 241-01 (Toronto Island), 186-01 (projects recoverable from City of Toronto), 241-01 (TRCA Capital funds).

DETAILS OF WORK TO BE DONE

TRCA has activated its Incident Management System (IMS) structure for high water levels on Lake Ontario, and is providing regular updates to all partner municipalities who have shoreline within our jurisdiction; this activity will continue until water levels begin receding and cross below the Shoreline Hazard Watch threshold for static water level.

TRCA is in the process of planning and implementing numerous flood and erosion control mitigation projects across our jurisdiction. Projects that have been completed, are currently in construction, or will have construction initiated within 2020, are outlined below:

- Ashbridges Bay Park Major Maintenance Project
- Bluffer's Park South Headland and Beach Major Maintenance Project
- Bluffer's Park Marina – West Shore Project
- Eastern Beaches Natural Beach Barrier Restoration and Beach Curb Repair Project
- Long Branch Park Major Maintenance Project
- Palace Pier Court Headland Maintenance Project
- Sunnyside Park Revetment Maintenance Project
- Toronto Island accelerated flood mitigation works:
    - Construction of 125m of beach curbs at Wards Island ferry dock
    - Raising of approximately 300m of road along Lakeshore Avenue and 200m of road along Cibola Avenue
    - Flood mitigation along the north shore of Algonquin Island
- Toronto Island Class Environmental Assessment to determine the long-term solutions for areas of this Island not covered by the accelerated works

TRCA also continues to work with its municipal partners of the City of Pickering and Town of Ajax on a number of shoreline resiliency initiatives. In 2019, TRCA leveraged funding from Ontario Power Generation (OPG) to repair and extend the beach dune protection fencing at the Frenchman's Bay West Spit in the City of Pickering, which has contributed significantly to the resilience of the area during high water events. TRCA has also provided the City of Pickering with a proposal for a shoreline erosion monitoring and harbour entrance channel assessment, to establish an existing conditions baseline from which to monitor future shoreline changes as a result of severe weather; and to inform maintenance dredging requirements to maintain safe navigation for marine vessels, respectively. TRCA is also interested in working with the City of Pickering on the West Spit of Frenchman's Bay to address failed infrastructure and to ensure that new infrastructure is protected against high lake levels and wave uprush from high wind events, pending confirmation of additional approximately $450,000 in funding.

In the Town of Ajax, TRCA installed post and paddle fencing along a section of the Waterfront Trail in 2018 to keep park users from the edge of severely eroded bluffs following the 2017 high water event; and completed stormwater management control and local hydrology improvements at the Paradise Park wetland in 2019. Ajax is currently revisiting a trail design for a section of the Waterfront Trail that was undermined as a result of the high lake levels, with TRCA assisting

with the permitting and design phases of the project. TRCA is also assisting the Town of Ajax with the review of the existing bridge at Duffins Creek and proposed infrastructure associated with the Lake Ontario Waterfront trail.

TRCA are coordinating these projects with our municipal partners and are engaging stakeholders and the public directly through formal Environmental Assessment consultation, where necessary, standard email, project specific websites and on-site signage. Lastly, the well-being of our employees and members of the public continues to be the top priority for TRCA, all work is being undertaken following all precautions outlined in TRCA's Pandemic Incident Management System (IMS) Procedures for Field Work.

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Date: April 1, 2020
Attachments: 2

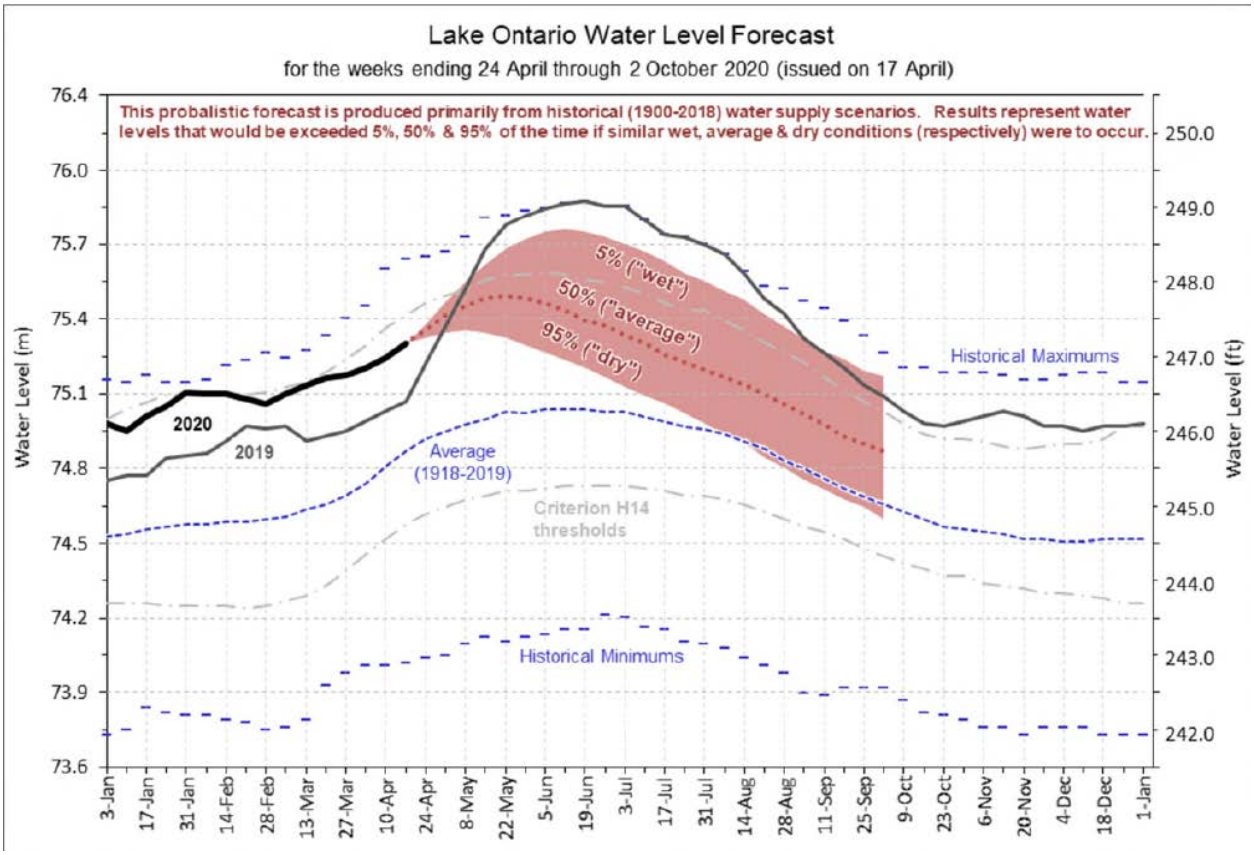
Attachment 1: Lake Ontario Water Level Forecast from International Lake Ontario-St. Lawrence River Board

Attachment 2: Summary of high water level impacts shared with Great Lakes Adaptive Management Committee, International Lake Ontario-St. Lawrence River Board, and International Joint Commission

Attachment 1 – Water Level Forecast for Lake Ontario, from International Lake Ontario-St.Lawrence River Board

Water Level Forecast Summary for Lake Ontario as of April 17 – TO BE SUPERSEDED

Water levels are expected to remain elevated well above average on Lake Ontario throughout the spring and summer of 2020. The International Lake Ontario-St.Lawrence River Board (ILOSRB) had previously recommended that communities prepare for a peak level of at least 75.5m, however the most recent press release forecasts notes a diminishing likelihood of seeing 2017/2019 levels, and this is reflected in the most recent forecast graphic, shown below.



Inflows from Lake Erie remain at record-highs, and this will continue to contribute significant volumes of water to Lake Ontario, sustain its well-above average water levels, and prevent any rapid lowering. However, generally mild temperatures and moderate precipitation since early spring, reduced snowpack and declining flows in the Ottawa River, and forecasts of mostly dry conditions for the next two weeks, are all positive indicators that suggest Lake Ontario will likely peak below the levels observed in 2017 and 2019.

Lake Ontario's (lake-wide average) level was 75.34 m (246.98 ft) on Wednesday (April 15). This level is also:

*o 34 cm *below* the record-high for this time of year set in 1973.*
*o 2 cm *below* than water level on the same date in 2017.*
*o 25 cm *above* the level on the same date in 2019.*

Compared to 2017, while levels are similar, conditions have been milder and drier, Ottawa River flows are lower as a result, and this is allowing outflows to be much higher. Compared to 2019, while levels are

higher, it was only in mid-April last year that an exceptional Ottawa River snowpack started melting rapidly with mild and wet weather, eventually leading to unprecedented flows in both peak and duration.

Lake Ontario outflows were 8,450 m3/s (298,400 cfs) on Thursday April 16. The International Lake Ontario – St. Lawrence River Board continues to maximize outflows from Lake Ontario, making frequent adjustments to maintain Lake St. Louis at the minor flood level of 22.33 m (73.3 ft). This remains above the current F-limit, which is meant to balance high water conditions upstream on Lake Ontario with those downstream in the lower St. Lawrence River. Note that because high levels downstream have been the limiting factor, the Plan 2014 safe navigation limit (L-Limit) has not been applicable since Seaway opened April 1st

The most recent forecast graphic is available here: https://ijc.org/en/loslrb/watershed/forecasts

Summary of Lake Impacts 2019

Toronto and Region Conservation Authority

As the International Joint Commission is charged with regulation of Lake Ontario outflows so as to balance upstream and downstream risks and industry considerations, and the Great Lakes Adaptive Management Committee is charged with evaluating regulation plans and decisions, this document is meant to summarize the tangible and significant impacts that have occurred to shoreline areas within the Toronto and Region Conservation Authority (TRCA) jurisdiction over the last three years. This information can support a fulsome understanding and consideration of the lake-based risks to the Greater Toronto Area and to also support consideration of additional regulation plan deviations that may help to further reduce the risk to Lake Ontario shorelines.

In both 2017 and 2019, TRCA provided support to our municipal partners, by providing forecast updates, highlighting potential impact areas, tracking existing impacts, and supporting municipal partners in their operational response. A real-time GIS tracking tool of impacts within TRCA's jurisdiction was shared with staff from the International Lake Ontario St. Lawrence River Board (ILOSRB) as well as the Great Lakes Adaptive Management (GLAM) Committee throughout the 2019 event. On September 6, 2019, staff from TRCA, the City of Toronto, the City of Pickering and the Town of Ajax met with staff from the ILOSRB and GLAM Committee to share a timeline and description of impacts. The second section of this document provides a summary of impacts to areas within TRCA's jurisdiction.

Summary of impacts

In the spring of 2017, water levels in Lake Ontario reached levels higher than had been measured since record keeping began in 1918, and these levels were once again surpassed in 2019 where TRCA issued a shoreline Hazard Warning for 115 days throughout the spring/summer. The effect of this flooding was significant across TRCA's jurisdiction which includes the Toronto Waterfront, Toronto Islands, and Pickering/Ajax waterfront sections.

The Toronto Islands are home to over 800 residents, almost 30 businesses, and two schools. The 2017 closure of the Islands during peak season due to high water presented a major disruption in tourist and recreational activity which is an important source of revenue to the City and local businesses. The flooding resulted in the activation of the City of Toronto Emergency Operations Centre and approximately $8 million in direct and indirect damages related to the closing of Toronto Island Park. In response to the 2017 flood conditions, TRCA and the City of Toronto deployed over 45,000 sandbags, 1,000 meter bags, and over a dozen industrial pumps to mitigate the effects of the rising water. In 2018, interim mitigation measures were installed on the Islands which helped keep portions of the Islands open despite the worse water level and wave conditions experienced in 2019. The main access road along the island was submerged for many weeks and deemed impassable, which resulting in the suspension of public access to the Hanlan's Point sections of the island. In 2019, and additional 22,000 sand bags were procured, and additional 60 meter bags were placed (in addition to re-using those from 2017), 14 aqua dams were installed, and 14 pumps were deployed.

The Toronto Waterfront includes many beaches and recreational infrastructure to the east and west of the downtown core, as well as marina and port-related infrastructure. As much of the Downtown Toronto waterfront is lake-fill, high lake levels result in poor drainage and sewer back-up onto roads and underpasses during times of wet weather. In 2019, portions of Lakeshore Blvd were frequently closed as the storm sewer system could not achieve positive drainage for rainfall. The overtopping of offshore erosion protection structures due to high-lake levels left many areas along the entire waterfront subject to erosion during times of high waves, including the Scarborough Bluffs. Submerged boardwalks, festival ground closures, damaged trails and long-submerged tree root systems are just some of the impacts of note.

For the City of Toronto alone (waterfront and Islands) the estimated cost of repairs due to the 2017 High Lake Level Impacts was $16.2 Million, while the 2018 ice/wind storm triggered an additional $12.1 Million in repairs. Full costing for the damage from the 2019 high-lake level is not yet available as surveying of erosion damage has only recently begun now that water levels have somewhat receded.

Impacts to the waterfront areas in **Pickering/Ajax** included significant trail erosion and damage to recreational infrastructure, as well as high water table impacts (seepage to basements) for properties surrounding Frenchman's Bay, as well as overland flooding of streets in the Paradise Park neighbourhood of Ajax. Previously buried infrastructure was exposed due to the erosion, and a public play structure had to be removed as the shoreline crept towards it.

The 2019 event was the worst experienced thus far in terms of still-water level, duration of high level, and concurrent wind-storms causing significant wave action and lake seiche. Impacts are still being tallied but it is critical to understand that levels even a few cm higher would have triggered an entire new set of impacts with drastic consequences as outlined below. While TRCA continues to work with municipal partners towards the implementation of resilience measures in certain specific areas, it is important to recognize the significant risk prior to the implementation of such measures, and the significant and widespread risk that will continue to exist in other shoreline areas. The most recent ILOSRB forecast through April 2020 displays the potential for high lake levels again in 2020.

TRCA would like to emphasize that static lake levels of 76.0m IGLD and above trigger further potential impacts, **in addition to a repeat of impacts already experienced this year**. These [occur at various levels above 76.0m and] *may* include, but are not limited to, the following:

- Flooding of portions of Billy Bishop Toronto City Airport facilities, including access roads, as well as taxiways and runways
- Ferry docking operational concerns; despite the retrofits, even higher lake levels could limit ferry service
- Flooding of Toronto Hydro non-submersible assets and requirement to de-energize portions of Toronto Islands, which in-turn would likely trigger secondary impacts such as the evacuation/public closure of Toronto Islands, and potential impacts to the Toronto Island Water Treatment Plant, which may not be able to support peak loads for the Enwave Deep

Lake Water Cooling system's provision of air conditioning to the downtown core during summer months.

- Impacts to Toronto Islands wastewater treatment pumping stations and potential sewer servicing suspension
- Significant drainage issues during rainfall events for underpasses and low-lying areas throughout downtown Toronto
- Insufficient freeboard under Liverpool Road to pass flows from Krosno Creek in Ajax
- Reduced capacity of river mouths, including the Humber and Don River, in turn reducing the freeboard to Don Valley Parkway for flooding during riverine flooding events on the Lower Don River.
- Potential impacts to other wastewater treatment facilities along the waterfront

The following sections detail impacts experienced within the TRCA jurisdiction in 2019

1) Impacts at 75.5m – 75.7m lake level (IGLD85 datum)

General impacts approaching critical water levels for Lake Ontario included ponding of water, closure of some trails and increased erosion along the most vulnerable shoreline areas.

Impacts – May 1 to May 12, 2019

- **Eastern Beaches**
  - **Flooding and inland pondin**g at Woodbine Beach due to breaching of sandbar - impacting recreational beach, volleyball courts, public viewing areas for Victoria Day fireworks
  - **Flooding** and impacts to Silver Birch Boathouse structure and adjacent boardwalk trail; sandbags and armourstone overtopped
  - **Extensive erosion** to southern points of Ashbridge's Bay Park Spit due to undercutting
- **Rouge Beach**
  - **Closure to public** - parking lot gates and washrooms due to flooding, this persisted for months
- **Scarborough Bluffs**
  - **Landslides and active shoreline erosion** near *Guild Inn Shoreline* causing deployment of crews for repair and implementation of closures to public trail and access road
  - TRCA also issued a Notice of Caution for the Scarborough Bluffs due to increased risk of landslides on May 7th, 2019.
  - **Erosion** along waterfront park at Bluffers Park
- **Lakeshore Blvd**
  - **Flooding to lanes** on Lakeshore Blvd due to reduced storm drainage during and after rainfall on May 10th - this continued to occur at other times
- **Port Union**

- **Erosion** at lakeside trail at Highland Creek mouth

- **Toronto Islands**
  - **Flooding/pooling** of water in low lying areas
  - **Flooding of Roadway** due to storm surge and waves breaching at Gibraltar Point
- **Pickering/Ajax Waterfront**
  - **Flooding/pooling** of water at Paradise Park Beach in Ajax, including ditches up to Ebony Rd.
  - **Closure** of Ajax Waterfront Trail at Rotary Park in Ajax from Rotary Park to west of pedestrian bridge due to erosion

2) Impacts at 75.7m - 76.0m lake level (IGLD85 datum)

Lake Ontario water levels between 75.7m to 76m (IGLD85 datum) in 2019 resulted in significant and prolonged inundation, erosion, and debris washup leading to closure and significant degradation of major roads, trails, boardwalks, residential buildings, Yacht Clubs, playground and park structures, Ferry Docks, boat launches and docks, shoreline protection structures, turf and trees and innumerable areas of the Toronto, Pickering, and Ajax waterfronts, as well as the Toronto Islands. Conditions were exacerbated during times of heavy wind or wave activity which often overtopped preventative measures such as sandbags, meter bags, aquadams, armourstone, etc.

New Impacts – May 13 to August 1, 2019

- **Western Beaches**
  - **Power shut-offs** in electrical cabinets for Toronto Golf Club at Marie Curtis Park
  - **Flooding of parkland** at Marie Curtis Park, Colonel Sam Smith Park and Humber Bay Park West
  - **Urban drainage** issues (catch basins beyond capacity) at Marie Curtis Park and Lakeshore Blvd (WB & EB lane closures on June 10th)
  - **Flooded/submerged/closure of walking paths/trails/boardwalks** at Humber Bay Arch Bridge (at Humber River Mouth), Sunnyside Park, Budapest Park and Marilyn Bell Park
  - **Flooded/submerged boat launches** at Humber Bay Park West
  - **Flooded docks** at Sunnyside Beach and Ontario Place Marina docks
  - **Flooded/submerged trees** at Sunnyside Beach
  - **Erosion to walking paths/trails/boardwalks** at Sunnyside Pavillion
  - **Erosion to beaches, shorelines and parklands** at Marie Curtis Park, Humber Bay Park East, Sunnyside Park and Budapest Park
  - **Damage to new fishing nodes** at Humber Bay Park East
  - **Wave damage to boardwalk/trail** at Budapest Park and Marilyn Bell Park
  - **Rowing/Canoe/Paddle and Dragonboat programming** activities cancelled or delayed at Sunnyside Paddling Club, The Boulevard Club, Toronto Sailing and Canoe Club as well as the Argonaut Rowing Club

- **Stream gauging equipment and data quality impacted** (Lower Humber at Old Mill) by prolonged high water levels on Lake Ontario due to backwater effects
- **Flooding impacts to outdoor concert venue** at Ontario Place (Live Nation's Budweiser Stage) with main venue building and stage impacted

- **Inner Harbour**
  - Toronto Music Garden – flooding of docking wall and electrical chamber
  - Peter Street basin – water cresting on south side
  - HTO Park – beach and dock/boardwalk area closed to the public due to flooding and continuous wave action
  - Harbour Square and Harbour Square Park – boardwalks closed due to flooding; significant damage due to prolonged submergence of boardwalk structures
  - Sugar Beach – promenade and electrical chamber flooded
  - Stream gauging equipment and data quality impacted (Don at Dundas) by prolonged high water levels on Lake Ontario due to backwater effects
- **Eastern Beaches**
  - **Power shut-offs** at Rouge Beach Park (for 4 months)
  - **Urban drainage** issues (catch basins beyond capacity) at Eastern Avenue on May 23rd and June 12th
  - **Increased debris washing up along shorelines** at Woodbine Beach (due to increased wave activity and municipal water infrastructure being overwhelmed or bypassed)
  - **Flooding/ponding of beaches** at Woodbine Beach (10-80m into beach area including lifeguard stations, volleyball courts and fireworks viewing area), Bluffer's Park Beach (half of beach is underwater) and Rouge Beach
  - **Flooded/submerged/closure of walking paths/trails/boardwalks** at Ashbridge's Bay Park (Coatsworth Cut) and Rouge Beach (including parking lot)
  - **Flooded/submerged boat launches** at Bluffer's Park
  - **Flooded/submerged wave decks/breaks** at Woodbine Beach
  - **Flooded structure** at Kew Beach – Silver Birch Boathouse, required constant pumping as sandbags were constantly being breached)
  - **Erosion of beaches and shoreline causing damage and/or closures to trails/pathways/boardwalks** at Ashbridge's Bay Park, Woodbine Beach, Kew and Balmy Beaches, Bluffer's Park, Doris McCarthy trail along Scarborough Bluffs, Port Union (East Point Park and Port Union waterfront trail) and Rouge Beach
  - **Damaged/submerged/lost trees** at Ashbridge's Bay
  - **Stream gauging equipment and data** quality impacted (Rouge at Glenrouge Campground) by prolonged high water levels on Lake Ontario due to backwater effects
- **Toronto Islands**
  - **Flooding and Significant Erosion of beaches** at Hanlan's Point Beach, Ward's beach, and Manitou Beach

- **Substantial and Prolonged Flooding of Roadways** at Lakeshore Ave near Gibraltar Point Lighthouse and Artscape, 500m stretch between the Royal Canadian Yacht Club and Snake Island, and numerous stretches along Cibola Ave. Water was continuous on Cibola Ave from Algonquin bridge to the Royal Canadian Yacht Club. Noticeable deterioration of submerged roads on Lakeshore Ave near Gibraltar point, and Cibola avenue. Condition of submerged roads worsens daily
- **Loss of safe Ingress/Egress on major roads** due to depth of flooding. Toronto Fire Service on delayed response as they have to pass through roads with 40 cm of water on them. Ambulance needed to be towed as a result of bottoming out near the Lighthouse.
- **Substantial and Prolonged Flooding** at southern section and entranceway of Centreville Amusement Park, Toronto Island Marina's eastern edge, Parks yard operational areas and buildings and fuel pump area, Innumerable in-land flooding areas (approximately 1/3 of the islands), and Grandstand boardwalks.
- **Closure of Ferry Service** to Hanlan's Point for vehicles and pedestrians (major accessway to Islands)
- **Closure** of Olympic island, Toronto Islands Grandstand, and Snake Island
- **Shoreline Protection overtopped** due to high lake level in conjunction with wave/surge action, affecting residential area along Seneca Ave on Algonquin Island, the Queen City Yacht Club, and the cove area of Ward's Island.
- **Substantial turf and tree damage** across the islands
- **Gas service shutoff** at meter to 6 Channel Avenue, due to floodwaters in contact with furnace
- **Numerous event cancellations**

o **Pickering/Ajax Waterfront**

- **Flooding, Erosion, and Debris Washup** of undermining trees, armourstone rocks, benches on pads, and boardwalk at Millennium Square in Pickering
- **Closure** and removal of two playgrounds at Millennium Square in Pickering (Flooding from waves and debris washup) , and Canoe club in Pickering
- **Road and Trail Closures** near Paradise Park (Lakefront Trail, Ruthel Rd and Ebony St) due to backwater from Lake, and Frenchman's Bay Beachpoint Promenade due to flooding and debris washup
- **Exposed Pipe** from Pickering Nuclear Generating Station washed up on beach
- **Armourstone Displacement** and undercutting of concrete path at Frenchman's Bay Harbour Entrance.
- **Slope Failure** at 58 Ontoro Blvd Ajax (within Central Lake Ontario Conservation Authority's jurisdiction) involving 38m long failure crest 10m from the residence. Slopes and seawalls for 10-12 homes have been damaged to the point of failure.
- **Hydrostatic Lake Level seepage** impacting homes/basements along Frenchman's Bay

- **Substantial Erosion** at Beachpoint promenade, Frenchman's Bay harbour entrance pier, and the beach, boardwalk, washroom building adjacent to Nuclear Plant in Pickering. Substantial Erosion and loss of trail and waterfront area near Rotary Park in Ajax.

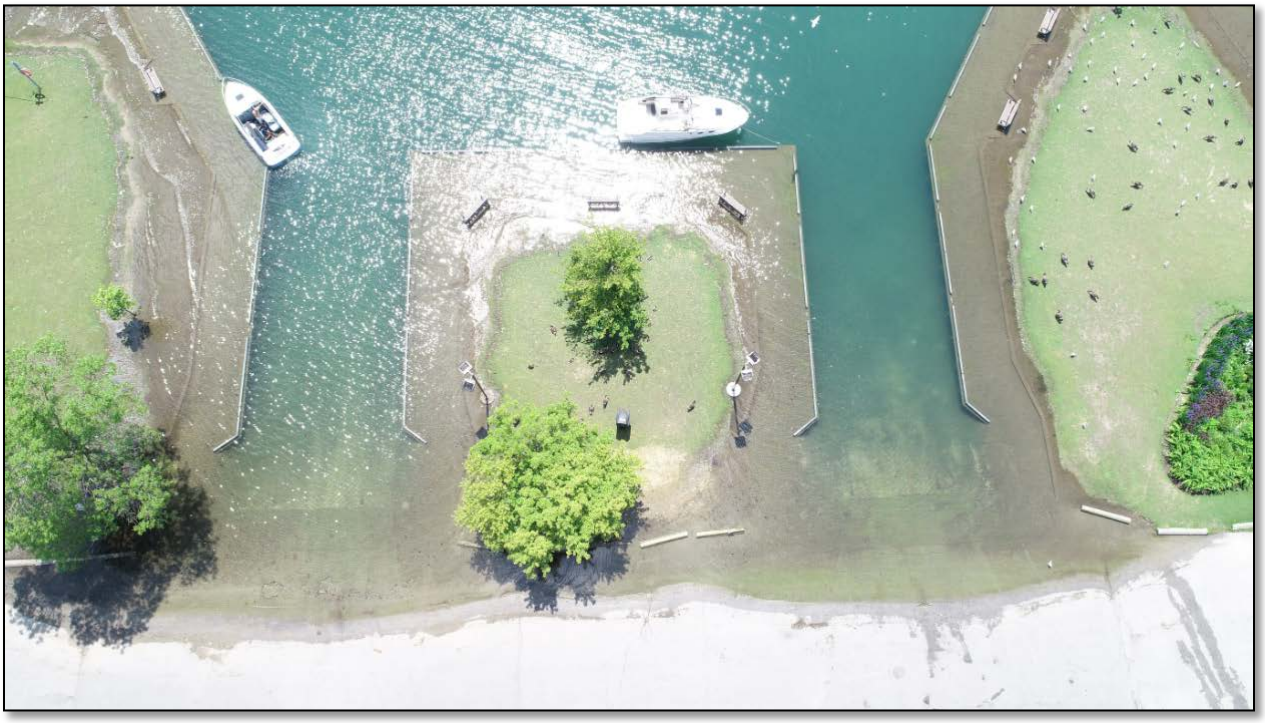


Photo 1: Bluffer's Park Flooded Boat Launch, Toronto – overhead drone view on June 26, 2019

Photo 2: East Point Park (Port Union) waterfront trail erosion, Toronto –June 28, 2019

Photo3: Flooded Rouge Beach Park and parking lot, Toronto – June 27, 2019

Photo 4: Flooded Olympic Island, Toronto Islands – July 24, 2019

Photo 5: Flooding at Lakeshore Ave, Toronto Islands – July 24, 2019

Photo 6: Erosion at Ajax Waterfront Park near Water Supply Plant, Ajax – June 24, 2019

Item 8.1

Section III – Items for the Information of the Board

TO: Chair and Members of the Board of Directors
Meeting #3/20, Friday, April 24, 2020

FROM: Michael Tolensky, Chief Financial and Operating Officer

RE: **2019 YEAR END FINANCIAL REPORT**

KEY ISSUE
Receipt of Toronto and Region Conservation Authority's (TRCA) unaudited financial report as of December 31, 2019 for informational purposes.

RECOMMENDATION

IT IS RECOMMENDED THAT the 2019 Year End Variance Report for the year ended December 31, be received.

BACKGROUND
As part of TRCA's financial governance procedures, this report presents the 2019 Twelve Month Financial Report, which covers the spend rate of expenditures and recognition of revenue for all of 2019. For the purposes of this report, TRCA's four categories of revenue have been combined into one category titled 'Revenue' in the attached financial charts. This includes:

- Authority Generated: Revenues raised through activities such as user fees, retail, rentals, program fees, event fees, and investment and interest income.
- Government Funded: Municipal, federal and provincial grants and contract services.
- Levies: Operating and Capital levies from municipal partners.
- Reserves: Accumulated *surplus* which is intended to finance unforeseen costs related to ongoing operations or unfunded *capital expenses* for the organization.

RATIONALE
TRCA believes in transparency and accountability for its spending, revenue recognition and performance of service delivery objectives against approved budgets, for both the organization and for each project and program as an individual endeavor. This is further supported by TRCA's core values which prioritize accountability of staff to be increasingly responsible for their actions, behaviors and outcomes. TRCA recognizes that all projects and programs offered have cost implications and that all costs incurred are in support of services being practical and affordable. Transparency throughout the budget management process is achieved in part through the analysis and reporting on year to date revenues/expenses as compared to the current fiscal year budget. In order to improve the accuracy in reporting anticipated issues in expenditures, TRCA established a seasonal forecasting baseline using historical data from the past three years to estimate the seasonal variances within each program area.

Relationship to Building the Living City, the TRCA 2013-2022 Strategic Plan
This report supports the following strategy set forth in the TRCA 2013-2022 Strategic Plan:
Strategy 9 – Measure performance

FINANCIAL DETAILS
The operating and capital report by Service Area and underlying Program Areas are provided in Attachments 1-5 respectively. The attachments provide a summary analysis of expenditures and revenues to date and the variance explanations by Program Area. The variance threshold for both revenues and expenditures are +/- 10% and $500,000 from anticipated. Variances within these thresholds are deemed to be within the expected range.

DETAILS OF WORK TO BE DONE
As TRCA's financial governance procedures and systems continue to evolve over time, internal processes for in-year billing from vendors, invoicing of customers and recognition of deferred revenue/internal recoveries will become a greater area of focus for the organization.

