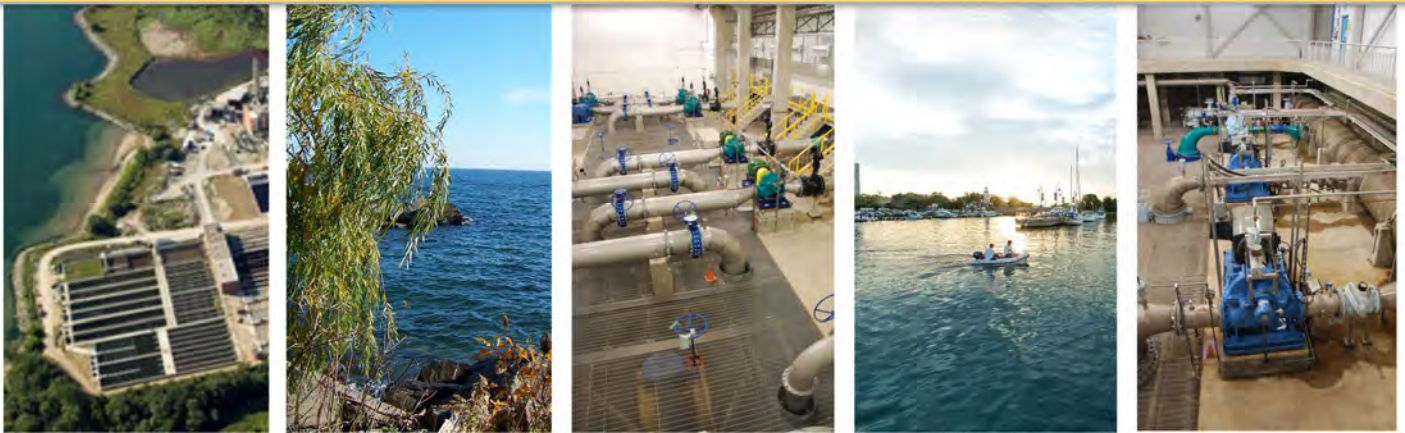


2013 Water and Wastewater  
Master Plan for the Lake-Based Systems



**Volume II - Background and Planning Context**

Final Report  
P001-0005

March 31, 2014



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- Appendix 2A. Water and Wastewater Servicing Principles and Policies Paper
- Appendix 2B. Planning Data
- Appendix 2C. Baseline Natural Heritage Studies Report

## 1 Introduction and Background

### 1.1 Background

The Region of Peel encompasses the area municipalities of the City of Mississauga, the City of Brampton and the Town of Caledon. The Region is responsible for water treatment, transmission and distribution mains, storage facilities and pumping stations, as well as wastewater treatment, sewers, force mains and sewage pumping stations. The Region employs the Ontario Clean Water Agency (OCWA) to operate, maintain and manage the major infrastructure of the lake-based water and wastewater systems, which are referred to as the water transmission system and the wastewater trunk collection system.

The Region of Peel is part of the Greater Golden Horseshoe (GGH) area situated around the western end of Lake Ontario that continues to be one of the fastest growing regions in North America. The Government of Ontario's legislative growth plan, *Places to Grow Act, 2005*, identifies substantial population and employment growth for the GGH to 2031.

Readily available and accessible public infrastructure is essential to the viability of existing and growing communities. Infrastructure planning, land use planning and infrastructure investment require close integration to ensure efficient, safe and economically achievable solutions to provide the required water and wastewater infrastructure.

To balance the needs of growth with the protection and preservation of natural, environmental and heritage resources, the Region of Peel initiated an update of its Water and Wastewater Master Plan.

The 2013 Master Plan provides a review, evaluation and development of water and wastewater servicing strategies for all servicing within the lake-based systems. The lake-based systems service or will service all of Mississauga and Brampton and some areas of Caledon, including Bolton, Mayfield West and, for wastewater servicing, Caledon East. The study does not examine the groundwater-based systems or communal wastewater systems in Caledon. The Master Plan uses updated population and employment growth forecasts based on a 2031 planning horizon.

The 2013 Master Plan builds on previous work undertaken as part of the 1999 Master Plan, the 2002 Master Plan Addendum and the 2007 Master Plan Update. The 2013 Master Plan is a critical component of the Region's planning for growth and will provide the framework and vision for the water and wastewater servicing needs for the lake-based service areas of the Region to 2031 and beyond.

### 1.2 Master Plan Objectives

The Water and Wastewater Master Plan comprehensively documents the development, evaluation and selection of the preferred water and wastewater servicing strategies to meet the servicing needs of existing and future development to 2031.

The 2013 Master Plan evaluates the ability of existing and planned water and wastewater infrastructure in the Region of Peel to efficiently and effectively service the Region's existing and anticipated growth, and to evaluate and develop recommended servicing strategies.

The key objectives of the 2013 Master Plan are as follows:

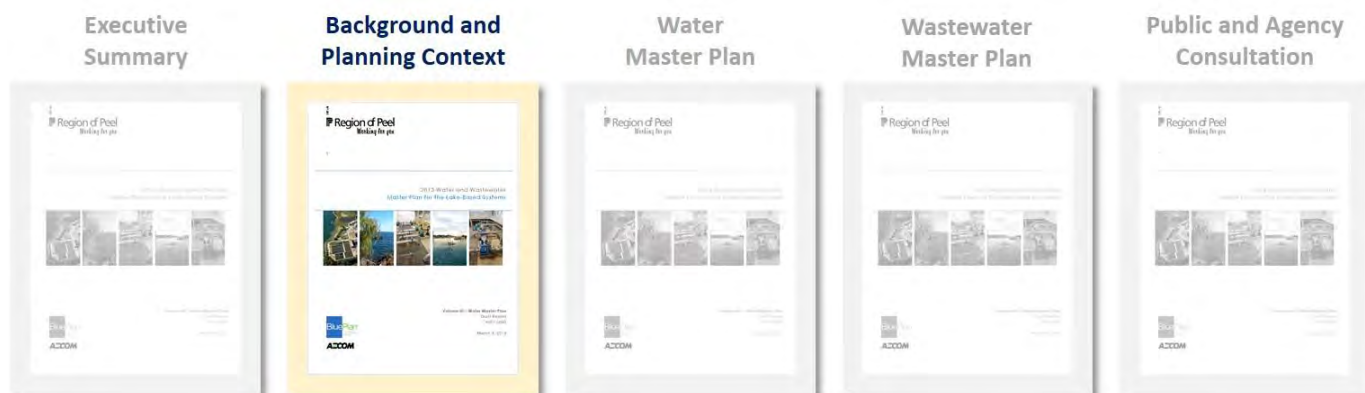
- Review planning forecasts to 2031 and determine the impacts on servicing needs for the Region's lake-based water and wastewater infrastructure;
- Evaluate and incorporate proposed water and wastewater infrastructure needs to 2041 and 2051;
- Review the Region's current lake-based water and wastewater servicing strategies to support the existing servicing agreements with York Region and the City of Toronto;
- Undertake a comprehensive review and analysis for both water and wastewater servicing requirements;
- Address key servicing considerations as part of the development and evaluation of servicing strategies including:
  - Level of service to existing users and approved growth
  - Operational flexibility
  - Security of supply
  - Mitigation of impacts to natural, social and economic environments
  - Opportunity to meet policy, policy statements, regulations and technical criteria
  - Opportunity to optimize existing infrastructure and service strategies
  - Ensuring the strategies are cost effective
- Consider and develop sustainable servicing solutions;
- Utilize updated industry trends and more detailed information from relevant Region studies and projects to provide better capital cost estimates;
- Utilize recently completed and on-going projects to update infrastructure status, capacity and cost estimates;
- Utilize the updated water and wastewater hydraulic models for the analysis of servicing alternatives;
- Establish a complete and implementable water and wastewater capital program; and
- Extensive consultation with the public and stakeholders.

### **1.3 Master Plan Documentation Layout**

The 2013 Water and Wastewater Master Plan Report, including all supporting volumes, is the documentation placed on public record for the prescribed review period. The documentation, in its entirety, describes all required phases of the planning process and incorporates the procedure considered essential for compliance with the *Environmental Assessment Act*.



The Master Plan Report is organized into five volumes as illustrated in Figure 2.1 and as described below:



**Figure 2.1. Master Plan Document Layout**

### **Volume I – Executive Summary**

Volume I provides a brief overview of the 2013 Master Plan, it summarizes the information contained in Volumes II, III, IV and V, including problem statement, purpose of the study, significant planning, environmental and technical considerations, description of the analysis performed and final solutions and recommendations.

### **Volume II – Background and Planning Context**

Volume II details the master planning process including the Master Plan Class EA process, related studies, legislative and policy planning context, water and wastewater servicing principles and policies, population and employment growth forecasts, existing environmental and servicing conditions and future considerations. The appendices in this volume contain relevant baseline and planning information including:

- Appendix 2A . Water and Wastewater Servicing Principles and Policies Paper
- Appendix 2B . Planning Data
- Appendix 2C . Baseline Natural Heritage Studies Report

### **Volume III – Water Master Plan and Project File**

Volume III is the principle document summarizing the study objectives, approach, methodologies, technical analyses, evaluation and selection of the preferred water servicing strategy. The first section provides the context for the evaluation and decision-making processes undertaken to determine the preferred servicing strategy. The second section provides detailed project-specific evaluation and technical supporting documentation for the Water Capital Plan.



### **Volume III – Water Master Plan Appendices**

Technical background information critical in the development of the Water Master Plan is included in the appendices of Volume III. The technical appendices contain relevant project, implementation and technical analysis information, including:

- Appendix 3A . Water Demand Projections
- Appendix 3B . Historical Water Flows
- Appendix 3C . Water Design Criteria and Starting Point Methodology
- Appendix 3D . Water Concept and Strategy Evaluation Tables
- Appendix 3E . Water System Schematics
- Appendix 3F . Unit Costs
- Appendix 3G . 2014 Water DC Map & Capital Plan Projects Map

### **Volume IV – Wastewater Master Plan and Project File**

Volume IV is the principle document summarizing the study objectives, approach, methodologies, technical analyses, evaluation and selection of the preferred wastewater servicing strategy. The first section provides the context for the evaluation and decision-making processes undertaken to determine the preferred servicing strategy, while referring the reader to the second section for detailed project-specific evaluation and technical supporting documentation for the Wastewater Capital Plan.

The second section, the Wastewater Project File, provides detailed project information for selected capital projects. Each file includes technical and financial documentation, including project tracking sheets, evaluation tables, maps and other technical supporting documentation to support the Schedule B projects satisfied under the Master Plan. The Master Plan provides systematic evaluation and documentation to support the Schedule B Class EA requirements as well as applicable review agency commitments prior to their respective implementation.

### **Volume IV – Wastewater Master Plan Appendices**

Technical background information critical in the development of the Wastewater Master Plan is included in the appendices of Volume IV. The technical appendices contain relevant project, implementation and technical analysis information, including:

- Appendix 4A . Wastewater Flow Projections
- Appendix 4B . Historical Wastewater Flows
- Appendix 4C . Wastewater Design Criteria and Starting Point Methodology
- Appendix 4D . Wastewater Concept and Strategy Evaluation Tables
- Appendix 4E . Unit Costs
- Appendix 4F . Model Build and Calibration Report
- Appendix 4G . Trunk Sewer and Pumping Station Schematics
- Appendix 4H . Schedule B Projects

- Appendix 4I . 2014 Wastewater DC Map & Capital Plan Projects Map

## **Volume V – Public and Agency Consultation**

Volume V contains all relevant documentation of the public consultation process including notices, comments and responses, and distribution information. Presentation material from all Public Information Centres (PICs) held during the process is included. Other presentation material and discussion information from workshops held with relevant agencies, approval bodies and other stakeholders are also included.

### **1.4 Master Plan Report Volume II**

The current volume provides the overall background, process and planning context that is the foundation on which the study has been undertaken. This volume clearly outlines the study objectives, the master planning process, relevant legislative and policy documentation, servicing principles and policies, existing conditions and future considerations.

