



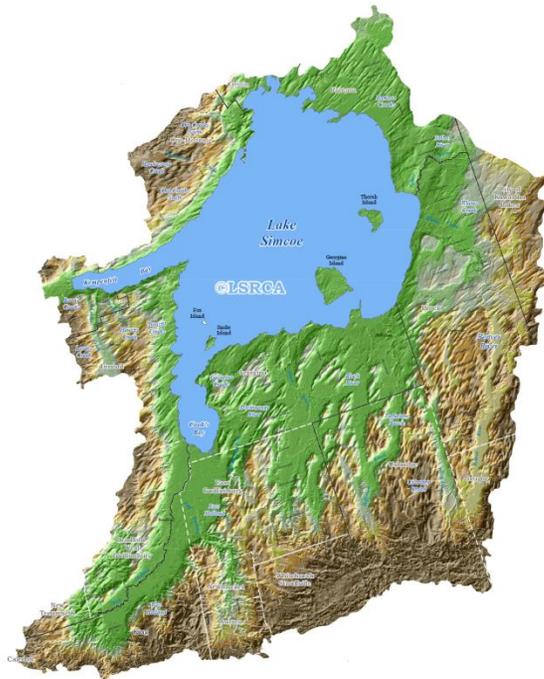
March 17, 2016

## REPORT

# Lake Simcoe Region Conservation Authority (LSRCA) Erosion and Sediment Control Research Study

**Submitted to:**

Steve Auger  
Lake Simcoe Region Conservation Authority  
120 Bayview Parkway  
Newmarket, Ontario  
L3Y3W3



REPORT



**Report Number: 1530684**

**Distribution:**

1 electronic copy - Lake Simcoe Region Conservation Authority  
1 hard copy - Golder Associates Ltd.





## Table of Contents

**1.0 INTRODUCTION.....1**

1.1 Methods.....1

**2.0 LITERATURE REVIEW .....2**

2.1 Federal Legislation .....2

2.2 Provincial Legislation.....2

2.3 Provincial Guidance, Land Use Plans and Implementation Mechanisms .....6

2.4 Regional and Municipal Guidance, Land Use Plans and Implementation Mechanisms.....9

2.5 Comprehensive Stormwater Management Master Plans.....14

2.6 Lessons Learnt: Review of the Regulatory Context .....14

**3.0 QUANTITATIVE RESEARCH FINDINGS.....19**

3.1 Are Erosion and Sediment Control Practices Applied Sufficiently?.....19

3.2 What is the Greatest Challenge in Implementing Erosion and Sediment Control Measures? .....19

3.3 Is There Adequate Enforcement of Erosion and Sediment Control Measures in the Lake Simcoe Watershed? .....20

3.4 What are the Greatest Drivers for Improved Erosion and Sediment Control Performance in the Lake Simcoe Watershed? .....21

3.5 Is the Current Erosion and Sediment Control Legislative Framework Sufficient? .....22

3.6 Is there Sufficient Collaboration between Regulatory Bodies Responsible for Erosion and Sediment Control? .....23

3.7 In What Ways Can Your Organisation Improve Erosion and Sediment Control Policies and Practices?24

3.8 Does Your Organisation Currently Offer Erosion and Sediment Control Training to Employees? If so, What Type of Training and Professional Designations are required? .....25

3.9 Would your Organization Support Self-Inspection and Assessment with a Public Declaration by a Qualified Professional? .....26

3.10 What are Practical and Acceptable Strategies to Increase Funding for Inspections and Enforcement of Erosion and Sediment Control Measures? .....26

**4.0 RESEARCH FINDINGS AND RECOMMENDATIONS BY STAKEHOLDER GROUPS .....28**

4.1 Regulators .....28

4.2 Users: Industry and First Nations.....31

**5.0 ADDITIONAL FINDINGS AND RECOMMENDATIONS .....34**



5.1 Training..... 34

5.2 Self-Assessment and Declaration by a Qualified Professional ..... 34

5.3 Use of Technology for Tracking, Inspection, and Enforcement..... 35

5.4 Soil Remediation and Testing..... 35

5.5 Consolidated Erosion and Sediment Control Standards..... 36

**6.0 CONCLUSION ..... 37**

**7.0 WORKS CITED..... 38**

**TABLES**

Table 1: Respondents by Stakeholder Group ..... 1

Table 2: Amendment 2 to the Growth Plan for the Greater Golden Horseshoe: 2013 Forecasts for the Distribution of Population and Employment to 2014 ('000) ..... 8

Table 3: Summary of Inclusion of Selected Themes in Legislation, Guidance Documents and Plans ..... 16

Table 4: Are E&SC Practices Applied Sufficiently in the Lake Simcoe Watershed? ..... 19

**FIGURES**

Figure 1: Greatest Challenges in Erosion and Sediment Control Implementation..... 20

Figure 2: Is There Adequate Erosion and Sediment Control Enforcement in the Lake Simcoe Watershed? ..... 21

Figure 3: What Are the Greatest Drivers for Improved Erosion and Sediment Control Performance in the Lake Simcoe Watershed? ..... 22

Figure 4: Is the Current Erosion and Sediment Control Legislative Framework Sufficient? ..... 23

Figure 5: What Ways Can Your Organisation Improve Erosion and Sediment Control Policies and Practices? ..... 25



## 1.0 INTRODUCTION

Lake Simcoe Region Conservation Authority (LSRCA) retained Golder Associates Ltd. (Golder) to conduct an Erosion and Sediment Control (E&SC) Policies and Practices research study in 2015. The purpose of this study was to collaboratively work with local stakeholders to support improvements to E&SC practices within the Lake Simcoe watershed, with the long-term goal of reducing the overall impact of stormwater on Lake Simcoe and its tributaries.

Thirty stakeholders were interviewed from October to December 2015 as part of this study. Respondents included stakeholders from federal and provincial governmental agencies, regional municipalities and municipalities in the Lake Simcoe Watershed, Conservation Authorities (CA), Academics, First Nations Communities and Industry. Industry respondents included project developers and their engineering consultants and contractors; representatives from agricultural organizations; and aggregate producers.

Interview questions focused on the implementation, inspection, monitoring and enforcement of E&SC policies that were in place at organizations interviewed and specifically, factors that either drove or hindered the adoption of E&SC measures. Respondents were also asked related questions about E&SC training, self-assessment and reporting by qualified professionals and excess soil and fill management.

**Table 1: Respondents by Stakeholder Group**

Stakeholder Group	Number of Respondents
Federal / Provincial Agencies	4
Regional Municipalities / Municipalities	11
Conservation Authorities	2
Academics	2
First Nations	2
Industry	9
<b>Total Number of Respondents</b>	<b>30</b>

## 1.1 Methods

The findings of the research study are generally presented qualitatively, although some quantitative results were derived from the research. These results are indicative of the state of E&SC in the Lake Simcoe Watershed; however, it is important to note that results were derived from a small sample involving approximately 30 primary interviews (the number of respondents varied by question, resulting in 28 to 30 responses per question). This is not considered, by academic standards, to be an adequate sample size to be conclusive or base decisions upon the results. It does indicate trends in E&SC and perspectives from a wide range of stakeholders that are valuable in the overall discussion of E&SC.



## 2.0 LITERATURE REVIEW

Existing federal, provincial and municipal legislation, guidance and land use planning documents provide a framework and measures that seek to address stormwater management issues for lands within the LSRCA's jurisdiction. The following literature review provides a discussion of these provisions and identifies where guidance exists.

### 2.1 Federal Legislation

Under the Fisheries Act, the Department of Fisheries and Oceans Canada (DFO) has the authority to regulate deleterious substances in water bodies (i.e., which includes sediment). Through the Act, DFO has the authority to develop regulations prescribing quantities or concentrations of substances, classes of substances permitted in water or treatments, and processes and changes in water that support the management of deleterious substances within watersheds (Section 34[2]). The legislation demands that should any individual become aware that a deleterious substance has or may reasonably be expected to be deposited into a water body (e.g., through failures in stormwater management), that inspectors or fishery officers must be notified (S. 38[5]). The Fisheries Act does not explicitly mention E&SC; however, it is implicitly implied since discharge of a deleterious substance is not allowed.

### 2.2 Provincial Legislation

More extensive legislation and frameworks for E&SC, including stormwater management exist, under the jurisdiction of the provincial government. These include the *Environmental Protection Act (1990)*, *Water Resources Act (1990)*, *the Planning Act (1990)*, *the Conservation Authorities Act (1990)*, *the Clean Water Act (2006)*, *the Lakes and Rivers Improvement Act (1990)*, *the Nutrient Management Act (2002)*, *the Water Opportunities and Water Conservation Act (2010)*, *the Safe Drinking Water Act (2002)*, *the Environmental Assessment Act (1990)*, *the Public Lands Act (1990)* and *the Endangered Species Act (2007)*.

Two provincial bodies are primarily responsible for regulating Ontario's water bodies: the Ministry of the Environment and Climate Change (MOECC) and the Ministry of Natural Resources and Forestry (MNR).

#### Environmental Protection Act

The Environmental Protection Act (1990) is the principal pollution control statute in Ontario. It has broad regulatory authority over environmental matters. The Act is used in conjunction with the Ontario Water Resources Act to address water pollution and contains various provisions that can be used to protect against water contamination (e.g., the prohibition of contaminants discharge into the environment by amount, concentration or level).

The Act requires persons to inform the MOECC when contaminants, which exceed amounts permitted by the regulation, are discharged into waterways and authorizes the MOECC to issue binding administrative orders to prevent, minimize, control, or remediate the discharge of contaminants, and charges persons/organizations responsible with monitoring, reporting on and cleaning up pollutant spills.

The MOECC has used the Environmental Protection Act to regulate specific industrial sectors in order to limit their discharge into waterways (e.g., the petroleum, pulp and paper, metals, organic/inorganic chemicals, manufacturing and electrical power generation sectors). It is generally not used to regulate residential and commercial real-estate developers and/or industries that may release non-toxic materials into waterways. The EPA does not explicitly



mention E&SC; however, it is implicitly implied since the Environmental Protection Act is the principal pollution control statute in Ontario.

### Ontario Water Resources Act

The Ontario Water Resources Act (1990) (OWRA) is a key statute governing Ontario's waters. The Act authorizes the MOECC to regulate and require approval for public water and sewage works infrastructure and services. This approval regime is generally triggered when stormwater management is associated with a particular project or undertaking (GGHCA 2006). Stormwater is considered 'sewage' under the Act.

The Act's water protection provisions prohibit the discharge of materials that may impair water. The Act also prohibits the discharge of sewage into any waters. It lists powers of a provincial officer to: enter a place, undertake an inspection, issue work orders; amongst other actions for the purpose of preventing, water quality impairments. The OWRA does not explicitly mention E&SC; however, it is implicitly implied since the Ontario Water Resources Act governs surface water and groundwater quality and quantity in Ontario.

### Planning Act

The Planning Act (1990) is wide-ranging in subject matter around provincial land use planning. In relation to stormwater management, it includes provisions around the supply, efficient use and conservation of water, the protection of ecological systems, features and functions; the protection of the agricultural resources, and the adequate provision and efficient use of sewage, water and waste management systems and services.

The Act also allows the Minister of Municipal Affairs and Housing to delegate its powers to lower tier municipalities, and recognizes the role of local boards and planning boards in sewage, water and waste planning. It authorizes municipalities to pass by-laws (including zoning by-laws) related to the allocation of sewage and water services, where municipalities can prohibit development on lands that are low-lying or subject to flooding and erosion.

The Planning Act requires that provisions for the disposal of stormwater and wastewater be established as a condition of development plan approval. It also identifies that development plans will not be approved until the responsible upper-tier municipality has been advised of the proposed development and has been given the opportunity to elicit stormwater disposal plans from the landowner. As a condition of approval, municipalities may require landowners to convey easements to the municipality or local boards for the construction, maintenance or improvement of stormwater management infrastructure. As part of subdivision control, the Act identifies draft plans indicating that subdivisions must consider flood control and natural resource conservation to manage Stormwater and discharges. The Planning Act does not explicitly mention E&SC; however, it is implicitly implied in Section 51 subsection 24(h) under the plan of subdivision approvals.

### Conservation Authorities Act

The Conservation Authorities Act (1990) empowers the 36 provincial CAs to establish and undertake programs for the conservation, restoration, development and management of local watersheds. Within their respective areas of jurisdiction, CAs can make regulations prohibiting, regulating or requiring CA permission for development where flood control, erosion, pollution or conservation may be affected.

In order to meet this mandate, the Act provides CAs with the power to study and investigate watersheds within their jurisdiction and determine a program whereby the watershed may be conserved, restored, developed and managed, and where the flow of surface waters can be controlled to prevent floods, pollution and their direct and indirect impacts. The CA also has the authority over programs related to the alteration or diversion of watercourses,



water pipes, sewers and drains. The CAs do not have powers within the Act that allow them to halt work if E&SC is not being appropriately implemented within or outside regulated areas.

In spite of the powers conferred to the CAs through the Act, when considered to be in the public interest, the MNRF may specify the manner in which a CA must carry out flood control and/or take over the operation of a CA's water control structures. In areas outside of the CA's jurisdiction, the MNRF can also require and specify the manner in which municipalities must carry out flood control operations or the operation of water control structures.

E&SC are required by the Conservation Authorities Act during construction adjacent to or within the regulated area or a water body.