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Date: March 19, 2020
Attachments: 5

Attachment 1: Twelve Month Variance Report – Operating Budget Expenditures
Attachment 2: Twelve Month Variance Report – Operating Budget Revenues
Attachment 3: Twelve Month Variance Report – Capital Budget Expenditures
Attachment 4: Twelve Month Variance Report – Capital Budget Revenues
Attachment 5: Twelve Month Variance Report – Variance Explanations

ATTACHMENT 1: OPERATING BUDGET EXPENDITURES

	Q4 2019 Anticipated		Q4 2019 Actual		Q4 2019 Variance		
	Anticipated Expenditures	Anticipated Q4 Spend (%)	Actual Expenditures	Actual Spend Rate	$ Difference Expenditures	% Difference Spend Rate	Reportable Expenditure Variance
Watershed Planning and Reporting	1,581,000	100%	1,623,537	103%	(42,537)	-3%	
Climate Science	-	0%	-	0%	-	0%	
Water Resource Science	-	0%	-	0%	-	0%	
Erosion Management	-	0%	-	0%	-	0%	
Flood Management	1,187,200	100%	1,036,209	87%	150,991	13%	
Biodiversity Monitoring	29,300	100%	43,733	149%	(14,433)	-49%	
Ecosystem Management Research and Directions	-	0%	-	0%	-	0%	
Forest Management	79,000	100%	131,203	166%	(52,203)	-66%	
Restoration and Regeneration	525,200	100%	499,914	95%	25,286	5%	
Greenspace Securement	-	0%	-	0%	-	0%	
Greenspace Management	779,400	100%	545,932	70%	233,468	30%	
Rental Properties	1,970,600	100%	1,792,267	91%	178,333	9%	
Waterfront Parks	-	0%	-	0%	-	0%	
Conservation Parks	5,522,950	100%	5,824,172	105%	(301,222)	-5%	
Trails	-	0%	475	0%	(475)	0%	
Bathurst Glen Golf Course	1,314,000	100%	1,071,377	82%	242,623	18%	
Black Creek Pioneer Village	4,232,450	100%	3,976,422	94%	256,028	6%	
Events and Festivals	646,900	100%	615,565	95%	31,335	5%	
Wedding and Corporate Events	-	0%	-	0%	-	0%	
Development Planning and Regulation Permitting	6,543,300	100%	5,932,258	91%	611,042	9%	
Environmental Assessment Planning and Permitting	3,981,500	100%	3,119,989	78%	861,511	22%	**A**
Policy Development and Review	492,800	100%	445,435	90%	47,365	10%	
School Programs	5,356,130	100%	4,633,548	87%	722,582	13%	**B**
Newcomer Services	730,100	100%	714,951	98%	15,149	2%	
Family and Community Programs	1,010,800	100%	944,548	93%	66,252	7%	
Living City Transition Program	146,300	100%	142,978	98%	3,322	2%	
Community Engagement	292,600	100%	385,554	132%	(92,954)	-32%	
Social Enterprise Development	-	0%	-	0%	-	0%	
Financial Management	3,018,800	100%	2,788,430	92%	230,370	8%	
Corporate Management and Governance	5,830,000	100%	5,350,012	92%	479,988	8%	
Human Resources	1,311,500	100%	1,118,248	85%	193,252	15%	
Corporate Communications	1,811,000	100%	1,626,125	90%	184,875	10%	
Information Infrastructure and Management	2,607,600	100%	2,607,213	100%	387	0%	
Project Recoveries	(5,498,000)	100%	(3,167,116)	58%	(2,330,884)	42%	**C**
Vehicles and Equipment	(100,000)	100%	(94,852)	95%	(5,148)	5%	
Grand Total	**45,402,430**	**100%**	**43,708,127**	**96%**	**1,694,303**	**4%**	

ATTACHMENT 2: OPERATING BUDGET REVENUES

	Q4 2019 Anticipated		Q4 2019 Actual		Q4 2019 Variance		
	Anticipated Revenues	Anticipated Q4 Spend (%)	Actual Revenues	Actual Spend Rate	$ Difference Revenues	% Difference Spend Rate	Reportable Revenue Variance
Watershed Planning and Reporting	1,581,000	100%	1,559,760	99%	(21,240)	-1%	
Climate Science	-	0%	-	0%	-	0%	
Water Resource Science	-	0%	-	0%	-	0%	
Erosion Management	860,700	100%	860,600	100%	(100)	0%	
Flood Management	326,500	100%	194,746	60%	(131,754)	-40%	
Biodiversity Monitoring	48,700	100%	62,778	129%	14,078	29%	
Ecosystem Management Research and Directions	-	0%	-	0%	-	0%	
Forest Management	-	0%	-	0%	-	0%	
Restoration and Regeneration	638,600	100%	942,772	148%	304,172	48%	
Greenspace Securement	1,095,300	100%	1,095,200	100%	(100)	0%	
Greenspace Management	370,000	100%	96,701	26%	(273,299)	-74%	
Rental Properties	3,622,100	100%	3,906,771	108%	284,671	8%	
Waterfront Parks	-	0%	-	0%	-	0%	
Conservation Parks	7,196,900	100%	7,807,634	108%	610,734	8%	
Trails	-	0%	-	0%	-	0%	
Bathurst Glen Golf Course	1,323,000	100%	1,204,377	91%	(118,623)	-9%	
Black Creek Pioneer Village	2,132,000	100%	1,827,475	86%	(304,525)	-14%	
Events and Festivals	1,064,400	100%	1,089,000	102%	24,600	2%	
Wedding and Corporate Events	-	0%	-	0%	-	0%	
Development Planning and Regulation Permitting	7,384,000	100%	5,681,172	77%	(1,702,828)	-23%	**D**
Environmental Assessment Planning and Permitting	3,858,000	100%	3,466,434	90%	(391,566)	-10%	
Policy Development and Review	-	0%	-	0%	-	0%	
School Programs	5,999,630	100%	5,460,870	91%	(538,760)	-9%	**E**
Newcomer Services	680,100	100%	665,597	98%	(14,503)	-2%	
Family and Community Programs	417,300	100%	511,944	123%	94,644	23%	
Living City Transition Program	127,700	100%	127,600	100%	(100)	0%	
Community Engagement	311,200	100%	373,342	120%	62,142	20%	
Social Enterprise Development	-	0%	-	0%	-	0%	
Financial Management	8,314,050	100%	8,489,722	102%	175,672	2%	
Corporate Management and Governance	341,000	100%	362,244	106%	21,244	6%	
Human Resources	-	0%	1,117,305	-	1,117,305	-	**F**
Corporate Communications	-	0%	-	0%	-	0%	
Information Infrastructure and Management	-	0%	8,989	0%	8,989	0%	
Project Recoveries	-	0%	-	0%	-	0%	
Vehicles and Equipment	-	0%	225,500	-	225,500	-	
Grand Total	**47,692,180**	**100%**	**47,138,534**	**99%**	**(553,646)**	**-1%**	

ATTACHMENT 3: CAPITAL BUDGET EXPENDITURES

	Q4 2019 Anticipated		Q4 2019 Actual		Q4 2019 Variance		
	Anticipated Expenditures	Anticipated Q4 Spend (%)	Actual Expenditures	Actual Spend Rate (%)	$ Difference Expenditures	% Difference Spend Rate	Reportable Expenditure Variance
Watershed Planning and Reporting	1,267,000	100%	1,480,945	117%	(213,945)	-17%	
Climate Science	958,000	100%	703,086	73%	254,914	27%	
Water Resource Science	4,681,950	100%	5,782,841	124%	(1,100,891)	-24%	G
Erosion Management	83,465,513	100%	34,998,779	42%	48,466,734	58%	H
Flood Management	4,275,300	100%	3,935,452	92%	339,848	8%	
Biodiversity Monitoring	2,640,400	100%	2,324,541	88%	315,859	12%	
Ecosystem Management Research and Directions	935,200	100%	770,771	82%	164,429	18%	
Forest Management	1,473,200	100%	1,144,128	78%	329,072	22%	
Restoration and Regeneration	16,566,675	100%	11,264,152	68%	5,302,523	32%	I
Greenspace Securement	2,727,000	100%	1,482,086	54%	1,244,914	46%	J
Greenspace Management	1,352,150	100%	1,366,251	101%	(14,101)	-1%	
Waterfront Parks	2,539,075	100%	1,519,712	60%	1,019,363	40%	K
Conservation Parks	622,600	100%	426,901	69%	195,699	31%	
Trails	6,951,300	100%	3,613,827	52%	3,337,473	48%	L
Black Creek Pioneer Village	692,000	100%	460,703	67%	231,297	33%	
Events and Festivals	-	0%	-	0%	-	0%	
Policy Development and Review	530,200	100%	406,290	77%	123,910	23%	
School Programs	8,726,500	100%	3,792,495	43%	4,934,005	57%	M
Newcomer Services	155,200	100%	145,063	93%	10,137	7%	
Family and Community Programs	288,100	100%	122,610	43%	165,490	57%	
Living City Transition Program	7,095,000	100%	5,334,822	75%	1,760,178	25%	N
Community Engagement	2,899,950	100%	2,252,292	78%	647,658	22%	O
Financial Management	-	0%	168,502	0%	(168,502)	0%	
Corporate Management and Governance	17,006,571	100%	3,076,405	18%	13,930,166	82%	P
Human Resources	48,450	100%	24,295	50%	24,155	50%	
Corporate Communications	-	0%	287,450	0%	(287,450)	0%	
Information Infrastructure and Management	672,000	100%	501,034	75%	170,966	25%	
Project Recoveries	3,500	100%	10,696	306%	(7,196)	-206%	
Vehicles and Equipment	-	0%	-	0%	-	0%	
Grand Total	168,572,834	100%	87,396,127	52%	81,176,707	48%	

ATTACHMENT 4: CAPITAL BUDGET REVENUES

	Q4 2019 Anticipated		Q4 2019 Actual		Q4 2019 Variance		
	Anticipated Revenues	Anticipated Q4 Revenue Rate (%)	Actual Revenues	Actual Spend Rate (%)	$ Difference Revenues	% Difference Spend Rate	Reportable Revenue Variance
Watershed Planning and Reporting	1,317,000	100%	1,598,184	121%	281,184	21%	
Climate Science	958,000	100%	682,555	71%	(275,445)	-29%	
Water Resource Science	4,825,050	100%	5,832,480	121%	1,007,430	21%	Q
Erosion Management	83,468,413	100%	35,141,723	42%	(48,326,690)	-58%	R
Flood Management	4,272,400	100%	4,065,970	95%	(206,430)	-5%	
Biodiversity Monitoring	2,447,300	100%	2,189,128	89%	(258,172)	-11%	
Ecosystem Management Research and Directions	935,200	100%	727,569	78%	(207,631)	-22%	
Forest Management	1,473,200	100%	1,104,041	75%	(369,159)	-25%	
Restoration and Regeneration	16,566,675	100%	11,629,274	70%	(4,937,401)	-30%	S
Greenspace Securement	2,727,000	100%	1,483,904	54%	(1,243,096)	-46%	T
Greenspace Management	1,325,150	100%	1,302,260	98%	(22,890)	-2%	
Waterfront Parks	2,539,075	100%	812,127	32%	(1,726,948)	-68%	U
Conservation Parks	622,600	100%	455,747	73%	(166,853)	-27%	
Trails	6,978,300	100%	2,439,336	35%	(4,538,964)	-65%	V
Black Creek Pioneer Village	2,432,000	100%	2,342,300	96%	(89,700)	-4%	
Events and Festivals	-	0%	-	0%	-	0%	
Policy Development and Review	530,200	100%	406,290	77%	(123,910)	-23%	
School Programs	8,755,500	100%	3,828,576	44%	(4,926,924)	-56%	W
Newcomer Services	155,200	100%	142,143	92%	(13,057)	-8%	
Family and Community Programs	259,100	100%	124,015	48%	(135,085)	-52%	
Living City Transition Program	7,095,000	100%	5,259,852	74%	(1,835,148)	-26%	X
Community Engagement	2,899,950	100%	2,288,823	79%	(611,127)	-21%	Y
Financial Management	-	0%	172,434	0%	172,434	0%	
Corporate Management and Governance	17,006,571	100%	3,510,049	21%	(13,496,522)	-79%	Z
Human Resources	48,450	100%	29,110	60%	(19,340)	-40%	
Corporate Communications	-	0%	274,981	0%	274,981	0%	
Information Infrastructure and Management	672,000	100%	500,159	74%	(171,841)	-26%	
Project Recoveries	3,500	100%	2,720	78%	(780)	-22%	
Vehicles and Equipment	-	0%	-	0%	-	0%	
Grand Total	170,312,834	100%	88,345,751	52%	(81,967,083)	-48%	

ATTACHMENT 5: VARIANCE EXPLANATIONS

OPERATING REPORTABLE VARIANCE NOTES - EXPENDITURES (Figures in 000's)

A	The York Region permit review staff compensation account and Metrolinx environmental assessment review projects have lower than anticipated expenditures as a result of staff gapping. Once these are taken into consideration, the variance is ($328) and -8% which is within the acceptable threshold.
B	The Claremont and Albion Hills Field centre expenditures are lower than anticipated as a result of staff gapping. Once these are taken into consideration, the variance is ($446) and -8% which is within the acceptable threshold.
C	The lower than anticipated recoveries are due to timing, as there were delays in the execution of capital projects. Once this is taken into consideration, the variance is ($1) and 0% which is within the acceptable threshold.

OPERATING REPORTABLE VARIANCE NOTES - REVENUES (Figures in 000's)

D	Revenue is lower than anticipated due to a limited number of high value permit applications throughout 2019. Once this is taken into consideration, the variance is $7 and 0% which is within the acceptable threshold.
E	The lower than anticipated revenues are as a result of both reduced bookings at Kortright from school board job action in Q4, and staff gapping which resulted in fewer funding applications for education programming support. Once this is taken into consideration, the variance is ($411) and -8% which is within the acceptable threshold.
F	This variance is reflective of the 2018 and 2019 NEER rebate which was received in 2019. Once this is taken into account, the variance is $0 and 0% which is within the acceptable threshold.

CAPTIAL REPORTABLE VARIANCE NOTES - EXPENDITURES (Figures in 000's)

G	The higher than anticipated expenditures are due to the stormwater management pond contract services with the City of Toronto which is fully cost recoverable. Once this is taken into account, the variance is ($56) and -1% which is within the acceptable threshold.
H	The lower than anticipated expenditures in Erosion Management is related to a number of major capital works project delays resulting in the under expenditure including: the East Don Trail which is delayed as a result of the approvals with Metrolinx and the construction activities of the trail; Ashbridges Bay which is awaiting additional approvals prior to mobilization; Bluffers Park South Headland project which has now commenced but will not be complete until Q3 2020; Upper Highland Creek trail at Ellesmere which is continuing through the approvals phase with construction delayed until Q1 2020; DMAF infrastructure projects which are in negotiations with private land owners and anticipated to be initiated once the agreements are executed in Q1 of 2020; and a number of other major works which are temporarily delayed as a result of agreement execution and negotiations. Once these are taken into account, the variance is ($7,234) and -9% which is within the acceptable threshold.
I	Expenditures are lower than anticipated due to a delay in the planning phase of The Meadoway Project. The 2019 scope of work has been revised and delayed until 2020. Additionally, the Menno-Reesor Restoration and Renovation project is underspent in 2019 as a result of a reduction in the scope of work following the transfer of land to Parks Canada. Once these are taken into account, the variance is ($1,096) and -7% which is within the acceptable threshold.
J	Greenspace land acquisition expenditures are lower than anticipated as expenses are contingent on the availability of land for acquisition. Once this is taken into consideration, the variance is $109 and 4% which is within the allowable threshold.
K	Expenditures are lower than anticipated due to a delay in the Scarborough Bluffs West Environmental Assessment which is awaiting direction from the City of Toronto on the timeline to launch the Environmental Assessment. It is expected a decision will be made by the end of Q2 2020. Additionally, the Scarborough Waterfront Project Environmental Assessment was approved in Q4 2019 and will commence in Q1 2020. Once these are taken into account, the variance is $6 and 0% which is within the acceptable threshold.
L	The expenditures are lower than anticipated as a result of the following projects: Black Creek Trail at Shoreham which will be complete in Q2 2020; the Don Mills trail which experienced delays related to the approvals associated with private land owner agreements; the Martin Goodman Trail which was temporarily delayed and will be complete in Q2 2020; and the Franklin Children's Garden which was delayed due to high water levels, and will be complete in Q3 2020. Once these are taken into account, the variance is ($362) and -5% which is within the acceptable threshold.

M	The lower than anticipated expenses are a result of delays with the Bolton Camp recreational infrastructure projects, with phase one retrofits ongoing into 2020. Additionally, the water and waste water site infrastructure project was initiated in 2019 and will continue into 2020. Once these are taken into account, the variance is $185 and 2% which is within the acceptable threshold.
N	Expenditures are lower than anticipated due to: reduced scope of work in 2019 for the electric vehicle charging stations as per joint decision between GTAA and TRCA; reprioritizing Community Transformation deliverables in accordance with municipal guidance; lower than anticipated partnership and grant contributions in the STEP program resulting in a reduced scope of work; and ongoing staff gapping in the SNAP program resulting in deliverables being deferred into 2020. Once these are taken into account, the variance is ($557) and -8% which is within the acceptable threshold.
O	Expenditures are lower than anticipated due to staff gapping in the following programs: the Spills Database Program; Black Creek Community Farm project; and the Central Counties Environmental Plan. Additionally the Toronto Golf Club Fish Barrier project has been deferred to Q3 2020 as a result in staffing changes at the Golf Course; and the reforestation program on private lands experienced a reduction in funding through the Province's 50 million trees campaign requiring a scaling down of activities. Once these are taken into account, the variance is ($259) and -9% which is within the acceptable threshold.
P	The lower than anticipated expenditure is related to the Head Office Construction Project which was delayed in obtaining site plan approval. Once this is taken into consideration the variance is ($1,292) and -8% which is within the acceptable threshold.

CAPTIAL REPORTABLE VARIANCE NOTES - REVENUES (Figures in 000's)	
Q	The higher than anticipated revenues are due to additional work with stormwater management pond contract services in partnership with the City of Toronto which is fully cost recoverable. Once this variance is taken into account, the variance is ($150) and -3% which is within the acceptable threshold.
R	The lower than anticipated revenues in Erosion Management are related to a number of major capital works project delays including: the East Don Trail which is related to delays in approvals with Metrolinx and the construction of the trail; Ashbridges Bay which is awaiting additional approvals prior to mobilization; Bluffers Park South Headland project which has now commenced but will not be complete until Q3 2020; Upper Highland Creek trail at Ellesmere which is continuing through the approvals phase with construction delayed until Q2 2020; DMAF infrastructure projects which are in negotiations with private land owners and is anticipated to be initiated once the agreements are executed in Q2 of 2020; and a number of other major works which are temporarily delayed as a result of agreement execution and negotiations. Once these are taken into account, the variance is ($5,988) and -7% which is within the acceptable threshold.
S	Revenue is lower than anticipated due to a delaying in the planning phase for The Meadoway Revitalization Project. Funds will be released from Toronto and Region Conservation Foundation in 2020 for future maintenance and adaptive management within the Meadoway. Additionally, the Menno-Reesor Restoration and Renovation project received less than anticipated revenues as a result of a reduction in the scope of work following the transfer of land to Parks Canada. Once this is taken into consideration, the variance is ($837) and -5% which is within the acceptable threshold.
T	Revenue is lower than anticipated due to a delay in the sale of the Speirs property which is to be completed in Q1 2020. Once this is taken into consideration the variance is $0 and 0% which is within the acceptable threshold.
U	Revenues are lower than anticipated due to a delay in the Scarborough Bluffs West Environmental Assessment which is awaiting direction from the City of Toronto on the timeline to launch the Environmental Assessment. It is expected a decision will be made by the end of Q2 2020. Additionally, the Scarborough Waterfront Project Environmental Assessment was approved in Q4 2019 and will commence in Q1 2020. Once these delays are taken into account, the variance is $49 and 2% which is within the acceptable threshold.
V	Revenue is lower than anticipated due to a delay in obtaining permits for the Claireville Trail which are now anticipated in Q2 2020; the Black Creek Trail at Shoreham which will be complete in Q2 2020 with the final site planting; the Don Mills trail which experienced delays related to private land owner agreement approvals; the Martin Goodman Trail which will be complete once the final plantings are executed in Q2 2020; and the Franklin Children's Garden which was delayed due to high water levels, and will be complete in Q3 2020; and the Claireville Trail which was delayed into 2020 and will transfer funds from the Toronto Region Conservation Foundation to cover expenses. Once these are taken into account the variance is ($362) and -5% which is within the acceptable threshold.

W	The revenue variance represents unspent funds for site servicing which is expected to be resolved in 2020. Once this is taken into account, the variance is $247 and 3% which is within the acceptable threshold.
X	Revenues are lower than anticipated due to: a reduced scope of work in 2019 for the electric vehicle charging stations as per joint decision between GTAA and TRCA; reprioritizing deliverables within community transformation program in accordance with municipal guidance; and lower than anticipated partnership and grant contributions in the STEP program. Once these are taken into account, the variance is ($569) and -8% which is within the acceptable threshold.
Y	The lower than anticipated revenues are as a result of the Toronto Golf Club Fish Barrier project being deferred into 2020; the Black Creek Community Farm project which has been delayed into 2020; and the reforestation program on private lands which experienced a reduction in funding through the Province's 50 million trees campaign. Once these are taken into consideration, the variance is ($263) and -9% which is within the acceptable threshold.
Z	The lower than anticipated revenues for the Head Office Construction Project are due to delays in obtaining site plan approval. Once this is taken into consideration the variance is ($1,285) and -8% which is within the acceptable threshold.

Item 8.2

Section III – Items for the Information of the Board

TO: Chair and Members of the Board of Directors
Meeting #3/20, Friday, April 24, 2020

FROM: Michael Tolensky, Chief Financial and Operating Officer

RE: **2020 BUDGETARY UPDATE - COVID-19 IMPACT**

KEY ISSUE
Toronto and Region Conservation Authority's (TRCA) 2020 Budgetary Update, reflecting the impact of COVID-19 for information of the Board.

IT IS RECOMMENDED THAT The 2020 Budgetary Update – COVID-19 Impact report be received.

BACKGROUND
The current global COVID-19 pandemic and Provincially declared emergency has resulted in closures of TRCA facilities as well as the cancellation of TRCA events and programs. These closures were initiated in mid-March impacting several events and programming planned for March break. Continued restrictions will dramatically impact TRCA's business models, primarily in the Education and Training and Parks and Culture Divisions.

RATIONALE
TRCA revenues are grouped predominantly into two categories: Government funding and Authority generated revenues. It is projected by staff that most projects and programs that rely on government funding will be able to continue operating within a COVID-19 environment, however, if any deliverables are impacted, these initiatives will be assessed accordingly.

To date, TRCA has already closed its public facilities and cancelled public events starting in March 2020, extending to the end of June 2020, with additional cancellations anticipated to follow. With ongoing restrictions anticipated in 2020, TRCA's ability to earn authority generated revenues, such as user/participant fees, will be considerably reduced.

In 2018, for example, Tourism and Recreation and Education and Outreach comprised $14.9 million of the organization's $36.8 million authority generated revenue (40%). When considering additional potential decreases in Service Areas throughout the organization, such as Greenspace Securement and Management and Planning Development Review, staff predict a worst-case scenario in which TRCA's 2020 budgeted operating revenues fall in excess of $20 million.

Relationship to Building the Living City, the TRCA 2013-2022 Strategic Plan
This report supports the following strategy set forth in the TRCA 2013-2022 Strategic Plan:
Strategy 7 – Build partnerships and new business models

DETAILS OF WORK TO BE DONE
Staff are constantly analyzing TRCA's 2020 operations in the context of COVID-19's impact on the organization's revenues and expenditures and potential for government funding to reduce the repercussions to our staff compliment, while ensuring that the safety of staff and the public is maintained.

This includes potential funding opportunities through the Federal Government's COVID-19 Economic Response Plan, such as the Canada Emergency Wage Subsidy (CEWS) and changes to the Canada Summer Jobs program. Staff will continue to monitor these programs and conduct ongoing communications with the program officers to ensure that the maximum allowable benefits are realized.

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Date: April 9, 2020

Item 8.3

Section III – Items for the Information of the Board

TO: Chair and Members of the Board of Directors
Meeting #3/20, Friday, April 24, 2020

FROM: Michael Tolensky, Chief Financial and Operating Officer

RE: **SENIOR STAFF EXPENSES**
Summary of senior staff expenses for 2019

KEY ISSUE

Summary report of senior staff expenses for 2019.

RECOMMENDATION

THAT the summary of senior staff expenses for Toronto and Region Conservation Authority's (TRCA) Chief Executive Officer, Chief Financial and Operating Officer, Chief Human Resources Officer and Divisional Directors for the year ended December 31, 2019, be received.

BACKGROUND

At Toronto City Council on November 29, 30 and December 1, 2011, the following resolution was approved:

> *City Council approve the publication on the City's public website on a semi-annual basis, commencing with the 2011 calendar year, expenses related to business travel, conferences and training, hospitality, and protocol for senior staff positions at the Division Head level and above.*
>
> *City Council provide a copy of this Item to the City's major agencies and corporations requesting that they adopt a similar policy for their organization if they have not already done so.*

In accordance with the above resolution, TRCA staff advised the City of Toronto that TRCA staff will report to the Authority annually on the expenses outlined within the City staff report dated October 19, 2011, *Feasibility of Publishing Expense Details of Senior City Staff on the City's Website*. TRCA commenced this summary reporting practice in 2013 to include expenses of TRCA's Chief Executive Officer, Chief Financial and Operating Officer and divisional Directors. This information will be available on TRCA's website as part of this report in the minutes of the meeting.

The following expenses have been detailed in Attachment 1:

1. Business travel, which includes any mileage reimbursement with a personal vehicle, or operating costs of a TRCA vehicle provided to staff;
2. Conferences and training, which includes registration fees, accommodations and per diem allowances;
3. Hospitality expenses, which includes hosting non-staff at TRCA events, eating establishments or other permitted locations.

Additional expense information can be provided in-camera, upon request.

Item 8.3

Relationship to Building the Living City, the TRCA 2013-2022 Strategic Plan
This report supports the following strategy set forth in the TRCA 2013-2022 Strategic Plan:
Strategy 9 – Measure performance

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Emails: pamela.papadopoulos@trca.ca
Date: April 9, 2020
Attachments: 1

Attachment 1: Summary of Senior Staff Expenses for 2019

Attachment 1: Summary of Senior Staff Expenses for 2019

John MacKenzie, Chief Executive Officer

Business Travel	11,040
Conferences and Training	980
Hospitality and Protocol	169
Total	**12,189**

Michael Tolensky, Chief Financial and Operating Officer

Business Travel	880
Conferences and Training	987
Hospitality and Protocol	-
Total	**1,867**

Natalie Blake, Chief Human Resources Officer (Sept – Dec 2019)

Business Travel	-
Conferences and Training	-
Hospitality and Protocol	-
Total	**-**

Derek Edwards, Director, Parks and Culture

Business Travel	7,054
Conferences and Training	465
Hospitality and Protocol	-
Total	**7,519**

Darryl Gray, Director, Education and Training

Business Travel	6,460
Conferences and Training	1,788
Hospitality and Protocol	90
Total	**8,338**

Chandra Sharma, Director, Community Engagement and Outreach (Jan – Nov 2019)

Business Travel	1,165
Conferences and Training	-
Hospitality and Protocol	36
Total	**1,201**

Nick Saccone, Director, Restoration and Infrastructure (Jan – March 2019)

Business Travel	1,588
Conferences and Training	-
Hospitality and Protocol	98
Total	**1,686**

Moranne McDonnell, Director, Restoration and Infrastructure (April - Dec 2019)

Business Travel	1,588
Conferences and Training	1,421
Hospitality and Protocol	117
Total	**3,126**

Sameer Dhalla, Director, Development and Engineering Services (Feb - Dec 2019)

Business Travel	1,534
Conferences and Training	-
Hospitality and Protocol	31
Total	**1,565**

Laurie Nelson, Director, Policy Planning (Feb - Dec 2019)

Business Travel	455
Conferences and Training	-
Hospitality and Protocol	-
Total	**455**

Item 8.4

Section III – Items for the Information of the Board

TO: Chair and Members of the Board of Directors
Meeting #3/20, Friday, April 24, 2020

FROM: Michael Tolensky, Chief Financial and Operating Officer

RE: **2019 FREEDOM OF INFORMATION REQUEST SUMMARY**

KEY ISSUE

A summary of access to information requests completed by Toronto and Region Conservation Authority in 2019 under the *Municipal Freedom of Information and Protection of Privacy Act*.

RECOMMENDATION

WHEREAS Toronto and Region Conservation Authority is subject to annual reporting requirement under the *Municipal Freedom of Information and Protection of Privacy Act;*

IT IS RECOMMENDED THAT 2019 Freedom of Information Request Summary report, be received.

BACKGROUND

Toronto and Region Conservation Authority (TRCA) is subject to the *Municipal Freedom of Information and Protection of Privacy Act (the Act)*. TRCA is also subject to the provisions of the federal *Personal information Protection and Electronic Documents Act* (PIPEDA).

Under subsection 26(1) of *the Act*, the institution is required to submit an annual report to the Information and Privacy Commissioner of Ontario (IPC) that provides statistics related to requests for access to information. This document provides a summary of statistics included in the TRCA 2019 annual report to the IPC, which was submitted on February 21, 2020.

Under the Act, TRCA reports on two types of information requests: requests for general records and requests for personal information. The former captures requests for information about someone else, while the latter is concerned with requests for “own personal information”, requested by an individual or their agent.

All requests must be completed within 30 calendar days, with the exception of cases when a Notice of Extension or a Notice to Affected Person is issued, which extends the request processing timeline.

RATIONALE

In 2019 TRCA received forty-eight (48) new requests for information under *the Act*. Fourty-six (46) of these requests were completed, while two (2) were carried forward to 2020 because the requests were received and entered in December and therefore had automatic legislative deadlines that extended into the following year. Additional seven (7) requests, carried over from 2018, were completed in 2019.

Of the fifty-three (53) completed requests, fifty-two (52) were related to "general records" and one (1) was related to “personal information".

Twenty-one (21) of these requests were received from individuals/public, 28 from businesses, 2 from an agent representing an individual, 1 from media, and 1 from government (all levels).

Of the 53 requests completed in 2019, 52 were completed within the legislated timelines, while one request was completed 1 day late due to the need for legal review. Overall, the requests were processed as follows:

- 32 were processed in 30 days or less;
- 20 were processed in 31-60 days, resulting from a duty to issue a Notice to Affected Person and/or a need to issue a Notice of Extension.
- 1 request was processed in 91 days or longer, resulting from a duty to issue a Notice to Affected Person and a need to issue a Notice of Extension.

In response to the 53 requests, the following was disclosed:

- all information was disclosed in 3 cases;
- information was disclosed in part in 25 cases (partial information);
- no responsive records existed in 19 cases (partial information);
- request was withdrawn, abandoned or non-jurisdictional in 6 cases.

When partial information was disclosed, the exclusions used for non-disclosure were as follows, and for the illustrated number of requests:

- Section 7 – Advice or Recommendation: 1
- Section 8 - Law Enforcement: 2
- Section 10 - Third Party Information: 9
- Section 11 - Economic/Other Interests: 3
- Section 12 - Solicitor-Client Privilege: 5
- Section 13 – Danger to Safety or Health: 1
- Section 14 - Personal Privacy (Third Party): 21
- Section 15 - Information soon to be published: 2

The Act provides the requester and affected third party with the right to appeal TRCA's decisions to the Information and Privacy Commissioner of Ontario. There are three stages in an appeal: intake, mediation and adjudication. Two (2) TRCA decisions were appealed to the IPC in 2019. One (1) of the appeals is currently in the mediation phase and one (1) is in the adjudication phase. Two (2) outstanding appeals from 2017 and one (1) appeal from 2018 were successfully resolved.