This volume has been organized in eight sections as described below:

1. Introduction
2. Master Planning Process
3. Related Studies and Background
4. Problem and Opportunity Statement
5. Study Area
6. Planning Context
7. Existing Conditions
8. Future Considerations

Volume II is one of five volumes that make up the complete Master Plan Class EA Study Report and should be read in conjunction with the other volumes.

## 2 Master Planning Process

The Municipal Engineers Association (MEA) Municipal Class Environmental Assessment (EA) process defines approaches for completing master plans within the context of the Class EA process. The 2013 Master Plan is based on Approach 2, which involves preparing a master plan document at the conclusion of Phases 1 and 2 of the Class EA process. This approach allows for all Schedule A, A+ and specific Schedule B projects identified in the Master Plan to move forward to implementation. The Master Plan provides systematic evaluation and documentation to support the identified Schedule B Class EA requirements with applicable review agency commitments prior to their respective implementation. As well, the Master Plan identifies required Schedule B and C projects that will proceed with separate studies to fully meet the Class EA requirements and allow for greater detail in the evaluation of alternatives and design concepts. Schedule C projects will continue to Phases 3 and 4 of the Class EA process with an Environmental Study Report (ESR) filed for public review.

### 2.1 Class Environmental Assessment Process

This section describes the Class EA process and the specific requirements for the preparation of master plans.

#### 2.1.1 Environmental Assessment Act

Ontario's *Environmental Assessment Act (EA Act)* was passed in 1975 and proclaimed in 1976. The *EA Act* requires proponents to examine and document the environmental effects that could result from major projects or activities and their alternatives. Municipal undertakings became subject to the *EA Act* in 1981.

The *Act* defines the environment broadly as:

- Air, land or water;
- Plant and animal life, including humans;
- The social, economic and cultural conditions that influence the life of humans or a community;
- Any building, structure, machine or other device or thing made by humans;
- Any solid, liquid, gas odour, heat, sound, vibration or radiation resulting directly or indirectly from activities of humans; and
- Any part or combination of the foregoing and the interrelationships between any two or more of them.

The purpose of the *EA Act* is the betterment of the people of the whole or any part of Ontario by providing for the protection, conservation and wise management of the environment in Ontario (RSO1990, c. 18, s.2).

As set out in Section 5(3) of the *EA Act*, an EA document must include the following:

- A description of the purpose of the undertaking;
- The undertaking;

- The alternative methods of carrying out the undertaking; and
- Alternatives to the undertaking.

The EA document must also include a description of:

- The environment that will be affected or that might reasonably be expected to be affected, directly or indirectly, by the undertaking or alternatives to the undertaking;
- The effects that will be caused or that might reasonably be expected to be caused to the environment by the undertaking or alternatives to the undertaking;
- The actions necessary or that may reasonably be expected to be necessary to prevent, change, mitigate or remedy the effects upon or the effects that might reasonably be expected upon the environment by the undertaking or alternatives to the undertaking; and
- An evaluation of the advantages and disadvantages to the environment of the undertaking, the alternative methods of carrying out the undertaking and the alternatives to the undertaking (RSO 1990, c. 18, s.2).

## 2.1.2 Principles of Environmental Planning

The *EA Act* sets a framework for a systematic, rational and replicable environmental planning process that is based on five key principles, as follows:

- **Consultation with affected parties.** Consultation with the public and government review agencies is an integral part of the planning process. Consultation allows the proponent to identify and address concerns cooperatively before final decisions are made. Consultation should begin as early as possible in the planning process.
- **Consideration of a reasonable range of alternatives.** Alternatives include functionally different solutions, %alternatives to+the proposed undertaking and %alternative methods+of implementing the preferred solution. The %to nothing+alternative must also be considered.
- **Identification and consideration of the effects of each alternative on all aspects of the environment.** These aspects includes the natural, social, cultural, technical, and economic environments.
- **Systematic evaluation of alternatives in terms of their advantages and disadvantages, to determine their net environmental effects.** The evaluation shall increase in the level of detail as the study moves from the evaluation of %alternatives to+to the evaluation of %alternative methods+.
- **Provision of clean and complete documentation of the planning process followed to allow “traceability” of decision-making with respect to the project.** The planning process must be documented in such a way that it may be repeated with similar results.

## 2.1.3 Class Environmental Assessment

%Class+Environmental Assessments (Class EAs) were approved by the Minister of the Environment in 1987 for municipal projects having predictable and mitigable impacts. The Municipal Class EA process

was revised and updated in 1993, 2000, 2007 and 2010. The Class EA approach streamlines the planning and approvals process for municipal projects that are:

- Recurring;
- Similar in nature;
- Usually limited in scale;
- Predictable in the range of environmental impacts; and
- Responsive to mitigation.

The Municipal Class Environmental Assessment, prepared by the Municipal Engineers Association (October 2000, as amended in 2007), outlines the procedures to be followed to satisfy Class EA requirements for water, wastewater and road projects. The process includes five phases:

- Phase 1: Problem or Opportunity Definition;
- Phase 2: Identification and Evaluation of Alternative Solutions to Determine a Preferred Solution;
- Phase 3: Examination of Alternative Methods of Implementation of the Preferred Solution;
- Phase 4: Documentation of the Class EA process in the form of an Environmental Study Report (ESR); and
- Phase 5: Implementation and Monitoring;

Public and agency consultation are integral to the Class EA planning process.

Projects subject to the Class EA process are classified into four schedules depending on the degree of expected impacts. Schedule A projects are minor operational and maintenance activities and are approved without the need for further assessment. Schedule A+ projects are also pre-approved; however, the public is to be advised prior to the project implementation. Schedule B projects require a screening of alternatives for their environmental impacts and Phases 1 and 2 of the planning process must be completed.

If outstanding issues remain after the public review period, any party may request that the Minister of the Environment consider a Part II Order, also known as bumping-up the project to a Schedule C Class EA or an Individual EA. Provided no significant impacts are identified and no requests for a Part II Order to a Schedule C or Individual Environmental Assessment are received, Schedule B projects are approved and may proceed directly to implementation.

Schedule C projects must satisfy all five phases of the Class EA process. These projects have the potential for greater environmental impacts. Phase 3 involves the assessment of alternative methods of carrying out the project, as well as public consultation on the preferred conceptual design. Phase 4 normally includes the preparation of an Environmental Study Report (ESR) that is filed for public review. Provided no significant impacts are identified and no requests for Part II Order or bump-up to an Individual Environmental Assessment are received, Schedule C projects are then approved and may proceed directly to implementation. Figure 2.2 illustrates the Municipal Class EA planning and design process with the phases required for each schedule.



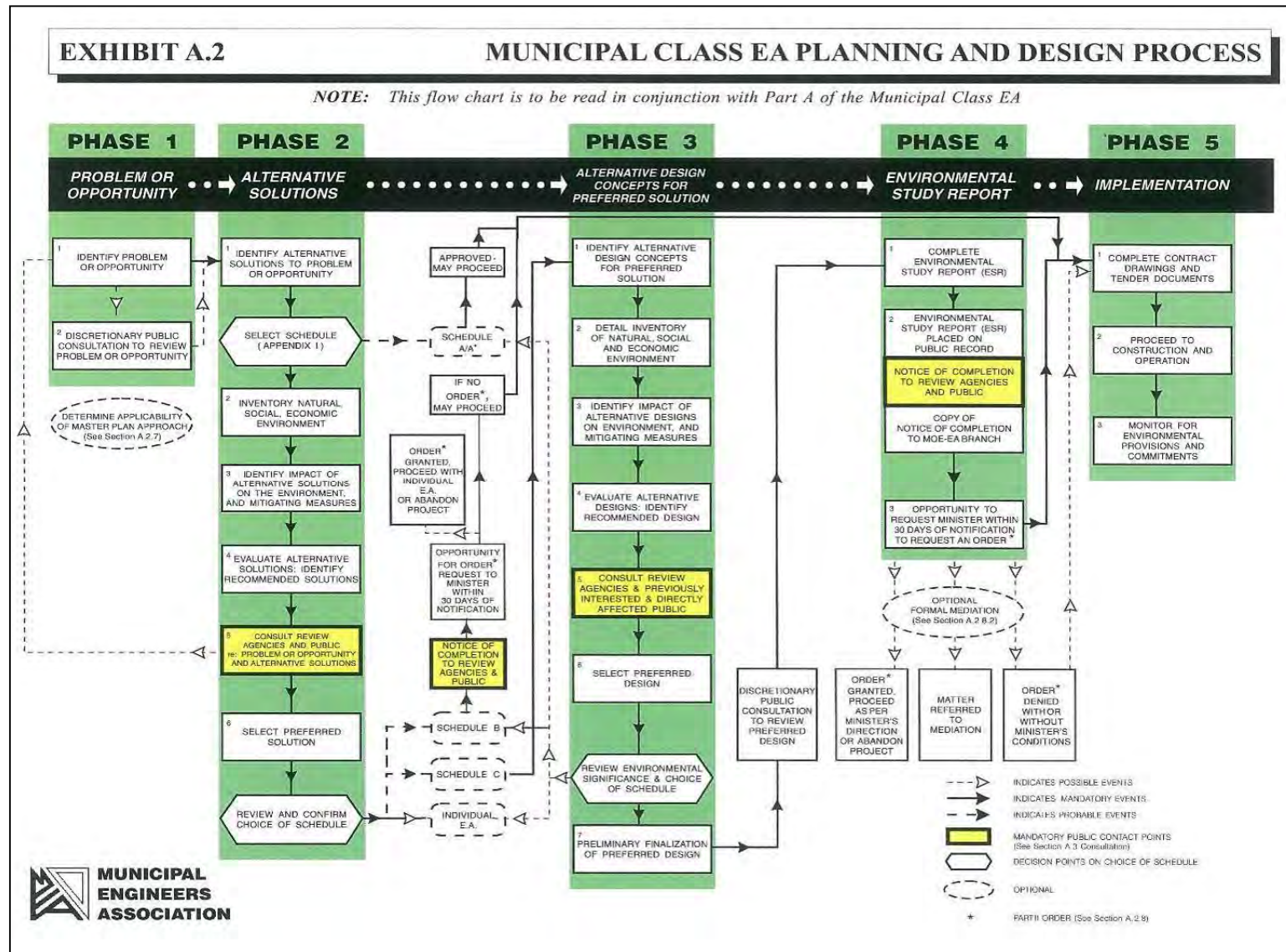


Figure 2.2. Municipal Class EA planning and design process

## 2.1.4 Master Planning Process

Municipalities recognize the benefits of comprehensive, long-range planning exercises that examine problems and solutions for an overall system of municipal services. The Municipal Class EA for Water and Wastewater Projects recognizes the importance of master plans as the basis for sound environmental planning. The Class EA defines master plans as:

Long range plans which integrate infrastructure requirements for existing and future land use with environmental assessment planning principles. These plans examine an infrastructure system(s) or group of related projects in order to outline a framework for planning for subsequent projects and/or developments.

Master plans have distinguishing features that set them apart from project-specific studies. These features include the following:

- Master plans are broad in scope and focus on the analysis of a system for the purpose of outlining a framework for the provision of future works and developments; and
- Specific projects recommended in a master plan are part of a larger management system and are distributed geographically throughout the study area. The implementation of specific projects may occur over an extended time frame.

According to the Class EA document, a master plan must at least satisfy the requirements of Phases 1 and 2 of the Class EA process and incorporate the five key principles of environmental planning, as identified in Section 2.1.2. A master plan must document public and agency consultation at each phase of the process. A reasonable range of alternative solutions must be identified and systematically evaluated.

The 2013 Master Plan is designed to build on decision-making completed in previous Master Plans and Development Charges By-law updates and to present a refined overall strategy for all of the communities in the study area. The approach for the 2013 Master Plan is to confirm the existing projects and, where applicable, evaluate and develop new projects. This approach was scrutinized through a public and agency consultation process and fully documented.

## 2.2 Public Consultation

Public consultation is an important component of the master plan process, allowing the Region to inform the public about the study and to obtain input from potentially interested and affected parties during the study process.