### Clean Water Act

Ontario's Clean Water Act (2006) requires local communities to develop Source Protection Plans that protect their municipal sources of drinking water. Developed through mandated local Source Protection Committees, these Plans must identify risks to local drinking water sources and develop strategies to reduce or eliminate these threats. The Act includes provisions for consultation within Source Protection Plan development, and requires Committees to assess reports for the source protection area that characterize water quality and quantity.

The Clean Water Act includes requirements around notification, should an individual or organization become aware that a substance is (or is about to be) discharged into existing municipal drinking water systems, and has also provided financial assistance to farmers, landowners, and small or medium businesses for activities that reduce threats to local water sources. Erosion is currently not prescribed as a drinking water threat. The Clean Water Act does not mention E&SC.

### Lake Simcoe Protection Act

The Lake Simcoe Protection Act (2008) focus is to protect and restore the ecological health of the Lake Simcoe watershed. Under the Act, the Lake Simcoe Protection Plan (LSPP) was established in 2009, providing strategic objectives, policies, targets and indicators to support implementation of the Act. Chapter 4 Water Quality sets out a number of policies for stormwater management and E&SC practices (see Section 2.4 of this report for more details). Most notably it requires all new stormwater works servicing major development to be designed to satisfy the Enhanced Protection Level (80% TSS removal). The LSPP Policy 4.20 explicitly sets out E&SC measures that are to be incorporated into subdivision and site plan control agreements. It also implicitly addresses ES&C through efforts to reduce Phosphorus from development activities in an effort to protect and restore the ecological health of the Lake Simcoe watershed.

### Lakes and Rivers Improvement Act

The Lakes and Rivers Improvement Act (1990) provides for the management, protection and use of provincial lakes, rivers, shorelines and banks, as well as the equitable exercise of public rights over these areas. It asserts that no person shall (or will permit others) to deposit or discharge substances into provincial lakes, rivers, shores or banks. Where this occurs, the MNRF may order those responsible to remove any applicable substances within a specified timeline. It also has jurisdiction over dam liabilities, requiring compensation to be distributed where lands are overflowed by dams erected before lands are granted by the Crown and where the grantee has been indemnified. The Lakes and Rivers Improvement Act does not explicitly mention E&SC; however, it is implicitly implied since no person shall (or will permit others) to deposit or discharge substances into provincial lakes, rivers, shores or banks.



### **Nutrient Management Act**

The Nutrient Management Act (2002) requires larger farm operators to develop nutrient management strategies in order to reduce the impacts of agricultural activity on water quality and treatment costs. It permits regulations to be made governing the management of nutrient-based materials and requires studies (e.g., topographical and soil studies) related to the effects of nutrient-based materials to determine the depth, direction of flow and contamination risks for waters in proximity to those lands. The Nutrient Management Act does not specifically mention E&SC.

### **Water Opportunities and Water Conservation Act**

The Ontario Water Opportunities and Water Conservation Act (2010) aims to foster innovative stormwater technologies, services and practices in both the private and public sectors and to conserve and sustain water resources for present and future generations. It allows the MOECC to regulate stormwater services and establish targets for the environmental registry. The Act requires the MOECC to report publicly on the activities of the Ontario Clean Water Agency, in terms of the financing, development, testing and commercialization of technologies and services that treat or manage stormwater, as well as outcomes achieved with respect to stormwater services. The Water Opportunities and Water Conservation Act does not mention E&SC.

### **Safe Drinking Water Act**

The purpose of the Safe Drinking Water Act (2002) is to protect human health through the regulation and testing of drinking water systems. It requires that all municipal drinking water systems obtain an approval from the MOECC in order to operate. Licensing conditions can include requirements and standards around the management of residue from the treatment process and the management of discharge (including erosion and sedimentation) from the treatment system into the natural environment. The Safe Drinking Water Act does not mention E&SC.

### **Environmental Assessment Act**

The Environmental Assessment Act (1990) is Ontario's primary environmental planning statute. The MOECC has approved a class environmental assessment process for municipal water, sewage and stormwater projects that address problems affecting the operation and efficiency of existing water systems, as well as potential water source contamination. In the case of new prospective projects, proponents are required to identify and assess potential effects to surface water and groundwater quantity and quality (e.g., effects of sediment and erosion, run-off, turbidity, flow regimes, etc.). Environmental assessment reports must identify mitigation measures to eliminate or reduce predicted likely adverse effects of the project within acceptable levels (e.g., where effects are deemed to be not significant). The Environmental Assessment Act does not refer to E&SC.

### **Public Lands Act**

The Public Lands Act (1990) is applicable to Crown land use planning, management, sales, and development on public lands and waters, which can have implications for E&SC. It identifies that no unauthorized materials or substances can be deposited in public lands or waters and that the Minister has the authority to fix terms and conditions related to water powers or privileges. It also provides the MNRF with the power to set aside public lands fronting bodies of water for recreational and access purposes. The Public Lands Act does not specifically refer to E&SC.



### Endangered Species Act

While Ontario's Endangered Species Act (2007) seeks to protect species at risk and their habitats, promoting stewardship activities to mitigate impacts and assist in the recovery of species that are at risk. These provisions can be related to the protection of endangered species habitats affected by inadequate E&SC. The Act identifies that no person may damage or destroy the habitat of endangered or threatened species, and tasks the MNR with preparing a strategy that identifies the habitat needs of endangered species, a description of the threats to survival and recovery, and provides recommendations on approaches to support species protection and recovery. The Endangered Species Act does not specifically refer to E&SC.

## 2.3 Provincial Guidance, Land Use Plans and Implementation Mechanisms

There are a number of guidance documents at the provincial level that outline strategies, land use exercises and implementation mechanisms applicable to E&SC and stormwater management at the provincial level.

### Stormwater Management Planning and Design Manual

In 2003, the MOECC published a stormwater management planning and design manual. The Manual presents what were considered at time of publication to be "state of the art" stormwater management practices, offering technical and procedural guidance for the planning design and review of stormwater management practices (MOECC 2014; MOECC 2015). The manual was also intended to be used as a baseline reference document in the review of stormwater management applications for approval under section 53 of the Ontario Water Resources Act (MOECC 2014).

It identifies that a combination of lot level, conveyance and end-of-pipe stormwater management practices are usually required to meet the multiple objectives of stormwater management: maintaining the hydrologic cycle, protection of water quality and preventing increased erosion and flooding. While offering solutions that have worked in the provincial context, the manual also encourages the development of innovative designs and technologies.

The Stormwater Management Plan and design manual (MOECC 2003, Section 4) provides planning and design recommendations and specifications including:

- General recommendations (i.e., Lot Level and Conveyance Controls and end-of-pipe controls);
- Siting of stormwater management facilities;
- Design modifications for cold climates (i.e., volume and inlet/outlet design modifications);
- Mitigation Measures for increased temperature;
- Lot level and conveyance controls (e.g., rooftop, parking lot, and super-pipe storage, reduced lot grading, roof leader to pond areas, roof leader discharge to soakaway pits, sump pumping of foundation drains, infiltration trenches, grassed swales, pervious catch-basins and pipe systems, stream and valley corridor buffer strips, vegetated filter strips and roof top gardens); and
- End-of-pipe stormwater management facilities (e.g., Vegetation stormwater management practices).

E&SC is required during construction and sediment removal from ponds (Section 6.4.2.10).



### Ontario Provincial Standards for Roads and Public Works

The Ontario Provincial Standards for Roads and Public Works (2006) develops and maintains consistent cost-effective methods to improve the administration of public works construction across the province, including public works associated with stormwater management<sup>1</sup>. The OPS standards provide a comprehensive set of specifications, drawings and technical solutions for the construction of barriers, drainage, sanitary sewers and watermains, including grading sections, paving, curbs, gutters, culverts, drains, manholes and catch-basins. They also manage the evaluation, classification and recording of data related to materials and products used in the construction of stormwater management public works. Their objective is to improve the safety, environmental responsibility and cost effectiveness of the design and construction of sewers, watermains and stormwater management services. All standards are reviewed on a five to fifteen year cycle to ensure they meet user needs and reflect current technology, materials and methodologies employed by the engineering and construction industries.

In particular, the Ministry of Transportation (MTO) developed an “Environmental Guide for Erosion and Sediment Control During Construction of Highway Projects” (MTO 2007) that provides the procedures and technical practices for developing and documenting effective E&SC measures that seeks to provide guidance on modern E&SC management approaches, provides cost effective E&SC techniques, facilitates easy access to and consistent application of E&SC techniques and drainage management practices, supports the development of effective E&SC through a variety of delivery methods, ensures that E&SC is addressed in a consistent and comprehensive manner, and provides solutions for potential liabilities as a result of the erosion of earth surfaces or sedimentation. The guidance document has been prepared by the MTO to support a consistent approach to erosion and sediment by the MTO and its contractors for highway construction and maintenance projects across all regions of the province. The recommendations and procedures that are outlined within the document also provide best management practices that can be applied by E&SC engineers, consultants, developers, municipalities and other governmental organizations to improve E&SC outcomes at their project sites. As stated above, the MTO developed an “Environmental Guide for Erosion and Sediment Control During Construction of Highway Projects” which provides E&SC guidelines.

### Growth Plan for the Greater Golden Horseshoe (2013 Consolidated Version)

Established in 2006, the Growth Plan for the Greater Golden Horseshoe (GGH) is a long-term plan that seeks to properly manage the GGH’s rapidly growing communities, creating “complete communities” that avoid deteriorating water quality and the disappearance of natural resources and agricultural lands that can be associated with rapid, poorly planned growth. It seeks to curb urban sprawl, protect green spaces and farmland, provide residents with vibrant downtowns, a range of housing options and improved transportation options. The Growth Plan was amended in 2012 and 2013 to contain new policies for the Simcoe Sub-area and to extend the Plan’s population and employment forecasts, respectively (Government of Ontario 2013). The Simcoe Sub-area amendment (2012) is intended to allow the County of Simcoe and the cities of Barrie and Orillia to expand, while protecting green spaces.

The Growth Plan calls for all municipalities that share water sources to coordinate their planning of stormwater, potable and wastewater systems to ensure that water quality and quantity is maintained or improved. The Plan

<sup>1</sup> These standards are developed under the general direction of the Ontario Provincial Standards (OPS) Advisory Board, the OPS Products Management Committee and the OPS Standards Management Committee.



encourages municipalities, in conjunction with CAs, to prepare watershed plans to guide development decisions and water and wastewater servicing decisions, and encourages municipalities to implement and support innovative stormwater management actions as part of redevelopment and intensification.

Specific to the Simcoe Sub-area, the Growth Plan aims to allocate the appropriate amount of land for employment and residential growth predicted in the area. It provides direction on where growth is to occur and creates a foundation for municipalities to align infrastructure investments with growth management, coordinate water and wastewater services, and promote green infrastructure. Effective growth management is intended to protect the natural environment from the impacts of growth while providing residents with appropriate urban amenities. The amended plan provides population and employment forecasts to assist for the planning and management of growth in the Simcoe Sub-area, anticipating population and employment growth. The predicted number of residents and workers in the County of Simcoe and the cities of Barrie and Orillia by 2041 are presented in Table 2 below:

**Table 2: Amendment 2 to the Growth Plan for the Greater Golden Horseshoe: 2013 Forecasts for the Distribution of Population and Employment to 2014 ('000)**

Communities	Population	Employment Population
Country of Simcoe	497	152
City of Barrie	253	129
City of Orillia	46	23
<b>Total</b>	<b>796</b>	<b>304</b>

The Growth Plan for the GGH identifies that development in the Simcoe Settlement Areas must be undertaken in accordance with the Lake Simcoe Protection Plan 2009, as applicable.

Within the Growth Plan for the GGH, the municipalities can identify natural heritage systems, features, and areas within strategic settlement employment areas and the economic employment districts for protection (i.e., including protection for stormwater management-related purposes).

The Simcoe Sub-area growth plan places particular emphasis on “primary settlement areas” and “strategic settlement employment areas.”<sup>2</sup> The Plan identifies four unique employment areas within the Simcoe Sub-area: the Bradford West Gwillimbury Strategic Settlement Employment Area, the Innisfil Heights Strategic Settlement Employment Area, the Lake Simcoe Regional Airport Economic Employment District and the Rama Road Economic Employment District.

Amongst these areas, only the Bradford West Gwillimbury Strategic Settlement and Employment Area identify an Environmental Protection Area where conservation, flood and erosion control are included as permitted uses. The Growth Plan for the GGH does not mention E&SC.

<sup>2</sup> Strategic Settlement Employment Areas are defined as areas to be planned and protected for employment uses that require large lots of land and depend upon efficient movement of goods and access to Highway 400. Major retail and residential uses are not permitted.



### Great Golden Horseshoe Erosion and Sediment Control Guidelines for Urban Construction

In 2006, the CAs of the GGH (including the LSRCA) developed E&SC guidelines for urban construction, in an effort to coordinate land development, construction and water management between various municipalities and agencies in the GGH (GGH Area Conservation Authorities 2006).

This document provides guidance for the development of effective erosion and sediment control plans (E&SC Plans). It highlights that an E&SC Plan report is to be developed in order to effectively summarize the information upon which the E&SC Plan was formulated, and that these reports should include or append Stormwater Management Design Briefs. As per the guidelines, E&SC Plan Drawings must depict E&SC stormwater management ponds and locations, storm inlets, outlets, emergency outlets, and other permanent and temporary drainage facilities (swale, waterways and channels). Volume, depth, and inflow and outflow rates must be provided, as well as target volumes and drainage areas to these ponds. Stormwater discharge locations must also be identified and detailed on Plan drawings. As stated above, the GGH E&SC guidelines for urban construction provide E&SC guidelines.