Furthermore, in accordance with the provisions of *Municipal Freedom of Information and Protection of Privacy Act*, provincial *Freedom of Information and Protection of Privacy Act*, and federal *Privacy Act*, other institutions regularly consult TRCA prior to issuing a decision related to TRCA's records in their custody or control (so-called third party records). In 2019 TRCA responded to six (6) third party consultation notices.

Relationship to Building the Living City, the TRCA 2013-2022 Strategic Plan
This report supports the following strategy set forth in the TRCA 2013-2022 Strategic Plan:
Strategy 9 – Measure performance

FINANCIAL DETAILS
Section 45 of *the Act* and section 6 of Regulation 823 prescribe fees associated with the processing of requests. A requester is required to pay an initial, mandatory application fee of $5, with the possibility of additional fees depending on the nature of the request. These fees may be charged for photocopying, search, and preparation time. In 2019, TRCA collected a total of $1,806.60 in such fees. In keeping with the spirit of *the Act* to make records accessible to the

public, TRCA does not charge fees for requests that take under half an hour to process, or in other circumstances where a fee waiver may be considered appropriate. A total of $62.40 of fees were waived accordingly.

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Date: February 21, 2020

Item 8.5

Section III – Items for the Information of the Board

TO: Chair and Members of the Board of Directors
Meeting #3/20, Friday, April 24, 2020

FROM: Richard Ubbens, Director, Parks and Culture

RE: **RESULTS OF BLACK CREEK HISTORIC BREWERY COMPETITIVE PROCESS**

KEY ISSUE

This report summarizes the results of Toronto and Region Conservation Authority's (TRCA) competitive process for the exclusive license to operate Black Creek Historic Brewery.

RECOMMENDATION

WHEREAS TRCA staff were authorized to pursue a competitive process to secure a proponent for the exclusive license to operate Black Creek Historic Brewery;

AND WHEREAS TRCA received no submissions meeting the mandatory criteria and technical proposal submissions requirements;

IT IS RECOMMENDED THAT this report be received and that TRCA staff be requested to explore opportunities to leverage our partnership.

BACKGROUND

At Board Meeting #4/19, held on Friday, April 26th, 2019, Resolution #A53/19 was approved in part as follows:

> *THEREFORE, LET IT BE RESOLVED THAT staff be authorized to prepare a Request for Proposal for exclusive license to operate the BCHB, subject to terms and conditions satisfactory to staff and TRCA's solicitor;*
>
> *AND THAT staff be directed to undertake a competitive process and report to the Board with the results.*

Subsequently, on August 8, 2019, staff issued the Expressions of Interest (EOI) to fifty-five (55) prospective candidates for a period of seven (7) weeks and closed the submission on September 27, 2019. The EOI included the operation of an on-site brewery for production and demonstration purposes as well as the operation of an off-site commercial brewery to produce historic ale that would be sold at LCBO, the Beer Store and other retail outlets.

One submission was received, and it was deemed unsuccessful because it failed to meet the mandatory criteria and technical proposal submissions requirements.

On January 22, 2020, based on internal direction resulting from earlier EOI responses, staff resubmitted an updated EOI to one hundred (100) prospective vendors for a period of four (4) weeks and closed the submission on February 19, 2020. The proposed expression included the operation of an off-site commercial brewery to produce beer to be sold at LCBO, the Beer Store and other retail outlets, however, the prospective vendor was not required to conduct educational demonstrations on-site or to brew historic ale exclusively.

One submission was received, from the same vendor that submitted the first time. The submission was again deemed unsuccessful because it failed to meet the mandatory criteria and technical proposal submissions requirements.

Relationship to Building the Living City, the TRCA 2013-2022 Strategic Plan
This report supports the following strategies set forth in the TRCA 2013-2022 Strategic Plan:
Strategy 6 – Tell the Story of the Toronto Region
The continued operation of the on-site historic demonstration brewery, as well as the use of historical beer recipes, tells the story of the region's rich history in ways that can be experienced through taste.
Strategy 7 – Build partnerships and new business models
This partnership will attract new user markets to Black Creek Pioneer Village, contributing to further growth within the Tourism and Recreation Service Area.

DETAILS OF WORK TO BE DONE
Moving forward, TRCA staff will continue to explore opportunities to leverage our Food Service vendor to utilize the brewery space and increase revenues for Black Creek Pioneer Village.

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Date: March 12, 2020

Item 8.6

Section III – Items for the Information of the Board

TO: Chair and Members of the Board of Directors
Meeting #3/20, Friday, April 24, 2020

FROM: Moranne McDonnell, Director, Restoration and Infrastructure

RE: **2020 EROSION RISK MANAGEMENT PROGRAM UPDATE**

KEY ISSUE

An information report regarding the Erosion Risk Management Program and related services and strategic updates from the Engineering Projects business unit of Restoration & Infrastructure.

RECOMMENDATION

WHEREAS TRCA staff were requested by the Executive Committee at meeting #3/19 to provide more information regarding the positive impact that the Federal Disaster Mitigation & Adaptation Fund will have on TRCA's plans for erosion mitigation work;

IT IS RECOMMENDED THAT this staff report on TRCA's Erosion Risk Management Program and the positive impacts of Federal Disaster Mitigation & Adaptation Fund and partner contributions be received;

AND FURTHER THAT this report be circulated to TRCA's municipal partners.

BACKGROUND

Managing the risk associated with the natural hazards of flooding and erosion is one of the primary roles of conservation authorities under the *Conservation Authorities Act*. Toronto and Region Conservation Authority (TRCA) fulfills this role through the delivery of multiple natural resource management programs and services, including the Erosion Risk Management Program (ERMP). The ERMP focuses on the identification and remediation of shoreline and valley land erosion hazards throughout TRCA's jurisdiction and encourages proactive prevention, protection, and management of erosion issues on private and public property.

While many business units in TRCA work to prevent and address erosion impacts, the main business unit that manages erosion hazards is Engineering Projects (EP) which is organized under the Restoration and Infrastructure Division (R&I). Under the ERMP, erosion hazards across TRCA's watersheds are identified and ranked on a priority basis. EP staff regularly conduct site visits throughout the year to assess and reprioritize erosion hazards in response to major weather events. As such, the list of priority sites is not static, and the ranking of sites may change within any given year as site conditions evolve or as new erosion hazard sites are identified. Stabilization works are conducted annually to address erosion hazards based on the available funding. In general, the ERMP is capitally funded through TRCA's partners at the City of Toronto, Region of Peel, York Region, Durham Region, and on a project-by-project basis by the Ministry of Natural Resources and Forestry.

This report is also being brought forward following the announcement of TRCA's success in receiving $22 million of additional funding over 10 years from Infrastructure Canada's Disaster Mitigation & Adaptation Fund (DMAF) for the Toronto Region Ravine Erosion Risk Management and Hazard Mitigation Project. While this funding will help accelerate critical erosion control

work to protect private property and infrastructure throughout TRCA's jurisdiction, there is still a significant backlog of structures to be repaired or hazards to be addressed. Metrics highlighting this have been provided in the rationale below for the different portfolios under the ERMP.

RATIONALE
The following will provide a brief overview of the various portfolios and major programs operated under the ERMP.

Toronto Ravine Major Maintenance
The Toronto Ravine Major Maintenance portfolio is for repairing and maintaining TRCA's permanent erosion control assets across the City of Toronto. These structures are found along ravine and valley corridors or along natural slopes. Repairs are prioritized based on a number of factors such as: asset age; remaining service life; proximity of permanent buildings or essential infrastructure; consequence of failure; and current condition of the asset. In 2020, TRCA is planning 18 projects under the Toronto Ravine Major Maintenance portfolio and 16 of these projects will have 40% of the project costs funded by DMAF (approximately $750,000).

Toronto Ravine Major Maintenance - Summary and Metrics		**Comments**
Estimated capital levy (2020-2029)	$18,000,000	City of Toronto levy only
DMAF contribution (2020-2028)	$3,772,800	DMAF ends 2028
Total funding available (2020-2029)	**$21,772,800**	
# of existing TRCA owned erosion control structures	300	
# of structures scheduled for maintenance - levy only	35	
# of structures scheduled for maintenance (2020-2029)	51	Without DMAF estimated number of structures repaired 2020-2029 = 35 (68% increase)
Total # of structures in backlog after 2029	**203**	Backlog = structures requiring repair prior <2029 but no funding allocated

Toronto Waterfront Major Maintenance
The Toronto Waterfront Major Maintenance portfolio is for repairing and maintaining TRCA's network of permanent shoreline erosion control assets along the City of Toronto waterfront. These structures are found along the north shore of Lake Ontario and are designed to protect the shoreline, adjacent tableland, public amenities, and infrastructure from erosion. Many of these assets are nearing the end of their lifespan and over the past three years catalogued damages to the structures have increased significantly due to multiple severe weather events. In 2020, TRCA is planning 7 projects under the Toronto Waterfront Major Maintenance portfolio, 5 of which will have 40% of the project costs funded by DMAF (approximately $1 million).

Toronto Waterfront Major Maintenance - Summary and Metrics		**Comments**
Estimated capital levy (2020-2029)	$51,000,000	City of Toronto levy only
DMAF contribution (2020-2028)	$33,794,667	DMAF ends 2028

PF&R DMAF & High Lake Events contribution (2020-2025)	$21,000,000	
Total funding available (2020-2029)	**$105,794,667**	
# of existing TRCA owned erosion control structures	211	
# of structures scheduled for maintenance (2020-2029)	86	Without DMAF estimated number of structures repaired 2020-2029 = 47 (55% increase)
Total # of structures in backlog after 2029	**86**	Backlog = structures requiring repair prior <2029 but no funding allocated

Valley Erosion Hazards

The Valley Erosion Hazards portfolio addresses erosion hazards and slope instability issues impacting private and public property throughout the ravine systems of the City of Toronto. The July 8, 2013 severe weather event was the catalyst for a funding increase to this portfolio that prompted TRCA to extend assistance to private properties where homes have been deemed at risk by erosion or instability. The goal of each project is to provide a cost-effective solution to protect essential infrastructure, such as residential dwellings and municipal assets, and projects are implemented on a priority basis to the limit of available funding each year. Landowners must comply with TRCA's Private Landowner Contribution Policy for Erosion Control Works Policy that requires benefiting landowners to convey land or contribute a portion of the project costs. In 2020, TRCA is planning 27 projects under the Valley Erosion Hazard portfolio and 20 of these projects will have 40% of the project costs funded by DMAF (approximately $840,000).

Toronto Valley Erosion Hazards - Summary and Metrics		**Comments**
Estimated capital levy (2020-2029)	$32,000,000	City of Toronto levy only
DMAF contribution (2020-2028)	$7,150,000	DMAF ends 2028
Total funding available (2020-2029)	**$39,150,000**	*excludes benefiting landowner contributions
# of hazard sites being monitored	650	
# of sites to be addressed (2020-2029)	170	Without DMAF estimated number of sites to be repaired 2020-2029 = 100 (59% increase)
Total # of high priority sites in backlog > 2029	**232**	

York Region Infrastructure

The York Region Infrastructure portfolio provides long-term erosion hazard management for Environmental Services infrastructure assets along ravines and watercourses (water and wastewater). The portfolio includes the monitoring, study, design, maintenance and implementation of erosion control works for infrastructure protection in TRCA's jurisdiction of York Region. Studies and remedial works are prioritized based on a number of factors such as: depth of cover; infrastructure type; remaining service life; consequence of failure; and current condition of the asset. In 2020, TRCA is planning 14 projects under the York Infrastructure portfolio and 9 of these projects will have 40% of the project costs funded by DMAF (approximately $176,000).

York Region Infrastructure - Summary and Metrics		Comments
Estimated capital levy (2020-2029)	$9,330,000	
DMAF contribution (2020-2028)	$1,600,920	DMAF ends 2028
Total funding available (2020-2029)	**$10,930,920**	
# of infrastructure hazard sites being monitored	533	
# of sites to be addressed (2020-2029)	20	Without DMAF estimated number of sites to be repaired 2020-2029 = 10 (100% increase)
Total # of high priority sites in backlog > 2029	**23**	

York Region Maintenance & Other Hazards (TRCA priorities)
The York Region Maintenance & Other Hazards portfolio is for maintaining TRCA's existing permanent erosion control assets and developing new erosion control protection on TRCA lands within York Region. These assets are often found along ravine and valley corridors or along natural slopes. Repairs are prioritized based on a number of factors such as: asset age; remaining service life; proximity of permanent buildings or essential infrastructure; consequence of failure; and current condition of the asset.

In 2020, TRCA is planning 8 projects under the York Region Maintenance & other hazards (TRCA priorities) portfolio and 4 of these projects will have 40% of the project costs funded by DMAF (approximately $34,000).

York Region Maintenance & Other Hazards - Summary and Metrics		Comments
Estimated capital levy and private landowner contribution (2020-2029)	$1,500,300	
DMAF contribution (2020-2028)	$193,220	DMAF ends 2028
Total funding available (2020-2029)	**$1,693,520**	
# of erosion control structures and erosion hazard sites being monitored	164	122 erosion control structures and 42 erosion hazard sites
# of sites to be addressed (2020-2029)	6	Without DMAF estimated number of sites to be repaired 2020-2029 = 3 (100% increase)
Total # of high priority sites in backlog > 2029	**9**	

Region of Peel Erosion Control & Infrastructure Protection
The Region of Peel Erosion Control and Infrastructure Protection portfolio monitors the risk to TRCA owned erosion control structures, Region of Peel infrastructure hazard monitoring sites, and other erosion hazards impacting public and private land. This portfolio includes the monitoring, study, design, maintenance and implementation of erosion control works to remedy these hazards. Mitigation measures and repairs are prioritized based on several factors such as: depth of cover; remaining service life; infrastructure type; consequence of failure; and current condition or exposure of the asset. Prioritization is based on the highest risk locations which in recent years tends to be infrastructure sites.

Beginning in 2017, TRCA delineated 1,376 infrastructure hazard sites within the Region of Peel in TRCA's jurisdiction to establish long-term monitoring sites with first inspections at most sites being completed between 2017-2019. In addition to these infrastructure sites, TRCA currently monitors a total of 135 erosion control structures and 50 erosion hazard sites. In 2020, TRCA is planning 4 projects under the Region of Peel Erosion Control and Infrastructure Protection portfolio and all 4 of these projects will have 40% of the project costs funded by DMAF (approximately $200,000).

Region of Peel Erosion Control & Infrastructure Protection – Summary & Metrics		**Comments**
Estimated capital levy (2020-2029)	$7,000,000	
DMAF contribution (2020-2028)	$1,512,000	DMAF ends 2028
Total funding available (2020-2029)	**$8,512,000**	
# of existing TRCA owned erosion control structures and infrastructure hazard monitoring sites	1,511	135 TRCA owned erosion control structures and 1,376 infrastructure hazard monitoring sites
# of sites to be addressed (2020-2029)	18	Without DMAF estimated number of sites to be addressed in 2020-2029 = 10 (80% increase).
# of critical/high priority sites in backlog >2029	80	

Fee for Service Work
EP also undertakes projects for TRCA's regional and municipal partners on a fee for service (FFS) basis to help address their priorities. These FFS projects vary in scale and complexity, but typically involve mitigating erosion hazard risks to public safety or municipal infrastructure as part of the design solution in natural or environmentally-sensitive areas.

In the City of Toronto, TRCA partners with the Parks, Forestry & Recreation (PF&R) and Transportation Services divisions through a Master Service Agreement. TRCA expects to establish similar master service level agreements with other municipalities and regions to help establish a streamlined scoping/funding process to help deliver additional recoverable projects while strengthening TRCA's partnerships and financial resilience.

In 2020, EP expects to undertake planning/implementation activities on 34 FFS projects with various municipal/regional partners.

ERMP – Other strategic updates
EP staff have been working on some key updates to the ERMP to improve operational efficiency. We have highlighted these initiatives in addition to some of the high-profile and emergency works projects EP staff are working on in the following sections.

Property Services & Legal – ECA updates and program changes
In 2019, EP and Property and Risk Management (PRM) staff embarked on significant updates

to existing agreement templates and operating procedures to ensure contributions under TRCA's Private Landowner Contribution for Erosion Control Works Policy were received prior to commencing work. This will reduce liability to TRCA by ensuring that financial contributions to projects are received and that land transfers take place in a timely manner and can be registered on title.

EP staff, with support from PRM, will be developing a standard operating procedure for this process later in 2020 to ensure that the necessary steps required to execute these agreements are followed in the correct order and in a timely manner.

Toronto Water Monitoring
In 2010, the City of Toronto and TRCA developed a long-term monitoring partnership to assess the risks to Toronto Water infrastructure in ravine and valley systems. The objective of the program is to inspect Toronto Water infrastructure within the City of Toronto's stream valleys and along the shoreline of Lake Ontario for the purpose of identifying Toronto Water infrastructure that is at risk or has been damaged due to erosion before a complete failure occurs. The program reduces environmental and public health and safety risks and allows Toronto Water staff to effectively and efficiently plan, prioritize and budget for asset maintenance, improvement, replacement and protection.

In 2020, TRCA staff anticipate that approximately 2,500 assets will be inspected due to the program growth requested by Toronto Water (doubling of field staff). TRCA staff inspected a total of 1,121 assets in 2019.

Post-storm monitoring / Incident Management System (IMS) - Erosion Risk Management
2019 was the first operational year of the IMS for Erosion Risk Management that was developed to follow a similar methodology as the TRCA Flood Risk IMS. The EP team decided to follow this model to coordinate response efforts in preparation for the potential of another significant erosion event like the July 8, 2013 storm. Utilizing the IMS in 2019, EP staff monitored 14 storm events, 4 high-wave warnings, and 4 months of high lake levels. Field crews were deployed to priority areas and findings were shared with municipal partners, impacted stakeholders, and other TRCA departments. TRCA has developed a Flood Risk Analysis Network tool named FRANk-to schedule 45 site inspections at TRCA owned erosion control structures within the impacted ravine systems. In previous years, EP staff would attempt to inspect every TRCA owned structure regardless of whether it had been impacted by a significant weather event. This change in approach for 2019 resulted in 640 less inspections at a cost savings of approximately $28,000. These savings were leveraged to establish testing sites for Remotely Piloted Aircraft (RPA) inspections, a technology that will be increasingly utilized in the future.

A jurisdiction-wide storm event on January 11th, 2020, which activated the EP's IMS system prompting staff to coordinate inspections and respond to erosion reports from the Flood Risk Management (FRM) group's Emergency Operations Centre (EOC). Field crews were deployed immediately and had inspected 54 sites across the jurisdiction from Etobicoke to the Rouge watersheds and north of Kleinburg to the Scarborough Bluffs shoreline in the first week. EP staff provided inspections summaries to other TRCA staff to ensure the Flood Duty Officers and relevant staff were informed of preliminary findings and next steps.

Yellow Creek (Vale of Avoca)
Due to risks to public health and safety, as well as essential infrastructure, TRCA declared emergency works for a 90-metre section of Yellow Creek below Summerhill Gardens in the Vale of Avoca ravine on July 31, 2019. The goal of this project is to remove the exposed stone and

mortar retaining wall and to realign the channel away from the slope. This work will help reduce the risk of future slope failures in this area. In addition, TRCA is building erosion control structures within the creek and is restoring a section of trail along the west bank that was lost due to erosion. Construction was initiated on August 29, 2019 and is anticipated to be completed in Spring of 2020. Photos captured during construction can be found in **Attachment 3**.

High Lake Events and Toronto Islands
The 2017 high lake level event resulted in flooding and erosion damage along the length of the City of Toronto shoreline from Marie Curtis Park in the west to Rouge Beach Park in the east. TRCA and City of Toronto staff collaborated to mitigate, document, catalogue, inspect and assess this damage. With the lake still above average spring levels, the City of Toronto was impacted by the ice and windstorm of April 14-15, 2018 which further exacerbated the shoreline damage. City of Toronto and TRCA staff coordinated efforts to assess the damage. High lake levels in 2019 contributed to further flooding, erosion, and damage to the Toronto shoreline resulting in a total of over $30 million in estimated damages to City and TRCA property and assets since 2017.

Since these major events, TRCA and City of Toronto staff have been implementing emergency needs works and prioritizing and planning all other identified immediate and short-term needs projects across the entire waterfront. While the impacts of the high lake level events have been felt along the entire length of Toronto's waterfront, the floods in both 2017 and 2019 disproportionally affected Toronto Island Park where over 800 residents, many businesses, and two schools were directly affected.

In anticipation of 2020 flooding, TRCA has initiated the Class Environmental Assessment for Remedial Flood and Erosion Control Projects (Class EA) process by issuing an emergency declaration to the Ministry of Environment, Conservation and Parks and Conservation Ontario. TRCA with the support of the City is raising park roads and implementing flood mitigation structures at key points on the Island in order to maintain emergency service access across the Island, protect park infrastructure, preserve the user experience, and reduce potential Island revenue loss. Additional information can be found in the declaration which is viewable as **Attachment 4**.

Following emergency work implementation, TRCA has committed to helping the City of Toronto continue the Class EA process and determine a long-term mitigation solution for the remainder of the Island. This work will be integrated with the Toronto Island Park Master Plan initiative and may involve elevating additional low-lying roads, implementing shoreline berms, raising the elevation of existing shoreline structures and/or directing water to pumping systems.

Relationship to Building the Living City, the TRCA 2013-2022 Strategic Plan
This report supports the following strategy set forth in the TRCA 2013-2022 Strategic Plan:
Strategy 2 – Manage our regional water resources for current and future generations
Strategy 7 – Build New Partnerships and Business Models

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Date: February 25, 2020
Attachments: 4

Item 8.6

Attachment 1: Table of projects being planned under the ERMP in 2020
Attachment 2: Map of projects being planned under the ERMP in 2020
Attachment 3: Photographs of various projects being planned under the ERMP in 2020
Attachment 4: Toronto Island Park Flood and Erosion Mitigation Project – Emergency Works Declaration

Attachment 1: Table of projects being planned under the ERMP in 2020

Municipality	Ward	Project Name	Portfolio	2020 Project Status
City of Markham	1	German Mills Settlers Park Sites 2-3 Sanitary Infrastructure Protection	York Region Infrastructure	Study, Planning or Design
City of Markham	5	Locust Hill Drainage Improvements Study	Fee For Service	Pre-Planning
City of Mississauga	5	Brandon Gate Park - Bank Stabilization Project	Region of Peel Erosion Control & Infrastructure Protection	Study, Planning or Design
City of Mississauga	5	Derry Greenway Sanitary Infrastructure Protection Project	Region of Peel Erosion Control & Infrastructure Protection	Study, Planning or Design
City of Pickering	1	Bruce Handscomb Park Trail Rehabilitation	Fee For Service	Pre-Planning
City of Richmond Hill	5	Patterson Valley South Richvale Erosion Hazards	Fee For Service	Construction
City of Richmond Hill	5	Patterson Creek I-066, I-067, I-065, I-064, P-102	York Region Infrastructure	Post-Construction
City of Richmond Hill	5	Patterson Creek near Grist Mill Park Sanitary Infrastructure Protection	York Region Infrastructure	Construction
City of Richmond Hill	5	Patterson Creek near Richvale Athletic Centre Sanitary Infrastructure Protection	York Region Infrastructure	Construction
City of Toronto	1	Lakeland Drive Major Maintenance Project	Toronto Ravine Major Maintenance	Study, Planning or Design
City of Toronto	1	22-24 Bucksburn Road Erosion Control and Slope Stabilization Project	Valley Erosion Hazards	Study, Planning or Design
City of Toronto	1	Hadrian Drive Slope Stabilization	Valley Erosion Hazards	Study, Planning or Design
City of Toronto	1	Norfield Crescent Minor Works	Valley Erosion Hazards	Study, Planning or Design
City of Toronto	1	Shendale Drive Slope Stabilization Project	Valley Erosion Hazards	Study, Planning or Design
City of Toronto	2	Mimico Creek behind Kevi Lane Stope Stabilization Project	Valley Erosion Hazards	Study, Planning or Design
City of Toronto	3	Humber Bay Park East Major Maintenance Project	Fee For Service	Study, Planning or Design
City of Toronto	3	Humber Bay Park West Boat Launch Repair	Fee For Service	Study, Planning or Design
City of Toronto	3	Humber Bay Park West Major Maintenance Project (WF11.03, 11.04, 11.05, 11.07)	Fee For Service	Study, Planning or Design
City of Toronto	3	Palace Pier Court Headland Maintenance Project	Fee For Service	Construction
City of Toronto	3	Area 1 - Mimico Creek (MC01.1, MC01.2, MC03) Major Maintenance Project	Toronto Ravine Major Maintenance	Study, Planning or Design
City of Toronto	3	Area 2 - Humber River (HR81.1) Major Maintenance Project	Toronto Ravine Major Maintenance	Study, Planning or Design
City of Toronto	3	Beaucourt Road Major Maintenance Project	Toronto Ravine Major Maintenance	Study, Planning or Design
City of Toronto	3	Etobicoke Valley Park Major Maintenance Project	Toronto Ravine Major Maintenance	Post-Construction
City of Toronto	3	Home Smith Park Road Weir (FCC16.03) Major Maintenance Project	Toronto Ravine Major Maintenance	Study, Planning or Design
City of Toronto	3	Royal York Road (MC06) Minor Maintenance Project	Toronto Ravine Major Maintenance	Construction
City of Toronto	3	Humber Bay Park West Major Maintenance Project (WF11.01, 11.02, 11.06, 11.08, 11.09)	Toronto Waterfront Major Maintenance	Study, Planning or Design
City of Toronto	3	Long Branch Park Major Maintenance Project	Toronto Waterfront Major Maintenance	Construction
City of Toronto	3	Prince of Wales Park Major Maintenance Project	Toronto Waterfront Major Maintenance	Study, Planning or Design
City of Toronto	3	Ridgegate Crescent Erosion Control Project	Valley Erosion Hazards	Construction
City of Toronto	4	Sunnyside Park Revetment Maintenance Project	Fee For Service	Construction
City of Toronto	5	Gaffney Park Erosion Control Project (13-59 Terry Drive)	Fee For Service	Study, Planning or Design
City of Toronto	5	Denison Road Upper Slope Stabilization Project	Toronto Ravine Major Maintenance	Study, Planning or Design
City of Toronto	5	Bexley Crescent Slope Stabilization Project	Valley Erosion Hazards	Study, Planning or Design
City of Toronto	5	Ridge Point Crescent Slope Stabilization	Valley Erosion Hazards	Study, Planning or Design
City of Toronto	6	Canyon Avenue (DR15.1) Major Maintenance Project	Toronto Ravine Major Maintenance	Pre-Planning
City of Toronto	6	Gwendolen Crescent Major Maintenance Project	Toronto Ravine Major Maintenance	Post-Construction
City of Toronto	6	Black Creek Tribuatry behind Appletree Court and Seeley Drive Erosion Control and Slope Stabilization Project	Valley Erosion Hazards	Study, Planning or Design
City of Toronto	6	Eldorado Court Slope Stabilization Project	Valley Erosion Hazards	Study, Planning or Design
City of Toronto	6	Peacham Crescent Slope Stabilization	Valley Erosion Hazards	Construction
City of Toronto	7	Archway Crescent (HR27.1,27.2) Major Maintenance Project	Toronto Ravine Major Maintenance	Study, Planning or Design
City of Toronto	7	Azalea Court Slope Stabilization Project	Toronto Ravine Major Maintenance	Study, Planning or Design
City of Toronto	7	25-31 Gravenhurst Avenue Minor Works	Valley Erosion Hazards	Study, Planning or Design
City of Toronto	7	96-106 Windhill Crescent Slope Stability and Erosion Risk Assessment	Valley Erosion Hazards	Study, Planning or Design
City of Toronto	7	Topcliff Avenue Erosion Control and Slope Stabilization Project	Valley Erosion Hazards	Study, Planning or Design
City of Toronto	10	Toronto Island Park Flood and Mitigation Project	Fee For Service	Study, Planning or Design
City of Toronto	10	Toronto Island Park Restaurant	Fee For Service	Study, Planning or Design
City of Toronto	11	Mud Creek Restoration - Reach 3	Fee For Service	Study, Planning or Design
City of Toronto	11	30 - 36 Rose Park Crescent Slope Stabilization Project	Valley Erosion Hazards	Study, Planning or Design
City of Toronto	11	Hudson Drive Slope Stabilization Project	Valley Erosion Hazards	Study, Planning or Design
City of Toronto	11	Yellow Creek near Heath Street East Erosion Control and Slope Stabilization Project	Valley Erosion Hazards	Study, Planning or Design

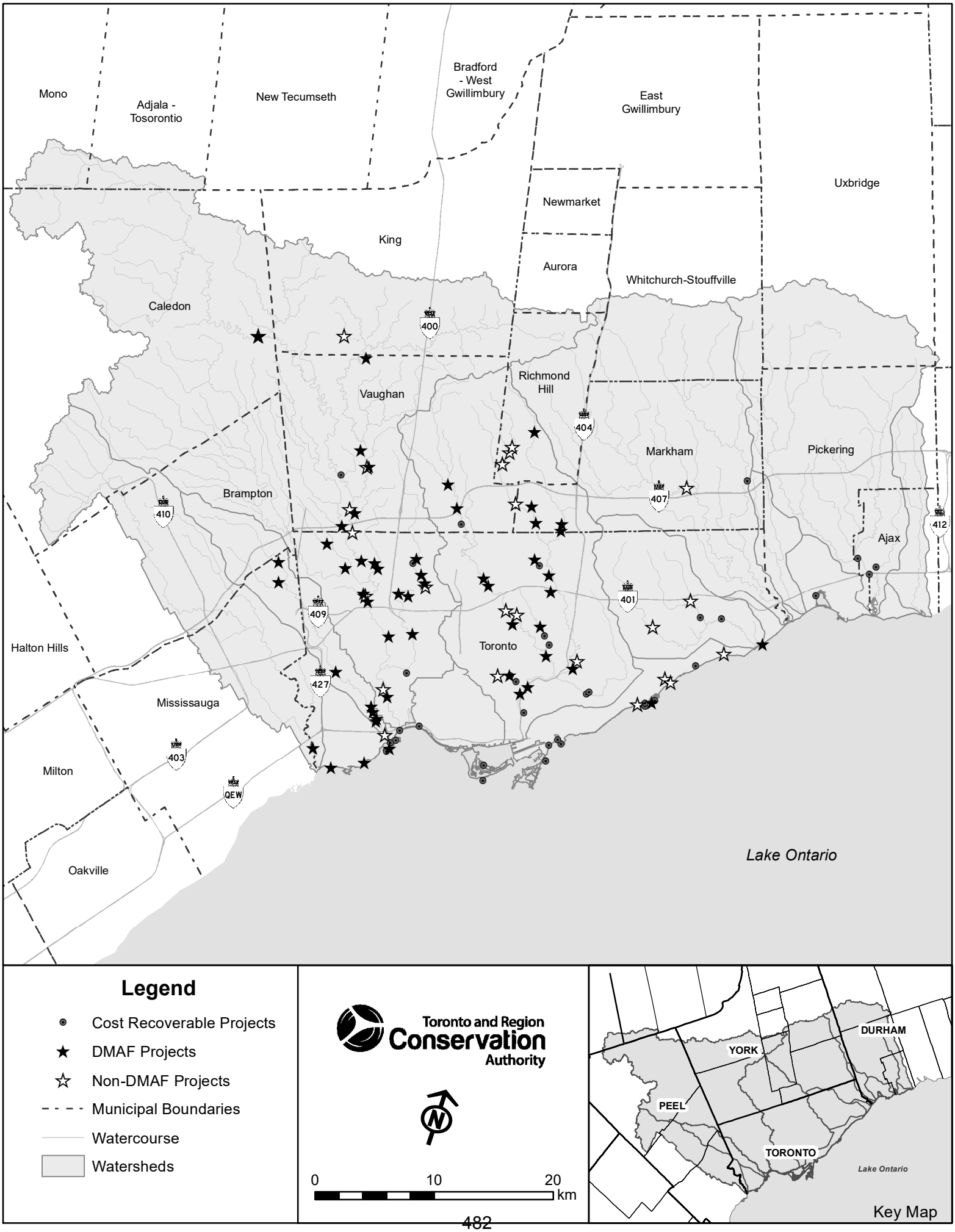
Attachment 1: Table of projects being planned under the ERMP in 2020