The main goals and objectives of the public consultation process were to:

- Present clear and concise information to stakeholders at key stages of the study process;
- Solicit community, regulatory and Regional staff input; and
- Meet Municipal Class EA consultation requirements.



An important component at the outset of the public consultation process was to develop a Communication and Consultation Plan. The main objective of the plan was to encourage two-way communication with the community, regulatory agencies and Regional staff. More specifically, the plan was designed to:

- Build on past communication protocols and consultation plans from previous Class EA and municipal planning initiatives, to ensure consistency and continuity;
- Ensure the general public, Councillors, stakeholders, external agencies (including federal and provincial) and special interest groups have an opportunity to participate in the study process;
- Ensure that factual information is provided to interested and affected stakeholders as soon as reasonably possible; and
- Make contact with external agencies to obtain legislative or regulatory approvals, or to collect pertinent technical information.

Full documentation of the consultation and communication program is contained in Volume V, Public and Agency Consultation.

## **2.2.1 Study Communication and Public Communication**

A contact list was compiled of relevant and interested parties, including agencies, local area municipalities and interested members of the community. This list was updated throughout the study and used for mailing and e-mailing, where applicable, project notices.

The following public consultation activities were undertaken as part of the master plan process.

### **2.2.1.1 Notice of Study Commencement**

The Notice of Commencement was published and distributed in February 2012 with a joint Notice of Public Information Centre No. 1.

### **2.2.1.2 Public Information Centre No. 1**

The first round of Master Plan Public Information Centres (PICs) was held during Phase 1 of the Class EA study process to present and receive feedback regarding the Problem and Opportunity Statement, Study Background, and Baseline, Planning Projections and Class EA Process.

PIC No. 1 was held at the locations and dates shown below:

- City of Brampton: February 14, 2012 (Region of Peel Head Office)
- City of Mississauga: February 23, 2012 (Mississauga Senior's Centre, 1389 Cawthra Road)

Details on attendance, comments received, and display panels presented are provided in Volume V, Public and Agency Consultation.

### 2.2.1.3 Public Information Centre No. 2

The second round of PICs was held during Phase 2 of the Class EA study process to present the key water and wastewater issues, servicing alternatives, and preliminary preferred servicing strategies.

PIC No. 2 was held at the location and dates shown below:

- City of Mississauga: November 25, 2013 (Burnhamthorpe Library, 3650 Dixie Road)
- City of Brampton: November 26, 2013 (Region of Peel Head Office)
- Town of Caledon: November 27, 2013 (Caledon Community Complex, 6250 Old Church Road, Caledon East)

### 3 Related Studies and Background Information

The 2013 Water and Wastewater Master Plan for the Lake-Based Systems is the most recent in a line of long-term infrastructure planning reports for the Region dating back to 1999. These previous reports were considered and the findings integrated as part of the 2013 Master Plan. This section summarizes the key recommendations from each Master Plan update.

#### 3.1 1999 Water and Wastewater Master Plan

The 1999 Master Plan identified preferred servicing strategies for the lake-based water and wastewater systems to 2031. Key recommendations from the 1999 Master Plan were as follows:

- Expansion of the Lorne Park and Lakeview Water Treatment Plants to 450 and 700 ML/d, respectively;
- Twinning of existing transmission mains and construction of new transmission mains;
- Capacity expansion of the Lorne Park, Herridge, Streetsville, Meadowvale North, Lakeview, Hanlan, Beckett Sproule, East Brampton, and North Brampton reservoirs and pumping stations;
- Construction of new reservoirs and pumping stations at Mayfield Road and Creditview Road (now named Alloa) and at Mayfield Road and Innis Lake Road (now named Tullamore);
- Construction of other new reservoirs, pumping stations and elevated tanks;
- Expansion of the Clarkson and G.E. Booth (formerly Lakeview) Wastewater Treatment Facilities (WWTFs) to 221 and 507 ML/d, respectively;
- Construction of a sewage pumping station to transfer sanitary flows from the east trunk system to the west trunk system;
- Twinning of the sanitary trunk sewer along parts of the east trunk system; and
- Construction of a new sanitary trunk sewer in the McVean Drive area and extension of the Credit River Sanitary Trunk Sewer.

#### 3.2 2002 Master Plan Addendum

The 2002 Master Plan Addendum undertook a review of the water supply projects identified in the 1999 Master Plan to provide capacity to service York Region as well as growth in the Region of Peel. Key recommendations from the 2002 Master Plan Addendum were as follows:

- Expansion of the Lorne Park and Lakeview Water Treatment Plants to 465 and 1080 ML/d, respectively;
- Oversizing of the east transmission system (now labelled as the central transmission system);
- New transmission main from the future Airport Road Pumping Station to the Peel/York boundary; and
- Revisions to the size and schedule of reservoir and pumping station upgrades proposed in the 1999 Master Plan.

### 3.3 2007 Water and Wastewater Master Plan

The 2007 Master Plan<sup>1</sup> identified capital works programs for the water and wastewater systems to 2031. Key recommendations included the following:

- Expansion of the Lorne Park and Lakeview WTPs to 500 and 1150 ML/d, respectively;
- Construction of new and twinned transmission mains;
- Construction of new and expanded reservoirs and pumping stations;
- Expansion of the Clarkson and G.E. Booth WWTFs to 350 and 518 ML/d, respectively;
- Twinning of the West Sanitary Trunk Sewer and parts of the East Sanitary Trunk Sewer;
- Construction of a new gravity sewer allowing transfer of flows from the west to the east trunk systems, to be converted to an east-to-west sewage pumping station and force main in the future.

### 3.4 Intensification Studies

The Government of Ontario's Places to Grow (P2G) Plan, discussed in detail in Section 6.1.4, specifies intensification policies and targets. The Plan directs growth to urban growth centres, including Mississauga and Brampton City Centres, and sets minimum density targets of 200 persons and employees per hectare for these centres. The Region has identified specific corridors and nodes where intensification is also planned, and has commenced supporting analyses to determine the effect of this growth on existing and planned water and wastewater infrastructure.

#### 3.4.1 Water

The Region completed a water system analysis for proposed intensification areas in 2011<sup>2</sup>. This study examined the effects of greater population growth within the Hurontario Corridor on the performance of the water supply system. Four scenarios were analyzed, as follows:

- **Base scenario:** Existing 2031 SGU populations (Total Population = 1.68 million);
- **Scenario 1:** Intensification of the Hurontario Corridor with population reduced outside the corridor to keep total population of the Region the same (Total Population = 1.68 million);
- **Scenario 2:** Scenario 1 with Mississauga City Centre increased to build-out potential projections (from Downtown21 Master Plan) (Total Population = 1.73 million);
- **Scenario 3:** Scenario 2 with no reduction to population outside the corridor (Total Population = 1.9 million)

The Region's water model was used to evaluate the performance of the water supply system under each scenario and capital projects were identified for each scenario. The results of this analysis were considered in the development of the 2013 Master Plan.

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<sup>1</sup> Water and Wastewater Master Plan Update. KMK Consultants Ltd, 2007.

<sup>2</sup> Water System Analysis for Intensification Areas. AECOM, 2011.

### 3.4.2 Wastewater

The Region completed a hydraulic analysis of impact of intensification within the Hurontario Corridor area on the performance of the wastewater collection system. The Region's wastewater model was used to evaluate the performance of the wastewater system under Scenario 2 and capital projects required were identified.

The recommendations from this study were considered in the development of the 2013 Master Plan.

### 3.5 Inflow and Infiltration Studies

In 2011, the Region initiated a Region-wide Inflow and Infiltration Strategic Policy and Five-Year Implementation Plan<sup>3</sup>. The associated report states that the Region is aware of high extraneous flows in its wastewater systems which reduces the capacity available to service new growth areas, increases the risk of wet weather overflows and basement flooding, and results in higher volumes and rates of wastewater that must be conveyed and treated. The Policy aims to build on past work to identify areas of high inflow and infiltration and develop a plan for inflow and infiltration reduction.

The Strategic Policy is formed of the following six areas of focus:

- Flow monitoring and assessment;
- Inspection and investigations;
- Public outreach and education;
- Private property programs;
- Asset remediation and repair; and
- Data management and supporting technology.

An implementation plan was developed for the five year period, which will be updated in 2016 based on new information collected and successes achieved.

A more detailed study is ongoing in parallel, examining the current measured levels of inflow and infiltration in various parts of the system and potential solutions<sup>4</sup>. The study focuses on the Bolton Sewage Pumping Station catchment area and areas upstream of the Clarkson and G.E. Booth WWTFs. More than 40 flow meters and 15 rain gauges were installed to isolate areas of concern. The data were used to update and recalibrate the Region's trunk sewer InfoWorksCS model. The calibrated model was used to estimate the effects of various design storms, ranging from 1-in-5 years to 1-in-100 years.

The Inflow and Infiltration Strategic Policy and the related Implementation Plan were considered in the development of the 2013 Master Plan.

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<sup>3</sup> *Strategic I/I Policy and 5 Year Implementation Plan (Draft)*. XCG, 2011.

<sup>4</sup> *Inflow and Infiltration (I-I) Study (Draft Final)*. Cole Engineering, July 2011.

### 3.6 Model Update and Calibration

The Region maintains all-pipe hydraulic models of its water system and wastewater system. These models are valuable tools to analyze the performance of the systems, to determine the impacts of growth, to identify areas with capacity issues, and to assist in the design of proposed infrastructure. For the 2013 Master Plan, the models were used to identify current and future capacity constraints within the systems, as well as assisting in sizing of the proposed capital projects.

#### 3.6.1 Water

The Region maintains an all-pipe water model using InfoWater by Innovyze. This model was updated and recalibrated for use in preparing the 2013 Master Plan with the following information:

- Asset information for pipes, reservoirs and pumping stations was reviewed and updated;
- Data capture was performed to verify node elevations and pipe diameters and the model was updated where required;
- Infrastructure constructed since the previous model update was added to the model; and
- New flow meter data from 2011 were collected and analyzed. These data were used to recalibrate the model to 2011 conditions.

The 2013 Master Plan focuses on the water transmission system, which includes treatment, pumping stations, reservoirs and transmission mains.

The model was used for the 2013 Master Plan as follows:

- The 2011 water model provides a baseline understanding of system performance under average day, maximum day and peak hour conditions;
- Confirmed projects planned for the near future are included in the model;
- Additional flows due to growth were added to the baseline 2011 model to represent predicted system performance in future years to 2031 and beyond;
- York Region water demand is included and the impacts of these demands on the proposed projects were analyzed; and
- Alternative strategies and proposed projects are represented in the model to analyze the effects on system performance and to confirm the appropriate sizing for projects in the capital program.

#### 3.6.2 Wastewater

The Region maintains an all-pipe wastewater model using InfoWorksCS by Innovyze. The 2013 Master Plan focuses on the trunk system, which is defined as sanitary sewers with a diameter of 675 mm or larger. Therefore, the modelling team provided a truncated model that represents the trunk system. A subset of 2010 gauges within the trunk system was identified and used to calibrate the trunk system model. This model, calibrated to 2010 conditions, was used in the 2013 Master Plan as follows:

- A baseline ~~existing~~ conditions model was created with any projects constructed since the 2010 calibration period, as well as projects under construction or with confirmed budgets for construction;
- This model was used to provide a baseline understanding of system performance under dry weather and wet weather conditions;
- Additional flows due to growth were added to the baseline model to represent predicted system performance in future years to 2031 and beyond;
- Flows from York Region and Toronto were identified and the impact of these flows on the proposed projects were analyzed; and
- Alternative strategies and potential projects were represented in the model to analyze the effect of these on system performance, and to confirm the appropriate sizing for projects in the capital program.



## 4 Problem and Opportunity Statement

The problem or opportunity statement defines the principal starting point in the undertaking of the Master Plan Class EA and assists in defining the scope of the project. The problem or opportunity statement for the 2013 Water and Wastewater Master Plan for the Lake-Based Systems is defined as follows:

- Since the previous update of the Region of Peel's Water and Wastewater Master Plan in 2007, significant Provincial policies and regulations have been adopted requiring the Region to review and update its vision for planning and servicing.
- Respectively, population and employment in the Region are expected to grow by approximately 340,000 and 200,000 between 2013 and 2031. To assess the impact of this growth, a comprehensive Water and Wastewater Master Plan for the Lake-Based Systems was initiated to identify servicing requirements for existing service areas and growth areas to 2031.
- Longer range forecasting of infrastructure requirements, post-2031, was also completed to forecast impacts on existing, planned and future projects and to ensure a seamless continuation of the water and wastewater servicing visions beyond 2031.