The Plan provides guidance regarding numerous erosion control practices that consider stormwater management, including measures related to:

- Vegetative Filter Strips (i.e., which intercept and detail stormwater runoff from up-gradient disturbed areas);
- Mechanical seeding (i.e., which can be applied to stabilize stormwater pond embankments);
- Settling controls (i.e., temporary sediment ponds, at the location of the ultimate stormwater management facility);
- Ditch Chexx (i.e., which create a settling and filtering effect of sediment laden stormwater runoff, which also slow down the velocity of stormwater prior to leaving the ditch area);
- Sediment control ponds and basis (i.e., consisting of an outlet structure to control the stormwater release rate);
- Storm drain outfall protection (i.e., which should be applied at the base of any stormwater outfall structure, including drainage tiles, stormwater facility outlets and piped or channel conveyance systems); and
- Filter rings (i.e., scalable systems for filtering a number of contaminants from stormwater).

(GGH Area Conservation Authorities 2006)

### 2.4 Regional and Municipal Guidance, Land Use Plans and Implementation Mechanisms

In the context of this literature review, regional and municipal documentation includes regional Protection Plans, Stormwater Master Plans, funding mechanisms and municipal Official Plans and zoning by-laws developed by the key upper and lower-tier municipalities of the Lake Simcoe Sub-area (i.e., the County of Simcoe and the Cities of Barrie and Orillia) are presented below.



### Lake Simcoe Protection Plan

The Lake Simcoe Protection Act (2008) required establishment of the Lake Simcoe Protection Plan. The Lake Simcoe Protection Plan (LSPP) describes the investments that adjacent municipalities have made on the lake, including stormwater management retrofits, sewage treatment plant upgrades and septic system decommissioning, and investments in stewardship programs and supporting the LSRCA among others (Government of Ontario, 2009a). The LSPP includes a range of stormwater management policies both for existing and planned development. It contains policies for the maintenance of stormwater management works and identifies recommended approaches and implementation measures for E&SC management in each settlement area. The plan builds off of the work of the LSRCA, which since 2000 has aimed for developments around Lake Simcoe to meet or exceed provincial environmental design standards for E&SC management. The LSRCA is identified as a key, ongoing partner in the Plan's implementation.

According to the Plan, applications for new major development must demonstrate how phosphorus loadings and changes in water balance will be minimized, and requires that all new works be designed to satisfy the enhanced Protection Level for TSS removal. The Plan includes policies that direct municipalities to:

- incorporate policies related to reducing stormwater runoff volume and pollutant loadings from major development and existing settlement areas into their Official Plans;
- encourage implementation of a hierarchy of source, lot-level, conveyance and end-of-pipe controls;
- encourage the implementation of innovative stormwater management measures;
- allow for flexibility in development standards to incorporate alternative community design and stormwater techniques (e.g., for site plan design, lot grading, ditches and curbing, road widths, road and driveway surfaces, and the use of open space as temporary detention ponds); and
- support implementation of source control programs, which are targeted to existing areas that lack adequate stormwater controls<sup>3</sup>.
- require ES&C measures are incorporated into site plan agreements and subdivision agreements.

(Government of Ontario, 2009a)

The Plan requires that applications for major development are accompanied by a stormwater management plan, which demonstrates consistency with relevant stormwater management master plan, and sub-watershed evaluations and budgets. These stormwater management plans must also demonstrate that an integrated approach be used to minimize stormwater management flows and reliance on end-of-pipe controls (e.g., through source controls, lot-level controls and conveyance techniques). It requires that an evaluation of anticipated changes in the water balance and phosphorus loadings (e.g., pre- and post-development) be minimized.

---

<sup>3</sup> An integrated treatment train approach refers to a planned sequence of methods of controlling stormwater and keeping its impact to a minimum by techniques including, but not limited to: source controls, such as green roofs; lot-level controls such as rain gardens; conveyance controls such as grassed swales. End-of-pipe controls include wet ponds at the final discharge stage.



Stormwater management works established to serve new major developments in the Lake Simcoe Watershed will not be permitted unless they satisfy the Enhanced Protection Level<sup>4</sup> of the MOECC's Stormwater Management Planning and Design Manual (2003). The Plan requires every owner and operator of new stormwater management works in the Lake Simcoe watershed to inspect and maintain the works periodically. The Plan identifies that the MOECC will also review approvals issued under the Ontario Water Resources Act. Strategies developed under the plan are to be designed to accommodate the implementation of the Growth Plan for the Greater Golden Horseshoe, where relevant.

The LSPP identifies that within two years of the implementation of the Plan, the MNR and MOECC, in consultation with other ministries, municipalities and the LSRCA, will lead the development of a template for municipal site alteration and tree cutting by-laws within the watershed as related to natural heritage features including wetland and woodlands (LSPP Policy 6.46-SA). This commitment aims to encourage the implementation of such a by-law throughout the Lake Simcoe Watershed.

The Plan also commits municipalities to prepare and implement comprehensive stormwater management master plans which will consider the potential impacts of climate change and the effectiveness of stormwater management works. Within a year of implementation, the Plan committed the MOECC, the LSRCA in collaboration with Aboriginal communities and other stakeholders to develop guidelines on the preparation of sub-watershed evaluations, including specific targets and recommended actions, such as stormwater management master plans. The LSPP states that E&SCs must be effectively implemented.

The recommendations of the LSPP have led to the development of the Lake Simcoe Phosphorus Reduction Strategy (2010).

### Lake Simcoe / South-eastern Georgian Bay Clean-Up Fund

In addition, Lake Simcoe/South-eastern Georgian Bay Clean-Up Fund (LSGBCUF) was established in 2007 with the aim to restore the ecological health of Lake Simcoe and South-eastern Georgian Bay and to improve water quality for residents and wildlife in the region. The LSGBCUF is funded by Environment Canada. The 2007-2012 Clean-up Fund invested approximately \$28.5 million (Environment Canada 2013) and supported 160 community-based projects focused on reducing phosphorus inputs from urban and rural sources, restoring fish and aquatic wildlife habitat and addressing near-shore toxic and nuisance algae growth (Environment Canada 2013). The Government of Canada announced \$29 million in funding in the 2012 budget for the 2012-2017 Lake Simcoe South-eastern Georgian Bay Clean-up Fund, in order to build on Round 1's successes (Environment Canada 2013).

Key projects of the fund have included the implementation of stormwater pond retrofits in several municipalities, phosphorus removal projects, a *'RainScaping'* retrofit program for low impact development projects to help transform current stormwater practices in both developed and to-be-developed lands, and the development of innovative stormwater and soil management best practices for residential developments (Environment Canada 2013). The LSGBCUF does not mention E&SC.

---

<sup>4</sup> The level of protection for stormwater management works specified in Chapter 3 of the MOECC's Stormwater Management Planning and Design Manual, 2003, that corresponds to the end-of-pipe storage volumes required for the long-term average removal of 80% of suspended solids.



### Simcoe County Official Plan

The 2013 County of Simcoe Official Plan includes provisions for stormwater management, encouraging local municipalities to establish stormwater management policies relating to development associated with new plans of subdivision and condominium development. The Official Plan cross-references text from the Lake Simcoe Source Protection Plan and it identifies that policies will consider the requirement for a Stormwater Management Report to address the impacts of development on stormwater runoff volume, water quality, erosion and sedimentation, and environmental features. In addition, the Plan requires new subdivisions, condominiums and other large scale commercial, industrial and institutional developments adjacent to a County Road to include a supporting stormwater management report registered with the Association of Professional Engineers of Ontario, and prepared in accordance with the Stormwater Management Planning and Design Manual (2003). These reports are required to address post-development runoff rates and include site-specific assessments to determine whether equalization of run-off rates is actually possible and to describe what the significance of changes in run-off rates would actually be on potentially-affected surface water bodies. In addition, these reports are required to demonstrate that projects maintain post-development runoff water quality to meet federal and provincial guidelines and standards for stormwater quality, maintain existing watershed boundaries and drainage patterns, identify the E&SC measures required to be undertaken during construction to mitigate the potential negative impacts of development, include descriptions of how stormwater plans will protect and maintain natural heritage systems, and how landscaping plans (e.g., vegetation) will be used as part of stormwater management. The Simcoe Official Plan references various documents which provide more detail regarding stormwater management and E&SC measures.

### City of Barrie Official Plan

The City of Barrie Official Plan (2014) addresses stormwater management, which seeks to control flooding, erosion, sedimentation and to maintain and enhance watercourses and water bodies in the City (Section 5.3 City of Barrie 2014). The City also commits to retrofitting existing stormwater ponds for quality and quantity controls in order to meet City standards and the requirements of provincial and watershed policy. It also requires the City to prepare stormwater management plans for public works and impose conditions for the preparation of a stormwater management plan for development proposals and draft plans of subdivision. The Plan also identifies that stormwater management facilities for development proposals may not be on lands designated for Environmental Protection or Open Space unless in accordance with existing policy.

The Official Plan highlights that for lands under private ownership, reasonable access will be provided to watercourses for maintenance, and that the City shall seek to acquire lands through which watercourses flow as conditions of development approval. It commits the City to flood control efforts in all hazard lands and areas, seeking to acquire such lands by dedication (City of Barrie 2014).

The City of Barrie maintains two by-laws with linkages to E&SC measures for development applications. *By-law 99-312 Site Plan Control Area* and *By-law 2006-101 Site Alteration Permit* require that a plan be developed and approved as part of the development approval. This plan must include proposed stormwater management and E&SC measures to be used during and after construction. This E&SC Plan must be developed and the bylaws recommend specific mitigations and management techniques that are approved for the City of Barrie. The plans must be prepared and stamped by a professional engineer. An engineering fee must be paid so that municipal services associated with the Project can be installed by the engineering and public works department. In addition to bylaw processing fees, a letter of credit must also be filed with the City of Barrie to ensure that there are contingency funds available if the developer is not in line with their development approval and the City of Barrie



has to remediate any works that are not in compliance with their permit. As stated above, the City of Barrie maintains two by-laws with linkages to E&SC measures for development applications. *By-law 99-312 Site Plan Control Area* and *By-law 2006-101 Site Alteration Permit* require that a plan be developed and approved as part of the development approval.

### City of Orillia Official Plan

The City of Orillia's Official Plan (2010) maintains general consistency with the LSPP, requiring applications for major development within the Lake Simcoe Watershed to be accompanied by a Stormwater Management Plan, which incorporates an integrated treatment train approach to minimize stormwater management flows and reliance on end-of-pipe controls. It identifies specific location of permanent end-of-pipe facilities, predicts changes to the water balance between pre and post-development conditions, assesses changes in phosphorus loadings between pre- and post-development, offers specific direction on how end-of-pipe stormwater management works will be designed to satisfy enhanced protection levels associated with the MOECC's Stormwater Management Planning and Design Manual, and identifies circumstances upon which interim stormwater facilities may be considered.

The Plan identifies that stormwater runoff volume and pollutant loadings from major development will be reduced using the strategies identified in Section 1.4.1 of the Plan, and requires that new major development only be permitted where the works are designed to satisfy the enhanced protection level specified in the MOECC Planning and Design Manual, 2003. It also identifies that permits may be required from the LSRCA prior to the development or site alteration on hazard lands, wetlands and any proposed alterations to watercourses or shorelines within the Lake Simcoe Watershed, in accordance with the Conservation Authorities Act.

In addition to stormwater management strategies, the Plan also addresses stormwater management facilities. It confirms that stormwater management facilities are permitted in all land use designations except environmental Protection Areas (although sometimes allowed subject to policy direction). It commits the municipality to plant native species and flood tolerant plants at the waters' edge to stabilize banks of ponds, and to blend pond with the natural landscape. It also identifies that the municipality will establish live fences and barrier plantings to manage E&SC.

The City of Orillia maintains *By-law 2014-44 Zoning*, which requires that as part of the development application process, a Site Plan must be prepared that includes stormwater management and erosion control measures. The Zoning by-law indicates that several potential land use developments are on hold, conditional upon the development of Stormwater Management Plans and/or the execution of a Site Plan Agreement that identifies stormwater management and erosion control measures associated with their development (City of Orillia 2015). As stated above, the City of Orillia maintains *By-law 2014-44 Zoning*, which requires that as part of the development application process, a Site Plan must be prepared that includes stormwater management and erosion control measures.

### Town of Aurora Official Plan

The Town of Aurora's Official Plan (2010) identifies soil pollution and erosion mitigation policies as one of the priorities (Section 5.6), and identifies measures that are put in place to prevent soil pollution in public works and private development projects. E&SC management is generally undertaken through the requirement for a permit under the Aurora Topsoil Preservation By-Law (no. 4751-05.P) and Zoning By-law (No. 2213078) for site alteration on the Oak Ridges Moraine, before any vegetation or soil may be removed.



The Official Plan also has policies developed for stormwater management, including policies for the development and installation of stormwater management facilities that are generally consistent with the LSPP. Proposed projects are evaluated on a watershed or sub-watershed basis. Stormwater Management Plans are also required to be developed to address water quantity controls to limit the post-development flows to pre-development flows for the 1 in 2-year to the 1 in 100-year storm events.