Municipality	Ward	Project Name	Portfolio	2020 Project Status
City of Toronto	12	72 Heath Street East Slope Stability and Erosion Risk Assessment	Valley Erosion Hazards	Study, Planning or Design
City of Toronto	14	Riverdale Park East Slope Regrading Project	Fee For Service	Post-Construction
City of Toronto	14	Tommy Thompson Park - East Shore and Peninsula D Restoration Project	Fee For Service	Study, Planning or Design
City of Toronto	14	Area 3 - Don River (DR90) Major Maintenance Project	Toronto Ravine Major Maintenance	Study, Planning or Design
City of Toronto	15	Leslie Street Culvert and Drainage Channel Stabilization Project	Fee For Service	Study, Planning or Design
City of Toronto	15	Wilket Creek Rehabilitation Project - Reach 3	Fee For Service	Pre-Planning
City of Toronto	15	Alderbrook Drive Slope Stabilization Project	Toronto Ravine Major Maintenance	Study, Planning or Design
City of Toronto	15	Woodsworth Road (DR70) Minor Maintenance Project	Toronto Ravine Major Maintenance	Construction
City of Toronto	15	Roslin Avenue Slope Stabilization	Valley Erosion Hazards	Study, Planning or Design
City of Toronto	16	Bartley Drive Erosion Control and Slope Stabilization	Valley Erosion Hazards	Study, Planning or Design
City of Toronto	17	Newtonbrook Creek Bridge Replacement Project	Fee For Service	Study, Planning or Design
City of Toronto	17	Burbank Drive Slope Stabilization	Valley Erosion Hazards	Study, Planning or Design
City of Toronto	17	East Don River behind Clarinda Drive Erosion Control and Slope Stabilization Project	Valley Erosion Hazards	Study, Planning or Design
City of Toronto	19	305 Dawes Road Project	Fee For Service	Study, Planning or Design
City of Toronto	19	Ashbridges Bay Landform Project	Fee For Service	Construction
City of Toronto	19	Ashbridges Bay Park Major Maintenance Project	Fee For Service	Construction
City of Toronto	19	Coatsworth Cut Maintenance Dredging	Fee For Service	Construction
City of Toronto	19	Taylor Creek Park Bridge 2 Protection Project	Fee For Service	Study, Planning or Design
City of Toronto	19	East Don River behind 30 Northline Road Erosion Control and Slope Stabilization Project	Valley Erosion Hazards	Study, Planning or Design
City of Toronto	20	Bluffer's Park Beach (WF22.03) Major Maintenance Project	Fee For Service	Study, Planning or Design
City of Toronto	20	Bluffer's Park Entrance Channel Maintenance Dredging	Fee For Service	Construction
City of Toronto	20	Bluffer's Park South Headland and Beach Major Maintenance Project - Phase II (Headland WF22.04)	Fee For Service	Construction
City of Toronto	20	Bluffer's Park South Headland and Beach Major Maintenance Project - Phase III (Beach WF22.05)	Fee For Service	Construction
City of Toronto	20	Bluffer's Park Southwest Headland Emergency Works	Toronto Waterfront Major Maintenance	Construction
City of Toronto	20	Bluff's Landslide Cleanup	Toronto Waterfront Major Maintenance	Construction
City of Toronto	20	Fishleigh Drive Erosion Control Project	Toronto Waterfront Major Maintenance	Post-Construction
City of Toronto	20	90 Meadowcliffe Drive Slope Stabilization Project	Valley Erosion Hazards	Study, Planning or Design
City of Toronto	21	St. Andrews Cemetery Slope Stabilization	Valley Erosion Hazards	Study, Planning or Design
City of Toronto	24	Upper Highland Creek Pan Am Path Connection Project (Phase 1)	Fee For Service	Construction
City of Toronto	24	Area 4 - Highland Creek (HC19) Major Maintenance Project	Toronto Ravine Major Maintenance	Study, Planning or Design
City of Toronto	25	University of Toronto Scarborough Campus (UTSC) Area B Bank Stabilization Project	Fee For Service	Study, Planning or Design
City of Toronto	25	Port Union Waterfront Park Major Maintenance Project	Toronto Waterfront Major Maintenance	Study, Planning or Design
City of Toronto	25	Greyabbey Ravine Slope Stabilization Project	Valley Erosion Hazards	Study, Planning or Design
City of Toronto	15 & 11	Mud Creek Restoration - Reach 6	Fee For Service	Construction
City of Toronto	15 & 16	E.T. Seton Park Major Maintenance	Toronto Ravine Major Maintenance	Study, Planning or Design
City of Toronto	Various	2019 Slope Stability and Erosion Risk Assessments	Valley Erosion Hazards	Study, Planning or Design
City of Vaughan	2	111 Longview Crescent Slope Stabilization	Fee For Service	Construction
City of Vaughan	2	Humber Pumping Station Emergency Outfall Maintenance	York Region Infrastructure	Construction
City of Vaughan	2	Humber River P004/P005 Sanitary Infrastructure Protection Project	York Region Infrastructure	Study, Planning or Design
City of Vaughan	2	Rainbow Creek Decommisioned Sewer Protection and Abatement	York Region Infrastructure	Study, Planning or Design
City of Vaughan	2	Boyd Bridge Crossing Replacement	York Region Maintenance & Other Hazards	Post-Construction
City of Vaughan	2	Granger Greenway EMS706 Bank Stabilization	York Region Maintenance & Other Hazards	Pre-Planning
City of Vaughan	2	Granger Greenway EMS789 Major Maintenance	York Region Maintenance & Other Hazards	Study, Planning or Design
City of Vaughan	2	Granger Greenway HR72.1 Major Maintenance	York Region Maintenance & Other Hazards	Study, Planning or Design
City of Vaughan	2	Legion Court Road Bank Stabilization	York Region Maintenance & Other Hazards	Study, Planning or Design
City of Vaughan	4	2 and 6 Cherry Hills Road Slope Stabilization	Fee For Service	Pre-Planning
City of Vaughan	4	West Don River near Langstaff Park Sanitary Infrastructure Protection	York Region Infrastructure	Post-Construction
City of Vaughan	4	70 Main Street South Slope Stabilization	York Region Maintenance & Other Hazards	Construction
City of Vaughan	5	Yonge Street Flume Minor Maintenance	York Region Infrastructure	Construction
Town of Ajax	1	Ajax Bridge 104 Maintenance	Fee For Service	Pre-Planning

Attachment 1: Table of projects being planned under the ERMP in 2020

Municipality	Ward	Project Name	Portfolio	2020 Project Status
Town of Ajax	1	Ajax Trans Canada Trail Bridge 1003 Emergency Works and Bank Stabilization	Fee For Service	Pre-Planning
Town of Ajax	3	Ajax Trans Canada Trail near Church Street Rehabilitation	Fee For Service	Pre-Planning
Town of Caledon	5	Bolton Sanitary Infrastructure Protection Project	Region of Peel Erosion Control & Infrastructure Protection	Construction
Township of King	2	5885 King Road Drainage Improvements	York Region Maintenance & Other Hazards	Construction

Attachment 2: Map of projects being planned under the ERMP in 2020



Toronto Ravine Major Maintenance

Figure 1. Eroding bank at failed TRCA erosion control asset along the main branch of the Don River, City of Toronto.

Toronto Waterfront Major Maintenance

Figure 2. Eroded headland structure in Bluffers Park, City of Toronto.

Valley Erosion Hazards

Figure 3. Slope failure at a Valley Erosion Hazard Site in the City of Toronto.

York Region Infrastructure

Figure 4. Exposed manhole chamber along Rainbow Creek Site 2.

York Region Maintenance & Other Hazards (TRCA Priorities)

Figure 5. Eroding bank and trail in Boyd Conservation Area, City of Vaughan.

Region of Peel Erosion Control & Infrastructure Protection

Figure 6. Exposed sanitary sewer (circled) at Region of Peel Infrastructure Site P-315.

Toronto Water Monitoring

Figure 7. Exposed manhole chamber along Black Creek, City of Toronto.

Recoverable Projects

Figure 8. Eroding bank and trail along Newtonbrook Creek, City of Toronto.

Yellow Creek / Vale of Avoca

Figure 9. Active construction at the Yellow Creek Emergency Works Site, City of Toronto.

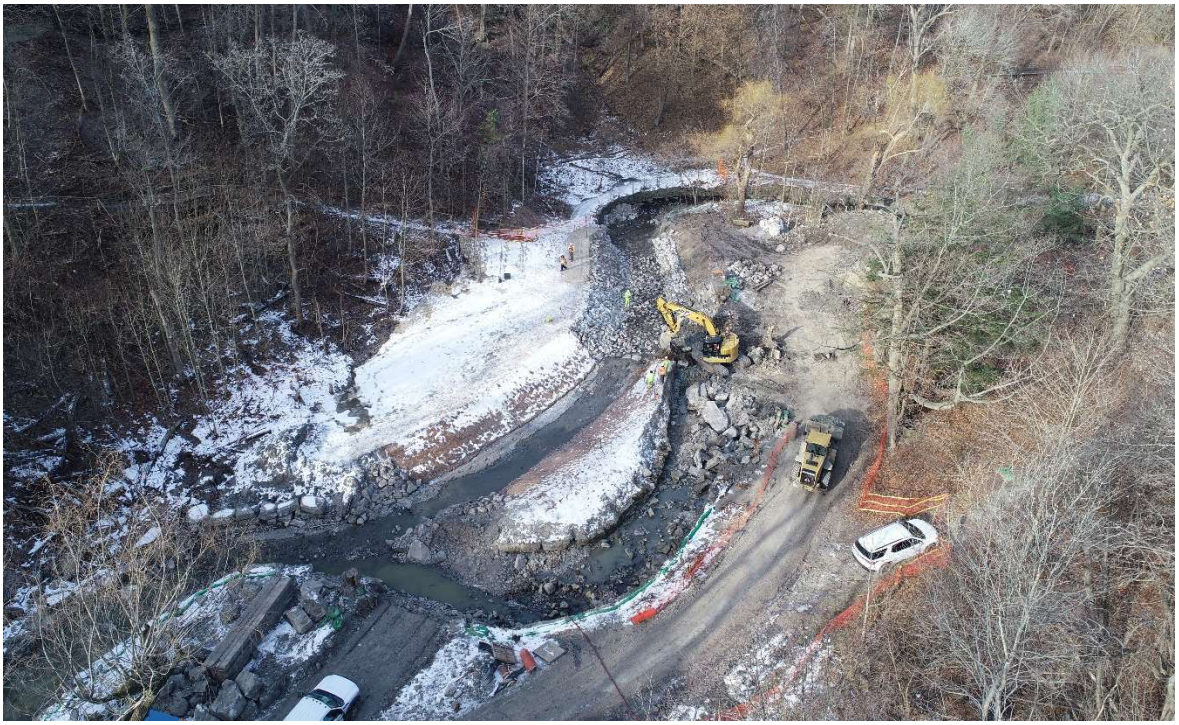


Figure 10. Active construction at the Yellow Creek Emergency Works Site, City of Toronto.

Toronto Island Park Flood and Erosion Mitigation Project – Emergency Works Declaration

To: MECP Central Region Office, Ministry of Environment, Conservation and Parks
Leslie Rich, Conservation Ontario

From: Jet Taylor, Senior Project Manager, Engineering Projects

Date: February 19, 2020

Toronto and Region Conservation Authority (TRCA) is preparing to undertake emergency flood and erosion control works within Toronto Island Park resulting from the 2017 and 2019 record Lake Ontario high-water events and associated flooding. Based on these events, coupled with flood mapping prepared by TRCA and Baird Engineering, 300 metres (m) of road along Lakeshore Avenue and 200 m of road along Cibola Avenue have been identified as requiring immediate raising in order to allow emergency service and operations vehicles to access the water treatment facility and Island resident community. 2019 flooding at the Island emergency service station is shown below in **Figure 1**.

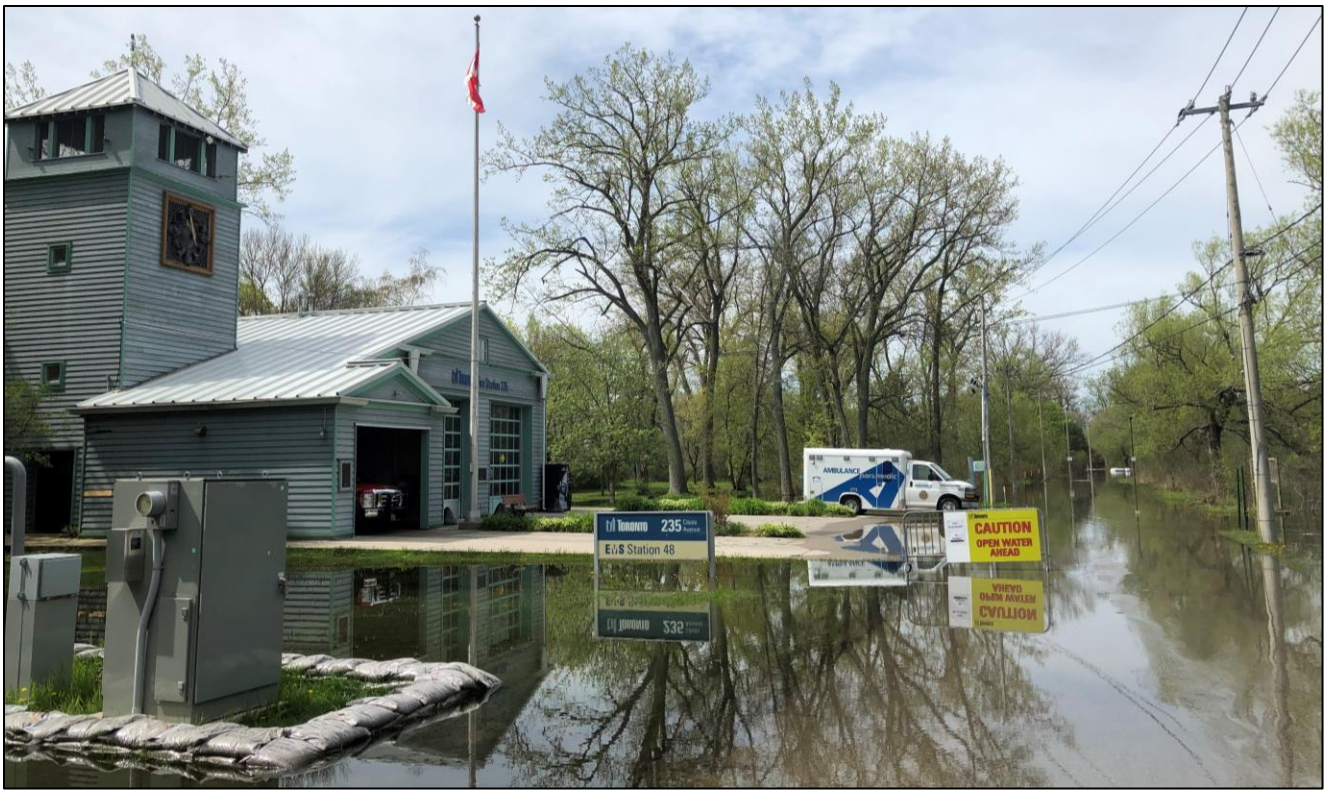


Figure 1. Flooding along Cibola Avenue at EMS Station 48. *City of Toronto, 2019.*

Further, shoreline protection along Algonquin Island and Wards Island is inadequate with significant wave overtopping resulting in community road and dwelling flooding and health and safety concerns as shown in **Figure 2**.

Figure 2. Flooding along Algonquin Island. *City of Toronto, 2019.*

In the spring of 2017, snowmelt in combination with significant rainfall resulted in an unprecedented rise in the water levels of Lake Ontario. Lake levels reached their peak height on May 27, 2017 with a recorded elevation of 75.93 m IGLD (International Great Lakes Datum), the highest water level ever recorded. The flooding event impacted the entirety of Toronto's Waterfront, especially Toronto Island Park.

The flood significantly affected Toronto Island Park with over 800 residents, many businesses, and two schools directly impacted. Both City of Toronto and TRCA staff worked to prevent damage and the loss of property and assets through emergency flood mitigation efforts including deployment of 45,000 sandbags, 1000 meter bags, and over a dozen industrial pumps.

Despite these efforts, Toronto Island Park was closed for 88 days between May 4 and July 30, 2017 due to the flooding. The closure during peak season presented a major disruption in tourist and recreational activity which is an important source of revenue to the City and local businesses. The island parks also experienced significant shoreline erosion, damage, and debris accumulation over the spring and summer of 2017.

In 2018, TRCA retained Baird & Associates (Baird) to provide coastal engineering services to complete a study to assist in planning for and responding to future flood conditions. The study consisted of the following four major components: i) Flood Characterization Report, ii) Flood Risk Assessment, iii) Flood Mapping, and iv) Flood Mitigation Alternatives Report.

The City of Toronto, TRCA, and Baird held a meeting in December 2018 to identify the leading mitigation alternatives for the areas most affected by the 2017 flood, with consideration for the

recommendations made by Toronto Island residents. The alternatives included protecting low-lying residential areas with a berm or dyke structure, elevating low-lying roads, increasing the crest elevation of shore protection structures, and directing surface drainage to existing sumps. These alternatives were developed using the 500-year stillwater level for Toronto (static lake level plus storm surge) as the design water level.

In the spring of 2019, Lake Ontario experienced unprecedented water levels which surpassed the previous 2017 record by ten centimeters. Lessons learned from 2017, along with proactive mitigation measures implemented in 2018, effectively reduced the impact of flooding in 2019. Strategically placed short-term measures helped reduce the impact of the 2019 high lake level event; however, key areas were identified that require long-term flood protection. TRCA has committed to helping the City of Toronto with the development of a long-term solution through the Class Environmental Assessment for Remedial Flood and Erosion Control Projects (Class EA) process, and intended to initiate this process in early 2020 pending confirmation of available funding; however given the persistent elevated water levels in Lake Ontario, it is TRCA's declaration that critical elements of this long-term protection be carried out forthwith in response to an emergency and it is in the interests of public health and safety and environmental and property protection. The critical works will be undertaken in accordance with Section 9.0 – Emergency Measures of the Class EA, with the remainder of works following the standard Class EA process.

The scope of emergency works includes a geotechnical investigation and detailed design to advise subsequent construction to raise approximately 300 m of road along Lakeshore Avenue, 200 m of road along Cibola Avenue, 370 m of flood protection along the north shore of Algonquin Island and 300 m of flood protection along the north shore of Wards Island. A location map has been attached to this notice that shows the emergency works areas.

TRCA will access the Island via barge and will utilize existing park roads for access. Emergency services staff will be made aware of road works and access past the construction area will be made available. TRCA intends to mobilize as early as February 20, 2020 for subsurface investigations with construction scheduled to begin in March, 2020. To ensure public safety, formal and informal trails along work areas and the construction access route will be closed until the emergency works have been completed.

TRCA's public, government and stakeholder communication strategy involves a meeting with the City Councillor and Island residents (currently scheduled for February 23, 2020), Notice of Project Commencement letter issuance to stakeholders, signage, and maintaining an active website with project updates.

Following completion of the emergency works, TRCA will submit a written report within 14 working days documenting the location and nature of the emergency; the physical, biological, socioeconomic and/or cultural effects of the emergency; actions taken to resolve the emergency; effectiveness of the actions taken; and anticipated future remedial works.

For more information, please contact the undersigned at 416-661-6600 Ext. 5526 or jet.taylor@trca.ca.

Sincerely,

Jet Taylor,

Senior Project Manager, Engineering Projects
Restoration and Infrastructure

Toronto Islands

Lakeshore Ave. Permanent Road Repair
Length: 300 m

Cibola Ave. Permanent Road Repair
Length: 200 m

Ward's Island Beach Curb
East Shoreline
West Shoreline

Algonquin Island Flood Protection
Length 370 m

Date: 2/14/2020
Created by: Restoration & Resource Management
Orthophoto: First Base Solutions, (2018)

Toronto and Region Conservation Authority

Disclaimer: The data used to create this map was compiled from a variety of sources & dates. The TRCA takes no responsibility for errors or omissions in the data and retains the right to make changes & corrections at anytime without notice. For further information about the data on this map, please contact the TRCA Restoration and Infrastructure Division. (416) 661-6600.

Item 8.7

Section III – Items for the Information of the Board

TO: Chair and Members of the Board of Directors
Meeting #3/20, Friday, April 24, 2020

FROM: Sameer Dhalla, Director, Development and Engineering Services

RE: **NORTHWEST GREATER TORONTO AREA (GTA) TRANSMISSION CORRIDOR IDENTIFICATION STUDY**

KEY ISSUE

To provide information on the Ministry of Energy, Northern Development and Mines (ENDM) and the Independent Electricity System Operator's (IESO) Northwest Greater Toronto Area (GTA) Transmission Corridor Identification Study.

RECOMMENDATION

WHEREAS on January 24, 2020 Toronto and Region Conservation Authority (TRCA) staff advised TRCA Board of Directors that the Ministry of Energy, Northern Development and Mines (ENDM) together with the Province's electricity system planner, the Independent Electricity System Operator (IESO), had initiated the Northwest Greater Toronto Area (GTA) Transmission Corridor Identification Study to protect lands for future transmission infrastructure;

WHEREAS the general study area for the Northwest GTA Transmission Corridor largely corresponds to the Ministry of Transportation's (MTO) narrowed 2019 Focused Analysis Area (FAA) for the GTA West Transportation Corridor Route Planning and Environmental Assessment (EA) Study;

WHEREAS the Province is seeking feedback on the narrowed study area and guiding principles in conducting the transmission study through Environmental Registry of Ontario (ERO) Posting #019-1503 by May 7, 2020;

AND WHEREAS the Province is seeking feedback on early access to land for environmental studies on transmission projects through ERO Posting #019-1371 by April 30, 2020;

IT IS RECOMMENDED THAT this staff report and preliminary comments on the ERO postings be received by the Board of Directors for information.

BACKGROUND

In June 2019, ENDM and the Province's electricity system planner, IESO, initiated the Northwest GTA Transmission Corridor Identification Study in order to identify and protect a transmission corridor to support growing demand for electricity in the western GTA, should the need arise. The starting point for the Northwest GTA Transmission Corridor Identification Study was MTO's 2015 FAA.

On January 24, 2020, staff reported to the TRCA Board of Directors Meeting #11/19, highlighting TRCA concerns and recommendations based on available materials associated with MTO's GTA West Transportation Corridor Route Planning and EA Study (hereafter "GTA West Highway EA"). Amended Resolution #A233/19 along with the full Board report is

available on the TRCA website. While the focus of the report was the GTA West Highway EA, staff also identified ENDM and IESO's transmission corridor study, due to the potential for cumulative impacts that these parallel infrastructure corridors could have related to TRCA interests.

Given that these parallel studies are tied to the outcome of one another, several provisions of the Resolution and Recommendations made in the Board of Directors report also apply to the new transmission corridor including, but not limited to:

> *Excerpt from Resolution* #A233/19
> *THAT TRCA staff continue to work with MTO staff and municipal partners through the Regulatory Agency Advisory Group, through the Greenbelt Transportation Advisory Group, and through an established working group with TRCA, other affected conservation authorities, municipalities and provincial and federal ministries, to address concerns related to potential alignment changes to the technically preferred route to accommodate development and community interests, as well as concerns related to the preferred design alternatives, including concerns related but not limited to: watercourse and wildlife crossings and trail connections, flood and erosion control, stormwater management, vegetation removals, natural heritage restoration and compensation, land acquisition and archaeology, and climate resiliency;*
>
> *THAT the 32 Recommendations contained within this report and in Appendix 1 to this report be approved for review by MTO;*
>
> *Recommendation:*
> 2. *MTO and ENDM/IESO confirm efforts to coordinate their independent studies and ensure negative impacts are fully assessed and minimized wherever practicable.*

ENVIRONMENTAL REGISTRY OF ONTARIO (ERO) POSTING #019-1503

On March 23, 2020, ENDM posted a proposal on the (ERO) seeking feedback by May 7, 2020 on a proposed narrowed study area (Attachment 1), and the guiding principles regarding the Northwest GTA Transmission Corridor Identification Study. The outcome of the ENDM/IESO study will be a recommendation regarding land to be preserved for future transmission infrastructure and protected from development or other purposes. Any future electricity transmission development in the area would be subject to EA Act requirements and other applicable regulatory approvals, including those through the Ontario Energy Board (OEB). While the Northwest GTA Transmission Corridor Identification Study is underway, the study area is subject to protection under the policies in the Provincial Policy Statement (PPS), 2020 (in effect on May 1, 2020) and A Place to Grow: Growth Plan for the Greater Golden Horseshoe.

This ERO posting poses two questions:

- Are you aware of potential barriers or issues that may be associated with the proposed narrowed area of interest?
- Are there other principles we should consider in conducting the study?

A detailed response to the ERO posting will be prepared by TRCA staff under separate cover. However, our preliminary comments largely align with staff's comments on the GTA West Highway EA and are provided below.

Narrowed Study Area
As illustrated, the proposed transmission corridor will generally be located within MTO's narrowed 2019 FAA. Although impacts associated with a transmission corridor will be different from those for a new highway, given the location of the narrowed area of interest, many of the concerns identified in the January 24, 2020 Board of Directors report will apply.

It will be imperative that the transmission corridor and associated infrastructure be sited to avoid risks to property, as a result of flood and erosion hazards scattered throughout the FAA. Not only should infrastructure be located outside of natural hazards areas, but often times associated works result in significant impacts to valley systems, including the potential to impact valley slopes and exacerbate erosion issues. Natural hazards associated with flooding and erosion will need to be considered within the ENDM planning process and risks properly managed in any subsequent EAs. It is anticipated that TRCA will continue to be engaged throughout this planning process to ensure close coordination as the location of the transmission corridor is further refined.

Proposed Guiding Principles
Through the ERO posting, ENDM is seeking feedback on the following guiding principles. The principles are described as being informed by provincial legislation, policies and technical planning documents to support the identification of a future corridor:

1. Co-locate with other linear infrastructure.
2. Plan for the most cost-effective outcome.
3. Minimize impacts to natural heritage, agricultural and hydrological features consistent with provincial policies.
4. Minimize impacts on built up areas.
5. Provide flexibility for the future.

1. Co-locate with other linear infrastructure
The PPS supports the co-location of linear infrastructure, where appropriate, to potentially mitigate impacts to surrounding agricultural land and environmentally sensitive areas. ENDM has identified that since planning is underway for MTO's GTA West Highway EA, that this offers an opportunity to consider co-location with the transmission study. It is important to note, however, that these studies are independent of one another and will proceed through two separate processes.

While TRCA staff generally supports co-location of infrastructure, staff is also concerned with the potential cumulative impacts that these two infrastructure projects will have on the natural heritage system (NHS). TRCA staff are available to work with both proponents to minimize these impacts, wherever practicable.

2. Plan for the most cost-effective outcome
TRCA is supportive of corridor route planning that minimizes costs, to the extent feasible. However, factors such as identifying the shortest geographic route for instance may not achieve desired results considering necessary connection points, and challenges with alignments through sensitive or possibly difficult to construct areas. It is anticipated that a fulsome analysis that considers a range of factors will determine the most cost-efficient outcome.

3. Minimize impacts to natural heritage, agricultural and hydrological features consistent with provincial policies
Development pressures within TRCA's jurisdiction are resulting in added stressors to the

few remaining natural systems within our jurisdiction, and it will be extremely important to ensure that impacts to the form and function of those natural corridors are avoided, to the extent possible. It is expected that construction of a new transmission corridor will result in significant vegetation and forest removals, with limited opportunity to replace lost habitat due to vegetation management requirements along these types of corridors. Furthermore, new transmission infrastructure has the potential to result in the removal of sensitive watercourses and wetlands, often with associated impacts to valley systems.

The alignment and design of the transmission corridor will need to consider the numerous valley and stream crossings within the study area and associated natural hazards (flood and erosion hazards). As such, the principle of avoiding flood and erosion hazards should also be included.

4. ***Minimize impacts on built up areas***
   As identified in the January 24, 2020 Board of Directors report, TRCA has worked closely with municipalities and the development industry over the past several years to protect significant natural features through municipal planning processes, and to convey lands into public ownership. It will be imperative that those negotiations and agreements be considered through this process.

5. ***Provide flexibility for the future***
   It is expected that the impacts of a new transmission corridor will result in significant losses to the NHS including unavoidable impacts to forest and wetland communities, with limited opportunity to restore the corridor to its full extent after construction. As restoration efforts within a transmission corridor may not be able to fully re-establish lost features and functions, habitat losses will need to be considered and compensated for to the extent possible. This also provides a unique opportunity, similar to that of The Meadoway project, to enhance biodiversity by maximizing naturalization and restoration efforts within the corridor, and by providing trail linkages along with new active transportation uses, subject to regulations/requirements within the corridor.

ERO POSTING #019-1371

On a related note, on March 2, 2020, ENDM posted a proposal on the (ERO) to give the OEB the authority to grant, under specific circumstances, earlier access to land to electricity transmission project proponents for the purpose of conducting preliminary environmental studies, prior to applying for Leave to Construct. It is anticipated that access to TRCA lands will be required to conduct these studies in multiple locations.

Correspondence was sent earlier this year by TRCA field staff requesting permission to enter private lands to complete annual terrestrial biological inventories across the region, including along the MTO alignment alternatives within the FAA. It is our understanding that MTO consultants have requested similar permissions to enter lands for investigations within the same general area.

Given that the MTO 2019 FAA is generally the same for the proposed transmission narrowed area of interest, it is recommended that efforts be coordinated among all agencies to avoid duplication of effort and delays, and that TRCA field staff also be given early access to lands to complete necessary investigations, as needed. Close coordination with TRCA archaeology staff will also be necessary to complete investigations on TRCA lands for any required ground disturbances.

A detailed response to this ERO posting will be prepared by TRCA staff under separate cover and submitted by the closing date of April 30, 2020.

NEXT STEPS

TRCA's response to ERO #019-1503 posting will provide requested feedback on the guiding principles and potential barriers or issues that may be associated with the proposed narrowed area of interest. The ENDM and IESO are proposing to align the timing of their study with milestones related to MTO's GTA West Highway EA. However, because MTO has yet to confirm a preferred route, it is unclear at this time where exactly the final alignment of the highway will be located, and ultimately how the new transmission corridor will align with the location of the highway. Staff will advise of this concern in its comments through the ERO process.