## 5 Study Area

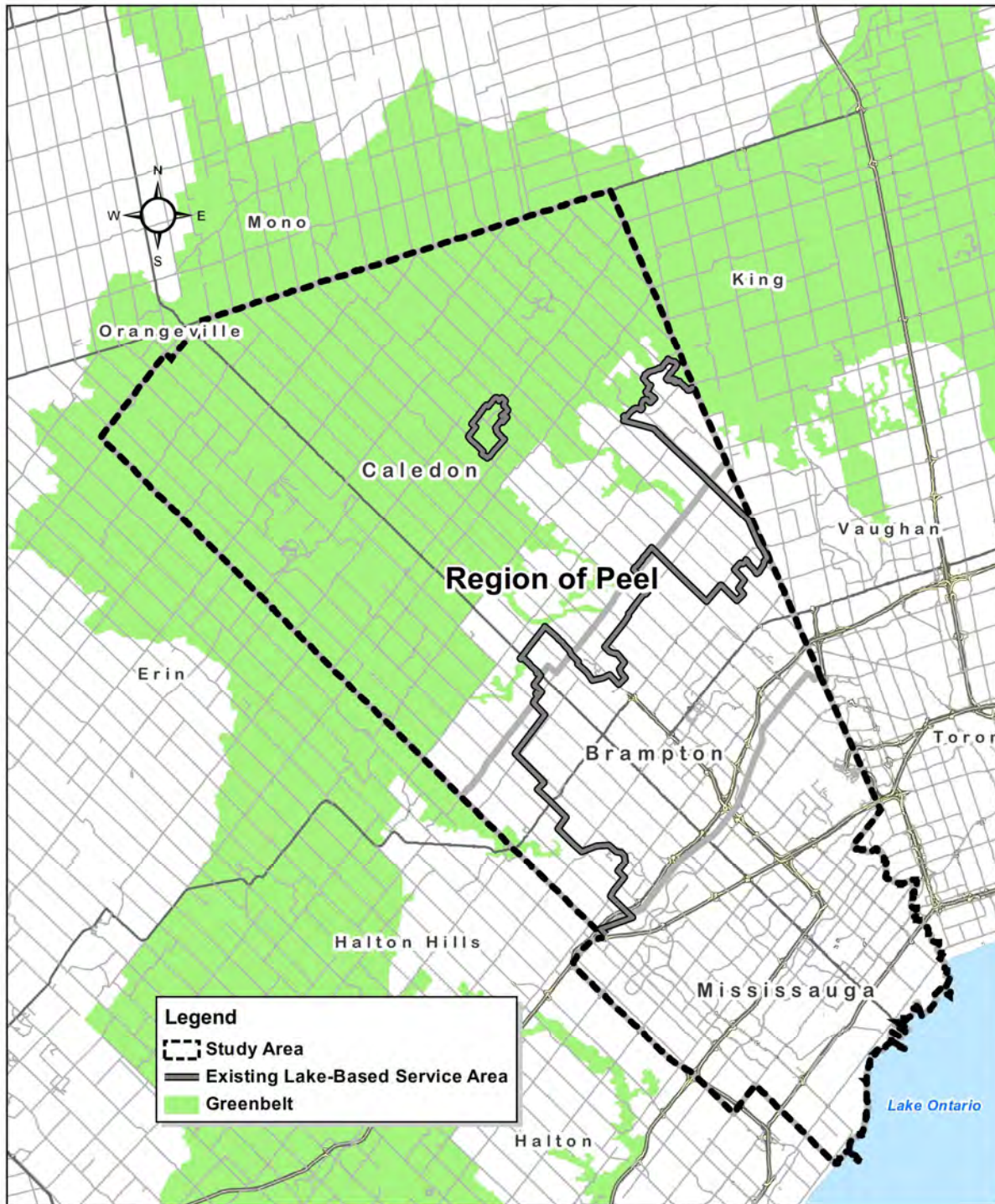
The Region of Peel is situated in the west-central portion of the Greater Golden Horseshoe (GGH). The Region is bounded to the south by Lake Ontario, to the west by Halton Region and Wellington County, to the east by the City of Toronto and York Region, and to the north by Dufferin County and Simcoe County. The area includes a diverse mix of urban, suburban, rural, agricultural, natural landscapes (including the Oak Ridges Moraine, the Niagara Escarpment and the Greenbelt) and encompasses the City of Brampton, the City of Mississauga and the Town of Caledon, as shown in Figure 2.3.

The Region of Peel has a total area<sup>5</sup> of 1,254 square kilometres with a population of 1,340,125 in 2011<sup>6</sup>. The study area covers the lake-based water and wastewater systems. The groundwater-based systems and communal wastewater systems in Caledon are not included in the scope of this study.

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<sup>5</sup> <http://www.peelregion.ca/planning/pdc/data/quickfacts.htm>, accessed 28 July 2011

<sup>6</sup> Region of Peel SGU GIS shapefile; P2011qfield. Region of Peel, 2011.



**Figure 2.3. Study area for the 2013 Water and Wastewater Master Plan for the lake-based systems**

## 6 Planning Context

### 6.1 Provincial and Federal Legislation and Policy

The Region of Peel, as all municipalities in Ontario, must operate within the administrative, legislative and financial framework established by senior levels of government. The key provincial and federal initiatives that provide directives, and are considered within the master planning process, are summarized below.

#### 6.1.1 Provincial Policy Statement

The Provincial Policy Statement (PPS)<sup>7</sup> provides policy direction on matters of provincial interest related to land use planning and development. As a key element of Ontario's policy-led planning system, the Provincial Policy Statement sets the policy foundation for regulating the development and use of land. It provides for appropriate development while protecting resources of Provincial interest, public health and safety and the quality of the natural environment. Key policies relevant to water and wastewater servicing are as follows:

- Infrastructure and public service facilities shall be provided in a coordinated, efficient and cost-effective manner to accommodate projected needs. Planning for infrastructure and public service facilities shall be integrated with planning for growth so that these are available to meet current and projected needs. (Policy 1.6.1);
- The use of existing infrastructure and public service facilities should be optimized, wherever feasible, before consideration is given to developing new infrastructure and public service facilities. (Policy 1.6.2);
- Planning for sewage and water services shall:
  - Direct and accommodate expected growth in a manner that promotes the efficient use of existing:
    - municipal sewage services and municipal water services; and
    - private communal sewage services and private communal water services, where municipal sewage services and municipal water services are not available;
  - Ensure that these systems are provided in a manner that:
    - can be sustained by the water resources upon which such services rely
    - is financially viable and complies with all regulatory requirements; and
    - protects human health and the natural environment;
  - Promote water conservation and water use efficiency;
  - Integrate servicing and land use considerations at all stages of the planning process; and
  - Subject to the hierarchy of services provided in policies 1.6.4.2, 1.6.4.3 and 1.6.4.4, allow lot creation only if there is confirmation of sufficient reserve sewage system capacity and reserve water system capacity within municipal sewage services and

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<sup>7</sup> Provincial Policy Statement. Ontario Ministry of Municipal Affairs and Housing, 2005.

municipal water services or private communal sewage services and private communal water services. (Policy 1.6.4.1); and

- Treatment capacity should be available for treatment of hauled sewage . that is, waste from septic tanks or other treatment units.

### **6.1.2 Greenbelt Plan**

The Greenbelt is a broad band of permanently protected land which supports agriculture as the predominant land use, gives permanent protection to the natural heritage and water resource systems, and provides for a diverse range of economic and social activities. It includes lands within, and builds upon the ecological protections provided by, the Niagara Escarpment Plan (NEP) and the Oak Ridges Moraine Conservation Plan (ORMCP). The Greenbelt Plan was published by the Ministry of Municipal Affairs and Housing in 2005. The Plan identifies where urbanization should not occur in order to provide permanent protection to the agricultural land base and the ecological features and functions occurring on this landscape.

### **6.1.3 Niagara Escarpment Plan**

The Niagara Escarpment Plan (NEP) was published by the Niagara Escarpment Commission in 2005 and updated in 2011. The Plan provides for the maintenance of the Niagara Escarpment and land in its vicinity substantially as a continuous natural environment, and to ensure only such development occurs as is compatible with that natural environment. The objectives of the Plan are as follows:

- to protect unique ecological and historical areas;
- to maintain and enhance the quality and character of natural streams and water supplies;
- to provide adequate opportunities for outdoor recreation;
- to maintain and enhance the open landscape character of the Niagara Escarpment in so far as possible, by such means as compatible farming or forestry and by preserving the natural scenery;
- to ensure that all new development is compatible with the purpose of the Plan as expressed in section 2 of the Plan;
- to provide for adequate public access to the Niagara Escarpment; and
- to support municipalities within the Niagara Escarpment Planning Area in their exercise of the planning functions conferred upon them by the *Planning Act*.

### **6.1.4 Places to Grow**

Places to Grow is a growth plan for the Greater Golden Horseshoe (GGH). It is a 25-year plan, released in 2006, that has the following objectives:

- Revitalize downtowns to become vibrant and convenient centres;
- Create complete communities that offer more options for living, working, learning, shopping and playing;
- Provide housing options to meet the needs of people at any age;



- Curb sprawl and protect farmland and green spaces; and
- Reduce traffic gridlock by improving access to a greater range of transportation options.

The Plan is a framework for implementing the Government of Ontario's vision for building stronger, more prosperous communities by better managing growth in the region to 2031. The Plan provides the framework for infrastructure investments in the GGH so that existing infrastructure and future investments are optimized to serve growth to 2031 and beyond.

The plan includes growth forecasts for the Region of Peel with a residential population of 1,640,000 and an employment force of 570,000 by 2031, as well as intensification policies and targets (e.g., 40 per cent of new development in urban areas). Development is to be directed to urban growth centres, including Mississauga and Brampton City Centres for which Places to Grow sets a minimum density target of 200 persons and jobs per hectare. For areas of greenfield development, the Plan sets a combined minimum density target of 50 residents and employees per hectare.

### 6.1.5 Oak Ridges Moraine Plan

The Oak Ridges Moraine is one of Ontario's most significant landforms. This irregular 160-kilometre-long ridge stretches from the Niagara Escarpment in the west to the Trent River in the east. The Niagara Escarpment and Oak Ridges Moraine form the foundation of south-central Ontario's natural heritage and green space systems. Located north of and parallel to Lake Ontario, the Moraine divides the watersheds draining south to Lake Ontario from those draining north to Georgian Bay, Lake Simcoe and the Trent River system. Through the *Oak Ridges Moraine Conservation Act, 2001* and the accompanying Oak Ridges Moraine Conservation Plan (ORMCP) published in 2002, the Province has established direction for protecting the Oak Ridges Moraine. The ORMCP is a regulation to the Oak Ridges Moraine Conservation Plan Area. ORMCP policies will be considered in the preparation of the 2013 Master Plan with specific objective compliance and factors considered as follows:

- Protecting the ecological and hydrological integrity of the Oak Ridges Moraine Area;
- Ensuring that only land and resources uses that maintain, improve or restore the ecological and hydrological functions of the Oak Ridges Moraine Area, including the quality and quantity of its water and its other resource, are recommended; and
- Providing for land and resource uses and development that are compatible with the other objectives of the ORMCP.

### 6.1.6 Planning Reform Act

The *Planning Act* establishes the rules for land use planning in Ontario. It describes how land uses may be controlled in communities. Changes to the planning system were introduced in 2006 by the *Planning and Conservation Land Statute Law Amendment Act*. Key changes are as follows:

- Municipalities must now update their Official Plan every five years, followed by an update of the accompanying zoning by-law within three years after the new Official Plan is in effect;
- There are more opportunities for public input before local decisions are made;
- Municipalities have enhanced ability to plan for a range and mix of housing types and densities; and

- Municipalities have additional ability to have the final say on whether designated employment lands can be changed to other uses.