In addition, standard mitigations are suggested in the Plan to reduce stormwater run-off volumes and pollutant loadings through implementing conveyance and end-of-pipe controls, encouraging innovative stormwater management measures related to site plan design, lot grading, ditches and curbing and the use of open space as temporary detention ponds. Aurora has also developed policies that promote using natural vegetation to improve the performance of stormwater management facilities. The plan also has a requirement for owners and operators of developments and in the Lake Simcoe watershed to inspect and maintain the works on a periodic basis. These requirements are also re-iterated and addressed in more detail in the Town of Aurora's Landscape Design Guidelines for Subdivision and Site Plan Developments (Town of Aurora 2015). Aurora's requirements include consultation and co-approval with the Conservation Authority and any other agency having jurisdiction.

## 2.5 Comprehensive Stormwater Management Master Plans

The LSPP states that within five years of coming into effect (i.e., by 2014), municipalities and the LSRCA are to prepare and implement comprehensive stormwater management master plans for each settlement area in the Lake Simcoe watershed in accordance with the Municipal Class EA process. Stormwater master plans outline characteristics of a watershed, define the existing stormwater systems that serve the watershed and make recommendations on how to improve the stormwater management systems and infrastructure within municipal limits. In 2011, the LSRCA produced Comprehensive Stormwater Management Master Plan Guidelines to provide direction to municipalities on how to prepare and implement Management Plans for settlement areas in the Lake Simcoe Watershed, in accordance with the LSPP (LSRCA 2011).

At the time of this report, five Municipalities in the watershed have completed the Comprehensive Stormwater Management Master Plans and 13 are still outstanding. The MOECC is looking for opportunities to ensure the Comprehensive Stormwater Management plans are completed for all settlement areas.

## 2.6 Lessons Learnt: Review of the Regulatory Context

There are a multitude of regulations, guidance and planning requirements for stormwater management and E&SC that are applicable to the Lake Simcoe Watershed, as presented in this literature review. Navigating through these requirements was outlined as a major constraint by industry, First Nations and municipal stakeholders, and one of the key findings of the research was that there was a need for a clear regulatory framework that comprehensively addressed all the E&SC requirements for the entire system. Respondents noted that they wanted a comprehensive guidance document on how to address all the acts and regulations as they pertained to E&SC management.

In addition, E&SC regulations are primarily being implemented and enforced based on the jurisdiction where Projects are being implemented. Oftentimes, E&SC performance may vary depending on the municipality's capacity to implement and enforce E&S controls. The research suggests that it may be prudent for requirements to be set out by sectors (property developers, farmers, aggregate producers) so that there are standardized requirements for E&SC users who operate in multiple jurisdictions in Ontario.



While there was no full agreement on which regulatory body should develop consolidated E&SC requirements, most respondents noted that it would be best for the Province to issue these guidelines so that they are widely applicable and can provide guidance to users and developers operating in different regions of Ontario. Some respondents also noted that guidance should be based on scientific and technical standards related to the watershed's health and sustainability. Respondents also noted that CAs, including the LSRCA, could have a role in outlining E&SC technical criteria that would proactively manage the health of the Lake Simcoe watershed.

Table 3 below provides a summary of selected themes in legislation, guidance documents and plans reviewed as part of the E&SC study. It identifies if the literature reviewed includes reference to site alteration requirements, the development of E&SC plans, characteristics and requirements for fill importation, surface water quality and quantity monitoring and/or control and if there are specific requirements to track, inspect, enforce or monitor E&SC performance.



## E&SC RESEARCH STUDY

**Table 3: Summary of Inclusion of Selected Themes in Legislation, Guidance Documents and Plans**

Themes	<i>Site Alteration</i>	<i>E&amp;SC Plan Required</i>	<i>Fill Importation (Yes / No)</i>	<i>Surface Water</i>	<i>Implementation</i>
<b>Description</b>	Requirements to address changes in hydrologic characteristics	Sediment migration and control	Quality characteristics	Quality and Quantity monitoring and/or control	Tracking, inspection and enforcement of monitoring or E&SC Plan
<b>Legislation</b>					
DFO	Implicitly implied	Implicitly implied	No	Implicitly implied	Yes
EPA	Implicitly implied	Implicitly implied	No	Implicitly implied	Yes
OWRA	Implicitly implied	Implicitly implied	No	Implicitly implied	Yes
Planning Act	Yes	Implicitly implied	No	No	No
Conservation Authorities Act	Yes	Yes	Yes	Yes	Yes
Clean Water Act	No	No	No	No	No
Lake Simcoe Protection Act	Yes	Yes in LSPP	No	Implicitly implied	No
Lakes and Rivers Improvement Act	Yes	Implicitly implied	No	Yes	Implicitly implied
Nutrient Management Act	No	No	Yes	Yes	Yes (under OWRA)
Water Opportunities and Water Conservation Act	No	No	No	No	No
Safe Drinking Water Act	No	No	No	No	No
Environmental Assessment Act	No	No	No	No	No
Public Lands Act	No	No	Yes <sup>2</sup>	No	No



## E&SC RESEARCH STUDY

<b>Themes</b>	<b>Site Alteration</b>	<b>E&amp;SC Plan Required</b>	<b>Fill Importation (Yes / No)</b>	<b>Surface Water</b>	<b>Implementation</b>
Endangered Species Act	No	No	No	No	No
<b>Provincial Guidance Documents</b>					
MOECC SWM Manual	Yes	Yes <sup>3</sup>	No	Yes	No
Ontario Provincial Standards for Roads and Public Works	No	Yes	Yes	No	No
Growth Plan for the Greater Golder Horseshoe (2013 Consolidated Version)	No	No	No	No	No
Great Golden Horseshoe Erosion and Sediment Control Guidelines for Urban Construction	Yes	Yes	Yes	Yes	No
<b>Regional and Municipal Guidelines</b>					
Lake Simcoe Protection Plan	Yes	Yes	No	Yes	Yes
Lake Simcoe / South-eastern Georgian Bay Clean-Up Fund	No	No	No	No	No
Simcoe County Official Plan	Yes	Yes	No	Yes	No <sup>4</sup>
City of Barrie Official Plan	Yes	Yes	No	Yes	Yes (under the by-laws) <sup>4</sup>



## E&SC RESEARCH STUDY

<b>Themes</b>	<b>Site Alteration</b>	<b>E&amp;SC Plan Required</b>	<b>Fill Importation (Yes / No)</b>	<b>Surface Water</b>	<b>Implementation</b>
City of Orillia Official Plan	Yes	Yes	No	Yes	Yes (under the by-laws) <sup>4</sup>
Town of Aurora Official Plan	Yes	Yes	Yes	Yes	Yes (under the development applications and by-laws)

1. Implicitly implied means that although the act does not explicitly state that E&SC, monitoring is required and/or enforced the government and industry are under the impression that these actions are required to meet the objectives and/or mandates of the act.
2. Under the Public Lands Act - *Except with the written consent of the Minister or an officer authorized by the Minister, no person shall deposit or cause to be deposited any material, substance or thing (Section 27 (1))*
3. MOECC SWM Manual – Erosion and Sediment Control is required during construction and sediment removal from ponds (Section 6.4.2.10)
4. The Official Plans enforce water quality and quantity monitoring, requirements to address changes in hydrologic characteristics and E&SC Plans through other legislation including the OWRA and City By-Laws.



### 3.0 QUANTITATIVE RESEARCH FINDINGS

Quantitative data was extrapolated from interview questions on several themes investigated through the study. In particular, the study was able to identify and weight perceptions around E&SC performance, challenges and drivers. The study also sought to identify the level of collaboration between regulators, the efficacy of the current legislation, and where stakeholders identify improvements in the system that can be achieved. Information was also collected on the awareness of the draft Lake Simcoe Watershed Model By-law and LID SWM Guidelines for Municipalities, which is in the process of being adopted by many municipalities that are within the jurisdiction of the Lake Simcoe Watershed. Finally, a quantitative analysis was also done on how to best provide E&SC training, how to best certify E&SC is adequately implemented and on practical and acceptable methods to fund inspections and enforcement by the conservation authority and local municipalities. As noted in the methods section above, while results may be indicative, they are not based on a representative sample.

#### 3.1 Are Erosion and Sediment Control Practices Applied Sufficiently?

Respondents were asked whether E&SC practices were applied sufficiently in projects undertaken by their organization and/or industries in the Lake Simcoe Watershed. Seventy five percent (75%) of key informants agreed that the application was sufficient; however 38.1% of all respondents chose to caveat their positive response by cautioning that application, while occurring, did occur to varying degrees. They noted that, while there were attempts to implement E&SC, there is a need for greater controls. Twenty five percent (25%) of individuals surveyed did not feel that E&SC practices were sufficiently applied.

Table 4: Are E&SC Practices Applied Sufficiently in the Lake Simcoe Watershed?

	Regulators (including Academics)	Users	Total	Total (%)
Yes	6	7	13	46.4
Yes, to varying degrees	6	2	8	28.6
No	5	2	7	25

Points for Consideration:

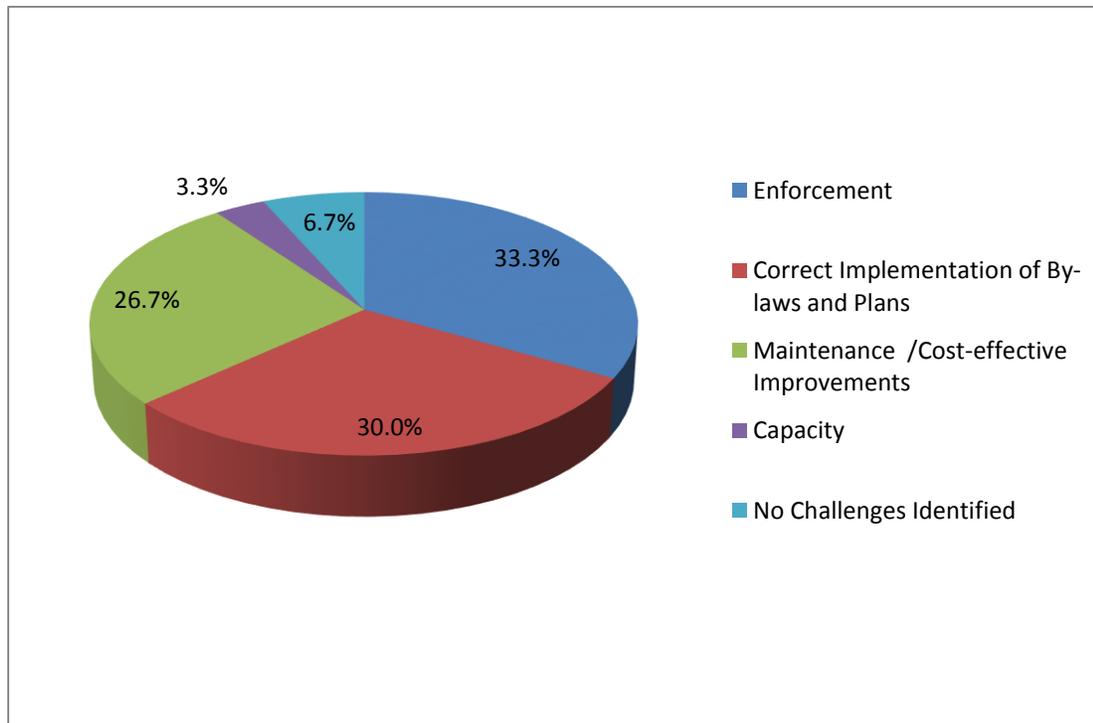
- Are there metrics available to support standardized measurements of adequate implementation of E&SC practices?

#### 3.2 What is the Greatest Challenge in Implementing Erosion and Sediment Control Measures?

One third of key informants (33.3%) identified that enforcement represented the greatest challenge to E&SC. When disaggregated by respondent category, agencies and academics were most concerned about enforcement. Municipal respondents identified that there were three aspects of E&SC that were challenging, namely enforcement, ongoing maintenance of E&SC control measures and the correct implementation of by-laws and plans. Users, on the other hand (i.e., industry and First Nations), identified the challenges associated with E&SC maintenance and cost effective improvements and capacity issues as key concerns. Two industry respondents, out of the 30 stakeholders interviewed (6.7%) did not identify any challenges or difficulties with respect to E&SC.