It is anticipated that the cumulative effects of these two large infrastructure projects will result in extensive and widespread impacts within the Etobicoke Creek and Humber River Watersheds. As is standard practice, TRCA staff will support access to TRCA lands for the required environmental studies to be completed and will provide advice as to our standard requirements for this process. Additionally, staff will continue to report back to the Board of Directors on this project, as well as the GTA West Highway EA at key milestones.

Relationship to Building the Living City, the TRCA 2013-2022 Strategic Plan

This report supports the following strategies set forth in the TRCA 2013-2022 Strategic Plan:
Strategy 2 – Manage our regional water resources for current and future generations
Strategy 4 – Create complete communities that integrate nature and the built environment
Strategy 7 – Build partnerships and new business models
Strategy 8 – Gather and share the best sustainability knowledge
Strategy 12 – Facilitate a region-wide approach to sustainability

FINANCIAL DETAILS

National Energy Board (NEB) and OEB Applications are a matter of exclusive federal or provincial jurisdiction, respectively, with the OEB itself being responsible for all decisions. While there are no provisions that would allow TRCA to charge review fees for participation in an NEB or OEB process, if conditions for NEB or OEB approval specifically require TRCA involvement, appropriate fees will be negotiated on a project-specific basis. Should this project move to an EA, the appropriate review fee will be charged.

DETAILS OF WORK TO BE DONE

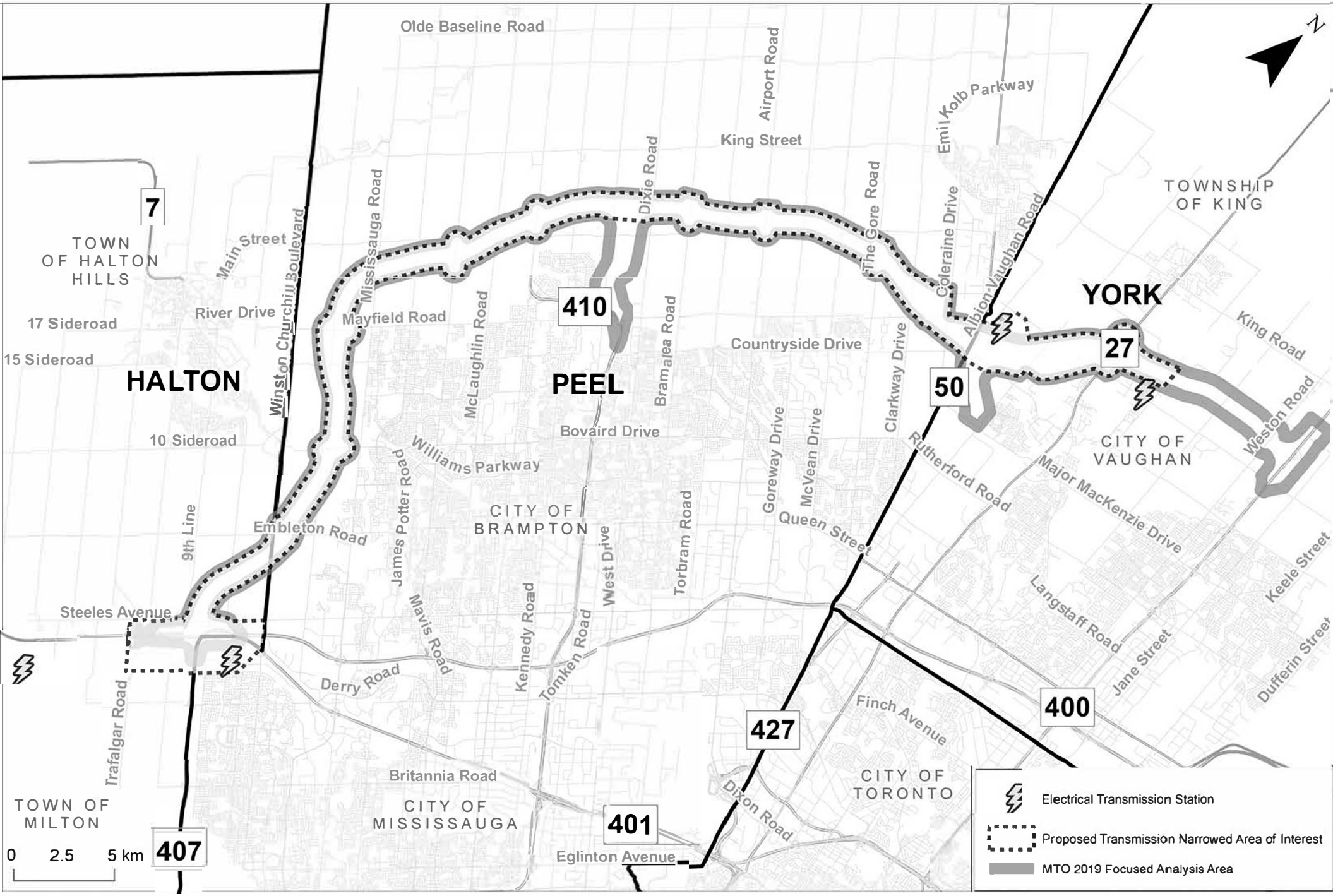
- TRCA staff will provide formal responses through the provincial ERO postings. Relevant recommendations from the GTA West Highway EA will inform these responses.
- TRCA staff will continue to work with and provide feedback to ENDM and IESO as new information is received and will report back to the TRCA Board of Directors once further information becomes available.

Report prepared by: Sharon Lingertat, extension 5717
Emails: sharon.lingertat@trca.ca
For Information contact: Sharon Lingertat, extension 5717
Emails: sharon.lingertat@trca.ca
Date: April 1, 2020
Attachments: 1

Item 8.7

Attachment 1: Proposed Transmission Narrowed Area of Interest versus MTO Focused Analysis Area

Proposed Transmission Narrowed Area of Interest Versus MTO Focused Analysis Area



Item 8.8

Section III – Items for the Information of the Board

TO: Chair and Members of the Board of Directors
Meeting #3/20, Friday, April 24, 2020

FROM: Laurie Nelson, Director, Policy Planning

RE: **SUMMARY OF 2020 TRCA POLICY CONSULTATION SUBMISSIONS AND RECENT PROVINCIAL POLICY INITITATIVES**

KEY ISSUE

Summary of Toronto and Region Conservation Authority (TRCA) policy consultation submissions on federal and provincial initiatives to date in 2020, and a summary of other recent policy initiatives relevant to TRCA interests, for the information of TRCA Board of Directors.

RECOMMENDATION

WHEREAS to date in 2020, the Province of Ontario has posted several legislative, regulatory and policy initiatives on the Environmental Registry of Ontario (ERO) relevant to Toronto and Region Conservation Authority's (TRCA) interests;

WHEREAS the federal government requests comments on federal policy initiatives and technical guidance documents relevant to TRCA interests from time to time;

WHEREAS TRCA staff have submitted several letter responses to provincial and federal governments' requests and are in the process of responding to other government proposals not yet due;

AND WHEREAS other various provincial initiatives relevant to TRCA interests have recently been introduced;

THEREFORE, LET IT BE RESOLVED THAT TRCA staff report on a summary of completed TRCA policy submissions and TRCA work-in-progress submissions, and other provincial policy initiatives to date in 2020, be received;

AND FURTHER THAT the Clerk and Manager, Policy, so advise municipal partners and Conservation Ontario.

BACKGROUND

Since January 1, 2020, the Province of Ontario released for consultation a number of legislative, policy, and regulatory proposals of interest to TRCA, the majority of which were posted on the Environmental Registry of Ontario (ERO). The policy team within the TRCA Policy Planning division are primarily responsible for leading internal reviews of government proposals on a range of matters relevant to TRCA interests. Examples of these proposals in 2020 have been the Ministry of Environment, Conservation and Parks' online Conservation Authorities Survey and Environmental Registry of Ontario (ERO) postings on such topics as priority transit projects and invasive species.

The TRCA review process typically involves circulating the government's posted materials to staff with experience in the subject matter, facilitating interdivisional dialogue, coordinating comments with Conservation Ontario and other conservation authorities (CAs) where

applicable, conducting additional research and analysis as needed, and drafting a response letter that synthesizes staff comments and recommendations. Staff may also attend any available training, webinars or consultation sessions to learn more about the proposal and have preliminary questions addressed by provincial staff. All TRCA provincial policy submissions, regardless of whether they are reported to the Board of Directors, are vetted through senior staff and signed by the Chief Executive Officer prior to submittal to ensure alignment with corporate strategic priorities and objectives.

By engaging staff from different divisions within the organization, TRCA's responses integrate the expertise and multi-disciplinary perspectives of TRCA's teams. Staff reviewing and providing comments range from development and infrastructure planning and permitting, ecology, water resources engineering, and hydrogeology, to watershed planning, research and knowledge management, climate change, ecological restoration and others, depending on the scope of the proposal. Submissions are informed by the successes and challenges staff experience in their day-to-day work with municipalities, proponents and other stakeholders, and emphasize shared provincial, municipal and TRCA objectives and priorities.

RATIONALE

The outcomes of provincial government initiatives can have implications on TRCA's day-to-day work in multiple roles as a resource management agency, a regulator, a public commenting body with delegated authority to represent the provincial interest for natural hazards, and landowner, in a region experiencing significant growth and associated land use and environmental challenges. Therefore, it is important for TRCA to provide input on government proposals in order to encourage federal and provincial initiatives to align with and support TRCA objectives and interests.

The policy work to respond to consultations is also important for strengthening relationships and coordination between TRCA and provincial and municipal partners. Provincial government proposals are commonly based on the themes of streamlining and finding efficiencies to stimulate and expedite business activities such as major plans and projects. It is vital for TRCA to highlight its expertise, experience and shared provincial and municipal objectives and issues, to demonstrate TRCA's valuable role in achieving efficiencies and effectiveness that support environmentally responsible and sustainable community building.

Staff at the Ministry of Environment, Conservation and Parks, Ministry of Natural Resources and Forestry, Ministry of Municipal Affairs and Housing and other provincial agencies sometimes reach out to TRCA for information and advice, in recognition of TRCA's expertise in watershed science and depth of on-the-ground experience in development and infrastructure planning and detailed design. For example, TRCA staff led a tour of flood vulnerable areas and successfully completed and in-process flood remediation projects in TRCA's jurisdiction, provided a comprehensive presentation on flood risk management and the roles of CAs, and submitted a letter of recommendations to inform the report by Ontario's Special Advisor on Flooding.

Summary of Responses

Due to the volume and limited timeline of consultations established through the ERO process, only TRCA submissions on major initiatives (e.g. amendments to CA Act, Provincial Planning Act and Plans) are reported to the Board of Directors or Executive Committee prior to, or coincident with, submission to the respective ministry. In Table 1 below is a list of provincial policy consultations for which TRCA completed and submitted responses between January 1, 2020 to date, with links to the proposals.

Recognizing that Board Members may have an interest in TRCA's submissions that were not brought to the Board, all completed 2020 TRCA letter responses from Table 1 are contained in the attachments to this report.

Table 1, 2020 TRCA Policy Consultation Submissions to the ERO Completed to Date

Proposal Name	Proposal Summary	Submission Date
1. Amendment to the Record of Site Condition (Brownfields) Regulation related to the Requirement to Sample Ground Water (ERO #019-0987) Link: https://ero.ontario.ca/notice/019-0987	The Ministry of the Environment, Conservation and Parks (MECP) is proposing changes to O. Reg. 153/04 that would provide flexibility for a qualified person (a licensed professional engineer or geoscientist) to exercise professional judgement regarding the need for groundwater testing where there is no soil and under key conditions.	January 13, 2020 Refer to Attachment 1
2. Proposal to amend Ontario Regulation 454/96 (Construction) to provide alternative regulatory approval requirements for repairs to existing low hazard wetland dams (ERO #019-1060) Link: https://ero.ontario.ca/notice/019-1060	The Ministry of Natural Resources and Forestry (MNRF) is proposing an amendment to provide an alternative, optional rules-in-regulation approach to dam owners, to repair existing low hazard wetland dams without obtaining approval under Section 16 of the *Lakes and Rivers Improvement Act*, if they meet the requirements in the regulation.	January 17, 2020 Refer to Attachment 2
3. Drainage Act Discussion Paper (ERO #019-1187) Link: https://ero.ontario.ca/notice/019-1187	The Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) is proposing changes to the *Drainage Act* that would reduce burden, streamline approvals and address stakeholder concerns while maintaining environmental standards.	February 18, 2020 Refer to Attachment 3
4. Proposed regulations for how the Environmental Assessment process will apply to four priority transit projects in the Greater Toronto and Hamilton Area (ERO #019-0614) Link: https://ero.ontario.ca/notice/019-0614	MECP is proposing regulations to modify the existing environmental assessment process for four priority transit projects in the Greater Toronto and Hamilton Area. The regulations will help get transit constructed quickly, economically and transparently while maintaining environmental oversight.	March 19, 2020 Refer to Attachment 4
5. Proposed regulation made under Ontario Regulation 332/12 (Building Code) made under the Building Code Act, 1992 (ERO #109-1332) Link: https://ero.ontario.ca/notice/019-	The Ministry of Municipal Affairs and Housing (MMAH) is proposing to amend the applicable law provisions of Ontario Regulation 332/12, (Building Code). in relation to building permits located on or near the designated transit corridor land as identified in an Order in Council to be	April 3, 2020 Refer to Attachment 5

1332	brought forward by the Minister of Transportation under the *Building Transit Faster Act, 2020* (if passed).	
6. Seeking information on invasive species and carriers under the Ontario Invasive Species Act, 2015 (ERO #019-1162) Link: https://ero.ontario.ca/notice/019-1162	MNRF is seeking information on 13 species and one carrier for possible regulation under the *Invasive Species Act*. The information collected in response to this proposal will help support the Ministry in determining whether to develop a future regulation.	April 14, 2020 Refer to Attachment 6
7. Developing Prevention and Response Plans for European water chestnut and water soldier under the Invasive Species Act, 2015 (ERO #109-1163) Link: https://ero.ontario.ca/notice/019-1163	MNRF is proposing Prevention and Response Plans for European water chestnut and water soldier which are prohibited invasive species under Ontario's *Invasive Species Act*. The Prevention and Response Plans will support monitoring, controlling, and eradication of these invasive plants.	April 14, 2020 Refer to Attachment 7

In Table 2 below is a list of provincial policy consultations for which TRCA staff are in the process of developing responses as their due dates are in the latter part of April or in May 2020; the list also contains links to the proposals.

Table 2, 2020 TRCA Policy Consultation Submissions Pending to the ERO

ERO Posting	Proposal summary	Due date
1. Proposed regulatory matters pertaining to community benefits authority under the Planning Act, the Development Charges Act, and the Building Code Act (ERO #109-1406) Link: https://ero.ontario.ca/notice/019-1406	MMAH proposes Regulatory Matters Pertaining to Community Benefits Authority Under the *Planning Act*, the *Development Charges Act*, and the *Building Code Act*	April 20, 2020
2. Early Access to Land for Environmental Studies on Transmission Projects (ERO #019-1371) Link: https://ero.ontario.ca/notice/019-1371	The Ministry of Energy, Northern Development and Mines is proposing to give the Ontario Energy Board the authority to grant, under specific circumstances, earlier access to land to electricity transmission project proponents for the purpose of conducting preliminary environmental studies prior to applying for Leave to Construct.	April 30, 2020 (Preliminary comments in separate report to the Board, April 24, 2020)
3. Proposal to identify and protect a corridor of land for future electricity	The Ministry of Energy, Northern Development and Mines seeks to identify and preserve a corridor of land in the Northwest	May 7, 2020 (Preliminary comments in

infrastructure in the Greater Toronto Area (ERO #019-1503) Link: https://ero.ontario.ca/notice/019-1503	Greater Toronto Area (GTA) for future electricity transmission infrastructure so we can support growth in Halton, Peel and York regions. We are seeking feedback on a proposed narrowed study area, as well as input on the guiding principles we will consider in conducting the study.	separate report to the Board, April 24, 2020)
4. Proposed amendments to Ontario Regulation 244/97 and the Aggregate Resources of Ontario Provincial Standards under the Aggregate Resources Act (ERO #019-1303) Link: https://ero.ontario.ca/notice/019-1303	The Ministry of Natural Resources and Forestry proposes changes to Ontario Regulation 244/97 and the Aggregate Resources of Ontario Provincial Standards under the Aggregate Resources Act.	May 15, 2020
5. New Statement of Environmental Values for Ministry of Infrastructure (ERO #019-1536) Link: https://ero.ontario.ca/notice/019-1536	The Ministry of Infrastructure is proposing a new Statement of Environmental Values in order to reflect the changes in its structure and mandate, as well as to acknowledge the priority of addressing climate change.	May 25, 2020

Other Policy Submissions and Updates

Also provided for the information of the Board, are the following summaries of recent non-ERO provincial policy initiatives and other policy consultations related to TRCA interests within early 2020.

Ontario Conservation Authorities Survey

Following the provincial multi-stakeholder consultation as reported to the Executive Committee and Board, on February 14, 2020, the Ministry of Environment, Conservation and Parks issued an on-line survey to the public (survey closed March 13, 2020) that solicited input on:

- which programs and services should be mandatory within the following:
  - managing natural hazards,
  - conservation and management of CA-owned/controlled lands
  - drinking water source protection
- the conservation authority model as it relates to:
  - transparency
  - permitting
  - oversight
  - CA board composition, and
  - key partnerships and collaborations.

TRCA's response to the survey was informed by previously Board endorsed TRCA submissions and recommended that the Province:

- include watershed planning and the management and conservation of natural resources within the scope of the regulations for mandatory programs and services:
    - managing natural hazards,
    - conservation and management of CA-owned/controlled lands, and
    - drinking water source protection.
- ensure that the programs and services of the CAs maintain their watershed focus and allow for the flexibility of including programs and services important to local circumstances
- add a clause of indemnification or statutory immunity to the CA Act for the good faith operation of essential flood and erosion control infrastructure and programming
- proclaim un-proclaimed sections of the CA Act associated with better deterrents to non-compliance with section 28 permitting regulations
- update the section 29 provisions for enforcement and compliance on authority owned or controlled lands to be consistent with the protections afforded under the *Provincial Parks and Conservation Reserves Act.*
- increase provincial funding to support authorities and cooperation between all levels of government to maximize opportunities presented by federal funding programs
- leverage the role of CAs in the land use planning and environmental protection process (*Planning Act*, *Environmental Assessment Act*, CA Act, *Clean Water Act*) and expertise of CAs in natural resource management to support implementation of provincial and municipal priorities
- base fees for programs and services on the principle of full cost recovery, including direct/indirect costs, rather than prescribe in regulations; furthermore, CAs be permitted to increase fees subject to a transparent process with stakeholders and approval by the Board of Directors, allowing fees for programs and services to keep pace with inflation, cost of living and ensure financial sustainability
- provide at least 18 months of transition timing to allow for the development of Memorandums of Understanding and that aligns with budget timelines
- include experts from conservation authorities, staff of the Ministries of Natural Resources and Forestry, Environment Conservation and Parks as well as Municipal Affairs and Housing, and municipalities when developing the draft regulations

The Province has reported on the survey website that over 2,200 comments were submitted and that a summary of the online results will be posted on the website in the coming months. It should also be noted that several municipalities within TRCA's jurisdiction, (and across the Province), passed Council resolutions of support for the valuable work of conservation authorities for submission to the Province. The timing of next steps and any amendments to the Act or release of the regulations remains unknown at this time, but the Ministry has advised that it will keep Conservation Ontario apprised.

Provincial Policy Statement 2020

The Provincial Policy Statement (PPS 2020) was released on February 28, 2020 and comes into effect on May 1, 2020, replacing the PPS 2014. TRCA previously reported to the Board and submitted comments to the Province on the proposed version of the PPS in 2019.

TRCA is generally supportive of several amendments made in the PPS 2020, including a statement in Section 3.0 Protecting Public Health and Safety that directly supports the role of CAs in mitigating natural hazard risks, including risks associated with climate change impacts,

and supports collaborative work among CAs, the Province, and planning authorities in achieving this goal. The PPS is more action-oriented with the phrase “shall prepare for the impacts of a changing climate” added to various policies throughout the PPS. TRCA appreciates the recognition in policy that evaluating and preparing for the impacts of a changing climate to water resource systems is best done at a watershed level.

Further provincial guidance to support policy implementation was identified in TRCA’s previous comments and remains applicable. This includes how preparation for the impacts of a changing climate will be implemented through planning and development and what climate projections should be used as a standard across the province. Similarly, TRCA supports policies that have been strengthened to require Indigenous consultation and engagement but further direction on the execution of this process is required.

Section 3.1.1 in Natural Hazards has been amended to reference provincial guidance to direct development in the context of natural hazards and states that the guidance will be “amended from time to time.” There is an urgent need to have the technical guidance updated to reflect current technology and approaches, particularly within the urban context, so as not to be a barrier for innovative solutions.

The final PPS, 2020 excluded policies that appeared in the proposed version of the PPS. The ability for municipalities to “manage” wetlands that are not provincially significant and a proposal to “fast track” certain applications were removed. TRCA previously advocated for the further refinement and definition of the wetlands-related policy, and for the definition of applications that are considered priority for “fast tracking” as well as the process for achieving this fast tracking. On a positive note, the policy permitting aggregate extraction in natural heritage features was removed.

PPS Part IV states that a key provincial interest is the wise use and management of the Province’s natural heritage resources, water resources, including the Great Lakes, agricultural resources, mineral resources, and cultural heritage and archaeological resources. However, the PPS, 2020 removed direction in PPS, 2014 that intensification and redevelopment shall be directed in accordance with the policies in Section 2: Wise Use and Management of Resources and Section 3: Protecting Public Health and Safety. As well, PPS, 2020 removed direction that a planning authority shall apply the policies of Section 2 and Section 3 in determining the most appropriate direction for expansions to the boundaries of settlement areas or the identification of a settlement area. While these statements have been deleted from the PPS 2020 and it would be preferred that they remain, within TRCA’s jurisdiction, the policies of Section 2 and Section 3 of the PPS remain applicable to any adjustments or expansions to the boundaries of settlement areas under the more specific provisions of A Place to Grow: Growth Plan for the Greater Golden Horseshoe (2019).

Other TRCA recommendations that were not addressed in PPS:

- recognition in policy or Preamble of the need for complete applications that demonstrate consistency with the PPS in order to achieve the Province’s goal to streamline and fast-track priority applications to increase the housing supply (Note: this would have also addressed the reduced application review times under the *Planning Act* and appeals to the LPAT);
- to not weaken various existing polices through wording changes from “shall” to “should”;
- to maintain the current policy wording that “Planning for stormwater management

shall not increase risks to human health and safety and property damage" instead of "mitigate the risks"; and

- minor wording edits in various policies to strengthen protection and enhancement of the natural heritage system and the water resources system, and to protect life and property from natural hazards.

Ontario's Flooding Strategy

On March 9, 2020, the Province released "Protecting People and Property: Ontario's Flooding Strategy". The Strategy renews the Province's commitment to protecting people and property by strengthening preparedness for flooding. To help achieve this goal, the Strategy outlines steps to be taken by Ontario over the next several years and actions designed to address and build upon the recommendations identified by Ontario's Special Advisor on Flooding.

The Strategy outlines five priority areas, supported by a set of actions and activities, which complement TRCA's existing flood risk reduction activities, namely:

1. Understand Flood Risks
2. Strengthen Governance of Flood Risks
3. Enhance Flood Preparedness
4. Enhance Flood Response and Recovery
5. Invest in Flood Risk Reduction

Also noted in the Strategy: "The Province is committed to working with municipalities, the federal government, homeowners, conservation authorities, industry and Indigenous communities to advance the actions contained within this Strategy." TRCA staff will be attending a webinar presentation by the Ministry of Natural Resources and Forestry on April 23, 2020 that will provide an overview of the Strategy and potential next steps being considered. TRCA looks forward to contributing our experience and expertise to assist the Ministry in achieving the goals and objectives outlined in the Strategy.

Federal consultation – Canada's Changing Climate

On March 30, 2020, TRCA submitted comments to Natural Resource Canada (NRCan) on the Ontario chapter draft report of the Regional Perspectives volume in Canada in a Changing Climate: Advancing our Knowledge for Action. This report is part of a national scale assessment being coordinated by NRCan to examine how Canada's climate is changing, the impacts of these changes, and how we are adapting to reduce climate change risks. The Ontario chapter seeks to enhance understanding of climate change impacts in the Ontario context, document adaptation progress across the province, and increase awareness of the relevance of climate change and the need for timely action.

TRCA's review effort was led by the Research and Knowledge Management team. Comments and recommendations advocated for:

- Greater recognition of watershed planning as a key tool for evaluating and preparing for the impacts of climate, in alignment with Ontario's Provincial Policy Statement;
- Expansion of local and regional examples of climate change adaptation to highlight the leadership demonstrated by conservation authorities, municipalities, and other regional/local organizations across Ontario;
- Increased integration of urban forest planning and management, including the opportunity to include green infrastructure in municipal asset management plans;
- Greater emphasis on the need for provincial technical guidance to support implementation of provincial policies for how to prepare for the impacts of a changing

climate. This includes guidance on how to account for and integrate climate change into flood plain mapping and development and infrastructure planning and design, and
- Highlighting the need to address climate change adaptation in the urban context where already stressed natural systems are under mounting pressure from redevelopment and intensification. It should be emphasized that these scenarios require innovative solutions for stormwater retrofit, natural hazard mitigation and remediation, as well as ecological restoration to achieve greater resilience.

Bill 189 – Amendments to Planning Act and Development Charges Act
On April 14, 2020, the Ontario Government passed Bill 189, the Coronavirus (COVID-19) Support and Protection Act, which amended a number of Acts including the *Planning Act* and *Development Charges Act* resulting in the following:

- *Planning Act* amendments that came into force on April 14, 2020, authorize the Minister of Municipal Affairs and Housing to create regulations in connection with a declared emergency to govern specified timelines associated with land use planning matters.

- Ontario Regulation 149/20 under the *Planning Act*, which came into force on April 15, 2020. Prior to the release of the regulation, the Ministry of Municipal Affairs and Housing advised municipalities that the intent is to allow for suspension of specified timelines associated with land use planning matters that could be applied retroactively to the date that an emergency was declared.

- It should be noted that municipalities and planning boards can still make decisions on land use planning matters during the period of suspended timelines, through virtual channels, pursuant to the *Municipal Emergency Act*, 2020, which permits members of a municipal council or local board to participate electronically in a meeting and be counted in determining whether a quorum of members is present.

- A new section 9.2 of the *Development Charges Act*, 1997, would allow any development charge by-laws that were set to expire on or after March 17, 2020 to remain in force until six months after the termination of the emergency, in an effort to give municipalities time to replace them.

- Interim-control by-laws that were in effect on March 17, 2020 and were not repealed before April 15, 2020, and would expire before the emergency terminates, are deemed to remain in effect for a specified period after the emergency. Interim control by-laws in effect on March 17, 2020 that would not expire before the emergency terminates are deemed to remain in effect after they would otherwise expire for a specified period.

TRCA's office has been closed to the public due to the COVID situation, our Infrastructure and Development Planning and Permit staff and Technical Review staff continue to operate remotely to maintain business continuity and service delivery to support municipalities, stakeholders and the public. Staff are available by telephone and email for clients and able to assist with electronic planning and permit submissions. Staff also participate in conference call and/or virtual meeting with municipalities, agencies, development industry and consultants.

Relationship to Building the Living City, the TRCA 2013-2022 Strategic Plan
This report supports the following strategies set forth in the TRCA 2013-2022 Strategic Plan:
Strategy 2 – Manage our regional water resources for current and future generations

Strategy 4 – Create complete communities that integrate nature and the built environment
Strategy 8 – Gather and share the best sustainability knowledge
Strategy 12 – Facilitate a region-wide approach to sustainability

FINANCIAL DETAILS
Staff are engaged in this policy analysis work per the normal course of duty, with funding support provided by TRCA's participating municipalities to account 120-12. No additional funding is proposed to support the policy analysis work associated with the preparation of these comments.

DETAILS OF WORK TO BE DONE
TRCA staff will continue to monitor the Environmental Registry of Ontario and the Province of Ontario News' Website to ensure TRCA is aware of, and where appropriate participates and comments on, legislative, regulatory, policy and guidance initiatives affecting TRCA interests. In particular, staff are waiting for the Province to launch consultation on the draft regulations under the amended *Conservation Authorities Act* and potentially further amendments to the Act.

Staff will keep the Board of Directors informed of TRCA submissions at regular intervals and will monitor the outcomes of future decision notices, and report on the implications of legislative, regulatory and policy initiatives as appropriate. Staff will also update TRCA policies and procedures as required and facilitate training to reflect legislative and policy changes affecting TRCA.

Report prepared by: Mary-Ann Burns, extension 5763, Jessica Murray, extension 6437
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Date: April 24, 2020
Attachments: 7

Attachment 1: TRCA Submission to ERO#019-0987
Attachment 2: TRCA Submission to ERO#019-1060
Attachment 3: TRCA Submission to ERO#019-1187
Attachment 4: TRCA Submission to ERO#019-0614
Attachment 5: TRCA Submission to ERO#019-1332
Attachment 6: TRCA Submission to ERO#019-1162
Attachment 7: TRCA Submission to ERO#019-1163

Attachment 1

Toronto and Region Conservation Authority

January 13, 2020

BY E-MAIL ONLY (sanjay.coelho@ontario.ca)

Mr. Sanjay Coelho
Environmental Policy Branch
40 St Clair Avenue West, Floor 10
Toronto, ON M4V1M2

Dear Mr. Coelho:

Re: Amendment to the Record of Site Condition (Brownfields) Regulation (ERO #019-0987)

Thank you for the opportunity to comment on the Ministry of Environment, Conservation and Parks' Environmental Registry (ERO) posting on the proposed regulatory changes to the requirements for groundwater sampling for brownfield development.

The Toronto and Region Conservation Authority (TRCA) undertakes a dual role with respect to the movement and use of excess soil within its watershed-based jurisdiction: as a regulator of site grading and the placement, dumping or removal of any material, originating on the site or elsewhere; and as a proponent of construction projects on TRCA-owned lands.

TRCA conducts itself in accordance with the objects, powers, roles and responsibilities set out for conservation authorities (CA) under the *Conservation Authorities Act* and the MNRF Procedural Manual chapter on CA policies and procedures. TRCA is:

- A public commenting body under the *Planning Act* and *Environmental Assessment Act*;
- An agency delegated the responsibility to represent the provincial interest on natural hazards under Section 3.1 of the Provincial Policy Statement;
- A regulatory authority under section 28 of the *Conservation Authorities Act*;
- A service provider to municipal partners and other public agencies;
- A resource management agency; and
- A major landowner in the Greater Toronto Area.

TRCA is also the lead Source Protection Authority for the CTC Source Protection Region, which encompasses the Credit Valley, Toronto and Region, and Central Lake Ontario Source Protection Authorities. Under the Clean Water Act, 2006, TRCA has a key role in the protection of the sources of drinking water for an estimated 3.4 million Ontario residents. This work includes the development of the CTC Source Protection Plan (the Plan) as well as supporting our municipal partners with technical and policy planning advice with respect to implementation of the Plan.

Brownfield redevelopment represents an opportunity to optimize the use of existing drinking water systems as well as to mitigate the impacts of past land uses that may pose a risk to municipal drinking water systems. However, the process must ensure that redevelopment does not inadvertently impact the quality or quantity of municipal drinking water supplies.