### 6.1.7 Sustainable Water and Sewage Systems Act

The Ontario Government passed the *Sustainable Water and Sewage Systems Act* in 2002; however, it is not yet in force<sup>8</sup>. The *Act* makes it mandatory for municipalities to assess the costs of providing water and sewage services and to recover the full cost of providing these services. All designated municipalities that provide water and sewage services must prepare a full cost report and a cost recovery plan to be approved by the Minister of the Environment. It is expected that this requirement may lead to higher water rates and give municipalities an incentive to promote conservation<sup>9</sup>.

### 6.1.8 Water Opportunities and Conservation Act

The Ontario Government passed the *Water Opportunities and Conservation Act* in 2010. The purposes of the *Act* are as follows<sup>10</sup>:

- To foster innovative water, wastewater and storm water technologies, services and practices;
- To create opportunities for economic development and clean-technology jobs in Ontario; and
- To conserve and sustain water resources for present and future generations.

To further the purposes of the *Act*, the Minister of the Environment may establish aspirational targets in respect of the conservation of water and other matters.

The *Act* requires certain municipalities, persons and entities to prepare, approve and submit to the Minister of the Environment municipal water sustainability plans for municipal water services, municipal wastewater services and municipal storm water services under their jurisdiction. The Minister may establish performance indicators and targets for these services. The *Act* also authorizes the making of regulations requiring public agencies to prepare water conservation plans, achieve water conservation targets, and consider technologies, services and practices that promote the efficient use of water and reduce negative impacts on Ontario's water resources.

### 6.1.9 Safe Drinking Water Act

The *Safe Drinking Water Act* was adopted in 2002. The *Act* provides for the protection of human health and the prevention of drinking water hazards through the control and regulation of drinking water systems and drinking water testing<sup>11</sup>. Key features of the *Act* include the following<sup>12</sup>:

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<sup>8</sup> [http://www.e-laws.gov.on.ca/html/statutes/english/elaws\\_statutes\\_02s29\\_e.htm](http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_02s29_e.htm). Accessed 28 September, 2011

<sup>9</sup> <http://www.ecolawinfo.org/WaterFAQ-WaterFinancing.aspx#watfin04>. Accessed 28 September, 2011

<sup>10</sup> *Bill 72 (Chapter 19, Statutes of Ontario, 2010) An Act to Enact the Water Opportunities Act, 2010 and to amend other Acts in respect of water conservation and other matters.* [http://www.ontla.on.ca/bills/bills-files/39\\_Parliament/Session2/b072ra.pdf](http://www.ontla.on.ca/bills/bills-files/39_Parliament/Session2/b072ra.pdf). Accessed 30 September, 2011

<sup>11</sup> [http://www.e-laws.gov.on.ca/html/statutes/english/elaws\\_statutes\\_02s32\\_e.htm](http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_02s32_e.htm). Accessed 28 September, 2011

<sup>12</sup> <http://www.ecolawinfo.org/WaterFAQ-OSDWAct.aspx>. Accessed 28 September, 2011



- Legally-binding standards for contaminants in drinking water;
- Requirement to use licensed laboratories for drinking water testing;
- Requirement to report any results that do not meet the standards to the Ministry of the Environment and the local Medical Officer of Health and to undertake corrective action;
- All operators of municipal drinking water systems must be trained and certified;
- Establishment of a licensing regime for drinking water systems; and
- Inspections and enforcement to determine compliance with the *Act*.

### 6.1.10 Clean Water Act

The *Clean Water Act* was adopted in 2006. The purpose of the *Act* is to protect existing and future sources of drinking water<sup>13</sup>. The *Act* requires the following<sup>14</sup>:

- That local communities assess existing and potential threats to their water, and that they set out and implement the actions needed to reduce or eliminate these threats;
- Empowers communities to take action to prevent threats from becoming significant;
- Public participation on every local source protection plan . the planning process for source protection is open to anyone in the community; and
- That all plans and actions be based on sound science.

### 6.1.11 CCME Setting Strategic Directions for Water

The Canadian Council of Ministers of the Environment (CCME) vision entitled *Setting Strategic Directions for Water* was announced in 2009. It provides a framework for future actions and activities related to water, such that Canadians have access to clean, safe and sufficient water to meet their needs in ways that also maintain the integrity of ecosystems. The goals of the document are as follows:

- Aquatic ecosystems are protected on a sustainable watershed basis;
- The conservation and wise use of water is promoted;
- Water quality and water quantity management is improved, benefiting human and ecosystem health;
- Climate change impacts are reduced through adaptive strategies; and
- Knowledge about the state of Canada's water is developed and shared.

The related three-year action plan was approved in 2010, which identifies deliverables and desired outcomes for CCME's work on water between 2011 and 2014 for each of the identified goals.

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<sup>13</sup> [http://www.e-laws.gov.on.ca/html/statutes/english/elaws\\_statutes\\_06c22\\_e.htm](http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_06c22_e.htm). Accessed September 28, 2011

<sup>14</sup> [http://www.ene.gov.on.ca/environment/en/legislation/clean\\_water\\_act/index.htm](http://www.ene.gov.on.ca/environment/en/legislation/clean_water_act/index.htm). Accessed September 28, 2011

### 6.1.12 Canada-wide Strategy for the Management of Municipal Wastewater Effluent

This Strategy was developed by the Canadian Council of Ministers of the Environment (CCME) in 2009. The Strategy sets out a framework to manage discharges from the more than 3,500 wastewater facilities in Canada. It requires that all facilities achieve minimum National Performance Standards and develop and manage site-specific Effluent Discharge Objectives (EDOs). The Strategy requires that overflow frequencies for sanitary sewers not increase due to development or redevelopment. The same applies for combined sewers unless occurring as part of an approved combined sewer overflow management plan. Neither should occur during dry weather, except during spring thaw and emergencies. Source control of pollutants is recommended, and monitoring and reporting on effluent quality required.

### 6.1.13 CCME Wastewater Systems Effluent Regulations

The proposed CCME Wastewater System Effluent Regulations were published in March 2010, with the final Regulations published on June 29, 2012. These Regulations are the primary instrument that Environment Canada is using to implement the CCME Canada-wide Strategy for the Management of Municipal Wastewater Effluent.

The proposed Regulations apply to any wastewater system that has a capacity to deposit a daily volume of effluent of 10 cubic metres or more from its final discharge point. The effluent from the applicable wastewater systems would be compared against national effluent quality standards, which are as follows:

- average carbonaceous biochemical oxygen demand (CBOD) due to the quantity of BOD matter in the effluent of less than or equal to 25 mg/L;
- average concentration of suspended solids in the effluent of less than or equal to 25 mg/L;
- average concentration of total residual chlorine in the effluent of less than or equal to 0.02 mg/L; and
- maximum concentration of un-ionized ammonia in the effluent of less than 1.25 mg/L, expressed as nitrogen (N), at 15°C ± 1°C.

Meeting the proposed Regulations would not be required until two years after the Regulation is registered; however, it would be a consideration if an upgrade or expansion of a facility occurs.

### 6.1.14 CEPA – Inorganic Chloramines and Chlorinated Wastewater Effluents in Municipal Wastewater Effluent

The *Canadian Environmental Protection Act (CEPA)*<sup>15</sup> requires the elimination of toxic chlorine residuals from municipal wastewater effluent. Total residual chlorine (TRC) is required to be less than or equal to 0.02 mg/L. Implementation is required by December 31, 2010 for all wastewater treatment plants with daily volume greater than 5,000 cubic metres.

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<sup>15</sup> *Canada Environmental Protection Act*. Parliament of Canada, 1999.

### 6.1.15 Ministry of the Environment Procedure F-5-1

Procedure F-5-1 outlines the treatment requirements for municipal and private sewage treatment works discharging to surface waters. Effluent requirements are established on a case-by-case basis considering the characteristics of the receiving water body. All sewage treatment works shall provide secondary treatment or equivalent as the normal level of treatment, unless individual receiving water assessment studies indicate the need for higher levels of treatment. Existing works not complying with the guideline are required to upgrade as soon as possible. The Procedure stipulates effluent design objectives for BOD, suspended solids, total phosphorus and ammonia and provides guidelines for BOD and suspended solids. Sewage treatment works designed according to the guidelines should be able to meet the objectives on an average annual basis and not exceed the guidelines.

## 6.2 Regional and Municipal Legislation and Policy

### 6.2.1 Liveable Peel

Liveable Peel was a sustainability strategy to consider the long-term (i.e., to 2051) economic, environmental, social and cultural impacts of demographic and socio-economic changes on the programs and services delivered by the Region of Peel. For the purposes of the 2013 Master Plan, the post-2031 projections to be provided by the Region and the area municipalities supersede the projections from this strategy.

### 6.2.2 Region of Peel Official Plan

The Region of Peel Official Plan<sup>16</sup> is a long-term plan used to assist the Region in managing growth and development. It was adopted by Council on July 11, 1996 and approved with modifications by the Minister of Municipal Affairs and Housing on October 22, 1996. Appeals of the Plan were forwarded to the Ontario Municipal Board (OMB). Sections of the Plan deemed not under appeal became effective on October 1, 1997. The current (2008) Office Consolidation includes Ministry and OMB approvals as well as various approved amendments. Revised population projections based on Places to Grow were incorporated into Regional Official Plan Amendment (ROPA) 24 as part of a growth conformity exercise. These projections are further discussed in Section 6.4 of this report.

The purpose of the Official Plan is to:

- Provide Regional Council with the long-term Regional strategic policy framework for guiding growth and development in Peel while having regard for protecting the environment, managing the renewable and non-renewable resources, and outlining a regional structure that manages this growth within Peel in the most effective and efficient manner;
- Interpret and apply the intent of Provincial legislation and policies within a Regional context using the authority delegated or assigned to the Region by the Province;
- Provide a long-term Regional strategic policy framework for the more specific objectives and land use policies contained in the area municipality official plans which must conform to this Plan;

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<sup>16</sup> Official Plan . Office Consolidation November 2008. Region of Peel, 2008.

- Recognize the duality in the Region of Peel between the urban nature of the City of Brampton and the City of Mississauga and the primarily rural nature of the Town of Caledon;
- Recognize the need for effective environmental protection and management measures to ensure environmental sustainability;
- Recognize the importance of protecting and enriching the natural and cultural heritage of the Region of Peel;
- Provide for the health and safety of those living and working in Peel; and
- Maintain and enhance the fiscal sustainability of the Region of Peel.

The Official Plan includes objectives and policies around the natural environment, water resources, and cultural heritage. These will be considered when assessing servicing alternatives.

Section 6.3 of the Official Plan discusses water and wastewater services. Key policies relevant to the 2013 Master Plan are as follows:

It is the policy of Regional Council to:

- Require and provide full municipal sewage and water services to accommodate growth in the Urban System and the three Rural Service Centres to 2021. The provision of full municipal sewage and water services in the Urban System and the three Rural Service Centres will be subject to the Regional financial and physical capabilities (6.3.2.1);
- Ensure that no development requiring additional or new water supply and/or sanitary sewer services proceeds prior to the finalization of a Servicing Agreement with the Region, confirming the responsibility for, and ability to provide, appropriate facilities for water supply and sewage disposal. In the case of plans of subdivision, confirmation will be required prior to draft approval, that servicing is or will be available (6.3.2.2);
- Pursue, in cooperation with the area municipalities, the public and businesses, water conservation strategies designed to improve the efficiency of the Region's systems (6.2.3.6);
- Ensure that the planning and construction of water and sanitary sewer services protects the environmental systems and natural resources of Peel in a manner consistent with the objectives and policies in this Plan (6.2.3.7);
- Pursue a water efficiency strategy with a goal to reducing per capita consumption by 10 to 15 per cent over the next 20 years (6.3.2.9).