Figure 1: Greatest Challenges in Erosion and Sediment Control Implementation

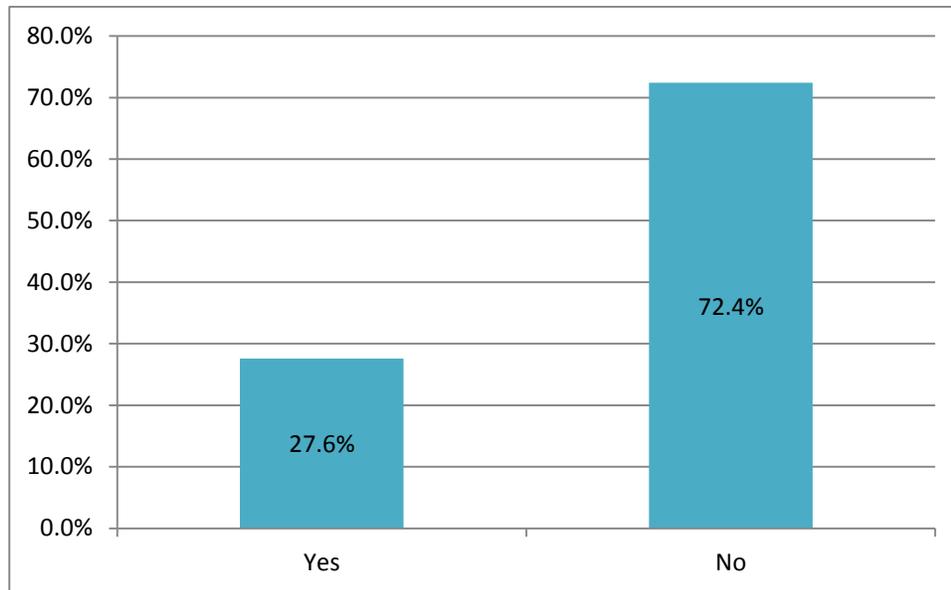


### 3.3 Is There Adequate Enforcement of Erosion and Sediment Control Measures in the Lake Simcoe Watershed?

The vast majority of key informants (72.4%) identified that they did not feel that adequate enforcement existed within the current E&SC management framework. Many of these respondents noted that the lack of enforcement (and in particular inspection by regulators), led to challenges in persuading developers and their contractors to comply with required E&SC measures. They also noted that without the threat of regular enforcement, some users choose to ask for forgiveness if they are identified as being non-compliant with the conditions of their development, rather than putting in place proactive E&SC measures, that are oftentimes a condition of their development agreement or permit. In general it was noted that it is challenging to get compliance without enforcement. Some respondents also noted that they wanted clarity on whom and how E&SC measures are being enforced. Approximately 27.6% of respondents said that existing enforcement mechanisms were sufficient (three municipal respondents (10.3%), four industry respondents (13.8%) and one First Nation respondent (3.4)).



Figure 2: Is There Adequate Erosion and Sediment Control Enforcement in the Lake Simcoe Watershed?



Points for Consideration:

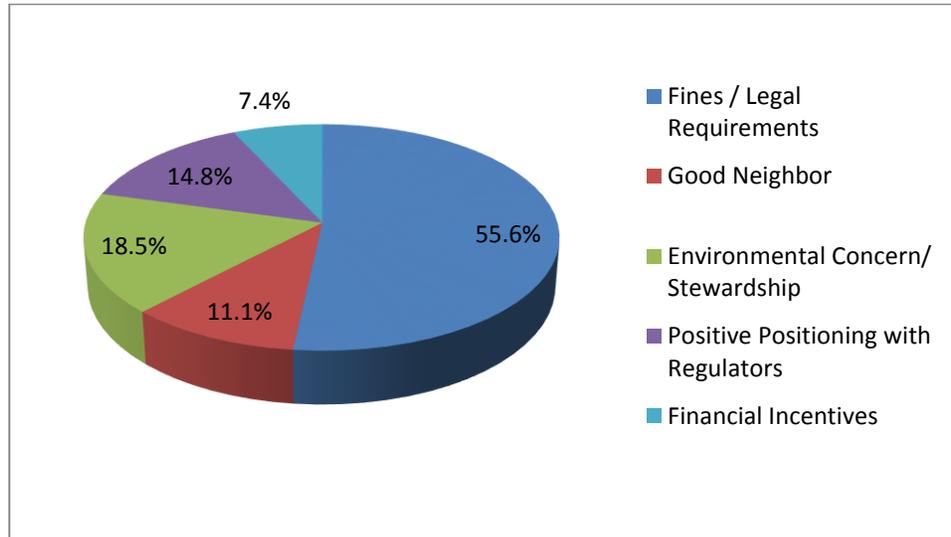
- What level of additional resourcing is required for adequate enforcement and inspection in all jurisdictions of the Lake Simcoe Watershed?
- What agencies (federal, provincial, municipal government and conservation authority) should be resourced to most efficiently increase enforcement capacity?

### 3.4 What are the Greatest Drivers for Improved Erosion and Sediment Control Performance in the Lake Simcoe Watershed?

With respect to the greatest drivers for improved performance, it was clear that fear of fines and adherence to legal requirements represented the greatest ‘pull factors’ in relation to effective E&SC, identified by 55.6% of respondents. This was the most common answer for municipal and federal and provincial agencies. Environmental and reputational concerns represented the second-most common answers, at 18.5%. The largest driver for industry to comply with E&SC standards was maintaining a good reputation with regulators, which they believed translated into reduced length of time for regulatory approvals, permitting new projects and building trust with regulators over the long-term. All First Nations cited environmental concerns were their largest driver. Provincial agencies cited financial incentives, such as access to grants and tax benefits, were important drivers for farmers and other small scale users and developers to increase their E&SC performance.



Figure 3: What Are the Greatest Drivers for Improved Erosion and Sediment Control Performance in the Lake Simcoe Watershed?



Points for Consideration:

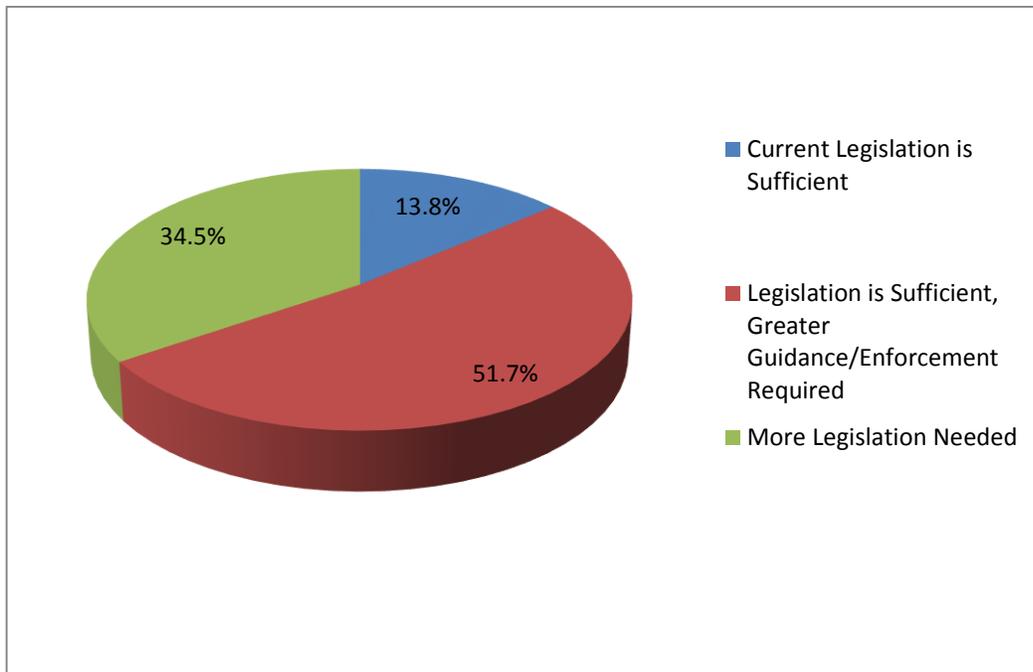
- Do municipalities equally issue fines for non-compliance with E&SC by-laws and conditions of development agreements?
- Do regulators reward developers with good E&SC performance through reduced length of time for regulatory approvals on their Projects?

### 3.5 Is the Current Erosion and Sediment Control Legislative Framework Sufficient?

Almost two thirds of respondents, across industries (65.5%) felt that the current legislation was sufficient. However, while agreeing that changes to legislation were not required, 51.7% of key informants (predominantly from municipalities and industry) identified that greater guidance and enforcement is required to make E&SC management policies more clear so that they are implemented effectively. Specifically, these respondents requested a comprehensive regulatory framework which amalgamated all E&SC requirements from existing legislation. On the other hand, approximately 37% of key informants identified that there was a need for new legislation. These responses were derived largely from agencies and municipalities, but were also generated by academia and First Nations. Those who identified that more legislation was needed identified a desire for “clear, provincial-based performance standards.” In general, 25 of the 29 respondents identified that E&SC legislation needs more guidance for implementation and that the rules and responsibilities need to be clearly laid out (either through guidance on the application of existing legislation or through new legislation that consolidate requirements). Most respondents also note that this legislation and guidance should be coordinated at a jurisdiction that was beyond the municipality, and potentially also greater than the watershed level.



Figure 4: Is the Current Erosion and Sediment Control Legislative Framework Sufficient?



Points for Consideration:

- What is the appropriate jurisdiction (Conservation Authority or Provincial Government) for developing new legislation and/or formulating additional guidance on existing E&SC legislation to improve E&SC performance?

### 3.6 Is there Sufficient Collaboration between Regulatory Bodies Responsible for Erosion and Sediment Control?

One of the findings of the research was that there were varying levels of cooperation between institutions working towards the regulation of E&SC. While more than half the respondents noted that there was good cooperation and collaboration between regulators, many noted that this working relationship was generally between the municipalities and CAs and that processes for working with provincial and federal regulatory agencies were generally lacking. Stakeholders did emphasize that there is a need for continuity in legislative requirements for E&SC (in terms of scope and scale), and that the provincial level is likely the most appropriate jurisdiction (in consideration of clear rules for developers working in more than one jurisdiction, i.e., linear infrastructure). Guidance on implementation, however, that considers the capacity of the receiving water body, could be tailored to specific watersheds and managed by CAs.

An ongoing collaborative initiative spearheaded by the LSRCA and many local municipalities in the Lake Simcoe Watershed is the development of a model by-law that could be used to address E&SC at the municipal planning level. The majority of respondents (55.2%) identified that they were not aware that such an initiative had taken place or that such a tool existed, across all sectors (municipalities, industry, agencies, academia and First Nations). Those who were aware of the model by-law included 63% of municipalities, 50% of agencies, 22% of industry and 100% of academic participants that participated in the study. No First Nations participants were aware of the model



by-law. Awareness of the model by-law was primarily because these stakeholders participated in the development process through their membership in the LSRCA Stormwater Management Technical Working Group, the forum where the by-law was developed. This points to the need for more widespread consultation and more participatory approaches in the development of model by-laws and other tools, if their value is to be maximized.

Points for Consideration:

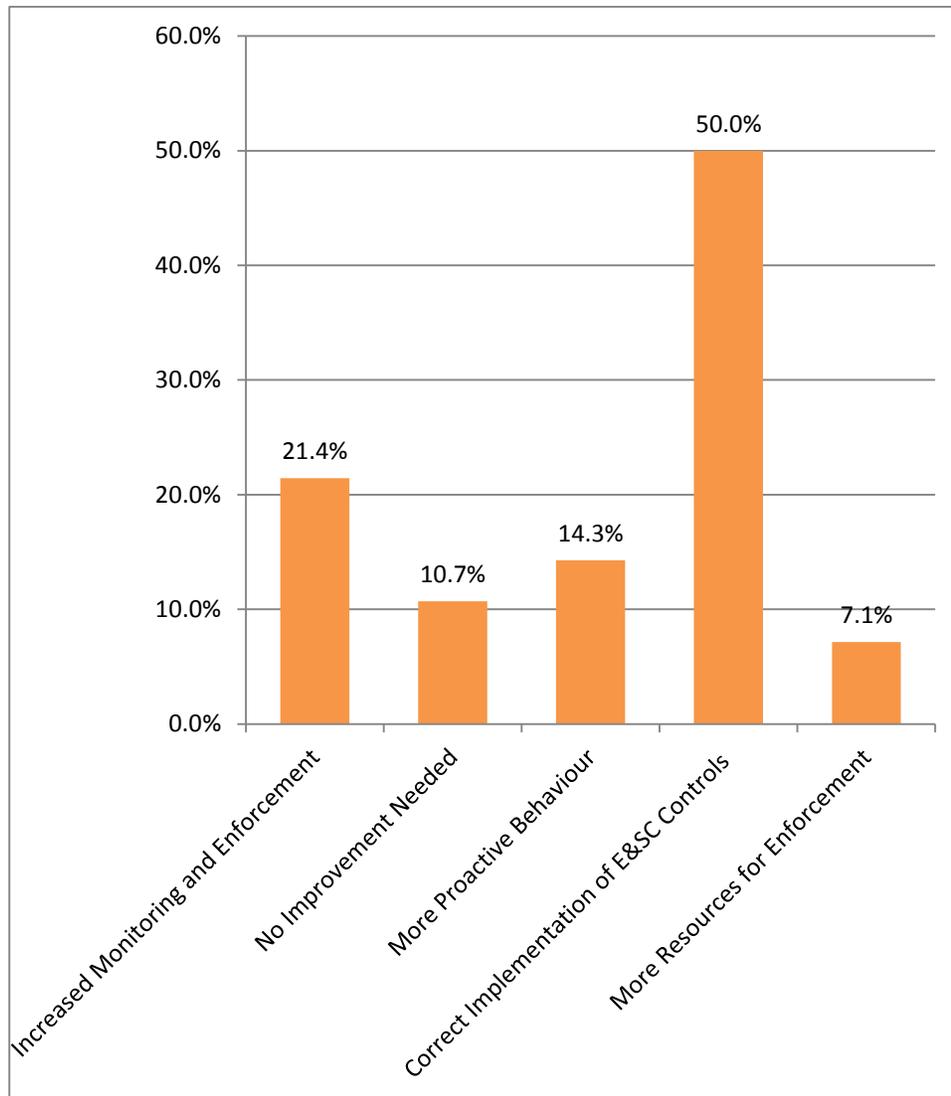
- Is there a need to develop a forum for collaboration between local government, CAs and provincial and federal agencies to collaborate on E&SC management?
- What are some of the tools/processes that can be used to increase the number of people consulted on the model by-law and other initiatives that are being undertaken to increase E&SC performance in the Lake Simcoe Watershed?