TRCA has provided detailed comments to the ERO previously on several proposals for the provincial Excess Soil Management Policy Framework and Brownfield regulation informed by TRCA's experience in development and infrastructure review and the management of "large scale fill" or "excess soil" for projects in our nine urban and urbanizing watersheds and Lake Ontario shoreline (e.g. Tommy Thompson Park-Toronto, Lakeview Waterfront Connection Project - Mississauga).

Proposed Regulatory Amendment

We understand the government's current proposal would provide flexibility for a Qualified Person to exercise professional judgement regarding the need for groundwater testing where excavation has removed the soil down to bedrock and under key conditions.

General Comments

TRCA staff have reviewed the proposal as described in the ERO posting and generally support the spirit of the initiative to streamline redevelopment processes to encourage urban revitalization and environmental remediation. We understand that the proposed amendment exempts properties from groundwater sampling that are municipally serviced, more than 30 metres from a water body, are not an "enhanced investigation property" under O.Reg 153/04, and are not part of a "risk assessment". We further understand that properties that are "serviced by a municipal drinking water system" constitutes those with a drinking water source that is Lake-based or from a municipal well. Therefore, staff presume that a property could meet all the criteria for exemption but still be in proximity to a municipal well (i.e. wellhead protection area). In the absence of groundwater testing, it is possible that the bedrock groundwater system has become unknowingly contaminated, which may place the municipal water system at risk.

Of lesser risk, but still of note, is that a municipally serviced property (either Lake- or municipal well-based) may still be in proximity to a private well serving other properties not municipally serviced, for which a sampling exemption poses a risk for that private water source.

TRCA Recommendation: That the proposed regulatory amendment includes the following additional criteria in the determination of exemption from groundwater sampling:

1. Confirmation that the subject property is not located within a Wellhead Protection Area A or B (WHPA-A or WHPA-B) as prescribed in Source Protection Plans under the *Clean Water Act*;
2. Confirmation that the property is not located within 100 metres of a private well used as a potable water source.

We trust these comments are clear and of assistance. Thank you once again for the opportunity to comment on the regulatory amendment for brownfield development. Should you have any questions or wish to meet to discuss our remarks, please contact the undersigned at 416.667.6290 or at john.mackenzie@trca.ca.

Sincerely,

John MacKenzie, M.Sc.(Pl), MCIP, RPP
Chief Executive Officer

BY E-MAIL
cc:
TRCA: Laurie Nelson, Director, Policy Planning
Sameer Dhalla, Director, Development and Engineering Services
Moranne McDonnell, Director, Restoration and Infrastructure
Don Ford, Senior Manager, Hydrogeology and Source Water Protection
Jennifer Stephens, Manager, Source Water Protection

Attachment 2

February 3, 2020

BY E-MAIL ONLY (stacey.vojtek@ontario.ca)

Stacey Vojtek
Crown Forests and Lands Policy Branch - Crown Lands Section
300 Water street
5th Floor, North tower
Peterborough, ON
K9J 3C7

Dear Ms. Vojtek:

Re: Proposal to Amend O. Reg 454/96 (Construction) under the Lakes and Rivers Improvement Act (ERO #019-1060)

Thank you for the opportunity to comment on the Ministry of Natural Resources and Forestry's Environmental Registry of Ontario (ERO) posting on the proposal to amend Ontario Regulation 454/96 (Construction), to provide alternative regulatory approval requirements for repairs to existing low hazard wetland dams under the *Lakes and Rivers Improvement Act* (LRIA).

The Toronto and Region Conservation Authority (TRCA) undertakes a dual role with respect to works affecting wetlands, lakes, and rivers within its watershed-based jurisdiction: as a regulator of wetlands, shorelines and watercourse alterations within regulated areas, and as a conservation land manager and proponent for construction and remediation projects, largely on TRCA-owned land.

TRCA conducts itself in accordance with the objects, powers, roles and responsibilities set out for conservation authorities (CA) under the *Conservation Authorities Act* and the MNRF Procedural Manual chapter on CA policies and procedures, and the Class Environmental Assessment for Remedial Flood and Erosion Control Projects. TRCA's roles are:

- A public commenting body under the *Planning Act* and *Environmental Assessment Act*;
- An agency delegated the responsibility to represent the provincial interest on natural hazards under Section 3.1 of the Provincial Policy Statement;
- A regulatory authority under section 28 of the *Conservation Authorities Act*;
- A service provider to municipal partners and other public agencies;
- A Source Protection Authority under the *Clean Water Act*;
- A resource management agency; and
- A major landowner in the Greater Toronto Area.

Proposed Regulatory Amendment

We understand the government's current proposal would amend Ontario Regulation 454/96 (Construction). If passed, this amendment would provide: "an alternative, optional rules in regulation approach" to wetland dam owners, to repair existing low hazard wetland dams without obtaining approval under Section 16 of the LRIA; these rules would only apply if dam owners meet the

requirements in the regulation. The proposal states that alterations, improvements and repairs to low hazard wetland dams are a low risk activity and do not need to be subject to the same requirements as larger, more complex dams that may have more significant public safety, dam safety or environmental interests. This risk based, streamlined process has been developed and supported through evidence collected by the Ministry over the past six years through a pilot project.

General Comments

TRCA is supportive of a risk based approach to streamlining approvals and that an amendment to Ontario Regulation 454/96 is being considered to exempt low risk works in order to expedite repairs to existing wetland dams.

Detailed Comments

While TRCA staff occasionally make repairs to wetland dams, the decommissioning of low risk dams for ecological restoration and conservation purposes is a more common undertaking. In TRCA's jurisdiction, there are many remnant structures in watercourses that no longer serve a function and should be removed in order to re-establish a more natural function to the watercourse. Enabling a proactive approach to decommissioning low risk dams is critical to improving stability and function within watercourses and is consistent with the objectives of the LRIA. Unfortunately, due to the length and cost of permitting processes, remnant structures are often left in the watercourse and are not maintained. Over time, they negatively impact channel stability, and overall natural system function. As well, they frequently lead to increases in stream temperature, negatively impacting habitat for fish and wildlife.

In light of the above, TRCA is requesting the current proposed amendment for alternative optional rules be expanded to include the removal of low risk dams for improved ecologic health, morphological and hydrologic function. Alternative, optional rules for removal of low risk dams within the LRIA regulation would not undermine requirements for sound hydrologic engineering and fluvial geomorphic design principles, given that legislation governing in-water works would remain applicable, such as the federal *Fisheries Act*, the *Endangered Species Act*, and the *Conservation Authorities Act.* In addition, including a requirement to publicly post the project plan, risk assessment report and mitigation measures would facilitate transparency and tracking of these projects. Benefits of this approach would include:

- Reducing permit backlog;
- Streamlining by allowing more time for MNRF to review higher-risk projects; and
- Promoting the completion of restoration and mitigation works in an efficient and cost-effective manner.

Further, the definition of "wetland dam" could benefit from being clearer and more concise. In this regard, the Province could consider using the 1999 Ontario Dam Safety Guidelines definition of dam as the criteria for defining what structures can be exempt from Section 16 approval. TRCA staff suggest that all dams that meet the criteria below could be exempt, contingent on the alteration or repair meeting LRIA Technical Bulletin requirements:

- dams with height less than 3.0 metres above the original stream bed;
- dams with height less than 2.0 metres above the original stream bed and a reservoir surface area of 2.0 hectares or less;
- the dam must have a low hazard potential classification, as determined by a licensed engineering practitioner;
- any alterations, improvements and repairs must not change the hazard potential classification of the dam.

This would create clear screening criteria for determining what constitutes a wetland dam and lead to a number of other benefits, such as:

- Encouraging dam owners to undertake repairs;
- Reducing regulatory burden and costs to dam owners;
- Decreasing the amount of time required to alter, improve and repair dams;
- Reducing Ministry workload.

TRCA Recommendations:

1) That the proposed regulatory amendment be expanded to apply to the decommissioning of low risk dams for ecological restoration and conservation purposes.

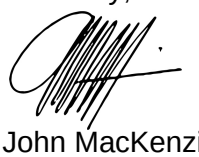
2) That projects meeting the proposed expanded amendment criteria be publicly posted to ensure transparency, accountability and tracking.

3) That the proposed regulatory amendment include a clear definition of what constitutes a "wetland dam".

4) Additional criteria be included for exemption consisting of the specifications listed above for sizing and hazard classification.

We trust these comments and recommendations are clear and of assistance. Thank you once again for the opportunity to comment on the regulatory amendment for repairs to existing low hazard wetland dams. Should you have any questions or wish to meet to discuss our remarks, please contact the undersigned at 416.667.6290 or at john.mackenzie@trca.ca.

Sincerely,



John MacKenzie, M.Sc.(Pl), MCIP, RPP
Chief Executive Officer

BY E-MAIL
cc:
TRCA: Laurie Nelson, Director, Policy Planning
Sameer Dhalla, Director, Development and Engineering Services
Moranne McDonnell, Director, Restoration and Infrastructure

Attachment 3

February 19, 2020

BY E-MAIL ONLY (sara.peckford@ontario.ca)

Sara Peckford
Ministry of Agriculture, Food and Rural Affairs
Food Safety and Environmental Policy Branch
1 Stone Road West
Ontario Government Building, 2nd floor, Southwest
Guelph, ON
N1G 4Y2

Dear Ms. Peckford:

Re: Drainage Act Discussion Paper (ERO #019-1187)

Thank you for the opportunity to comment on the Ministry of Agriculture, Food and Rural Affairs' Environmental Registry (ERO) posting on the Drainage Act Discussion Paper.

The Toronto and Region Conservation Authority (TRCA) conducts itself in accordance with the objects, powers, roles and responsibilities set out for conservation authorities (CA) under the *Conservation Authorities Act* and the MNRF Procedural Manual chapter on CA policies and procedures as:

- A public commenting body under the *Planning Act* and *Environmental Assessment Act*;
- An agency delegated the responsibility to represent the provincial interest on natural hazards under Section 3.1 of the Provincial Policy Statement;
- A regulatory authority under section 28 of the *Conservation Authorities Act*;
- A service provider to municipal partners and other public agencies;
- A resource management agency; and
- A major landowner in the Greater Toronto Area.

In these roles, TRCA works in collaboration with municipalities and stakeholders to protect people and property from flooding and other natural hazards, and to conserve natural resources. As stewards of the land, the agricultural community is a key partner in achieving the long-term health of our watersheds.

Drainage Act and Conservation Authorities Act Protocol

The purpose of the *Drainage Act* is to establish a process for creating mutual agreement drains and petition drains (also called municipal drains). The ERO Drainage Act Discussion Paper focuses on petition drains, not mutual agreement drains. Petition drains are created when landowners petition area municipalities for design and construction of drainage works, with the associated costs assessed to landowners benefitting from the drainage works. These municipal drains are generally constructed to improve agricultural drainage.

The process to install a new municipal drain, or to alter or expand an existing municipal drain, may trigger the need for a conservation authority permit under section 28 of the *Conservation Authorities*

Act (CA Act). Additionally, maintenance and repair of existing municipal drains is the legal responsibility of municipalities and may also require a CA Act s.28 permit.

In order to resolve legal liability issues for municipalities and conservation authorities arising from municipal drain provisions in the *Drainage Act* and the *Conservation Authorities Act*, the inter-agency *Drainage Act* & Section 28 Regulations Team (DART) was formed in 2008. The DART produced the "Drainage Act and Conservation Authorities Act Protocol" (the DART Protocol) and joint Drain Maintenance or Repair Notification Form (the Form), which may be used to apply for permissions from conservation authorities, the Ministry of Natural Resources and Forestry, and Fisheries and Oceans Canada for municipal drain maintenance and repair. The DART Protocol and Form do not address permissions for new drains and improvements to existing drains. Use of the Form simplifies the application process for proponents by using a single form for all permissions. The Form must be submitted to each of the agencies from which permissions are required.

Regarding CA Act s.28 permissions, the DART Protocol includes a set of Standard Compliance Requirements for regular repair and maintenance activities that, if followed, serve as the written permission to proceed with work under the CA Act. Implementation of the DART Protocol has improved regulatory certainty, reduced burden and streamlined CA Act s.28 permitting requirements for routine maintenance and repair of existing municipal drains. This is to the benefit of landowners that depend on municipal drains and the municipalities liable for the drainage works, while still meeting the requirements of CA regulations.

Government Proposal

We understand the government plans to propose changes to the *Drainage Act* that would reduce burden, streamline approvals and address stakeholder concerns while maintaining environmental standards. The Drainage Act Discussion Paper describes the proposed changes as intending to:

- provide the minister with legislative authority to develop and sign off on technical protocols such as the *Drainage Act and Conservation Authorities Act Protocol*
- create a new streamlined *Drainage Act* process for minor improvements
- enable a simplified process to update the engineer's report to account for changes to the design made during construction

General Comments

TRCA staff have reviewed the proposal as described in the Discussion Paper and support the initiative to streamline review processes to facilitate drainage critical for agricultural productivity and the production of food.

TRCA Responses to Discussion Paper Questions

Consultation Question 1:

Beyond the DART Protocol, what additional protocols could be established to help streamline approvals?

TRCA is supportive of new protocols consistent with the DART Protocol approach to appropriately streamline review processes for agricultural drainage works while meeting the requirements of s.28 CA regulations. Therefore, any new streamlining measures should maintain requirements for appropriate technical analyses for all drainage works that are not like-for-like replacement projects to ensure natural features and hazards are protected and adverse upstream or downstream impacts do not occur. For example, a Qualified Professional should prepare a hydraulic analysis for culvert

extensions that form part of the approved drain infrastructure. Hydraulic analyses should be required for other proposals to change channel geometry and similar projects that may affect the flood plain.

Consultation Question 2:
What projects should be included in the definition of minor improvements? What else would you like a minor process to achieve?

The parameters and associated thresholds within the new processes for minor works should define which drainage work types, size and scale constitute minor improvements. The discussion paper mentions developing protocols to streamline approvals for "low risk activities." As with the term "minor improvement," the term "low risk activities" should be defined and CAs could assist given our efforts through the DART – see the definition of minor projects as articulated in the current DART Protocol. We note that the 2017 Fisheries and Oceans Canada publication, "Guidance for Maintaining and Repairing Municipal Drains in Ontario" may provide additional guidance.

Consultation Question 3:
Do you have any specific concerns with any of the items discussed in the paper?

Regarding section 3. Simplifying Administrative Processes, TRCA is supportive of a simplified process to update the engineer's report to account for any changes made during construction. This could be a practical measure and an improvement in the process. TRCA suggests that any design changes from the permitted/approved design should be in conformance with any conditions of the initially permitted design.

Consultation Question 4:
Do you have any additional suggestions to reduce burden or contribute to additional opportunities for your business?

In order to assist applicants, technical guidance should clearly articulate what is required in technical reports to support a project. For instance, for an environmental appraisal (section 6 of the *Drainage Act*), the method to weigh and evaluate criteria in the appraisal through a sustainability lens (examining the economic, environmental and social aspects of proposed drainage works) should be outlined. This additional guidance would enhance certainty for all stakeholders and contribute to efficient and effective review processes.

In TRCA's experience, there are situations where watercourses that form part of municipal drains are re-naturalized and become surrounded by urban development through ongoing planning processes. Currently, municipal drains in urban settings that are not abandoned through *Drainage Act* processes (sections 19 and 84) involve assessing individual urban dwellings' drain maintenance costs (taxes to maintain drains), even though these drains are no longer necessary for agricultural purposes. Amendments to the *Drainage Act,* or development of new protocols, might consider outlining terms for what happens to a municipal drain when urban development occurs, and the drain is no longer necessary for agricultural purposes.

Drain abandonment that occurs upon urban development may present opportunities for ecological restoration of watercourses and avoiding future drain maintenance activities that no longer benefit surrounding land uses.

TRCA Recommendations
In order to achieve a streamlined process to support agricultural operations and continue to ensure the protection of people and property from natural hazards and the conservation of natural resources, TRCA recommends that:

1) The introduction of new streamlining measures or any proposed changes to the *Drainage Act* maintain the requirement for a permit where applicable, in accordance with section 28 of the *Conservation Authorities Act* and the DART Protocol;

2) The parameters and thresholds defining minor improvements and low risk activities, where they affect CA regulated activities, are developed in consultation with CAs.

3) Technical guidance for study requirements be made available to applicants to enhance certainty for project proponents.

4) Should the proposed amendments to the Act or new streamlining measures address drain abandonment, the protection and restoration of any remaining natural features be considered in consultation with conservation authorities as applicable.

Thank you once again for the opportunity to provide comments on the Drainage Act Discussion Paper. Should you have any questions, require clarification on any of the above, or wish to meet to discuss our remarks, please contact the undersigned at 416.667.6290 or at john.mackenzie@trca.ca.

Sincerely,

John MacKenzie, M.Sc.(Pl), MCIP, RPP
Chief Executive Officer

BY E-MAIL
cc:
TRCA: Laurie Nelson, Director, Policy Planning
Sameer Dhalla, Director, Development and Engineering Services
Moranne McDonnell, Director, Restoration and Infrastructure

Attachment 4

March 19, 2020

BY E-MAIL ONLY (ken.cunningham@ontario.ca)

Ken Cunningham
Environmental Assessment Branch
Ministry of the Environment, Conservation and Parks
135 St. Clair Avenue West
Toronto, Ontario M4V 1P5

Dear Mr. Cunningham:

Re: Proposed regulations for how the Environmental Assessment process will apply to four priority transit projects in the Greater Toronto and Hamilton Area (ERO #019-0614)

Thank you for the opportunity to comment on the Ministry of Environment, Conservation and Parks' Environmental Registry (ERO) posting on the proposed regulations for how the Environmental Assessment process will apply to four priority transit projects in the Greater Toronto and Hamilton Area.

Toronto and Region Conservation Authority (TRCA) is a key participant in the environmental assessment (EA) process within its watershed-based jurisdiction, both as a reviewer of EAs and as a proponent of undertakings under the *Environmental Assessment Act*. TRCA conducts itself in accordance with the objects, powers, roles and responsibilities set out for conservation authorities (CAs) under the *Conservation Authorities Act* and the MNRF Procedural Manual chapter on CA policies and procedures. TRCA's roles are:

- A public commenting body under the *Planning Act* and *Environmental Assessment Act*;
- An agency delegated the responsibility to represent the provincial interest on natural hazards under Section 3.1 of the Provincial Policy Statement;
- A regulatory authority under Section 28 of the *Conservation Authorities Act*;
- A service provider to municipal partners and other public agencies;
- A Source Protection Authority under the *Clean Water Act*;
- A resource management agency; and
- A major landowner in the Greater Toronto Area.

In these roles, TRCA works in collaboration with municipalities and stakeholders to protect people and property from flooding and other natural hazards, and to conserve natural resources.

Government Proposal

We understand the government's current proposal would modify the existing environmental assessment process for four priority transit projects in the Greater Toronto and Hamilton Area. It will modify the existing Transit Project Assessment Process (TPAP), as set out under Ontario Regulation 231/08 for Transit Projects and Metrolinx Undertakings, to better suit a public-private partnership (P3) project delivery model, while ensuring appropriate consultation occurs, and that the protection of the

environment remains a priority. Specifically, the proposal is to enact a new regulation pertaining specifically to the Ontario Line Project, and to amend O. Reg. 231/08 Section 15.

The existing TPAP is a scoped environmental assessment process for certain classes of transit projects specified in Schedule 1 of O. Reg. 231/08. These project classes are exempt from the more rigorous class environmental assessment process required by Part II.1 of the *Ontario Environmental Assessment Act*. We understand that the current government proposal is for a further scoped EA process, as compared with the TPAP, for the four priority transit projects, and furthermore that substantial components of the process will be completed within the coming months so construction may begin before the end of 2020.

General Comments

TRCA staff have reviewed the proposal and generally support streamlining the delivery of priority public transit projects while maintaining environmental oversight. TRCA works regularly with its provincial and municipal partners on public infrastructure projects while avoiding duplication and delay. At the same time, we recognize the importance of a robust assessment of environmental, social and economic considerations and public consultation processes, appropriately scoped for project scale and location.

Proposed Ontario Line Regulation

Issues resolution

TRCA supports that objections to the proposed projects are addressed through an issues resolution process that Metrolinx manages. It has been our experience working on other Metrolinx projects, that when Metrolinx maintains full control of their project from a project management perspective, a timelier review and commenting process is facilitated.

Early Works

The Provincial Policy Statement (2020) states the objective to direct development away from areas of natural and human-made hazards, which protects public health and safety, and minimizes cost, risk and social disruption. Through this lens, TRCA has a long-standing relationship with Metrolinx working on major facilities to ensure they are planned and developed to avoid and or minimize impacts from the provincial interest on natural hazards, specifically flood risks.

TRCA emphasizes that natural hazards associated with flooding and erosion must be accounted for during the EA phase in order to properly manage their associated risk to infrastructure investments and the public users of transit projects. The proposed early works process may not account for this, which is of concern to TRCA due to the Ontario Line's location within the lower Don River flood plain and in an area particularly affected by the fluctuating Lake Ontario levels. Considerable financial resources are currently being channeled towards addressing flood risk to over 290 hectares of downtown Toronto and the Port Lands. The studies, monitoring and information arising from the Port Lands Flood Protection initiative should be considered, maintained and incorporated into the planning and development of the Ontario Line. It will be critical that Metrolinx engages with key stakeholders of the Port Lands Flood Protection Initiative to identify and avoid these flood risks as well as develop mitigation measures. TRCA is recommending that the responsibility and accountability for planning, design and implementation of mitigation measures remain with Metrolinx and not be assigned to contractors.

Climate Change Considerations

The impacts of a changing climate should also be accounted for during the project's design phase in order to inform risk management measures. For the Ontario Line, as an example, this may include utilizing updated TRCA or other models to account for changing climate and including additional freeboard for planned infrastructure in flood prone areas to accommodate for rising Lake Ontario water levels. It is imperative that technical studies, including evaluating and planning for the mitigation of such risk using current methodologies, be completed by Metrolinx prior to the detailed design phase. These studies may take time to complete, and as such may cause conflict in the approval of some of the proposed early works, namely bridge structures and any other structures such as stations proposed in flood plain areas.

Accordingly, TRCA staff are concerned with the scope of the proposed "early works" definition of project components that will be allowed to proceed to construction before the completion of the draft Environmental Impact Assessment Report. Early works typically include activities such as land assembly, preloading and utility relocations. This contrasts with the currently proposed major structural realignment activities included as "early works" such as station construction, bridge replacements and expansions and rail corridor expansion. TRCA cautions that as currently proposed the broad definition of early works may result in major alignment challenges with unforeseen impacts to public safety related to flooding and erosion impacts, as well as negative impacts to natural systems that may include natural heritage features of provincial interest.

Another concern is existing riverine flood protection infrastructure that has been constructed to protect life and property, impacts to which must be avoided through the design of the Ontario Line. In addition, the groundwater conditions are a significant environmental factor along stretches of the proposed Ontario Line corridor, much of which is proposed to be tunneled. Developing mitigation strategies for groundwater impacts should be considered in the early works initiatives so as not to impact the overall project schedule. TRCA notes that groundwater conditions may affect the project's construction feasibility, and that groundwater issues are typically identified through the existing Environmental Assessment process.

Preliminary activities should also consider land assembly/acquisition in the early works phase if the entirety of lands within the project area are not owned by the Province. TRCA recognizes that TRCA-owned lands may be required for project completion in certain locations and would appreciate being involved early in the process as these negotiations can be lengthy.

Soil Considerations

TRCA has several planned erosion and hazard management infrastructure projects along the Toronto Waterfront that could be potential sites for the placement of soils. TRCA would appreciate continued engagement on potential soil management strategies as these projects evolve.

Draft Early Works Report

As proposed under Section 8(2).7, the Draft Early Works Report must include measures to mitigate the negative environmental impacts of the preferred alternative. This methodology is problematic as mitigation measures are proposed prior to assessment and evaluation of the impacts that the preferred method of carrying out the early works and other methods might have on the environment (and Metrolinx's criteria for assessment and evaluation of those impacts). Those steps occur as part of the Environmental Impact Assessment Report, however, if the early works as stated in the draft document can proceed prior to the Environmental Impact Assessment Report there could be

unforeseen issues in the future that result in project delays. TRCA would recommend that selection of the preferred alternative, including in the case of early works, include an evaluation of potential impacts and mitigation to confirm feasibility and that the proposed regulation be revised to account for an amendment process.

Preferred alternative determination

The Draft Environmental Conditions Report speaks to mitigating the environmental impact of the preferred alternative in draft regulation Section 4(3).7, suggesting the preferred alternative is determined based on minimal environmental information prior to completion of the Environmental Impact Assessment Report. This approach is problematic, as mitigation occurs prior to assessment and evaluation of the impacts that the preferred method of carrying out the works and other methods might have on the environment (and Metrolinx's criteria for assessment and evaluation of those impacts). Those steps occur as part of the Environmental Impact Assessment Report that follows the Environmental Conditions Report. TRCA would prefer that the selection of the preferred alternative include an evaluation of potential impacts and mitigation to confirm feasibility.

Assessment and reporting requirements

TRCA notes that the proposed regulation lacks a clear definition of "Environment" (draft regulation Section 1), and which studies are to be included in an Environmental Conditions Report (Section 4(3)), Environmental Impact Assessment Report (Sections 15(1) and 18(1)), and Early Works Report (Sections 8(2) and 11(1)). For example, stormwater, groundwater, natural hazards including flooding and erosion, natural heritage, terrestrial and aquatic habitat studies must be specified for the report. TRCA recommends these studies be clearly defined to ensure the proper information is assessed, mitigated and conveyed in the Environmental Conditions Report, Environmental Impact Assessment Report and Early Works Report.

From TRCA's perspective, it is imperative that issues associated with transit construction in proximity to the Waterfront Toronto Port Lands and in particular the associated flood protection features in this area, which constitute technically complex areas prone to significant flooding, are addressed and confirmed through the preliminary Environmental Conditions Report. Satisfying complex technical concerns in this regard is paramount to ensuring the constructability of the project which will in turn reduce risk and save time during construction.

Given the inherent impacts on the natural heritage system associated with transit projects, ecosystem compensation should be addressed in the various project studies. Where impact assessment and mitigation measures are required, ecosystem compensation should also be included as a necessary consideration. This requirement to consider ecosystem compensation earlier in the project will streamline the approach to finalizing required compensation at later planning stages. TRCA recommends that ecosystem compensation should be included in the draft regulation within Sections 8(2).7, 15(2).7 and 21(1).4 of the proposed regulation.

Species at risk

TRCA supports that Metrolinx may apply for and obtain authorization to proceed with measures to accommodate any species at risk or provincial heritage properties in advance of completing the process outlined in the regulation, subject to any consultation or other requirements associated with those processes. In TRCA's experience, issues related to species at risk are raised at the detailed

design stage and can delay approvals, whereas this delay could be avoided if the issues are addressed earlier in the process. TRCA also recommends that the regulation include a protocol or agreement whereby Metrolinx can address issues requiring federal species at risk approvals, as well as approvals from Fisheries and Oceans Canada regarding harmful alteration or disruption, or destruction of fish habitat under the purview of the *Fisheries Act* in order to avoid review delays at the detailed design stage.

Project changes

Regarding how project changes are dealt with in the draft regulation, Section 21(2) states that the procedure in subsection (1) for addressing a change does not apply if the change is required to comply with another Act, a regulation made under another Act, or an order, permit, or approval or other instrument issued under another Act. However, there is no procedure outlined for changes required to comply with these elements (i.e., how changes required to comply with a permit issued under another Act will be incorporated into the project's assessment and approval process). TRCA suggests outlining how a change required to comply with another Act will be addressed and the protocol for circulating proposed changes in order that other agencies, such as conservation authorities remain informed.

Proposed Changes to O. Reg. 231/08

As noted in our comments on the proposed Ontario Line Regulation, given the inherent impacts on the natural heritage system associated with transit projects, ecosystem compensation should be addressed in the various project studies. Where impact assessment and mitigation measures are required, ecosystem compensation should also be included. It is our experience that the inclusion of ecosystem compensation considerations earlier in the planning process will streamline the approach to compensation at later planning stages. TRCA recommends that ecosystem compensation in accordance with Metrolinx's standard should be included in Sections 15(1).3 and (15).4 of O. Reg. 231/08, in the addendum to the environmental project report.

TRCA Recommendations

In order to achieve a streamlined priority transit project development process in a timely manner and continue to ensure the protection of people and property from natural hazards and the conservation of natural resources, TRCA recommends:

1) The proposed project assessment timeline ensures projects can demonstrate that they will avoid increasing risk of natural hazards (flood and erosion risks) to infrastructure or public health and safety through the completion of appropriate technical studies that inform detailed design.

2) The environmental studies required are clearly defined within the regulation to ensure the proper information is assessed, mitigated and conveyed in the Environmental Conditions Report, Environmental Impact Assessment Report and Early Works Report.

3) A protocol be developed for harmonizing federal approvals and any other required provincial approvals early in the process to avoid delays prior to detailed design. The Aquatic Habitat Toronto model involving DFO, MNRF, TRCA and other government agencies may be helpful to consider in this regard.

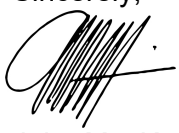
4) The scope of early works be limited to typical low risk activities such as land assembly, staging, stockpiling, in lower risk areas of the project.

5) Should the proposed scope of early works remain as proposed, that a 30% detailed design be required and reviewed by the government agency review team for the project to confirm potential impacts, feasibility and mitigation measures prior to the approval of the early works.

6) We recommend that consideration of sustainability strategies such as the placement or use of soil in nearby projects in support of nearby conservation authority flood and erosion control projects be considered to reduce GHG emissions be a requirement.

Thank you once again for the opportunity to provide comments on the proposed regulations for how the Environmental Assessment process will apply to four priority transit projects in the Greater Toronto and Hamilton Area. Should you have any questions, require clarification on any of the above, or wish to meet to discuss our comments, please contact the undersigned at 416.667.6290 or at john.mackenzie@trca.ca.

Sincerely,



John MacKenzie, M.Sc.(Pl), MCIP, RPP
Chief Executive Officer

BY E-MAIL
cc:
TRCA: Laurie Nelson, Director, Policy Planning
Sameer Dhalla, Director, Development and Engineering Services
Moranne McDonnell, Director, Restoration and Infrastructure
Beth Williston, Associate Director, Infrastructure Planning and Permits

Attachment 5

April 3, 2020

BY ONLINE SUBMITTAL ONLY

Building and Development Branch
Ministry of Municipal Affairs and Housing
777 Bay Street, 2nd Floor
Toronto, Ontario M5G 2E5

Re: Proposed regulation made under Ontario Regulation 332/12 (Building Code) made under the Building Code Act, 1992 (ERO #019-1332)

Thank you for the opportunity to comment on the Ministry of Municipal Affairs and Housing's Environmental Registry (ERO) posting on the proposed amendment to Ontario Regulation 332/12 (Building Code) made under the *Building Code Act, 1992*. The posting provides notice that the government is proposing to amend the applicable law provisions of Ontario Regulation 332/12, the Building Code.