### **6.2.3 Regional Climate Change Strategy**

The Region of Peel, the City of Brampton, the Town of Caledon, the City of Mississauga, Credit Valley Conservation and the Toronto and Region Conservation Authority jointly developed a Climate Change Strategy<sup>17</sup>. The associated Background Report<sup>18</sup> gives further information to support this Strategy.

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<sup>17</sup> Peel Climate Change Strategy. Region of Peel *et al.*, 2011.

<sup>18</sup> Peel Climate Change Strategy Background Report. Region of Peel *et al.*, 2011

The Background Report identifies the following projected changes in climate variables in the Region, including the following:

- Warmer and slightly wetter weather on average in the coming decades, with more warming during the winter than the summer, and precipitation increases confined largely to the winter with up to a 10 per cent reduction in summer and fall precipitation in southern Ontario;
- The number of days exceeding 30 degrees Celsius in southern Ontario to more than double by the 2050s;
- Overall drier conditions and reductions in available moisture;
- Extreme daily precipitation events, such as thunderstorms, to become more frequent and severe due to increased precipitation variability although the magnitude of the potential changes is not yet understood;
- Less snow overall; and
- Potential increases in destructive events such as rainstorms and freezing rain.

The potential impacts of these projected climate changes include the following:

- Increased urban water use could create demand on the distribution system leading to increased infrastructure and maintenance costs for distribution, storage and treatment;
- Potential to exceed the capacity of sewers and watercourses (resulting in flooding);
- Potential for overflow at wastewater treatment plants; and
- Possibility for more extreme high contaminant concentrations.

The Climate Change Strategy identifies the following overall goals:

- Proactive and responsive planning and leadership;
- Actions to reduce greenhouse gas emissions;
- Targeted and proactive adaptation actions;
- Making the shift to a green economy;
- Increasing awareness and level of engagement throughout Peel; and
- Ongoing research and adaptive risk management.

A series of actions to be initiated over the next five years were identified. Those relevant to the 2013 Master Plan include the following:

- As municipal official plans, by-laws and policies are updated on a regular cycle, ensure that they reflect climate change adaptation considerations targeted to reduce vulnerabilities to the projected impacts and achieve Green House Gas (GHG) reductions. This action should consider issues such as understanding the implications of increased risks of flooding in some areas and drought conditions in others; understanding effects on infrastructure brought about by frequent heat waves, intense storms and soil erosion; manage rainwater at source and opportunities for using rainfall as a resource; establish guidelines to promote sustainable infrastructure such as wastewater cascades and utility islands.

- Build on existing decision making tools and strategies so that climate change mitigation and adaptation activities can continue in the spirit of collaboration.
- Work with other jurisdictions to urge more stringent provincial action on the redevelopment of Ontario's Building Code. An update should incorporate GHG mitigation measures into buildings, including water conservation.
- Address water, natural heritage and land management issues related to climate change through integrated watershed management.
- Redesign and retrofit water collection and conveyance infrastructure and systems to reduce vulnerabilities due to climate change, including adopting measures to reduce vulnerability of sanitary sewer systems to flooding events (e.g., downspout disconnection, identification of cross-connections, etc.), and implementing runoff reduction practices such as source and conveyance facilities that capture and reuse runoff.
- Building on existing programs, implement additional water quality and water and wastewater conservation strategies and incentives.
- Model and monitor the impacts of changes to precipitation on groundwater recharge and flood risk.

#### **6.2.4 City of Mississauga Official Plan**

The Mississauga Plan (the City Plan) for the City of Mississauga Planning Area was modified and approved by the Region of Peel in May 2003, with the exception of certain parts of the Plan where a decision was withheld or parts that were appealed to the OMB. For those parts that are not approved, the relevant parts of the City Plan (approved in July 1997 by the Ministry of Municipal Affairs and Housing and subsequently amended) currently apply.

The Plan outlines general policies as well as specific district policies. Key policies relevant to the 2013 Master Plan include the following:

- There is an objective to develop and locate nodes with a greater intensity of housing, employment, retail commercial, and community facilities (2.2.2.5, under appeal).
- Mississauga will ensure, in co-operation with other levels of government, appropriate agencies and the private sector, that adequate water, sanitary sewer, storm sewer services, waste management and utilities are provided (2.6.1.1); with objectives to ensure that capital cost, maintenance cost, and environmental impact are minimized (2.6.2.1) and to provide a reliable and consistent level of service to all residents (2.6.2.2).

#### **6.2.5 Mississauga Downtown21 Master Plan**

The Mississauga Downtown21 Master Plan (2010) is a plan and strategy for the Mississauga City Centre, intended to achieve urban objectives for this area. The plan area is approximately bounded by Highway 403 to the north, Robert Speck Parkway to the east, Elm Drive and Webb Drive to the south, and Wallenberg Crescent to the west.

The objectives of the Mississauga Downtown21 Master Plan include the following:

- Nurture a vibrant, walkable, and compact downtown;
- Integrate development, including housing, employment and urban amenities; and
- Improve access to public transit and other modes of transportation.

The Downtown21 Master Plan establishes a new street framework with additional local streets, service of the area with higher order transit, additional open space, and distinct districts.

### **6.2.6 City of Brampton Official Plan**

The City of Brampton Official Plan was adopted by City Council in October 2006 and approved by the OMB in October 2008. Key policies relevant to the 2013 Master Plan include the following:

- Brampton expects that the Region of Peel will provide appropriate and timely sanitary sewerage facilities to serve the City's development subject to the following principles:
  - Appropriate protection, conservation and mitigation of the natural heritage system features, functions and linkages in which sewers are to be installed;
  - Operate sewer systems on a gravity flow basis to avoid the need for pumping stations to the extent practicable and feasible; and
  - Sanitary sewer collection systems designed on the basis of long term development patterns as provided for in this Plan or for the total development of the drainage area tributary (4.7.1.1);
- The City shall not consider proposals for interim servicing of lands unless evaluated in the context of its Growth Management Program (4.7.1.2).
- To continue to provide a potable water supply, the following policies apply:
  - That water purification supply facilities and distribution works be installed and maintained in accordance with Provincial requirements to adequately service the built-up and new developing areas of the City;
  - That the design of water supply and distribution facilities be based on ultimate development within the South Peel Servicing Scheme area; and
  - That new development obtains water through the South Peel Servicing System (4.7.2.1).
- To educate the public on methods of water conservation, the City shall encourage education initiatives and support the Region of Peel in any programs related to water conservation (4.7.2.2).

### **6.2.7 Town of Caledon Official Plan**

The Town of Caledon Official Plan (December 31, 2008) office consolidation was reviewed. The Official Plan aims to guide future land use, physical development and change, and the effects on the social, economic, and natural environment within the Town of Caledon to 2021.



The Official Plan states that development within the Town will be monitored on a regular basis to ensure that the principles, strategic directions, goals, objectives and policies are being achieved, including such matters as available water and sewer capacity (6.5.1).

The Plan states that the Rural Service Centres of Bolton, Caledon East and Mayfield West are identified as compact, well-integrated rural towns on full piped water and sewer services. The Rural Service Centres are designated as the primary growth areas for the planning period and will be the focus for the majority of new residential and employment growth. Secondary plans are provided for a number of areas, including these Centres.

### 6.3 Water and Wastewater Policy Review

A full policy paper was developed as part of the 2007 Master Plan<sup>19</sup>. This policy paper developed water and wastewater policies and guiding principles to provide guidelines and direction to the master planning process. These policies are generally applicable to the 2013 Master Plan. However, new legislation and strategies have been introduced since the 2007 Master Plan that, where appropriate, have been incorporated into the updated policy paper.

*The Water Opportunities and Conservation Act* (discussed in Section 6.1.8) requires the submission of water and wastewater sustainability plans a new policy G.13 was added to reflect this recent legislation.

The Regional Climate Change Strategy (discussed in Section 6.2.3) was developed in 2011. It specifically directs that as municipal official plans, by-laws and policies are updated on a regular cycle, ensure that they reflect climate change adaptation considerations targeted to reduce vulnerabilities to the projected impacts and achieve GHG reductions. A new policy G.14 was added to reflect this Strategy.

A further new policy G.15 was added to reflect the draft Toronto-Peel Wastewater Agreement. Once finalized, the conditions of the Agreement must be met.

The Canada-wide Strategy for the Management of Municipal Wastewater Effluent (discussed in Section 6.1.12) was developed in 2009. The Strategy is relevant to Policy W.01 regarding raw water quality: ~~the Region of Peel shall endeavour to protect its raw water sources.~~ The best practices and criteria refer to compliance with various targets and new regulations as applicable. The Strategy falls under the category of new regulation and thus the best practices text was modified to include this new regulation. The Strategy is also relevant to wastewater servicing. A new wastewater policy statement WW.05 was included to reflect this Strategy.

It is noted that the *Sustainable Water and Sewage Systems Act* has been passed, but is not yet in force. The *Act* makes it mandatory for municipalities to assess the costs of providing water and sewage services, and to recover the full cost of providing these services. Should the *Act* come into force, this requirement should be reflected in Regional policies.

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<sup>19</sup> *Region of Peel Water and Wastewater Master Plan Update. AECOM, 2007.*

## 6.4 Planning Forecasts

### 6.4.1 Places to Grow

Places to Grow is the official Provincial growth plan for the Greater Golden Horseshoe (GGH). It is a 25-year plan, released in 2006, that provides a framework for implementing the Government of Ontario’s vision for building stronger, more prosperous communities by better managing growth in this region to 2031.

The plan includes growth forecasts for the Region of Peel with a residential population of 1,640,000 and an employment force of 870,000 by 2031, as well as intensification policies and targets (e.g., by 2015 and for each year thereafter a minimum of 40 per cent of all new residential development is to occur within the built-up area).

Since the commencement of the 2013 Master Plan, the Province has released Amendment 2 (2013) which provides revised 2031 forecasts and new 2041 forecasts. Due to the timing of release of Amendment 2 and the preparation of the 2013 Master Plan, the 2013 Master Plan remains focused on the original forecasts as outlined below but with consideration given to the new post-2031 forecasts.

### 6.4.2 Regional Official Plan (ROPA 24)

The Regional Official Plan provides policy direction to guide future land use and growth in the Region. The Region developed forecasts based on Places to Grow as part of a growth conformity exercise, used for the Regional Official Plan Amendment (ROPA 24) and adopted by Council, giving a total 2031 residential population of approximately 1.64 million. Forecasts at a Small Geographic Unit (SGU) level were based on figures received from the area municipalities and total approximately 1.68 million. Previous infrastructure studies have found that this difference is relatively insignificant and therefore the SGU data were not adjusted. These data are referred to as the Region’s Baseline Planning Data Set.

The distribution of population and employment growth among the primary geographic regions of the Study Area are presented in Table 2.1 and Table 2.2.

**Table 2.1. Forecasted residential population for the Region of Peel to 2031**

Municipality	2011	Forecast			
		2016	2021	2026	2031
Brampton	534,000	599,000	659,000	714,000	758,000
Caledon	68,000	77,000	88,000	101,000	113,000
Mississauga	738,000	757,000	775,000	793,000	812,000
<b>Total</b>	<b>1,340,000</b>	<b>1,434,000</b>	<b>1,522,000</b>	<b>1,608,000</b>	<b>1,683,000</b>

Notes: Data source is Strategic Growth Unit GIS layer (Region of Peel, 2011)

Forecasts include the total Region of Peel residential population as opposed to just that within the study area, and include both serviced and un-serviced population. The serviced residential population of the lake-based water and wastewater systems is less than the above numbers.

**Table 2.2. Forecasted employment force for the Region of Peel to 2031**

Municipality	2011	Forecast			
		2016	2021	2026	2031
Brampton	203,000	239,000	274,000	295,000	320,000
Caledon	28,000	33,000	38,000	44,000	49,000
Mississauga	455,000	483,000	500,000	509,000	519,000
<b>Total</b>	<b>686,000</b>	<b>755,000</b>	<b>812,000</b>	<b>848,000</b>	<b>888,000</b>

Notes: Data source is Strategic Growth Unit GIS layer (Region of Peel, 2011)

Forecasts include the total Region of Peel employment force as opposed to just that within the study area, and include both serviced and un-serviced employment. The serviced employment force of the lake-based water and wastewater systems is less than the above numbers.