### **3.7 In What Ways Can Your Organisation Improve Erosion and Sediment Control Policies and Practices?**

Respondents strongly identified that key areas for improvement are tied to the correct implementation of E&SC Controls (50%), and in particular the establishment of stronger rules and requirements, metrics and standards, and the availability of training designed to assist stakeholders in effective implementation of E&SC measures. People also noted that other proactive efforts that limit erosion would be where most of the benefits were gained, including good protocols for maintenance, monitoring and enforcement (35.7%). All respondents that identified higher financial penalties would lead to improved E&SC performance came from municipalities, while all respondents who identified that they felt no improvement was needed were from industry.



Figure 5: What Ways Can Your Organisation Improve Erosion and Sediment Control Policies and Practices?



### 3.8 Does Your Organisation Currently Offer Erosion and Sediment Control Training to Employees? If so, What Type of Training and Professional Designations are required?

With respect to E&SC training, 66.7% of respondents identified that they provide some form of instruction to staff. Among these respondents, 20.7% simply confirmed the availability of training, while 41.4% identified that they provided Certified Inspector of Sediment and Erosion Control (CISEC) training (i.e., municipal, industry and agency respondents) and 3.4% identified that they provided training on how to implement legislation (i.e., an agency respondent). The 33.3% of respondents whose organizations did not provide training came from a diverse mix of sectors and communities, including municipalities, industries, agencies and First Nations.



Some respondents noted that they did not endorse CISEC, and have developed their own training protocol that focused on project design and proactive mitigation measures to reduce erosion, such as tree clearing protocols and appropriate phasing of construction to reduce non-vegetated and/or exposed soil that is susceptible to erosion. Other respondents identified the need for training that targeted specific groups within the development process who needed to gain further training and awareness around E&SC. In particular, this proposed training included the Certified Professional in Erosion and Sediment Control (CPESC) designation for designers of E&SC controls, CISEC for inspectors of E&SC control implementation, an E&SC installer program for contractors who implement E&SC designs and an introduction to E&SC program for municipal employees, provincial agencies who may implement construction projects that require E&SC management and for developers who may need to understand the value of E&SC mitigations for their project implementation.

Points for Consideration:

- Should the LSRCA and its member municipalities formally endorse CISEC as the recommended training for all industry and regulatory personnel working in E&SC implementation and enforcement in the Lake Simcoe Watershed?

### **3.9 Would your Organization Support Self-Inspection and Assessment with a Public Declaration by a Qualified Professional?**

In terms of industry led monitoring and reporting, the vast majority of key informants supported the public declaration by a qualified professional (82.8%), although 24.1% of respondents (i.e., from agencies and municipalities) cautioned that the selection of the correct professional body would be important to their support. Respondents generally identified that professional engineers would be best suited for providing public declarations; however they may need additional training in E&SC prior to being a qualified professional.

Points for Consideration:

- What educational, professional designation and experiential criteria should be required for the qualified professional in E&SC?

### **3.10 What are Practical and Acceptable Strategies to Increase Funding for Inspections and Enforcement of Erosion and Sediment Control Measures?**

As identified above, the vast majority of key informants did not feel adequate enforcement existed within the existing E&SC management framework. The level of enforcement was generally tied to the funding gap of some regulators to enforce E&SC. In particular, enforcement capabilities for municipalities are correlated to their tax base. More populous municipalities, therefore, have more resources to pay for enforcement. The research also found that less populated municipalities seem to lack enforcement capabilities due to a funding and human resources gap, although they often had a larger physical area within their jurisdiction. This was especially challenging for municipalities that have high growth targets identified in the Growth Plan for the GGH, Simcoe Area Amendment (2012), and therefore large construction and residential development projects that are ongoing within their jurisdictions, without the existing population base to support E&SC enforcement during construction phase. Thus, a key issue to resolve is the identification of practical and acceptable strategies to increase funding for inspections and enforcement. Respondents described a number of potential measures through which to gather the appropriate funds. The majority of key informants (58.6%) felt that developers should pay the costs associated



with E&SC enforcement. While municipalities and agencies were of this view, surprisingly, industry respondents (which included the consulting industry) also selected this option more frequently than other methods. One industry respondent suggested that a percentage of the permit fees directed to the CA should be used towards enforcement, in the case of agencies with the ability to collect permit fees. Municipalities who have better processes of linking permit fees (and other money) to required level of effort for inspection have less resourcing problems. Some municipalities are considering implementing a Stormwater Utility fee (similar to garbage collection and other municipal service fees) to pay for inspection of new developments, and also for maintenance and improvements of existing infrastructure.

The Town of Aurora already has a Stormwater reserve funding approach established in 1998, which in part, supports efforts to review and track E&SC plans implemented within their jurisdiction through responding to any complaints or issues of deficiency, as reported.

The Town of Newmarket, City of Orillia, and City of Barrie are all exploring the future potential for implementing Stormwater Utility fees within their jurisdiction, as funding mechanisms to address stormwater infrastructure renewal, operation and maintenance (O&M). E&SC plan tracking and enforcement, staff resources as well as capital improvements.

Stormwater Utility fees are already being implemented in southern Ontario municipalities, including the Cities of Kitchener and Mississauga.

Points for Consideration:

- What processes can municipalities use to link permit fees to the required level of effort that they will have to spend on inspection and enforcement of E&SC for projects within their jurisdictions?
- How successful have storm water utility fee programs in Kitchener and Mississauga been? Is there a high cost for implementing these programs? Are they generating enough resources for improved E&SC performance? Have they been well received by the general public and developers within these jurisdictions?



## 4.0 RESEARCH FINDINGS AND RECOMMENDATIONS BY STAKEHOLDER GROUPS

### 4.1 Regulators

#### Federal and Provincial Regulators

Federal and provincial agencies responsible for the management of E&SC in the Lake Simcoe Watershed noted that they have a reduced mandate which has limited their enforcement capacity. For instance, the DFO's mandate has been limited to the discharge of deleterious substances and impairment of fish habitat, while the MNR focus is on endangered species and their habitat. The MOECC no longer has a role in the regulation of E&SC compliance in the Lake Simcoe watershed; however, they support knowledge transfer and investments in innovative technologies through the funding of pilot programs. Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA), on the other hand is not a regulator, but a provincial agency that is tasked with providing capacity development mechanisms, such as best management practices and resources for farmers.

The reduction of capacity of federal and provincial agencies has increased the responsibility of local actors such as CAs, regional municipalities and municipalities to regulate and enforce compliance with E&SC requirements of users within their jurisdiction. The research indicated that local actors were expected to adapt to the reduced mandate of federal and provincial agencies. One of the findings of the research is that local actors (municipal, industry, First Nations) have not been formally provided with information about the change in the mandate of federal and provincial agencies, and are therefore unclear about who is responsible for enforcing E&SC compliance. In particular, there was no clear understanding amongst respondents if the CAs or municipalities were ultimately responsible for assuring that E&SC controls were dutifully implemented. This uncertainty was greatest in small municipalities where funding and human resources were most constrained.

Recommendation:

- Different levels of government may not have a clear understanding of who is responsible for approval, inspection and enforcement of E&SC plans, particularly when Projects operate in multiple jurisdictions. It is recommended that more specific guidance should be provided by the Provincial government on how E&SC performance should be approved, inspected and enforced by all relevant levels of government (Provincial Ministries, Regional Municipalities / Municipalities, CAs).

#### Regional Municipalities / Municipalities

Municipalities are largely responsible for the issuing permits for development within their jurisdictions, which include the requirements related to E&SC management. Most municipalities have by-laws in place that address E&SC management through site alteration by-laws, fill by-laws<sup>5</sup> or comprehensive development agreements. They are also responsible for ensuring the public works projects are in compliance with E&SC control measures. The conditions of municipal approval may involve ensuring that other approvals are gained from other agencies (i.e., permits from CAs on designated lands, permits from MNR on crown lands or if endangered species are present).

This research indicates that the capacity of municipalities to develop and implement comprehensive regulations, and monitor and enforce compliance is correlated to the size of their constituency (i.e., tax base). Populous

<sup>5</sup> Fill' means any type of material deposited or placed on lands and includes soil, stone, concrete, asphalt, sod or turf



municipalities oftentimes have sufficient financial resources for their staff to develop appropriate by-laws, review and approve development proposals and review monitoring reports after large storm events or on a monthly basis, as required. They also are able to have dedicated personnel to regularly go to construction sites and ensure that E&SC controls are being correctly implemented. Most populous municipalities are also able to keep up with the pace of development because they have appropriate processes for linking permit fees (and other money) to the required level of effort for inspection, and can therefore hire more staff as needed.

The more rural and less populated municipalities in the Lake Simcoe Watershed face greater policy development, approval and enforcement challenges to effectively manage E&SC in their jurisdictions. This is due to their smaller tax base, and oftentimes the large areas within their municipal boundaries where monitoring and enforcement have to take place. In addition, these smaller municipalities are oftentimes looking to attract investments into their communities and their Councils are therefore more reluctant to institute high permit fees and other development charges that cover the cost of their staff approving, monitoring and enforcing E&SC controls. Smaller municipalities are also less inclined to impose requirements for financial securities or letters of credit to pay for any potential remediation work that they may have to do on behalf of private developments. Capacity issues were listed as one of the greatest challenges in municipalities such as Oro Medonte, Ramara, Kawartha Lakes, Georgina and the Township of Brock. These municipalities oftentimes indicated that they were looking for additional support to effectively manage E&SC in their jurisdictions. They identified that this support could come from the CA, Regional Municipalities or the Province. Some respondents also noted that there may be an opportunity to enter into an agreement with more populous neighboring municipalities who have policies, including engineering standards in place, to increase their capacity. This model is currently in place in Barrie and Georgina, where the two municipalities currently share a chief engineer.

A number of municipal respondents also note that the management of E&SC at existing developments, public works and roadways is also an area where policies need to be developed, and that there is currently a gap for existing developments.

Recommendation:

- Institutionalize processes for increasing the capacity of smaller municipalities through collaboration with provincial agencies, regional municipalities, larger neighbouring municipalities or CAs, as appropriate.

### Conservation Authorities

CAs, including the LSRCA are mandated through the Conservation Authorities Act (1990) to provide authorization for any development or site alteration activities undertaken in regulated areas. Regulated areas of the watershed generally include locations near watercourses, valleys, wetlands and shorelines. Property owners must obtain a permit from the CA before beginning any development, site alteration, construction, or placement of fill within the regulated area.

The LSRCA provides review services to member municipalities (all municipalities in the Lake Simcoe watershed, excluding Orillia) and two regional municipalities (York and Durham). The larger municipalities such as Barrie, Aurora and Newmarket require the LSRCA to issue permits for municipal projects and private development projects in regulated areas only. Representatives of these municipalities have indicated that they have sufficient capacity to approve monitor and enforce E&SC compliance in their jurisdiction. On the other hand, respondents who represented smaller municipalities within the watershed noted that they require additional support from the



LSRCA in identifying controls, monitoring and enforcing compliance in projects throughout their municipality, not only in the regulated areas.

The LSRCA also plays an important role in knowledge transfer and the standardization of by-laws throughout all municipalities in the watershed. Their facilitation of working groups, such as the quarterly Stormwater Management Technical Working Group (SWM TWG) represents a forum where provincial, municipal and regional municipal regulators overseeing stormwater management and E&SC practice can work together to develop harmonized approaches for watershed management. The SWM TWG is also open to consultants, suppliers and others involved in the sector to share best management practices (BMPs) and present new technologies (e.g., online multi-user platforms for monitoring and enforcement, LID methods, etc.). These meetings are well attended, and many respondents in the study identified that the working groups and the LSRCA's roles in capacity development was an important and valuable contribution to the management of the Lake Simcoe watershed. One of the key outcomes of the working group has been the development of the 'Draft Lake Simcoe Watershed Model By-Law for Municipalities' which aims to standardize stormwater management and E&SC requirements throughout municipalities in the watershed. To date, 1 municipality (Town of Aurora) has adapted / adopted the model by-law and 1 municipality (Town of Newmarket) is in the process of updating their current site alteration by-law incorporating language from the model by-law, and having their councils review the by-law in anticipation of adoption.

Respondents from the LSRCA reported two main challenges in carrying out their mandated role in designated areas and additional support and capacity building role. The greatest challenge that was noted is that the LSRCA has limited enforcement capacity to 'Immediately Stop Work' at Project sites where E&SC is not being adequately undertaken. This lack of enforcement capability hinders the CA's ability and respondents from the LSRCA noted that a solution needs to be found, either in a revision to the Conservation Authority Act (1990) to grant them this power, or through agreements with member municipalities to issue Stop Work orders on the LSRCA's recommendation.

A second challenge identified by the LSRCA is that the increased demand for services, including support to municipalities outside of regulated areas, needs to be appropriately resourced, in terms of people and funding. In addition to the federal and provincial funding received by the LSRCA, their work is also paid for by permit fees that range from \$150 for minor permits to \$28,000 as the maximum fee for draft subdivision plan approvals (LSRCA 2015a). The LSRCA receives funding from member municipalities that accounts for almost 64% of their operating expenditures (LSRCA 2015b). One innovative approach has been the model that the LSRCA and Regional Municipality of York have developed. The Regional Municipality of York provides funds to the LSRCA to hire staff that are dedicated to their projects to ensure that the CA has capacity for Projects in their jurisdiction. There is a potential for this model to be adopted with other municipalities so that the LSRCA can provide services to them outside of regulated areas.

#### Recommendations:

- The LSRCA should look for mechanisms to increase their capacity to support member municipalities in the review, approval, inspection and enforcement of E&SC performance within and outside designated areas. This will include identifying ways to raise financial resources to support member municipalities.