The Toronto and Region Conservation Authority (TRCA) conducts itself in accordance with the objects, powers, roles and responsibilities set out for conservation authorities (CA) under the *Conservation Authorities Act* and the MNRF Procedural Manual chapter on CA policies and procedures for plan review and permitting activities, as follows:

- A public commenting body under the *Planning Act* and *Environmental Assessment Act*;
- An agency delegated the responsibility to represent the provincial interest on natural hazards under Section 3.1 of the Provincial Policy Statement;
- A regulatory authority under section 28 of the *Conservation Authorities Act*;
- A service provider to municipal partners and other public agencies;
- A Source Protection Authority under the *Clean Water Act*;
- A resource management agency; and
- A major landowner in the Greater Toronto Area.

In these roles, TRCA works in collaboration with municipalities and stakeholders to protect people and property from flooding and other natural hazards, and to conserve natural resources.

TRCA has an interest in the above noted proposal given that conservation authorities' development regulations under section 28 of the *Conservation Authorities Act* are among the statutes and regulations listed as applicable law under the Building Code, Ontario Regulation 332/12. In addition, conservation authorities are prescribed commenting agencies under the *Planning Act* and *Environmental Assessment Act*, whereby TRCA comments on both development and infrastructure planning and projects traversing TRCA regulated areas. Currently, TRCA is working closely with Metrolinx to provide technical advice on the four priority transit projects referenced in the ERO posting. Accordingly, TRCA also commented on the related ERO posting #019-0614 for a proposed expedited environmental assessment process for the four priority transit projects. A copy of our submission to the Ministry of Environment, Conservation and Parks, dated March 19, 2020 has been enclosed for your reference.

Government Proposal Background

The “New Subway Transit Plan for the GTHA” contains commitments for four priority transit projects: the Ontario Line, Scarborough Subway Extension, Yonge North Subway Extension, and the Eglinton Crosstown West Extension.

In February 2020, the government introduced Bill 171, the proposed “Building Transit Faster Act”, which, if passed, would allow the Lieutenant Governor in Council to designate land as “transit corridor land”. This designation would require development proponents to obtain a corridor development permit for development and construction activities on or near transit corridor land that may also require coordination with subway construction.

In anticipation of Bill 171 becoming law, the Ministry of Municipal Affairs and Housing (MMAH) is proposing to amend the “applicable law” provisions in Ontario Regulation 332/12 (the Building Code) made under the *Building Code Act*, 1992.

Government Proposal

TRCA understands that the current ERO posting is requesting comments on the Ministry of Municipal Affairs’ proposal to amend the Building Code to add to the existing list of “applicable law” needed to be upheld prior to issuance of a municipal building permit. The proposed amendment would require that corridor development permits for new development on or near the transit corridor land are received from the Ministry of Transportation (MTO) prior to a chief building official issuing a municipal building permit.

TRCA General Comments

TRCA supports the government’s approach to focusing development and intensification close to transit and for coordinating development and infrastructure planning. We caution, however, that the intensification of development and infrastructure in these corridors should not come at the expense of other provincial interests, such as public safety from managing natural hazards and achieving more resilient communities by protecting natural heritage systems. As stated in the Provincial Policy Statement (2020), Ontario's long-term prosperity, environmental health and social well-being depend on reducing the potential for public cost or risk to Ontario’s residents from natural or human-made hazards.

Currently, the Building Code regulation (O. Reg. 332/12) defines “applicable law” to include conservation authorities’ regulations made under section 28 of the *Conservation Authorities Act*. TRCA’s section 28 regulation, along with its commenting roles under the *Planning Act* and Environmental Assessment processes, are crucial for assisting municipal and provincial partners in meeting shared objectives for reducing natural hazard risks and conserving natural resources. Accordingly, the different provincial interests represented in the list of applicable law should have equal weight in development and infrastructure planning.

To this end, TRCA’s role is to ensure development and infrastructure avoid risks posed by natural hazards, mitigates and remediates risk where they must locate within hazards, and that natural resources are conserved to enhance resilience to the impacts of urbanization and climate change. In TRCA’s and municipal partners’ experience, planning for redevelopment and urban revitalization in the complex landscapes of the four priority transit corridors requires innovative solutions for stormwater retrofit, natural hazard mitigation and remediation, as well as ecological restoration to achieve greater resilience, (e.g. Port Lands Flood Protection Initiative and the Ontario Line project per attached letter). These opportunities tend to be greater at the early stages of the development and infrastructure planning processes and when the two processes are coordinated. An example in

TRCA's jurisdiction of where such upfront work and early coordination for redevelopment, transit building, flood remediation and urban revitalization have furthered provincial, municipal and TRCA objectives, is Vaughan Metropolitan Centre within the Black Creek sub-watershed adjacent to the top of the University subway line.

TRCA Recommendations

In order to ensure the protection of people and property from natural hazards and the conservation of natural resources, TRCA recommends that:

1) The MTO process to designate transit corridor land be coordinated with MMAH, municipalities and conservation authorities where applicable in the early stages of the planning and/or environmental assessment process in order to avoid increasing the risk of natural hazards (flood and erosion risks) to infrastructure, development or public health and safety.

2) Conservation authorities' regulations made under Section 28 of the *Conservation Authorities Act* continue to be "applicable law" under O. Reg. 332/12 (Building Code).

Thank you once again for the opportunity to provide comments on the proposed amendments to Ontario Regulation 332/12 (Building Code) made under the *Building Code Act, 1992*. Should you have any questions, require clarification on any of the above, or wish to meet to discuss our remarks, please contact the undersigned at 416.667.6290 or at john.mackenzie@trca.ca.

Sincerely,

John MacKenzie, M.Sc.(Pl), MCIP, RPP
Chief Executive Officer

Encl. TRCA Submission to ERO #019-0614, March 19, 2020

BY E-MAIL
cc:
TRCA: Laurie Nelson, Director, Policy Planning
Sameer Dhalla, Director, Development and Engineering Services

March 19, 2020

BY E-MAIL ONLY (ken.cunningham@ontario.ca)

Ken Cunningham
Environmental Assessment Branch
Ministry of the Environment, Conservation and Parks
135 St. Clair Avenue West
Toronto, Ontario M4V 1P5

Dear Mr. Cunningham:

Re: Proposed regulations for how the Environmental Assessment process will apply to four priority transit projects in the Greater Toronto and Hamilton Area (ERO #019-0614)

Thank you for the opportunity to comment on the Ministry of Environment, Conservation and Parks' Environmental Registry (ERO) posting on the proposed regulations for how the Environmental Assessment process will apply to four priority transit projects in the Greater Toronto and Hamilton Area.

Toronto and Region Conservation Authority (TRCA) is a key participant in the environmental assessment (EA) process within its watershed-based jurisdiction, both as a reviewer of EAs and as a proponent of undertakings under the *Environmental Assessment Act*. TRCA conducts itself in accordance with the objects, powers, roles and responsibilities set out for conservation authorities (CAs) under the *Conservation Authorities Act* and the MNRF Procedural Manual chapter on CA policies and procedures. TRCA's roles are:

- A public commenting body under the *Planning Act* and *Environmental Assessment Act*;
- An agency delegated the responsibility to represent the provincial interest on natural hazards under Section 3.1 of the Provincial Policy Statement;
- A regulatory authority under Section 28 of the *Conservation Authorities Act*;
- A service provider to municipal partners and other public agencies;
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In these roles, TRCA works in collaboration with municipalities and stakeholders to protect people and property from flooding and other natural hazards, and to conserve natural resources.

Government Proposal

We understand the government's current proposal would modify the existing environmental assessment process for four priority transit projects in the Greater Toronto and Hamilton Area. It will modify the existing Transit Project Assessment Process (TPAP), as set out under Ontario Regulation 231/08 for Transit Projects and Metrolinx Undertakings, to better suit a public-private partnership (P3) project delivery model, while ensuring appropriate consultation occurs, and that the protection of the

environment remains a priority. Specifically, the proposal is to enact a new regulation pertaining specifically to the Ontario Line Project, and to amend O. Reg. 231/08 Section 15.

The existing TPAP is a scoped environmental assessment process for certain classes of transit projects specified in Schedule 1 of O. Reg. 231/08. These project classes are exempt from the more rigorous class environmental assessment process required by Part II.1 of the *Ontario Environmental Assessment Act*. We understand that the current government proposal is for a further scoped EA process, as compared with the TPAP, for the four priority transit projects, and furthermore that substantial components of the process will be completed within the coming months so construction may begin before the end of 2020.

General Comments

TRCA staff have reviewed the proposal and generally support streamlining the delivery of priority public transit projects while maintaining environmental oversight. TRCA works regularly with its provincial and municipal partners on public infrastructure projects while avoiding duplication and delay. At the same time, we recognize the importance of a robust assessment of environmental, social and economic considerations and public consultation processes, appropriately scoped for project scale and location.

Proposed Ontario Line Regulation

Issues resolution

TRCA supports that objections to the proposed projects are addressed through an issues resolution process that Metrolinx manages. It has been our experience working on other Metrolinx projects, that when Metrolinx maintains full control of their project from a project management perspective, a timelier review and commenting process is facilitated.

Early Works

The Provincial Policy Statement (2020) states the objective to direct development away from areas of natural and human-made hazards, which protects public health and safety, and minimizes cost, risk and social disruption. Through this lens, TRCA has a long-standing relationship with Metrolinx working on major facilities to ensure they are planned and developed to avoid and or minimize impacts from the provincial interest on natural hazards, specifically flood risks.

TRCA emphasizes that natural hazards associated with flooding and erosion must be accounted for during the EA phase in order to properly manage their associated risk to infrastructure investments and the public users of transit projects. The proposed early works process may not account for this, which is of concern to TRCA due to the Ontario Line's location within the lower Don River flood plain and in an area particularly affected by the fluctuating Lake Ontario levels. Considerable financial resources are currently being channeled towards addressing flood risk to over 290 hectares of downtown Toronto and the Port Lands. The studies, monitoring and information arising from the Port Lands Flood Protection initiative should be considered, maintained and incorporated into the planning and development of the Ontario Line. It will be critical that Metrolinx engages with key stakeholders of the Port Lands Flood Protection Initiative to identify and avoid these flood risks as well as develop mitigation measures. TRCA is recommending that the responsibility and accountability for planning, design and implementation of mitigation measures remain with Metrolinx and not be assigned to contractors.

Climate Change Considerations

The impacts of a changing climate should also be accounted for during the project's design phase in order to inform risk management measures. For the Ontario Line, as an example, this may include utilizing updated TRCA or other models to account for changing climate and including additional freeboard for planned infrastructure in flood prone areas to accommodate for rising Lake Ontario water levels. It is imperative that technical studies, including evaluating and planning for the mitigation of such risk using current methodologies, be completed by Metrolinx prior to the detailed design phase. These studies may take time to complete, and as such may cause conflict in the approval of some of the proposed early works, namely bridge structures and any other structures such as stations proposed in flood plain areas.

Accordingly, TRCA staff are concerned with the scope of the proposed "early works" definition of project components that will be allowed to proceed to construction before the completion of the draft Environmental Impact Assessment Report. Early works typically include activities such as land assembly, preloading and utility relocations. This contrasts with the currently proposed major structural realignment activities included as "early works" such as station construction, bridge replacements and expansions and rail corridor expansion. TRCA cautions that as currently proposed the broad definition of early works may result in major alignment challenges with unforeseen impacts to public safety related to flooding and erosion impacts, as well as negative impacts to natural systems that may include natural heritage features of provincial interest.

Another concern is existing riverine flood protection infrastructure that has been constructed to protect life and property, impacts to which must be avoided through the design of the Ontario Line. In addition, the groundwater conditions are a significant environmental factor along stretches of the proposed Ontario Line corridor, much of which is proposed to be tunneled. Developing mitigation strategies for groundwater impacts should be considered in the early works initiatives so as not to impact the overall project schedule. TRCA notes that groundwater conditions may affect the project's construction feasibility, and that groundwater issues are typically identified through the existing Environmental Assessment process.

Preliminary activities should also consider land assembly/acquisition in the early works phase if the entirety of lands within the project area are not owned by the Province. TRCA recognizes that TRCA-owned lands may be required for project completion in certain locations and would appreciate being involved early in the process as these negotiations can be lengthy.

Soil Considerations

TRCA has several planned erosion and hazard management infrastructure projects along the Toronto Waterfront that could be potential sites for the placement of soils. TRCA would appreciate continued engagement on potential soil management strategies as these projects evolve.

Draft Early Works Report

As proposed under Section 8(2).7, the Draft Early Works Report must include measures to mitigate the negative environmental impacts of the preferred alternative. This methodology is problematic as mitigation measures are proposed prior to assessment and evaluation of the impacts that the preferred method of carrying out the early works and other methods might have on the environment (and Metrolinx's criteria for assessment and evaluation of those impacts). Those steps occur as part of the Environmental Impact Assessment Report, however, if the early works as stated in the draft document can proceed prior to the Environmental Impact Assessment Report there could be

unforeseen issues in the future that result in project delays. TRCA would recommend that selection of the preferred alternative, including in the case of early works, include an evaluation of potential impacts and mitigation to confirm feasibility and that the proposed regulation be revised to account for an amendment process.

Preferred alternative determination

The Draft Environmental Conditions Report speaks to mitigating the environmental impact of the preferred alternative in draft regulation Section 4(3).7, suggesting the preferred alternative is determined based on minimal environmental information prior to completion of the Environmental Impact Assessment Report. This approach is problematic, as mitigation occurs prior to assessment and evaluation of the impacts that the preferred method of carrying out the works and other methods might have on the environment (and Metrolinx's criteria for assessment and evaluation of those impacts). Those steps occur as part of the Environmental Impact Assessment Report that follows the Environmental Conditions Report. TRCA would prefer that the selection of the preferred alternative include an evaluation of potential impacts and mitigation to confirm feasibility.

Assessment and reporting requirements

TRCA notes that the proposed regulation lacks a clear definition of "Environment" (draft regulation Section 1), and which studies are to be included in an Environmental Conditions Report (Section 4(3)), Environmental Impact Assessment Report (Sections 15(1) and 18(1)), and Early Works Report (Sections 8(2) and 11(1)). For example, stormwater, groundwater, natural hazards including flooding and erosion, natural heritage, terrestrial and aquatic habitat studies must be specified for the report. TRCA recommends these studies be clearly defined to ensure the proper information is assessed, mitigated and conveyed in the Environmental Conditions Report, Environmental Impact Assessment Report and Early Works Report.

From TRCA's perspective, it is imperative that issues associated with transit construction in proximity to the Waterfront Toronto Port Lands and in particular the associated flood protection features in this area, which constitute technically complex areas prone to significant flooding, are addressed and confirmed through the preliminary Environmental Conditions Report. Satisfying complex technical concerns in this regard is paramount to ensuring the constructability of the project which will in turn reduce risk and save time during construction.

Given the inherent impacts on the natural heritage system associated with transit projects, ecosystem compensation should be addressed in the various project studies. Where impact assessment and mitigation measures are required, ecosystem compensation should also be included as a necessary consideration. This requirement to consider ecosystem compensation earlier in the project will streamline the approach to finalizing required compensation at later planning stages. TRCA recommends that ecosystem compensation should be included in the draft regulation within Sections 8(2).7, 15(2).7 and 21(1).4 of the proposed regulation.

Species at risk

TRCA supports that Metrolinx may apply for and obtain authorization to proceed with measures to accommodate any species at risk or provincial heritage properties in advance of completing the process outlined in the regulation, subject to any consultation or other requirements associated with those processes. In TRCA's experience, issues related to species at risk are raised at the detailed

design stage and can delay approvals, whereas this delay could be avoided if the issues are addressed earlier in the process. TRCA also recommends that the regulation include a protocol or agreement whereby Metrolinx can address issues requiring federal species at risk approvals, as well as approvals from Fisheries and Oceans Canada regarding harmful alteration or disruption, or destruction of fish habitat under the purview of the *Fisheries Act* in order to avoid review delays at the detailed design stage.

Project changes

Regarding how project changes are dealt with in the draft regulation, Section 21(2) states that the procedure in subsection (1) for addressing a change does not apply if the change is required to comply with another Act, a regulation made under another Act, or an order, permit, or approval or other instrument issued under another Act. However, there is no procedure outlined for changes required to comply with these elements (i.e., how changes required to comply with a permit issued under another Act will be incorporated into the project's assessment and approval process). TRCA suggests outlining how a change required to comply with another Act will be addressed and the protocol for circulating proposed changes in order that other agencies, such as conservation authorities remain informed.

Proposed Changes to O. Reg. 231/08

As noted in our comments on the proposed Ontario Line Regulation, given the inherent impacts on the natural heritage system associated with transit projects, ecosystem compensation should be addressed in the various project studies. Where impact assessment and mitigation measures are required, ecosystem compensation should also be included. It is our experience that the inclusion of ecosystem compensation considerations earlier in the planning process will streamline the approach to compensation at later planning stages. TRCA recommends that ecosystem compensation in accordance with Metrolinx's standard should be included in Sections 15(1).3 and (15).4 of O. Reg. 231/08, in the addendum to the environmental project report.

TRCA Recommendations

In order to achieve a streamlined priority transit project development process in a timely manner and continue to ensure the protection of people and property from natural hazards and the conservation of natural resources, TRCA recommends:

1) The proposed project assessment timeline ensures projects can demonstrate that they will avoid increasing risk of natural hazards (flood and erosion risks) to infrastructure or public health and safety through the completion of appropriate technical studies that inform detailed design.

2) The environmental studies required are clearly defined within the regulation to ensure the proper information is assessed, mitigated and conveyed in the Environmental Conditions Report, Environmental Impact Assessment Report and Early Works Report.

3) A protocol be developed for harmonizing federal approvals and any other required provincial approvals early in the process to avoid delays prior to detailed design. The Aquatic Habitat Toronto model involving DFO, MNRF, TRCA and other government agencies may be helpful to consider in this regard.

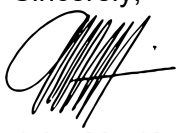
4) The scope of early works be limited to typical low risk activities such as land assembly, staging, stockpiling, in lower risk areas of the project.

5) Should the proposed scope of early works remain as proposed, that a 30% detailed design be required and reviewed by the government agency review team for the project to confirm potential impacts, feasibility and mitigation measures prior to the approval of the early works.

6) We recommend that consideration of sustainability strategies such as the placement or use of soil in nearby projects in support of nearby conservation authority flood and erosion control projects be considered to reduce GHG emissions be a requirement.

Thank you once again for the opportunity to provide comments on the proposed regulations for how the Environmental Assessment process will apply to four priority transit projects in the Greater Toronto and Hamilton Area. Should you have any questions, require clarification on any of the above, or wish to meet to discuss our comments, please contact the undersigned at 416.667.6290 or at john.mackenzie@trca.ca.

Sincerely,



John MacKenzie, M.Sc.(Pl), MCIP, RPP
Chief Executive Officer

BY E-MAIL
cc:
TRCA: Laurie Nelson, Director, Policy Planning
Sameer Dhalla, Director, Development and Engineering Services
Moranne McDonnell, Director, Restoration and Infrastructure
Beth Williston, Associate Director, Infrastructure Planning and Permits

Attachment 6

April 14, 2020

BY E-MAIL ONLY (invasive.species@ontario.ca)

Biodiversity Coordinator
Ministry of Natural Resources and Forestry
300 Water Street,
5th Floor, North Tower
Peterborough, Ontario K9J 3C7

Attention: Mr. Jeremy Downe
Invasive Species Policy Advisor
Biodiversity Section

Re: Seeking information on invasive species and carriers under the Ontario Invasive Species Act, 2015 (ERO #019-1162)

Thank you for the opportunity to comment on the Ministry of Natural Resources and Forestry's (MNRF) Environmental Registry (ERO) posting, "Seeking information on invasive species and carriers under the Ontario Invasive Species Act, 2015."

The Toronto and Region Conservation Authority's (TRCA) is actively involved in invasive species management strategy and implementation within our jurisdiction, in order to conserve natural resources. TRCA conducts itself in accordance with the objects, powers, roles and responsibilities set out for conservation authorities (CA) under the *Conservation Authorities Act* and the MNRF Procedural Manual chapter on CA policies and procedures for plan review and permitting activities, as follows:

- A public commenting body under the *Planning Act* and *Environmental Assessment Act*;
- An agency delegated the responsibility to represent the provincial interest on natural hazards under Section 3.1 of the Provincial Policy Statement;
- A regulatory authority under Section 28 of the *Conservation Authorities Act*;
- A service provider to municipal partners and other public agencies;
- A Source Protection Authority under the *Clean Water Act*;
- A resource management agency; and
- A major landowner in the Greater Toronto Area.

In these roles, and as stated in the *Made-In-Ontario Environment Plan*, CAs work in collaboration with municipalities and stakeholders to protect people and property from flooding and other natural hazards, and to conserve natural resources. TRCA's municipal partners rely on TRCA's assistance for implementing the natural heritage policies of the Provincial Policy Statement by protecting and restoring natural heritage resources through our mandate under the *Conservation Authorities Act*. We understand that under the *Invasive Species Act*, 2015, decisions to recommend species for regulation are based on the risk that a species poses to Ontario's natural environment and socio-economic well-being. The Act directs that these risks be identified through species-specific ecological risk assessments, the experiences of other jurisdictions, and public consultation.

Government Proposal

We understand the government's proposal seeks information on the ecological, social and economic impacts and benefits of thirteen species and one carrier. The information collected will support the completion of ecological risk assessments and inform the possible future development of a regulatory proposal under the *Act*. These investigations are part of a government effort to review actions taken in nearby jurisdictions, to improve regulatory consistency among jurisdictions in the Great Lakes Basin. The species currently under review are:

- Marbled crayfish (*Procambarus virginalis*)
- Tench (*Tinca tinca*)
- New Zealand mud snail (*Potamopyrgus antipodarum*)
- European frogbit (*Hydrocharis morsus-ranae*)
- Yellow floating heart (*Nymphoides peltata*)
- Prussian carp (*Carassius gibelio*)
- Red swamp crayfish (*Procambarus clarkii*)
- Fanwort (*Cabomba caroliniana*)
- Bohemian knotweed (*Reynoutria* × *bohemica*)
- Giant knotweed (*Reynoutria sachalinensis*)
- Himalayan knotweed (*Koenigia polystachya*)
- Mountain pine beetle (*Dendroctonus ponderosae*)
- Wild pigs (*Sus scrofa*)

The government is also reviewing the potential benefits of regulating the movement of watercraft over land as a carrier, meaning something capable of facilitating the movement of an invasive species from one place to another, to determine if current education initiatives focused on Clean, Drain, Dry principles and practices should be made mandatory through regulation.

General Comments

TRCA staff have reviewed the proposal and generally supports the government's proposal to examine the thirteen species and one carrier for regulation under the *Invasive Species Act*.

In TRCA's jurisdiction, invasive species management is an important consideration for ecological and socio-economic reasons. Much of TRCA's jurisdiction contains highly altered landscapes and urban areas with a high prevalence of invasive flora and fauna. TRCA and its partner municipalities have repeatedly expressed a strong commitment to healthy terrestrial and aquatic ecosystems that provide numerous ecosystem functions and services, which are critical for human health and well-being.

TRCA's *The Living City Policies, 2014* (LCP) highlights TRCA's mission to work with our partners to ensure that The Living City is built on a natural foundation of healthy rivers and shorelines, greenspace and biodiversity, and sustainable communities. It acknowledges that the loss of native plants and animals and the proliferation of invasive species are increasingly a threat to local ecosystem function and that both land use and climate changes are expected to exacerbate these issues. Accordingly, the LCP, used to guide staff review of proposed works either under the *Planning Act*, *Environmental Assessment Act* or permits under TRCA's regulation under the *Conservation Authorities Act*, contains policies to recommend a natural approach to the landscaping adjacent to natural heritage systems with native, non-invasive and locally appropriate species.

Further, an action in TRCA's ten-year *Strategic Plan* (2013-2022) is to enhance our regional watershed monitoring network so that we can identify new threats like invasive species and regularly evaluate the effectiveness of our efforts to protect, manage, and restore greenspace. A priority of TRCA's five-year update to the Strategic Plan is to share TRCA's research, data and leading science to inform provincial initiatives such as this ERO posting.

TRCA has actively managed invasive species in its jurisdiction for many years to protect and enhance ecological features and functions, to protect human health, and to engage and educate the public. Included in these initiatives are: monitoring, controlling, and treating invasive species, restoring invasive species-dominated habitat on TRCA owned properties, and promoting general public awareness. Some examples of this work include:

- community-based garlic mustard and burdock management projects,
- Asian long-horned beetle surveillance work,
- buckthorn, dog-strangling vine and *Phragmites* management at select sites,
- emerald ash borer hazard tree management, and
- participating in the development of the Ontario Invasive Plant Council's "Grow Me Instead" booklets.

Responses to Questions for Public Consultation

With TRCA's roles and experience in mind, we offer the following responses to the ERO posting's Questions for Public Consultation.

1. *Do you agree/disagree that we should review the identified species and carrier for regulation under the Invasive Species Act, 2015?*

TRCA is supportive of the completion of ecological risk assessments and potential regulation of the thirteen identified species and one invasive species carrier. Further, it is TRCA's experience that proactive assessment and management of invasive species is required to avoid ecological, economic and societal impacts of these species, particularly in the face of a changing climate. Aggressive action to monitor and control invasive species in the near term can mitigate long-term impacts.

During this review process, strong consideration should be given to the geographical distribution of species and carriers that will be selected for assessment. Invasive species of concern may be different in terms of their impact and current pervasiveness depending on geography and dominant land use. For example, most dominantly urban regions have specific invasive species (e.g., Norway maple (*Acer platanoides*), garlic mustard (*Alliaria petiolate*), common buckthorn (*Rhamnus cathartica*)) and pathways/carriers that are much more problematic in these regions as compared to the other parts of the province. Despite their relatively limited established ranges, these species may have significant implications on provincial goals and objectives, and it is therefore critical that additional species be reviewed for potential regulation. Partnering with local and regional municipalities along with conservation authorities will provide this information and guidance.

TRCA staff are active in the field across our nearly 3,500 km^2 jurisdiction. Staff observations and experience have informed the identification of multiple non-native plants as existing or emerging threats in our jurisdiction. For example, a few years ago Miscanthus sp. was typically observed growing in ditches near residential areas where it had been planted as a garden plant and was rarely documented in non-landscaped areas. Now, staff more commonly observe this non-native invasive plant located relatively far from residential areas. This development justifies assessment of the risk Miscanthus sp. poses to the natural environment and economy.

Another example is Norway maple (*Acer platanoides*). TRCA works with our municipal partners on invasive species management. Based on TRCA data, Norway maple is the second most dominant sub-canopy forest layer in Toronto ravines after Manitoba maple (*Acer negundo*), and is targeted for

strategic removal from ravines by the City of Toronto and TRCA. Meanwhile, Norway maple sales by private industry to municipalities continue, so that public dollars are used for acquiring and for removing the species at the same time. As Norway maple was heavily planted and promoted by the Province in the 1970s and those trees are now seed producers whose progeny is clearly successfully in Toronto's ravines, a risk assessment should be a straight-forward exercise.

TRCA would therefore support prohibition under the *Invasive Species Act* of additional species beyond those currently proposed by MNRF but recognizes that under the Act, ecological risk assessments to determine the appropriate approach for managing each of the species must first take place. The recommended species for regulation are listed below.

i. Amur silver grass (*Miscanthus sacchariflorus*)
ii. Chinese silver grass (*Miscanthus sinensis*)
iii. Common buckthorn (*Rhamnus cathartica*)
iv. Curly-leaved pondweed (*Potamogeton crispus*)
v. English ivy (*Hedera helix*)
vi. Flowering rush (*Butomus umbellatus*)
vii. Garlic mustard (*Alliaira petiolate*)
viii. Giant hogweed (*Heracleum mantegazzianum*)
ix. Goutweed (*Aegopodium podagraria*)
x. Himalayan balsam (*Impatiens glandulifera*)
xi. Japanese barberry (*Berberis thunbergii*)
xii. Japanese chaff flower (*Achyranthes japonica*)
xiii. Japanese stiltgrass (*Microstegium vemineu*)
xiv. Kudzu (*Pueraria montana*)
xv. Lesser periwinkle (*Vinca minor*)
xvi. Norway maple (*Acer platanoides*), with appropriate notification to the horticultural industry
xvii. Oriental/Asiatic bittersweet (*Celastrus orbiculatus*)
xviii. Periwinkle (*Vinca minor*)
xix. Purple loosestrife (*Lythrum salicaria*)
xx. Rough manna grass (*Glyceria maxima*)
xxi. Sea buckthorn (*Hippophae rhamnoides*)
xxii. Tree of heaven (*Ailanthus altissima*), as it is the preferred host for the spotted lanternfly (*Lycorma delicatula*) which is currently a regulated species under the federal *Plant Protection Act*
xxiii. Water lettuce (*Pistia stratiotes*)
xxiv. White mulberry (*Morus alba*)
xxv. Wild chervil (*Anthriscus sylvestris*)
xxvi. Wild parsnip (*Pastinaca sativa*)
xxvii. Winged burning bush (*Euonymus alatus*)
xxviii. Winged euonymus (*Euonymus alatus*)
xxix. Winter creeper euonymous (*Euonymus fortune*)
xxx. Yellow archangel (*Lamiastrum galeobdolon*)

2. *Do you have information, including personal experiences, that would help us as this review proceeds?*

Within its jurisdiction, TRCA uses and coordinates a wealth of natural environment information collected by on-the-ground personnel who are experts in the field, including aquatic and terrestrial biologists, field naturalists, ecological restoration experts, foresters, and plant propagation experts.

Our staff have extensive local knowledge of the local environment, the biological conditions associated with Lake Ontario waters within our jurisdiction, and the issues created by the existing and emerging invasive species in the region. Given our years of experience managing invasive species, substantial landholdings and ongoing experience in a natural heritage advisory role to municipalities in our jurisdiction, TRCA is available to assist in incorporating our strategic invasive species management planning and implementation expertise into the Province's review of the thirteen species and one carrier.

3. *Would the regulation of one or more of the proposed species or carrier have a positive or negative economic impact on you or your business?*

While TRCA undertakes strategic invasive species management, it does not propagate or typically transport these species. In this regard, the regulation(s) would not have a direct effect on TRCA's work. As a major landowner, regulation of these species and carrier would lower the risk to our lands due to reduced propagation and transportation of these by others within our jurisdiction, as the impacts of invasive species on our properties include, but are not limited to, loss of biodiversity, increased erosion risk on marginal lands and impacts to infrastructure. Reduced need for invasive species management on our properties would be an economic benefit to TRCA.

4. *What rules do you recommend be applied to some or all the identified species or carrier? See sections 6, 7, or 8 of the Invasive Species Act, 2015 for more information.*

TRCA recommends that all prohibitions, restrictions and conditions apply to all species, however, for regulated plant species, an appropriate length of time should be provided to the horticultural industry to allow them to make adjustments to the species they propagate and sell.

5. *Should we consider exceptions to the prohibitions during the development of the regulatory proposal (e.g. allowing the import of the species provided individuals are dead)?*

Based on exceptions for currently regulated species, TRCA believes this approach is reasonable and consistent. That being said, reproductive elements such as fish eggs can remain viable after death for several days. Therefore, the suitability of granting such exceptions should account for the risk of potential exotic pathogen introduction carried by dead specimens of each species, and should not rely on generalized rules. Further, the ease of monitoring and regulating such exceptions should be considered.