### 6.4.3 'Scenario A' and 'Scenario B' Forecasts

Following discussions of more recent planning trends and knowledge further to ROPA 24, planners at the Region of Peel and the area municipalities agreed that updated growth projections were required for the purpose of the 2013 Water and Wastewater Master Plan. These numbers do not supersede the Region's Baseline Planning Data Set and do not have official status, but are considered appropriate for the purposes of the 2013 Master Plan. These data provided the baseline growth estimate for 2031, as well as projections for 2041 and 2051, and ensured a co-ordinated approach between the Region and the area municipalities. These forecasts were developed by the Region's planning team based on input from the local area municipalities, and are referred to as Scenario A and Scenario B. The final dataset was provided on March 7, 2012.

### 6.4.4 Comparison of Scenarios

Table 2.3 compares the three forecasting scenarios discussed in this report.

**Table 2.3. Summary of forecasting scenarios for the 2013 Master Plan**

	Municipality	ROPA 24		Scenario A		Scenario B	
		2031	2051	2031	2051	2031	2051
Residential Population	Brampton	758,000	n/a	738,000	803,000	750,000	812,000
	Caledon	113,000		114,000	156,000	114,000	156,000
	Mississauga	812,000		820,000	899,000	829,000	973,000
	<b>TOTAL</b>	<b>1,683,000</b>		<b>1,673,000</b>	<b>1,858,000</b>	<b>1,693,000</b>	<b>1,941,000</b>
Employment Force	Brampton	320,000		319,000	350,000	321,000	352,000
	Caledon	49,000		52,000	69,000	52,000	69,000
	Mississauga	519,000		532,000	619,000	550,000	705,000
	<b>TOTAL</b>	<b>888,000</b>		<b>903,000</b>	<b>1,037,000</b>	<b>923,000</b>	<b>1,126,000</b>

### 6.4.5 Master Plan Forecasts

The ROPA 24 planning forecasts are based on the Places to Grow projections, developed in 2006, and were previously accepted as suitable for use in infrastructure planning. The Region has since worked with the area municipalities to understand how the ROPA 24 forecasts may change based on updated information.

Updated datasets, here referred to as Scenario A and Scenario B, have been developed using the ROPA 24 forecasts as a basis. Updated information from the municipalities has been incorporated to reflect recent changes and knowledge on likely growth patterns. Scenario A is similar to ROPA 24 while Scenario B incorporates more recent and conservative forecasts for intensification areas.

For the purpose of the 2013 Master Plan, a conservative approach was considered appropriate due to the uncertainty associated with planning forecasts. After discussions with the Region and the area municipalities, it was decided to use Scenario B as the basis for the 2013 Master Plan.

To summarize, the following scenarios were used for the purpose of infrastructure planning in the 2013 Master Plan:

- **2031 Baseline:** For infrastructure planning purposes in the 2013 Master Plan, a slightly revised projection dataset was used as the Baseline to 2031, referred to as Scenario B.
- **Post-2031 Growth:** Post-2031 growth will be analyzed to determine the effects of this growth on planned infrastructure, and to consider the possibility of strategic oversizing. The scenarios to be analyzed are the following:
  - **Scenario B (2041) and Scenario B (2051).** These scenarios extrapolate from the 2031 Baseline, with additional growth in intensification areas, northwest and northeast Brampton, and parts of Caledon.

## 6.5 Inter-Regional Servicing Requirements

### 6.5.1 City of Toronto

The 2013 Master Plan included a review of the Region's servicing strategy to support the wastewater servicing agreement with the City of Toronto.

#### 6.5.1.1 Peel-Toronto Inter-Regional Servicing Agreement

A draft agreement exists between the City of Toronto and the Region of Peel on cross-boundary sewage flows<sup>20</sup>. This agreement states that there are three locations where sewage flows across the municipal boundary line between Peel and Toronto, as listed in Table 2.4.

**Table 2.4. Location of sewage interconnections between Toronto and Peel**

Direction of Flow	Interconnection Point	Receiving System	Receiving Facility
<b>Toronto to Peel</b>	Rakely Court and Eglinton Avenue East	South Peel East Sanitary Trunk Sewer	G.E. Booth WWTF
<b>Toronto to Peel</b>	41 <sup>st</sup> Street and Lakeshore Road East	South Peel East Sanitary Trunk Sewer	G.E. Booth WWTF
<b>Peel to Toronto</b>	Disco Road and Highway 427	North Mimico Sanitary Trunk Sewer	Humber Bay WWTF

<sup>20</sup> Peel-Toronto Cross Boundary Sewage Agreement (Draft). Provided in May 2011.

There are currently no agreements in force and effect that govern these flows. The draft agreement states that each municipality will receive the flow from the other at the designated interconnection points and treat it at the designated treatment facility. A boundary flow meter shall be installed at each interconnection point. A rate per cubic metre is specified for 2009, to be charged on a net-flow basis. The agreement implies that net flows are currently favourable to Peel (i.e., the flow from Toronto to Peel exceeds the flow from Peel to Toronto).

#### 6.5.1.2 Toronto Official Plan

The Toronto Official Plan<sup>21</sup> was adopted by City Council in November 2002 and approved, in part, with modifications by the OMB in June 2006 and further approved by the OMB in September 2007. The October 2009 Office Consolidation incorporates all policies approved by the OMB up to the conclusion of the April 30, 2009 prehearing conference. All policies appealed to the OMB for which a decision by the OMB has not been determined; and all Official Plan Amendments in effect as of May 2009 that are identified in the Plan.

With respect to water and wastewater services, the Plan states that these services are important foundations for growth within the City. This may mean bigger pipes and treatment plants in some areas, but it is also important to use less water in homes and businesses, to absorb rainwater where it falls and to use streams and rivers more effectively to control flooding. Policy 4b states that the City will support, encourage and implement measures and activities that reduce water consumption, wastewater and storm water flows and improve water quality in accordance with best management practices developed by the City for this purpose.

The Plan states that expansions to the City's water and wastewater treatment infrastructure are necessary to serve population and employment growth. The City's Water Efficiency Plan implements water conservation measures that will offset the need to expand infrastructure.

Policy 1f in Chapter Three states that the adverse effects of storm water and snowmelt will be reduced based on a hierarchy of watershed-based wet weather flow practices which recognize that wet weather flow is most effectively managed where it falls, supplemented by conveyance, then end-of-pipe solutions.

#### 6.5.1.3 City of Toronto Wet Weather Flow Master Plan

The City of Toronto has developed a Wet Weather Flow Master Plan<sup>22</sup> that outlines actions over a 25-year period to protect the environment and sustain healthy water bodies. It aims to reduce the adverse effects of wet weather flow. The Plan's objectives for the sewer system are as follows:

- Eliminate discharges of sanitary sewage;
- Reduce infiltration and inflow to sanitary sewers; and
- Reduce the occurrence and severity of basement flooding.

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<sup>21</sup> *Toronto Official Plan – October 2009 Office Consolidation. City of Toronto, 2009.*

<sup>22</sup> [http://www.toronto.ca/water/protecting\\_quality/wwfmmp/index.htm](http://www.toronto.ca/water/protecting_quality/wwfmmp/index.htm). Accessed on July 27, 2011

Objectives will be achieved through a range of strategies, including source controls, fixing cross-connections, and conveyance controls.

The Region of Peel currently receives wastewater flows from Toronto at two locations, which are ultimately treated at the G.E. Booth Wastewater Treatment Facility (WWTF). Reduction of infiltration and inflow to the sanitary sewers tributary to these locations may reduce the impact of wet weather flows on the downstream Peel sewers and the WWTFs.

## 6.5.2 York Region

The 2013 Master Plan included a review of the Region's servicing strategies to support the existing water and wastewater servicing agreements with York Region.

### 6.5.2.1 York-Peel Inter-Regional Agreement

The York-Peel water and wastewater agreements set out the committed servicing requirements to York Region from the Region of Peel.

Committed water supply capacity to a maximum day demand of 388.32 ML/d in 2031 and beyond is factored into the development of the Peel water servicing strategy.

Committed wastewater treatment capacity to an average day wastewater flow of 53.2 ML/d in 2031 and beyond is factored into the development of the Peel wastewater servicing strategy. This flow is pumped from the Humber Sewage Pumping Station in York Region to the east trunk system in Peel and is treated at the G.E. Booth WWTF.

### 6.5.2.2 York Region Official Plan

The York Region Official Plan<sup>23</sup> was adopted by Council on December 16, 2009, and approved by the Ministry of Municipal Affairs and Housing on September 7, 2010, subject to a number of modifications.

The Plan generally refers to the York Region Water and Wastewater Master Plan in terms of water and wastewater infrastructure. However, relevant policies in the Official Plan include the following:

General:

- To work with partners in the provision of water and wastewater services for the Region;
- To continue to partner with the Regions of Peel and Durham, the City of Toronto and the conservation authorities to study, analyze and monitor groundwater and surface water resources to ensure a unified approach to protecting and enhancing water quality and quantity;
- To require the preparation of comprehensive master environmental servicing plans as part of secondary plans to protect and enhance the natural hydrologic function of water systems. Such

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<sup>23</sup> York Region Official Plan – As Approved by the Ministry of Municipal Affairs and Housing. York Region, 2010.

plans will emphasize water conservation and reuse, and will incorporate innovative technologies with a goal that water balance and hydrologic functions will be maintained; and

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

#### Water Conservation and Efficiency:

- To develop a long-term, innovative strategy for water conservation and efficiency;
- To restrict the use of potable water for outdoor watering;
- To require the installation of rainwater harvesting and re-circulation/reuse systems on all new residential buildings for outdoor irrigation and outdoor water use;
- To encourage the use of water-conserving, efficient, drought resistant landscaping; and
- To pursue with local municipalities and conservation authorities the implementation of water efficiency innovations such as water reuse systems, rainwater harvesting and innovative storm water management.

#### 6.5.2.3 York Region Water and Wastewater Master Plan

York Region updated their Water and Wastewater Master Plan in 2009<sup>24</sup>. The Region is forecasted to achieve significant population and employment growth to 2031 and beyond, meaning that without appropriate action, the demand for water and wastewater servicing will eventually exceed system capacities. Assessment of various alternatives showed that enhancing and expanding the Region's existing systems was the most appropriate solution, with Lake Ontario-based servicing preferred over Lake Simcoe-based servicing.

Water is provided from the Region of Peel to the southern portion of York Region, and wastewater generated in the southwest section of York, principally parts of Vaughan, is conveyed to and treated in the Region of Peel.

Key aspects of the Plan that are relevant to the Region of Peel are as follows:

#### Water:

- The Master Plan indicates that there will be sufficient supply from Toronto, Peel and groundwater to meet expected demands to 2031; however, expansion of the water delivery system will be needed. It is expected that growth will exceed supply capacity by 2037, which could be managed by pursuing more aggressive water efficiency and conservation measures and by acquiring additional water from Toronto and Peel.

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<sup>24</sup> *Water and Wastewater Master Plan Update. Genivar and XCG, 2009.*



No consideration was given in the 2013 Master Plan to increasing the maximum day demand allocation for York Region of 388.32 ML/d in 2031 and beyond.

Wastewater:

- The Plan states that no additional treatment capacity increase above the existing Peel-York agreement is required beyond 2031. York Region will work with Peel to manage high flows during storm events through pipe storage and infiltration/inflow reduction;
- The Plan recommends continued diversion of flows from the Humber Sewage Pumping Station to the Region of Peel;
- As an immediate priority (i.e., by 2016) the Plan recommends exploring the possibility of treating additional wastewater flows in Peel, beyond the limits of the current inter-regional agreement. This would allow York Region improved operational flexibility, increased wastewater system reliability and may address some short term capacity limitations; and
- In northwest Vaughan, future growth will be serviced by constructing a collector trunk sewer. This trunk sewer is oversized to provide inline storage. The Plan recommends that York Region consider negotiating an increase in flows directed to Peel through the existing or a new diversion to mitigate the need for this inline storage.