- The LSRCA should continue to provide a knowledge transfer and facilitation role to member municipalities and other stakeholders (First Nations, Industry, Academia, other governmental agencies) in E&SC, as well as other emerging issues (i.e., fill management and soil remediation).

## 4.2 Users: Industry and First Nations

### Developers

Property developers, their consultants (E&SC engineers, certified inspectors) and building contractors were all interviewed as part of this study and this section includes findings from these stakeholder groups. In total, six representatives from the property development industry were interviewed as part of this study.

A large proportion of respondents working in the property development industry noted that they would support E&SC standards and guidelines that do not provide a competitive advantage based on the jurisdiction of their project and that they prefer an equal playing field for all those operating in their sector. One example of this approach, which was highlighted through this study is the model used in the aggregates industry. A respondent from the aggregate sector noted that they were very clear about what was required from them, in terms of E&SC, as all requirements were outlined in the Aggregate Resources Act (1990) and therefore they followed similar protocols at all their properties in Ontario. Key components included receiving a license or permit from the Province based on the size of their operations, regular inspection and enforcement protocols, compliance reporting by a qualified professional that must be submitted annually to the Province, regional municipality and local municipality. A standard compliance assessment report form, which includes a checklist for distribution to ensure that all relevant authorities are kept informed, was required to be completed for all compliance reports.

This was in line with responses from an engineering consultant who designed E&SC mitigations for large subdivision projects. They noted that standardized regulatory and monitoring requirements, along with consistent enforcement would be a driver for their clients to give high priority to E&SC, and internalize requirements into construction costs. Consultants and contractors also indicated that the developer was the one who drove E&SC performance. If they demand it and pay for it, consultants and contractors would implement it. The E&SC expectations, and related costs should be laid out in contract documents, and contract documents should also have contingency budgets to ensure that resources are available for effective management.

Construction firms contracted to build projects also noted that it would be useful if E&SC was internalized by the developers into construction costs and the process of selecting construction firms. In addition, they noted that funds should be allocated in the construction budget for implementing and maintaining E&SC measures. Industry respondents and regulators both identified that it would be beneficial to have dynamic E&SC plans that could adapt to changing conditions at site, and that there be closer interaction between regulators (municipal and CA enforcement officers), developers, consulting engineers and contractors to put in place appropriate measures based on conditions and circumstances at site.

#### Recommendations:

- Developers should consider identifying BMPs in E&SC management in their internal corporate policies so that similar standards are applied at all their projects, irrespective of any differences in by-laws or legislative requirements in the different jurisdictions where they operate.



- Developers should include the costs of implementing E&SC measures (including contingency money for any unforeseen remediation activities that are required) into their construction contracts. Consideration should be given to using E&SC performance of construction contractors as a criterion for awarding contracts.

### Agriculture Sector

Representatives of two agricultural organizations in the Lake Simcoe Watershed were interviewed for this research. The most common theme that arose from the research was that the quality of land and soil is very important to farmers. The primary driver for limiting erosion was to stop the amount of topsoil that was lost from soil and wind erosion as it is very valuable for agricultural productivity. Respondents indicated that E&SC management at their properties was in the farmer's best interest. This finding was corroborated by the OMAFRA who noted that financial drivers are important for farmers, and that farmers see value in erosion control once it affects their bottom line – i.e., receive low yields due to deteriorating soil quality.

Respondents from the farming community also noted that E&SC rules and regulations must be developed in consideration of the scale of activities and capabilities of individual farmers. Some examples that were highlighted included the requirements for farmers for site alteration and cleaning out ditches. Respondents noted that some of the requirements imposed on farmers included expensive engineering studies and permits from government agencies for 'small site alterations such as clearing out man-made ditches or the construction of grain silos on their properties'. These activities that may cost anything from a few hundred to a few thousand dollars became too expensive for farmers when they were required to do engineering studies requiring expensive consultants. In these cases, farmers may circumvent the rules and undertake ditching and/or small construction activities without the necessary approvals as they perceive that it is unlikely that the municipality will enforce penalties for their non-compliance. Instead of this circumvention of the rules, respondents noted that if cost-effective requirements for farmers were developed, there would be greater compliance with the rules.

Respondents also noted that if engineering studies including E&SC plans prepared by engineers are required for developments on their properties, there should be funding made available to farmers to implement these programs. In terms of farmers' uptake of funding opportunities, OMAFRA noted that there was high participation of their Growing Forward Program (Phase 1 and 2), and that farmers are willing to apply for funding and implement BMPs identified in these programs if they believe that they will see economic gains.

An example of one success has been the Holland Marsh Drainage System Joint Municipal Services Board (HMDS JMSB). The Board is charged with the development and maintenance of the drainage system. Property owners pay a standard rate to the HMDS JMSB based on the size of their property for the maintenance of ditches. The Board is charged with maintaining and improving both public and private ditches in line with best practice, including E&SC BMPs. This model may be one way to improve E&SC performance in municipalities that have large amounts of rural lands that are privately held, so that the burden of responsibility is shared between public and private stakeholders and E&SC best practices are implemented.

#### Recommendations:

- Site alteration requirements for farmers should be tailored to the scope and scale of these activities, and the abilities of farmers to implement the requirements; and
- Programs such as the HMDS JMSB should be developed to institutionalize E&SC management in agricultural regions, when these projects make sense and are supported by local farmers.



### First Nations

Representatives of two First Nations with reserve land and traditional territory in the Lake Simcoe Watershed were interviewed as part of this research. Both communities noted that environmental stewardship and sustainable development were priorities for their communities and they were committed to implementing development projects in consideration of the health of the Lake Simcoe Watershed. In particular, representatives of Georgina Island noted that being a community in the middle of Lake Simcoe, the health of the Lake was important to every aspect of their lives. They also noted that Elders within their community noted that in recent times, the Lake had a different smell and that the fish smelt and tasted different, which for them indicated that there was an adverse change in the health of Lake Simcoe.

First Nations communities are committed to implementing the necessary regulations and BMPs when undertaking development on their land. They actively participate in working groups and committees (i.e., Source Water Protection Committee, Lake Simcoe Protection Plan Committee) that support sustainable watershed management. While some First Nations communities do have some substantial challenges with regard to capacity to implement environmental management systems, it was also noted that communities regularly hire specialized consultants to support them when there is no in-house capacity to implement projects.

One finding of the research study, however, was that E&SC management was not high on the radar of First Nations representatives interviewed. In terms of the Lake Simcoe Watershed, First Nations communities were much more aware of the effects of phosphorus, salting, illegal fill and non-E&SC spills management. From observations through the interview process, it did appear that E&SC management was an issue that First Nations communities interviewed had limited awareness about and did not have significant management systems in place to manage.

Recommendation:

- Provincial agencies and CAs should continue to work with First Nations to increase their awareness of E&SC management, support initiatives that promote improved E&SC performance in their communities and support First Nations commitment to environmental stewardship of the Lake Simcoe watershed.



## 5.0 ADDITIONAL FINDINGS AND RECOMMENDATIONS

### 5.1 Training

Education and training was noted as one of the most important aspects of increasing awareness and capabilities to identify, implement and monitor E&SC performance. As identified in Section 3, 66.7% of all organizations interviewed confirmed that they provided E&SC training to their staff. Of these, approximately 62% of organizations used the CISEC training program for their staff. Although some organizations have developed their own training protocols for their staff, In terms of municipal respondents, 8 out of the 11 (73%) of municipalities and regional municipalities interviewed indicated that they provided E&SC training to their staff. Seventy-five percent of municipalities who offered E&SC training used CISEC. It is therefore apparent that CISEC has been well adopted by both regulators and the industry and provides a good standardized basis for building capacity of individuals who are responsible for E&SC implementation, regulation and enforcement. There are also opportunities to develop and offer additional training on E&SC as it relates to the regulatory environment, use of technology and BMPs to increase the capacity of those working in the sector.

Recommendation:

- Continue to ensure availability of CISEC and other training opportunities within the Lake Simcoe watershed. Develop training or integrate training around the rules and regulations that must be adhered to, in Lake Simcoe context, for effective E&SC performance.

### 5.2 Self-Assessment and Declaration by a Qualified Professional

One of the research objectives was to identify if regulators and industry were supportive of self-inspection and assessment of E&SC performance through a public declaration by a qualified professional. This approach is used in several instances, including certifying that aggregate projects are in conformance with their permits and/or licenses (Ontario Aggregate Resources Act 1990); project applications for Permits to Take Water (Ontario Water Resources Act 1990); and Mineral Disclosure Standards (National Instrument 43-101). In all cases a person with a professional designation such as a Professional Geologist or Professional Engineer are used for this certification. The professional designation is used to ensure that the person has the appropriate education and their membership to the professional body includes that they have an ethical obligation to truthfully report their findings. A third aspect of being a qualified professional is that the qualified person must show that they have a minimum number of years of experience working in their field. In the case of a National Instrument 43-101 Qualified Person, this experiential requirement is five years (TMX Group 2015).

While the majority of respondents, 83%, supported the use of self-inspection and assessment by a qualified professional, approximately half of these people posed the question 'who is qualified'? In line with other such initiatives, it is important that a qualified professional has the correct education, association to a professional body and a minimum level of experience. Many respondents noted that the qualified person should be a professional engineer who has a requisite amount of experience and training in E&SC. It may also be judicious to ensure that they have specific training on E&SC through CISEC or equivalent training.



Recommendation:

- Develop a profile of what a Qualified Professional in E&SC should be (i.e., educational, professional designation and experiential criteria) and work with regulators to ensure that there are standardized expectations of who can provide declarations of E&SC performance for industry-led monitoring and reporting processes.

### 5.3 Use of Technology for Tracking, Inspection, and Enforcement

The use of innovative technologies was proposed by a number of respondents interviewed from municipal, industry and academic stakeholders. Technologies that are currently being used include web based monitoring and reporting applications, which can be used on smartphones or tablets in the field and use pictures and geo-referencing to instantly enable information to be accessed by a distribution list that may include project proponents and their consultants and contractors and municipal, CA and other regulators. These apps provide a low cost and low effort way to collect and distribute E&SC monitoring reports, and allow for tracking follow-up activities if any actions are required in real time.

The municipality of Barrie has also installed a rain gauge that provides notification to all users on its distribution list if there is a significant amount of rainfall within a certain period of time. The distribution list sends an email to municipal engineers and other relevant staff, developers and their engineers of active construction sites in the municipality.

Other examples of technologies that are being used include the use of drones after storm events to provide aerial photos and video to identify any erosion or sediment spills. Drones are being used by several municipalities and engineering consulting firms working in the Lake Simcoe Watershed.

Recommendations:

- Undertake an inventory of all technology currently being used for E&SC management and identify technologies that may support improvement in E&SC performance in the Lake Simcoe watershed; and
- Continue to showcase and highlight different technologies, and their applications at the LSRCA Stormwater Management Technical Working Group Meetings to educate stakeholders and identify options that can be adopted within the Lake Simcoe watershed.

### 5.4 Soil Remediation and Testing

The study aimed to collect information from respondents about the policies and procedures that they had in place to address excess soil and fill<sup>6</sup> management and disposal, including contaminated soil. Many respondents, including the LSRCA and MOECC noted the illegal disposal of contaminated soil is a significant problem in municipalities of the Lake Simcoe Watershed.

Respondents noted that the transport and illegal dumping was controlled by illicit groups (nicknamed Dirt Jockeys) who sought to circumvent legal chain-of-custody processes. According to respondents, much of the contaminated

---

<sup>6</sup> "fill" means any type of material deposited or placed on lands and includes soil, stone, concrete, asphalt, sod or turf either singly or in combination.



soil was brought in from Toronto and other GTA municipalities and was a by-product of high levels of condominium, subdivision and retail commercial development and densification.

Respondents from several municipalities noted that they have put a temporary moratorium on receiving any fill into their municipalities until appropriate regulations, chain-of-custody, testing and enforcement mechanisms can be put in place to manage illegal fill entering their municipalities. As with the development of E&SC management strategies, there is an opportunity for collaboration between stakeholders to strengthen policies to manage fill in the Lake Simcoe Watershed.

Recommendations:

- Undertake a research study (similar to this E&SC study) that identifies existing pieces of legislation and guidance that apply to fill management and soil remediation in the Lake Simcoe watershed and Province of Ontario;
- Undertake research with stakeholders to more fully understand issues that drive and deter the adoption of effective fill management processes; and
- Identify opportunities to strengthen fill management processes (implementation, inspection, monitoring and enforcement) in the Lake Simcoe watershed.

### 5.5 Consolidated Erosion and Sediment Control Standards

A key finding of this research is that a consolidated E&SC standard should be developed in consideration of all existing legislation, by-laws and guidance documents. This standard should provide technical direction based on scientific knowledge. It should be implemented in consideration of watershed health and sustainability. Many respondents noted that the standard should be developed by the Provincial Government so that requirements are standardized throughout the province for all users (Municipalities, Industry, First Nations and Farmers) to avoid different rules for different regions of the Province.

There is also a role for CAs to provide specific criteria for their jurisdictions based on watershed requirements.

Recommendations:

- Identify the appropriate level of government, or government agency, to develop an E&SC standard. The majority of respondents noted that this could be the Provincial Government or Conservation Authority
- Develop a clear E&SC standard in consideration of all existing legislation, by-laws and guidance documents. This standard should provide technical direction based on scientific knowledge and metrics.
- The E&SC standard should be based on sector, rather than jurisdiction. That is, subdivision developers should face similar requirements irrespective of the municipality in which they operate. This should also apply for other sectors (i.e., agriculture, aggregates, linear infrastructure).