6. *Are there any additional questions you would like to discuss or concerns you would like to address?*

<u>Defining roles and responsibilities</u>

The current *Invasive Species Act* (the Act) and associated O. Reg. 354/16 (the regulation) do not define roles and responsibilities of public and private land managers regarding prevention of invasive species spread, early detection and management of invasive species, or invasive species eradication. TRCA would recommend that public entities should be responsible for surveillance, prevention measures, and management of invasive species on public lands, and private landowners responsible for the same on private lands. Governments at all levels should consider granting public agencies and authorities involved in invasive species management blanket access permissions and liability protection for conducting work to monitor and manage invasive species on both public and private lands. Enhancing the accountability of these groups (including Provincial agencies,

municipalities, conservation authorities, and private landowners including industry, institutions and other stakeholders) through policy can help improve outcomes for limiting the economic, social and ecological impacts of invasive species in Ontario.

A coordinated approach across jurisdictions and individual private properties, in tandem with appropriate enforcement of the Act and associated regulation, is required to minimize the economic and ecological impacts of invasive species in Ontario.

Due diligence for avoiding incidental spread

TRCA has identified incidental spread of invasive species as a major obstacle to effective invasive species eradication in the province. O. Reg. 354/16 specifically addresses incidental possession and transportation of only two aquatic invasive plant species. Prevention and Response Plans that provide guidance and direction on avoiding incidental invasive species transportation, as well as outreach and education campaigns to relevant industries, stakeholders, land users and land managers are needed as part of a provincially coordinated approach to invasive species management. Specific guidance on what constitutes “due diligence” is required for different activities that commonly cause incidental transport of invasive species. For example, direction should be provided on specific watercraft inspection methods to detect aquatic invasive plants prior to moving watercraft over land and appropriate biosecurity measures to ensure proper handling and disposal of invasive specimens. Another example is defining specific measures to adequately inspect and clean boots, mechanical equipment and other tools when landscaping in areas that contain terrestrial invasive species in order to avoid incidental transport of invasive species to other areas or subsequent work sites. Enforcement of due diligence measures is critical to ensuring these measures are effective.

Evaluating potential impacts to high value assets

High value assets, for which invasive species introduction or establishment might have higher risks and implications based on ecological, social, and economic impacts, should be considered while implementing regulatory rules. Experts suggest that a single invasive species may have a different magnitude of impact depending on ecological, social, and economic characteristics of the area under invasion. These circumstances may require additional guidance following the Act.

Enforcing the Clean, Drain, Dry principles and practices

TRCA supports the Ministry in creating regulations to enforce the Clean, Drain, Dry principles and practices that are currently communicated to the public through an education campaign. Aggressive action against invasive species carried by watercraft overland can be achieved through the regulation and enforcement of Clean, Drain, Dry principles and practices, helping to limit the spread of invasive species.

Aquarium releases of aquatic invasive species

TRCA notes that many aquatic invasive species present in Ontario originated from intentional or accidental aquarium releases. We recommend pursuing stronger regulations applicable to hobby fishkeeping (aquariums) and similar markets. This regulatory approach could be paired with public education programs targeting pet/aquarium stores, aquaria enthusiasts and anglers in order to inform these communities of risks posed to our natural environment by invasive species that can be found in aquariums and the regulations in place prohibiting or restricting their existence in Ontario.

Public education campaigns

Additionally, TRCA recommends a public education campaign targeting residential properties and all types of gardeners/garden clubs to ensure awareness and halt the trading of restricted plants (including those proposed for assessment by the province and those proposed by TRCA in this

letter). For example, TRCA has in its environmental education community outreach programs, materials to assist residents interested in landscaping with native plants (available from https://trca.ca/get-involved/home-garden/). Education campaigns related to wild pigs should also be targeted to the agricultural industry and hunters to ensure awareness and to stop the distribution and release of wild pigs.

TRCA Recommendations

In order to ensure the conservation of natural resources, TRCA recommends that:

1) The Ministry moves forward with its proposal to investigate the 13 species and one carrier for regulation under the *Invasive Species Act*.

2) The Ministry undertake ecological risk assessments to determine the appropriate approach for managing the 30 species listed in response to discussion question #1, which pose immediate threats to the environmental, social, and economic resilience of Ontario.

3) The Ministry amend the Act and/or associated regulation to assign the responsibilities of invasive species prevention, avoidance of spread, and/or management and eradication to public and private landowners and land managers to enhance accountability and improve outcomes for invasive species management. This includes potentially including blanket access permissions and liability protection for organizations such as TRCA that carry out monitoring and invasive species management work. Clarifying these responsibilities may also better facilitate existing enforcement provisions in the Act.

4) The Ministry develop and disseminate guidance on proper due diligence methods to reduce the frequency of incidental transport of invasive species and enable greater enforcement of the Act. This may take the form of Prevention and Response Plans coupled with outreach campaigns to relevant stakeholders.

5) That the Ministry collaborate with municipalities and CAs to identify invasive species with high potential impacts and determine the magnitude of ecological, social and economic issues associated with those species' invasions, and to generally obtain information about the species under review.

6) That all prohibitions, restrictions and conditions in Sections 6, 7 and 8 of the Act apply to all species and the carrier (as applicable) proposed for regulation.

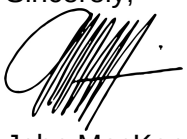
7) That regulations be created to regulate the movement of watercraft over land as a carrier under the *Invasive Species Act*.

8) That, in addition to regulation of the thirteen species and one carrier, public awareness and education campaigns be introduced targeting hobby fish keepers (aquariums), hobby horticulturalists/gardeners, and the commercial businesses that support them to ensure these communities are aware of both the risks posed by these invasive species and the new regulations.

9) That, in addition to regulation of the thirteen species and one carrier, communication and awareness campaigns be introduced targeting large public landowners, land managers and end users, such as municipalities, conservation authorities, institutions and public utilities to ensure they are aware of the new regulations and can achieve timely compliance.

Thank you once again for the opportunity to provide feedback regarding assessment and regulation of these thirteen species and one invasive species carrier under the *Invasive Species Act*, *2015*. Should you have any questions, require clarification on any of the above, or wish to meet to discuss our remarks, please contact the undersigned at 416.667.6290 or at john.mackenzie@trca.ca.

Sincerely,



John MacKenzie, M.Sc.(Pl) MCIP, RPP
Chief Executive Officer

BY E-MAIL
cc:
TRCA: Laurie Nelson, Director, Policy Planning
Sameer Dhalla, Director, Development and Engineering Services
Moranne McDonnell, Director, Restoration and Infrastructure

Attachment 7

April 14, 2020

BY E-MAIL ONLY (invasive.species@ontario.ca)

Biodiversity Coordinator
Ministry of Natural Resources and Forestry
300 Water Street,
5th Floor, North Tower
Peterborough, Ontario K9J 3C7

Attention: Mr. Jeremy Downe
Invasive Species Policy Advisor
Biodiversity Section

Re: Developing Prevention and Response Plans for European water chestnut and water soldier under the Invasive Species Act, 2015 (ERO #019-1163)

Thank you for the opportunity to comment on the Ministry of Natural Resources and Forestry's (MNRF) Environmental Registry (ERO) posting on the proposed Prevention and Response Plans (the Plans) for European water chestnut and water soldier under the *Invasive Species Act*, 2015.

The Toronto and Region Conservation Authority's (TRCA) is actively involved in invasive species management strategy and implementation within our jurisdiction, in order to conserve natural resources. TRCA conducts itself in accordance with the objects, powers, roles and responsibilities set out for conservation authorities (CA) under the *Conservation Authorities Act* and the MNRF Procedural Manual chapter on CA policies and procedures for plan review and permitting activities as follows:

- A public commenting body under the *Planning Act* and *Environmental Assessment Act*;
- An agency delegated the responsibility to represent the provincial interest on natural hazards under Section 3.1 of the Provincial Policy Statement;
- A regulatory authority under Section 28 of the *Conservation Authorities Act*;
- A service provider to municipal partners and other public agencies;
- A Source Protection Authority under the *Clean Water Act*;
- A resource management agency; and
- A major landowner in the Greater Toronto Area.

In these roles, and as stated in the *Made-In-Ontario Environment Plan*, CAs work in collaboration with municipalities and stakeholders to protect people and property from flooding and other natural hazards, and to conserve natural resources. TRCA's municipal partners rely on TRCA's assistance for implementing the natural heritage policies of the Provincial Policy Statement by protecting and restoring natural heritage resources through our mandate under the *Conservation Authorities Act*.

Government Proposal

We understand the government's current proposal is to develop Prevention and Response Plans for European water chestnut (*Trapa natans*) and water soldier (*Stratiotes aloides*), two prohibited invasive species under the *Invasive Species Act* (ISA). The Act gives Ontario tools to prevent, detect, and manage invasive species in the province. The draft Prevention and Response Plans are to enable management and eradication activities which would otherwise be prohibited by regulation under the ISA.

The proposed Prevention and Response Plans for European water chestnut and water soldier identify persons authorized to implement the Plans, sets out the types of activities for which the Plans apply and describes the conditions under which these persons will be permitted to possess, transport, and deposit these species in Ontario. The Plans are intended to ensure that monitoring, control and eradication activities do not further spread these species or introduce them to new areas.

General Comments

TRCA staff have reviewed the draft Prevention and Response Plans and generally support provincial action to ensure the target species are prevented from spreading to new areas and are monitored, controlled and eradicated effectively.

In TRCA's jurisdiction, invasive species management is an important consideration for ecological and socio-economic reasons. Much of TRCA's jurisdiction contains highly altered landscapes and urban areas with a high prevalence of invasive flora and fauna. TRCA and its partner municipalities have repeatedly expressed a strong commitment to healthy terrestrial and aquatic ecosystems that provide numerous ecosystem functions and services, which are critical for human health and well-being.

TRCA's *The Living City Policies, 2014* (LCP) highlights TRCA's mission to work with our partners to ensure that The Living City is built on a natural foundation of healthy rivers and shorelines, greenspace and biodiversity, and sustainable communities. It acknowledges that the loss of native plants and animals and the proliferation of invasive species are increasingly a threat to local ecosystem function and that both land use and climate changes are expected to exacerbate these issues. Accordingly, the LCP, used to guide staff review of proposed works either under the *Planning Act*, *Environmental Assessment Act* or permits under TRCA's regulation under the *Conservation Authorities Act*, contains policies to recommend a natural approach to the landscaping adjacent to natural heritage systems with native, non-invasive and locally appropriate species.

Further, an action in TRCA's ten-year *Strategic Plan* (2013-2022) is to enhance our regional watershed monitoring network so that we can identify new threats like invasive species and regularly evaluate the effectiveness of our efforts to protect, manage, and restore greenspace. A priority of TRCA's five-year update to the Strategic Plan is to share TRCA's research, data and leading science to inform provincial initiatives such as this ERO posting.

TRCA has actively managed invasive species in its jurisdiction for many years to protect and enhance ecological features and functions, to protect human health, and to engage and educate the public. Included in these initiatives are monitoring, controlling, and treating invasive species, restoring invasive species-dominated habitat on TRCA properties, and promoting general public awareness. Some examples of this work include:

- community-based garlic mustard and burdock management projects,
- Asian long-horned beetle surveillance work,
- buckthorn, dog-strangling vine and *Phragmites* management at select sites,

- emerald ash borer hazard tree management, and
- participating in the development of the Ontario Invasive Plant Council's "Grow Me Instead" booklets.

With TRCA's roles and experience in mind, we offer the following feedback.

European water chestnut and water soldier Prevention and Response Plans

Roles and responsibilities

TRCA requests that the Plans' sections on "Resources to Support the Implementation of the Prevention and Response Plan" provide specific guidance as to who is responsible for supporting the Plans' implementation, including the roles of the Province, municipalities, conservation authorities, and others.

Prevention and monitoring

TRCA recognizes these draft Prevention and Response Plans are the first issued by the Province since the ISA came into effect. Critical tools for invasive species management, as recognized by the ISA, include prevention, monitoring, and control and eradication activities. The current draft Plans focus on control of invasive species after they have been introduced to an area. TRCA suggests the Plans include a greater focus on measures to help prevent these invasive species from entering additional parts of Ontario and practices to promote their early detection, per the *Invasive Species Act*, Section 13(2). Prevention measures are often more cost-effective than implementing removal measures after species have established in a new area. Monitoring activities enable early detection and can reduce the required total cost and effort of control activities.

Reducing incidental spread

TRCA has identified incidental spread of invasive species as a major obstacle to effective invasive species eradication in the province. Greater detail on appropriate biosecurity measures could be provided for both authorized persons and those handling the species incidentally. The public and in particular recreational water body users, (anglers and recreational water body users including watercraft operators and others), should be educated on specific, appropriate measures to reduce incidental transport and deposition of these invasive species.

Regarding authorized activities and measures the Province may take beyond providing guidance and education, restrictions on recreational use of water bodies or areas within water bodies that European water chestnut and/or water soldier have been detected may be appropriate in certain circumstances to reduce incidental species transportation. Exceptions allowing continued professional operations, (such as fisheries), in these areas could be accompanied by outreach campaigns and enforcement of due diligence practices to reduce incidental spread of these aquatic invasive species caused by professional activities. Geographic restrictions for recreational watercraft operation may reduce instances of incidental possession and transport of European water chestnut and water soldier plants that attach to a boat as a result of operating it in infested waters; this is not an offence under the regulation prohibiting these species (O. Reg. 354/16) but nonetheless contributes to incidental transport and spread of these species.

Detailed direction required to enhance compliance

Item (b) in the Authorized Activities section of each Plan states that the following activity may occur: "deposit and release of [European water chestnut/water soldier] away from any body of water as required to dispose of plants or plant parts that were removed from a body of water". Condition #5 states that once these plant species are removed from the water they, "must be disposed of or destroyed in a manner that ensures that no part of the plant will re-enter the body of water or enter into any other body of water." It would be helpful to provide more information on proper disposal

methods to enable authorized persons to effectively dispose of collected European water chestnut and water soldier plants and plant parts. For example, the Plans could state whether there are certain facilities the plants should be taken to, whether the plants can be disposed of in a landfill or regular municipal garbage, whether they can be incorporated into compost (noting that the seeds may remain viable), or can be incinerated.

The Plans' Conditions sections should be expanded to include detailed direction on methods to achieve compliance with the Plan. For example, condition #3 in each Plan states that, "All equipment and/or watercraft used in infested waters during the course of water soldier prevention, monitoring, or control or removal activities must be inspected and cleaned of any European water chestnut/water soldier prior to movement overland." TRCA suggests including step-by-step instructions on how to inspect equipment and watercraft, direction on what types of products (if any) should be used to clean equipment and watercraft, whether the authorized person completing the inspection should wear Personal Protective Equipment (PPE) and, if so, direction on appropriate PPE, and direction on how to disinfect or dispose of PPE and other materials that the invasive plant may come in contact with during the inspection and cleaning process (as appropriate). This information should also be provided or referenced in the "Tips for controlling European water chestnut/water soldier" sections under #4 Clean equipment and watercraft.

Other "Tips" that we recommend expanding to provide more detailed direction include tip #5 Dispose of European water chestnut/water soldier carefully, and #6 Handle with care/Beware of the seeds. Tip #5 could provide direction on whom should carry out disposal procedures (i.e., specify if this is limited to authorized persons) and what unauthorized persons should do if they find one of these species on their watercraft (such as recreational watercraft operators), how exactly the plants or plant parts should be handled and disposed of, and how and to which government agency the sighting should be reported. Tip #6 could provide direction on proper PPE to use during handling of the plants, if any is required in addition to gloves.

Plan and data updates

TRCA recommends that the Plans affirm that any updates to or cancellation of the Plans will be informed by the best available science and will be communicated to the public via appropriate media mechanisms in order to reach relevant stakeholders. TRCA also requests information on how the Province plans to disseminate to the public existing and forthcoming records of sightings and spread of these species.

Herbicides

Regarding the application of herbicides (Water soldier Plan page 8, European water chestnut Plan pages 9-10), TRCA is interested in whether the recommended herbicide (diquat) affects local fauna. If there is potential for off-target fauna impacts, a characterization of local fauna should be required prior to herbicide application in a water body and inform subsequent decisions on measures to avoid or minimize off-target exposure and impacts. Such measures may include seasonal restrictions on herbicide application, depending on the species present in a water body. Further, TRCA notes that the Herbicide section of Other Considerations (page 10) in the European water chestnut Plan is absent from the water soldier Plan, and we suggest including the same language in both Plans.

By-catch and off-target flora and fauna impacts

TRCA suggests that the Other Considerations sections of both Plans include guidance on how authorized persons should deal with by-catch, such as amphibians and reptiles, that may be inadvertently removed from the water during invasive species control activities. As well, the In-water Work Timing Window Guidelines cited only consider relevant timelines for protection of fish, not amphibians or reptiles. TRCA therefore recommends additional guidance be provided on avoiding

impacts to amphibians through appropriate seasonal or other restrictions on control activities targeting both invasive species. We also recommend the Plans provide additional guidance, as appropriate, on avoiding impacts to off-target flora and fauna resulting from control measures.

As an aside, the second paragraph of page 3 of the draft Plan for European water chestnut references water soldier when it should be referencing European water chestnut. Also, in the European water chestnut Plan, page 5, b) ii., last sentence, appears to be incomplete.

TRCA Recommendations

In order to further the conservation, restoration and management of natural resources within our watersheds, TRCA recommends that:

1) The Plans provide direction on the roles and responsibilities of the Province, municipalities, conservation authorities, and others to better support Plan implementation.

2) Prevention measures used to avoid further spread and establishment of invasive species across the province and measures to enable early detection of the species in new areas of the province be expanded upon in the Plans, recognizing the general cost-effectiveness of executing prevention and monitoring measures in concert with control measures, as compared with an invasive species response regime that solely targets already-established invasive plant populations.

3) The Plans provide more information on proper disposal, inspection methods and Personal Protective Equipment (PPE) to enable authorized persons to effectively and safely detect and dispose of collected European water chestnut and water soldier plants and plant parts, and avoid contamination of other water bodies.

4) The Plans provide direction on the steps unauthorized persons should take when incidental possession of European water chestnut and water soldier plants and plant parts occurs, including direction on how to report species sightings.

5) Potential impacts of herbicides on in-water fauna be examined prior to herbicide application, including through characterizations of fauna present in the water body and consideration of measures to avoid or minimize off-target exposure.

6) The Plans provide direction to authorized persons on how to deal with by-catch, including amphibians and reptiles, that may be inadvertently removed from the water during invasive species control activities

7) The Plans provide direction on avoiding impacts to amphibians and reptiles that may occur during mechanical invasive plant removal, including but not limited to seasonal restrictions on invasive plant control activities. The Plans should also provide direction on avoiding impacts to off-target flora and fauna during control activities.

Thank you once again for the opportunity to provide feedback on the draft Prevention and Response Plans for European water chestnut and water solider. Should you have any questions, require clarification on any of the above, or wish to meet to discuss our remarks, please contact the undersigned at 416.667.6290 or at john.mackenzie@trca.ca.

Sincerely,

John MacKenzie, M.Sc.(Pl) MCIP, RPP
Chief Executive Officer

BY E-MAIL
cc:
TRCA: Laurie Nelson, Director, Policy Planning
Sameer Dhalla, Director, Development and Engineering Services
Moranne McDonnell, Director, Restoration and Infrastructure

Item 8.9

Section III – Items for the Information of the Board

TO: Chair and Members of the Board of Directors
Meeting #3/20, Friday, April 24, 2020

FROM: Michael Tolensky, Chief Financial and Operating Officer

RE: **TORONTO AND REGION CONSERVATION AUTHORITY ADMINISTRATIVE OFFICE BUILDING PROJECT**
Project Update

KEY ISSUES

Update on Toronto and Region Conservation Authority (TRCA) Administrative Office Building Project and implications on the Project schedule, budget and municipal approvals resulting from the COVID-19 pandemic.

RECOMMENDATION

THAT this staff report on the status of the Toronto and Region Conservation Authority Administrative Office Building Project be received.

BACKGROUND

On February 27, 2015 Res. #A23/15 approved 5 Shoreham Drive as the preferred site for the new TRCA administration building. On June 24, 2016 Res. #A85/16 approved a project budget of $70M with $60M provided by participating municipalities and the remaining funds from land disposition funds. On February 24, 2017 Authority Res. #A14/17 staff reported that all six of TRCA's participating municipalities had approved the Project and the allocation of $60M in new and existing capital funding. On May 25, 2018 Authority Res. #A79/18 staff reported that the Minister of Natural Resources and Forestry granted approval to use $3,538,000 in disposition proceeds from land sales, for a revised overall budget of $63,538,000 and, if possible, that the disposition funds be used to reduce the overall term of the required financing. The revised approved upper limit of the project budget of $60M was not increased at that time, as the decision was made to wait until the tendering process was complete in mid-2019 to determine a more accurate budget for the project.

On May 17, 2017 Authority Res. #83/17 TRCA awarded Jones Lang LaSalle Canada (JLL) as its project managers and on August 30, 2017 Authority Res. #A156/17 awarded the integrated design contract to a team led by ZAS Architects and Bucholz McEvoy Architects, to proceed with the detailed design, planning and approvals, of the Project. On November 3, 2017 Authority Res. #A216/17 awarded Eastern Construction Company Limited a Construction Management Contract to provide pre-construction services throughout the design and procurement stages along with construction management services for the construction of the new facility pending agreement on the construction cost of the Project. This work includes the issuance of tenders to construction trades.

On Friday, January 25, 2019 Board of Directors Res.#A19/19 staff issued an update on the procurement of financial services and that the Canadian Imperial Bank of Commerce (CIBC) is providing a term loan for the costs of the new administration building project up to $54,000,000.

On Friday, May 24, 2019 Board of Directors Res.#A78/19 staff provided an update on project

costing and a strategy to move to the tendering process and received direction from the Board to report back on the total construction and Construction Management Services costs at the time construction tenders are received.

On Friday January 24, 2020 Board of Directors RES. #A232/19 provided an update on the value engineering process and that staff had authorized the project construction manager Eastern Construction to award construction tenders to selected trades that align with the project budget, that staff had authorized Eastern Construction to proceed with construction and finally, that staff were authorized to issue Notices of Borrowing to the project financial services provider according to the loan schedule based on the project cash flow.

RATIONALE

In light of the COVID-19 pandemic, the Ontario government has ordered the closure of all non-essential businesses pursuant to its powers under the Emergency Management and Civil Protection Act (the "Emergency Act"). On March 23, 2020, the Ontario government issued a list of essential businesses that would be exempt from the closure order effective Tuesday, March 24 at 11:59 pm for at least 14 days. The Ontario government has since significantly expanded the list of non-essential workplaces with the introduction of Ontario Regulation 119/20: Order under Subsection 7.0.2(4) - Closure of Places of Non-Essential Businesses, which was declared into law at 3 PM on April 3, 2020 (the "Essential Services Regulation"). On April 14, 2020 the Ontario government extended the state of emergency another 28 days to May 12, 2020.

Site Closure

On April 3, 2020 Eastern Construction informed TRCA by email that they would be suspending work on the project that day as they interpreted that the project no longer fell into the category of essential services. Eastern Construction issued an official notice on April 6, 2020 of work suspension but worked until April 6, 2020 to undertake the necessary construction and maintenance activities to ensure safety at the temporarily closed project site.

Staff have engaged outside legal services to assist TRCA in reviewing Eastern Construction's interpretation of the Ontario government's expanded list of non-essential workplaces is appropriate and will respond if necessary. Further, TRCA and the project team with the assistance of outside legal services will review Eastern Construction's interpretation of the Construction Management contract to confirm if the Ontario government mandated closure of non-essential businesses should be considered a Stop Work Order or a project delay due to Force Majeure.

Schedule

RES. #A232/19 revised the project occupancy date to January 2022 due to Site Plan Approval delay. However, considering the COVID-19 pandemic. the project occupancy date will depend on the length of time the Government closure order will be in effect. In general, the project approvals delay has been exacerbated by the closure of the City Civic Centres and the resulting diminished capacity to process applications. The Site Plan Agreement remains outstanding and with it the full building permit. TRCA has issued to the City of Toronto all the pre-approval Notice of Approval Conditions (NOAC) including drafts of the shared use agreement with neighbouring Tennis Canada and the lease agreement with City of Toronto. Unfortunately, both agreements were not finalized before the City of Toronto closed all of its Civic Centres on March 19, 2020. Fortunately, prior to the closure of non-essential activities the City Building Department issued a Conditional Permit allowing for foundations to be constructed. To mitigate schedule risk an above ground conditional permit has been submitted to the City but there has been no response

due to the Civic Centres being closed.

Milestone Schedule			
	Dec.18/19 – Baseline Schedule	Mar. 31/20 - Revised Schedule	Notes
Site Plan Approval	Feb. 2020	TBD	NOAC received Nov. 8/19 – all pre-approval conditions submitted
Building Permit	Mar. 2020	Jun. 2020	Will depend on City closure due to COVID-19. Applied for above grade Conditional Permit.
Conditional Permit	Jan. 2020	Mar. 30/20	Foundations only.
Construction	Jan. 2020 to Dec 2021	Jan. 2020 to Feb. 2022	Depending on site closure due to COVID-19
Occupancy	Nov. 2021	Jan. 2022	Depending on site closure due to COVID-19
Completion	Jan. 2022	Feb 2022	Depending on site closure due to COVID-19

Assuming the emergency order is not extended further Eastern Construction could resume construction on May 12th, 2020 adding at minimum five weeks to the project schedule. This will possibly shift the Occupancy to Feb. - Mar. 2022 and project Completion to Mar. - Apr. 2022. It should be kept in mind that the delay to municipal approvals because of the City closure due to COVID-19 may also affect the schedule if construction is delayed due to permitting.

Budget

The project costs remain within the overall budget of $65,538,000 but this may be challenged by delays related to the COVID-19 pandemic and the suspension of construction. Staff are discussing with the consultant team and outside counsel what, if any compensation, Eastern Construction is entitled to under the construction management contract because of the delay.

	Preliminary Project Budget	**Tender w/ Value Engineering (VE) (Nov. 28, 2019)**	**Post Tender w/ Value Engineering (VE) (Mar. 31,2020)**	**Variance to Tender w/ Value Engineering (VE) (Nov. 28, 2019)**	**Variance Explained**
Construction Cost	$35,608,539	$40,945,268	$41,661,627	**$716,359**	**A**
General Conditions (GC)	$5,362,573	$6,187,565	$6,187,565	**$0**	
Construction Management (CM) Fee	$860,569	$934,308	$948,599	**$14,219**	**B**
Construction Contingency	$3,418,791	$2,341,620	$2,377,442	**$35,818**	**C**
Total Construction Costs	**$45,250,472**	**$50,408,765**	**$51,175,233**	**$766,468**	
Consultant Fees	$4,021,133	4,297,883	4,297,883	**$ -**	
Permits	$624,697	$626,658	$626,658	**$ -**	
Furniture/Fittings and Equipment	$1,550,000	$1,750,000	$1,750,000	**$ -**	

Relocation Costs	$2,026,697	$2,026,697	$2,026,697	**$ -**	
Project Mgmt.	$2,575,000	$1,871,325	$1,871,325	**$ -**	
Financing Costs	$2,515,265	$1,940,016	$1,940,016	**$ -**	
Non-Recoverable HST (1.76%)	$1,037,736	$1,066,993	$1,066,993	**$ -**	
Soft Cost Contingency	$399,000	$399,000	$399,000	**$ -**	
Total Costs	**$60,000,000**	**$64,387,337**	**$65,153,806**	**$766,469**	
Total Available Funds	**$60,000,000**	**$65,538,000**	**$65,538,000**	**$ -**	**D**
Additional Contingency Funds	**$ -**	**$1,150,663**	**$384,194**		

Variance Explanations:

A. The post-tender increase in construction costs is a result of trades being unable to meet preliminary value engineering estimates. Further, the tender for a portion of the mechanical system (water augmented transparent air ducts – "waterwalls") received only one bid at three times the estimated cost. This item is being retendered to reduce costs through a competitive bidding result.
B. The construction management fee is calculated as 1.9% of the total construction cost per Eastern Construction's successful CM proposal.
C. The construction contingency is calculated at 5% of total construction cost, excluding the construction management fee.
D. Total Available Funds includes $2M to reflect a grant from the National Research Council's Green Construction Through Wood program, which was confirmed after the July 26, 2019 Board of Directors meeting. This funding is in addition to the $60M contributed by TRCA's partner municipalities and $3,538,000 contributed by the Province through approved land dispositions.

TRCA has entered the construction phase of the project with contingencies totaling $3,160,636. This total represents 5.2% of total project costs of $59M (includes construction, consultant fees, permitting fees, FF&E and relocation). According to TRCA's consultants, a 5% contingency on construction projects is deemed to be conservative from a risk perspective.

Although total funding available for the project totals $65,538,000, TRCA will continue to work to bring the project budget to the previously reported $64,387,337. TRCA with the construction manager and design team are looking at the following cost savings measures:

1. Waterwalls – The waterwall tender produced only one bid at $2M which was $1.25M over the estimate. This item is in the process of being retendered. It is expected that a more competitive process will yield better results. The tender will be closing in May.
2. Geo – Exchange System – It is expected that a switch to an open loop ATES system may yield savings in the range of $200k to $300K. By the end of May or beginning of June 2020 the savings for this item will be more apparent. TRCA is pursuing funding from governmental agencies to assist with the development of an ATES system.
3. Engineered Fill and Backfilling – The budget carries a cash allowance of $319k for this work. A savings found with this work occurring in the summer months allowing the project to use native materials rather than importing materials due to wet weather. This item should be clearer in June 2020

4. De-watering – A cash allowance of $103K for dewatering excavation will not likely be required now that excavation has been pushed out further into dryer weather. Same as engineered fill and backfilling whether this item is required will be clearer by June.

Construction Loan
Board of Directors Resolution #A145/19 authorized staff to issue Notices of Borrowing to the project financial services provider, Canadian Imperial Bank of Commerce (CIBC), according to a loan schedule based on the project cash flow. TRCA and the project financial services provider, CIBC, worked together to develop a quarterly amortization schedule for a $54,000,000 term loan that best reflects the payment schedule from TRCA's partner municipalities, commencing on January 4, 2022 and ending on January 2, 2047, representing a period of 25 years.

TRCA worked with the construction manager to develop an expected loan drawings schedule, between January 2020 and January 4, 2022, when the $54,000,000 construction loan converts to long-term debt. The decision by the construction manager to suspend construction will alter this schedule, which is expected to have financial ramifications on the project.

101 Exchange Lease Agreement
RES. A232/19 authorized staff to extend the lease at 101 Exchange Avenue as required to ensure overlap with the building occupancy period.

As previously reported TRCA requested and received from the landlord a lease extension at 101 Exchange from the original schedule of July 2021 to the end February 2022 at the current lease rate. Given the delay related to the suspension of construction, a further lease extension will be required. Preliminary discussions have occurred, and the expectation is that an extension will be acceptable. Staff will continue to work with the facilities manager of 101 Exchange Avenue to ensure a smooth transition.

DETAILS OF WORK TO BE DONE
The construction manager will be pursuing further cost savings into May 2020. The site plan approval process is nearing completion with TRCA providing the City the necessary documentation as outlined in the Notice of Approval Conditions to finalize the Site Plan Agreement. TRCA will continue to contact staff through the COVID-19 City closures to attempt to mitigate further approvals delay. TRCA staff will continue the furniture, fixtures and equipment procurement process starting with furniture layout and the staff relocation strategy.

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Date: April 15, 2020