### 6.0 CONCLUSION

E&SC, as part of overall stormwater management, is an important aspect of the water quality and health of the Lake Simcoe watershed. With high levels of population growth and associated property development projected for municipalities of the watershed, proactive management is required to ensure that Lake Simcoe and its tributaries remain an important area for traditional and non-traditional livelihoods, recreation, tourism and development.

LSRCA's Stormwater Management Technical Working Group is a valuable forum for cross-learning and collaboration of stakeholders. Research participants who did not participate in the working group, however, were less informed about the efforts being made to address E&SC such as the development and implementation of the Lake Simcoe Watershed Model By-Law for Municipalities. There is an opportunity, therefore, to increase awareness and outreach activities with stakeholders such as property developers, consultants, contractors, farmers and their associations, First Nations, Provincial Agencies (excluding the MOECC) about the work being done by the LSRCA and its provincial government, municipal government and industry partners. This outreach may also enable partnerships to be formed between stakeholders with more and less capacity, with the intention of increasing the overall performance of all actors working in the field of E&SC in the Lake Simcoe watershed.

Continued funding and other resource opportunities need to be realized through support and leadership from MOECC and the LSRCA, to move the recommendations from this study forward, to support meeting LSPP, and to develop policies that support better E&SC practice in the following key areas:

- Training / Professional Accreditation;
- Implementation, Monitoring,, Inspection and Enforcement; and
- E&SC Standardization.

The MOECC, LSRCA and other appropriate agencies (including the DFO, MTO, MNRF, OMAFRA and other GTA CAs) should develop a strategy for the Lake Simcoe watershed that addresses the key findings and recommendations presented in this study.



### 7.0 WORKS CITED

- AMEC. 2013. Drainage and Stormwater Management Master Plan - City of Barrie. Available at: <http://www.barrie.ca/City%20Hall/growth/Documents/Oct.%202013%20-%20DSWM%20MP-Final%20-%20Report.pdf>. Accessed December 1, 2015.
- City of Barrie. 2014. Official Plan. Prepared by the Planning Services Department. Available at: <https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwji17aXk8nJAhUQpIMKHYm7BmcQFggeMAA&url=http%3A%2F%2Fwww.barrie.ca%2FDoing%2520Business%2FPlanningandDevelopment%2FDocuments%2FOfficial-Plan-text.pdf&usg=AFQjCNHJgXWJ-EE4DWgumgDEw9IEjGZglQ&sig2=qoEoz8ljEHHDxRjFtXwP9A>. Accessed December 1, 2015.
- City of Barrie. n.d. City of Barrie By-laws. Available at: <http://www.barrie.ca/City%20Hall/By-laws/Pages/by-laws.aspx>. Accessed December 1, 2015.
- City of Orillia. 2015. Stormwater Master Plan. Available at: <http://www.orillia.ca/en/livinginorillia/StormwaterMasterPlan.asp>. Accessed December 1, 2015.
- City of Orillia. 2010. The City of Orillia Official Plan. Available at: <http://www.orillia.ca/en/doingbusinessinorillia/officialplan.asp>. Accessed December 1, 2015.
- Conservation Ontario. 2013. The Clean Water Act. Available at: <http://www.conservation-ontario.on.ca/what-we-do/source-water-protection>. Accessed December 1, 2015.
- Environment Canada. Lake Simcoe/Southeastern Georgian Bay Clean-Up Fund (LSGBCUF). 2013. Available at: <http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=EBF944F0-1>. Accessed December 1, 2015.
- GGH Area Conservation Authorities. 2006. Erosion and Sediment Control Guidelines for Urban Construction. Available at: [https://www.google.ca/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwj\\_qZaBjMLJAhWDqIMKHRFXAZEQFggeMAA&url=http%3A%2F%2Fwww.trca.on.ca%2FdotAsset%2F40035.pdf&usg=AFQjCNHr7voXn86q8gaWg9zmF3MYx72mfw&sig2=C9x6GdkfOslEdKLDzu\\_0nw](https://www.google.ca/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwj_qZaBjMLJAhWDqIMKHRFXAZEQFggeMAA&url=http%3A%2F%2Fwww.trca.on.ca%2FdotAsset%2F40035.pdf&usg=AFQjCNHr7voXn86q8gaWg9zmF3MYx72mfw&sig2=C9x6GdkfOslEdKLDzu_0nw). Accessed December 1, 2015.
- Government of Canada. 2015. Fisheries Act R.S.C., 1985, F-14. Current to November 16, 2015. Available at: <http://laws-lois.justice.gc.ca/PDF/F-14.pdf>. Accessed November 25, 2015.
- Government of Ontario, Drinking Water Source Protection, Lake Simcoe Conservation Authority, Severn Sound Environmental Association and Nottawasaga Valley Conservation Authority. 2015. Approved South Georgian Bay Lake Simcoe Source Protection Plan. Available at: <http://www.ourwatershed.ca/assets/downloads/spp/2015-approved-source-protection-plan.pdf>. Accessed December 1, 2015.
- Government of Ontario. 2015a. Ontario Water Resources Act, R.S.O. 1990, C. O.40. Consolidation Period from January 1, 2015. Available at: <http://www.ontario.ca/laws/statute/90o40>. Accessed November 26, 2015.
- Government of Ontario. 2015b. Safe Drinking Water Act, 2012, S.O. 20012, C. 32. Consolidation period from January 1, 2015. Available at: <http://www.ontario.ca/laws/statute/02s32>. Accessed December 1, 2015.



- Government of Canada. 2015c. Environmental Protection Act, R.S.O. 1990, C. E. 19. Consolidation period from April 24, 2015. Available at: <http://www.ontario.ca/laws/statute/90e19>. Accessed December 1, 2015.
- Government of Ontario, 2013. Growth Plan for the Greater Golden Horseshoe, 2006. Available at: [https://www.placestogrow.ca/index.php?option=com\\_content&task=view&id=9&Itemid=14](https://www.placestogrow.ca/index.php?option=com_content&task=view&id=9&Itemid=14). Accessed November 26, 2015.
- Government of Ontario. 2012a. Fish and wildlife Conservation Act, 1997, S.O. 1997, c. 41. Current to June 20, 2012. Available at: <http://www.ontario.ca/laws/statute/97f41>. Accessed November 25, 2015.
- Government of Ontario. 2012b. Clean Water Act, 2006, S.O. 2006, C.22. Available at: <http://www.ontario.ca/laws/statute/06c22>. Accessed December 1, 2015.
- Government of Ontario. 2012a. Lakes and Rivers Improvement Act, R.S.O. 1990, C. L. 3. Consolidation period from June 20, 2012. Available at: <http://www.ontario.ca/laws/statute/90l03>. Accessed December 1, 2015.
- Government of Ontario. 2012b. Public Lands Act, R.S.O. 1990, P. 43. Consolidation period from June 20, 2012. Available at: <http://www.ontario.ca/laws/statute/90p43>. Accessed December 1, 2015.
- Government of Ontario. 2012c. Planning Act, 1990, C.P.13. Consolidation period from January 1, 2012. Available at: <http://www.ontario.ca/laws/statute/90p13>. Accessed December 1, 2015.
- Government of Ontario. 2011. Conservation Authorities Act, R.S.O. 1990, C.27, consolidation period from June 6, 2011. Available at: <http://www.ontario.ca/laws/statute/90c27>. Accessed November 26, 2015.
- Government of Ontario. 2010a. Environmental Assessment Act, R.S.O. 1990. C. E. 18. Consolidated period from October 25, 2010. Available at: <http://www.ontario.ca/laws/statute/90e18>. Accessed December 1, 2015.
- Government of Ontario. 2010b. Water Opportunities and Water conservation Act, 2010, S.O. 1010, C. 19-Bill 72. Available at: <http://www.ontario.ca/laws/statute/s10019>. Accessed December 1, 2015.
- Government of Ontario. 2010c. Nutrient Management Act, 2002, S.O. 2002, C.4. Consolidation period from January 1, 2010. Available at: <http://www.ontario.ca/laws/statute/02n04>. Accessed December 1, 2010.
- Government of Ontario. 2009a. Lake Simcoe Protection Plan. Available at <https://www.ontario.ca/page/lake-simcoe-protection-plan>. Accessed December 1, 2015.
- Government of Ontario. 2009b. Aggregate Resources Act R.S.O. 1990. Consolidated period from December 15, 2009. Available at: <https://www.ontario.ca/laws/statute/90a08>. Accessed January 15, 2016.
- Government of Ontario. 2008. Endangered Species Act, 2007, S.O. 2007, C. 6. Consolidation period from June 30, 2008. Available at: <http://www.ontario.ca/laws/statute/07e06>. Accessed December 1, 2015.
- LSRCA. 2015a. Planning and Development Fee Policy 2015. Available from: [http://www.lsrca.on.ca/permits/permit\\_fees.php](http://www.lsrca.on.ca/permits/permit_fees.php) [Accessed 1 Feb 2016].
- LSRCA. 2015b. LSRCA 2015 Annual Report. Available from: [http://www.lsrca.on.ca/about/annual\\_report.php](http://www.lsrca.on.ca/about/annual_report.php) [Accessed Feb 1 2016]



- LSRCA. 2011. Comprehensive Stormwater Management Master Plan Guidelines. Available at: [http://www.lsrca.on.ca/pdf/reports/swm\\_master\\_plan\\_guidelines.pdf](http://www.lsrca.on.ca/pdf/reports/swm_master_plan_guidelines.pdf). Accessed December 7, 2015.
- Marshall Macklin Monaghan. 2005. Stormwater Management Plan for the City of Orillia. Prepared for the City of Orillia. Available at: <http://www.orillia.ca/en/livinginorillia/StormwaterMasterPlan.asp>. Accessed November 25, 2015.
- Ministry of the Environment and Climate Change (MOECC). 2010. Lake Simcoe Phosphorus Reduction Strategy. Available at: <https://dr6j45jk9xcmk.cloudfront.net/documents/872/5-6-4-lake-simcoe-phosphorus-reduction-en-pdf.pdf>. Accessed December 1, 2015.
- Ministry of Transportation Ontario (MTO). 2007. Environmental Guide for Erosion and Sediment Control During Construction of Highway Projects, February 2007.
- MOECC. 2014. Stormwater Management Planning and Design Manual. Available at: <http://www.ontario.ca/document/stormwater-management-planning-and-design-manual>. Accessed December 1, 2015.
- MOECC. 2015. Stormwater management planning and design manual. Available at: <http://www.ontario.ca/document/stormwater-management-planning-and-design-manual>. Accessed December 1, 2015.
- Ontario Provincial Standards. 2006. Ontario Provincial Standards for Roads and Public Works. Available at: <http://www.ops.on.ca/AboutOPS%7C/tabid/38/Default.aspx>. Accessed December 1, 2015.
- Sarvis, G. 2014. Rama commits to source water protection. Available at: <http://www.orilliapacket.com/2014/02/28/rama-commits-to-source-water-protection>. Accessed December 1, 2015.
- TMX Group. 2015. Mining Disclosure: NI 43-101 fundamentals, best practices, and useful guidance for TSX and TSX Venture Issuers. Available from: <https://www.osc.gov.on.ca/en/15019.htm> [Accessed 5 February 2016].
- Town of Aurora. 2015. Landscape Design Guidelines: Subdivision and Site Plan Developments. Available from: <https://www.aurora.ca/Thingstodo/Documents/Parks/Appendix%201,%20Policy%20A%20Landscape%20Design%20Guidelines%20June%202015.pdf>. [Accessed 24 Feb 2016].
- Town of Aurora. 2010. Town of Aurora Official Plan. Available from: <https://www.aurora.ca/TownHall/Documents/Corporate%20Reports/Town%20of%20Aurora%20Official%20Plan%202010.pdf> [Accessed 24 Feb 2016]
- Town of Bradford West Gwillimbury. 2015. Stormwater Management Plan. Available at: <http://www.townofbwg.com/twnsrv/engsrvc/TwnPrjctsCnstrct/StormwaterMP>. Accessed December 1, 2015.



## Report Signature Page

**GOLDER ASSOCIATES LTD.**

Natasha Kone  
Social Specialist

Kevin MacKenzie, M.Sc., P.Eng.  
Associate / Water Resources Engineer

NK/KM/wlm

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

n:\active\2015\3 proj\1530684 lsra\_e&sc research study\_on\07 summary report\1530684 rpt final 2016mar17 lsra research study.docx

As a global, employee-owned organisation with over 50 years of experience, Golder Associates is driven by our purpose to engineer earth's development while preserving earth's integrity. We deliver solutions that help our clients achieve their sustainable development goals by providing a wide range of independent consulting, design and construction services in our specialist areas of earth, environment and energy.

For more information, visit [golder.com](http://golder.com)

Africa	+ 27 11 254 4800
Asia	+ 86 21 6258 5522
Australasia	+ 61 3 8862 3500
Europe	+ 44 1628 851851
North America	+ 1 800 275 3281
South America	+ 56 2 2616 2000

[solutions@golder.com](mailto:solutions@golder.com)  
[www.golder.com](http://www.golder.com)

**Golder Associates Ltd.**  
**6925 Century Avenue, Suite #100**  
**Mississauga, Ontario, L5N 7K2**  
**Canada**  
**T: +1 (905) 567 4444**