## 7 Existing Conditions

### 7.1 Natural Environment

The Region of Peel Official Plan includes a set of environmental policies to protect and augment the natural environment and are supported and supplemented by similar policies in the Official Plans of Mississauga, Brampton and Caledon. Within the Region, there exists a system of natural areas of varying significance. These interdependent areas are described as the Regional Natural Heritage System and are the focus of resource protection policies.

Integral to the studies baseline understanding a Baseline Natural Heritage Studies Report was prepared and is attached in Appendix 2C of this volume. The following section summarizes the Region's natural features please refer to Appendix for further details. The Baseline Natural Heritage Studies Report was considered in the preparation of the 2013 Master Plan.

The Region of Peel's diverse natural features perform numerous ecological functions essential to life processes, including the conservation of biological diversity. These functions include: maintaining and improving air and water quality; controlling and mitigating the effects of erosion, sedimentation and flooding; and providing habitat for a variety of plant and animal species. Natural features also provide many recreational, aesthetic and economic benefits to our human communities.

The significant natural areas and major landscaped features located in Peel include the Niagara Escarpment, Lake Ontario, the Oak Ridges Moraine, forests, woodlots and other identified areas of natural and scientific interest. There are 57 Environmentally Significant Areas (ESAs) identified in the Region of Peel (including the Escarpment and other areas of provincial-level significance).

The significant water resource features in Peel include numerous streams and creeks (including the Etobicoke Creek and Mimico Creek) and major rivers (such as the Credit River and Humber River) where their natural tributaries form the major watersheds in Peel.

#### 7.1.1 Environmentally Significant Areas

Environmentally Significant Areas (ESAs) are natural areas that have been identified as significant and worthy of protection on three criteria: ecology, hydrology and geology. The Provincial Government, through the *Planning Act* and the Provincial Policy Statement requires that municipalities develop policies to protect natural heritage features. The Region of Peel uses ESAs as a means to protect natural areas like wetlands, fish habitat, woodlands, habitat of rare species, groundwater recharge and discharge areas, and Areas of Natural and Scientific Interest (ANSIs). The locations of the Region's 57 ESAs were considered in the preparation of the 2013 Master Plan with the specific objective of avoiding negative impacts.

#### 7.1.2 Areas of Natural and Scientific Interest

In addition to wetlands and woodland, the Ontario Ministry of Natural Resources (MNR) identifies Areas of Natural and Scientific Interest (ANSIs) throughout the province. The principle behind the recognition of

ANSIs is that protecting the most significant features is crucial to maintaining biodiversity and the conservation of natural heritage. There are two types of ANSIs: life science and earth science.

The MNR has confirmed ANSI status for 33 locations in the Region of Peel. Sixteen sites are identified as Life Science ANSIs, of which seven are considered to have provincial significance. The 17 remaining ANSIs in Peel are identified as Earth Science ANSIs: seven of these sites are considered provincially significant.

The locations of the Region's 33 ANSIs were considered in the preparation of the 2013 Master Plan with the specific objective of avoiding negative impacts.

### 7.1.3 Watersheds

The Credit River, Humber River, Etobicoke Creek, Mimico Creek and their natural tributaries, along with other creek systems, form the major watersheds in Peel. The shoreline of Lake Ontario also has ecological, economic, aesthetic, recreational, historical and cultural importance. Many of these features must be protected to ensure that impacts on the natural ecosystems are minimized and shorelines, water quality and aquatic ecosystems are protected.

The Region of Peel has an abundance of ground and surface water resources; therefore, it is critical to recognize the interconnections and relationships between human activities and natural systems. The Master Plan recognizes the importance of watershed management and the planning challenges brought about by increased pressure generated by the large population and job growth projected for the Region. To minimize impacts to watersheds, where necessary the Master Plan project team will meet and discuss proposed projects with the relevant conservation authorities.

The 36 conservation authorities in Ontario are local watershed management agencies that protect and manage water and other natural resources in partnership with government, landowners and other organizations. The conservation authorities are organized by watershed. The watersheds of the Region of Peel fall under the jurisdiction of three conservation authorities: the Toronto and Region Conservation Authority (TRCA), Credit Valley Conservation (CVC), and Conservation Halton. The conservation authorities are also responsible for flood plain mapping, which were considered in the 2013 Master Plan, where available.

#### 7.1.3.1 Toronto and Region Conservation Authority (TRCA)

In the Region of Peel, the Toronto and Region Conservation Authority's (TRCA's) area of jurisdiction includes the watersheds of Etobicoke Creek, the Humber River, and Mimico Creek. The Etobicoke Creek and Mimico Creek watersheds originate on the south slope of the Oak Ridges Moraine and extend south to Lake Ontario. They cover 21,100 and 7,700 hectares, respectively, and together support a population of over 400,000 people.<sup>25</sup>

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<sup>25</sup> <http://trca.on.ca/the-living-city/watersheds/etobicoke-mimico-creek/> [Accessed 20 December, 2011]

The Humber River watershed is the largest in the Toronto area, originating on the Niagara Escarpment and the Oak Ridges Moraine and flowing south to Lake Ontario. The watershed is home to 732,000 people and covers nearly a thousand square kilometres.<sup>26</sup>

Various restoration and other projects are underway in these watersheds. A management plan for the Bolton Resource Management Tract in the Town of Caledon, owned by the TRCA, is currently under development.

#### 7.1.3.2 Credit Valley Conservation (CVC)

Credit Valley Conservation's (CVC's) watershed is composed of 23 sub-watersheds, of which 21 fall partly or completely within the Region of Peel. The watershed includes the tributary area to the Credit River, which travels from its headwaters in Orangeville, Erin and Mono south to Lake Ontario. The CVC also has responsibility for a number of other local watersheds, including the small watersheds in Mississauga that feed into Lake Ontario.<sup>27</sup>

#### 7.1.3.3 Conservation Halton

Conservation Halton is responsible for three major watersheds and 18 smaller watersheds located in the Halton Region, each of which ultimately drains into Lake Ontario<sup>28</sup>. Small areas of Mississauga form part of the Joshua's Creek and Sixteen Mile Creek watersheds. The Joshua's Creek watershed forms part of the North Shore watershed. The Sixteen Mile Creek watershed covers 357 square kilometres of land, draining into Lake Ontario in the Town of Oakville.

### 7.1.4 Niagara Escarpment

The Niagara Escarpment is a provincially significant, 725-kilometre-long geological feature, a portion of which runs through Peel. In 1990, the United Nations Educational, Scientific and Cultural Organization (UNESCO) named Ontario's Niagara Escarpment a World Biosphere Reserve. This designation recognizes the natural features and ecological importance of the Escarpment.

### 7.1.5 The Oak Ridges Moraine

The Oak Ridges Moraine is one of Ontario's most significant landforms. This irregular 160-kilometre-long ridge stretches from the Niagara Escarpment in the west to the Trent River in the east. The Niagara Escarpment and Oak Ridges Moraine form the foundation of south-central Ontario's natural heritage and greenspace systems. Strategically located north of and parallel to Lake Ontario, the Moraine divides the watersheds draining south into western Lake Ontario from those draining north into Georgian Bay, Lake Simcoe and the Trent River system.

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<sup>26</sup> <http://trca.on.ca/protect/watersheds/humber-river/watershed-features.dot> [Accessed 20 December, 2011]

<sup>27</sup> <http://www.creditvalleyca.ca/watershed-science/our-watershed/> [Accessed 20 December, 2011]

<sup>28</sup> <http://www.conservationhalton.ca/ShowCategory.cfm?subCatID=1000> [Accessed 20 December, 2011]

### **7.1.6 The Parkway Belt**

The Parkway Belt West Plan provides a system of linked natural areas and protected utility corridors that originates in Dundas and runs through the Regions of Halton, Peel and York. The Plan was taken into consideration during the preparation of the 2013 Master Plan.

### **7.1.7 Significant Woodlands**

The Region of Peel recognizes the importance of woodlands and trees to the health and quality of life in the community. The Region's policies encourage the protection and restoration of forests, including trees, hedge rows, wooded areas and significant woodlands. Where the Region is undertaking infrastructure work, the Region will, where feasible, protect and preserve existing woodland resources.

## **7.2 Socio-economic and Cultural Environment**

### **7.2.1 Cultural Heritage**

The Region of Peel and the area municipalities encourage and support heritage preservation. Criteria and guidelines established by the Ministry of Culture, Tourism and Recreation are used to identify, preserve and interpret the cultural heritage features, structures, archaeological resources, and cultural heritage landscapes. Cultural heritage policies established by the Region include the need for appropriate assessment, preservation, interpretation and rescue excavation of cultural heritage and archaeological resources including mitigation measures as prescribed by the Province. Provincial and Regional cultural heritage policies and objectives were considered in the preparation of the 2013 Master Plan.

### **7.2.2 Aggregate Resources Areas**

The planning responsibility for aggregate resources is shared between the Province and the Region of Peel. The Provincial interest is to protect the aggregate resources for long-term use and ensure that as much as possible is made available to the aggregate industry. The task of the Region of Peel is to establish comprehensive mineral aggregate policies for the protection and use of mineral aggregate resources. The Region of Peel Official Plan identifies areas designated as having high potential aggregate resources. High potential aggregate sites are distributed within the Town of Caledon and in northwest Brampton. These areas of protection were considered in the preparation of the 2013 Master Plan.

### **7.2.3 Prime Agricultural Lands**

The preservation and enhancement of farming and agricultural land are vital components of the sustainable future envisioned for the Region of Peel and were considered in the preparation of the 2013 Master Plan.

## 7.2.4 Open Space and Recreation

Recreational opportunities are vast and varied within the study area due to the presence of natural features, open spaces and parklands. Active recreation is accommodated by the many municipal parks, while passive recreation is supported by the river valleys and trail systems of the Credit River, the Etobicoke Creek and the Lake Ontario waterfront.

The Region of Peel supports passive recreational opportunities through regional cooperation and partnership with provincial agencies, conservation authorities and area municipalities. The preservation and enhancement of open space and recreational opportunities are vital components of the sustainable future envisioned for the Region of Peel, and were considered in the preparation of the 2013 Master Plan.

## 7.2.5 Pearson International Airport

Pearson International Airport, located in the City of Mississauga, is recognized as a valued transportation facility and an important link in the movement of goods and people. The Region has existing policies to minimize future conflicts between the operation of the airport and surrounding land uses. Regulations apply noise exposure forecast contours (Transport Canada) and guidelines for development in the vicinity of airports (Provincial Ministry of Municipal Affairs and Housing) so that no new residential uses are developed within areas exposed to set noise disturbance levels.

## 7.3 Existing Water System

The Region of Peel's lake-based water transmission system services the City of Mississauga, much of the City of Brampton, and parts of the Town of Caledon. The system consists of two Lake Ontario-based water treatment plants (the Lakeview WTP and the Lorne Park WTP), transmission mains, pumping stations, reservoirs and elevated tanks that deliver water to customers through seven pressure zones separated by approximately 30-metre intervals of elevation. The lake-based water transmission system consists of three main trunk systems: west, central and east.

Separate from the water transmission system, the water distribution system conveys treated water from the water transmission facilities to the customers. With the exception of east-west sub-transmission capacity, the water distribution system is not included in the 2013 Master Plan.

The Region of Peel also maintains four municipal groundwater systems servicing rural communities in the Town of Caledon. These municipal groundwater systems are not included in the 2013 Master Plan.

A full description of the existing system is contained in Volume III, Section 1, of this Master Plan.

## 7.4 Existing Wastewater System

The lake-based wastewater system services the City of Mississauga, much of the City of Brampton and parts of the Town of Caledon. The system consists of two gravity trunk sewer systems that terminate on the shores of Lake Ontario at the G.E. Booth WWTF and the Clarkson WWTF. The east and west wastewater service areas are approximately divided by the watershed boundary between the Etobicoke Creek and the Credit River.

The two systems are connected via the West-East Sanitary Trunk Sewer, which currently diverts some wastewater flows by gravity from the west trunk system to the east trunk system at Highway 407.

A full description of the existing system is contained in Volume IV, Section 1, of this Master Plan.



## 8 Future Considerations

### 8.1 Future Infrastructure

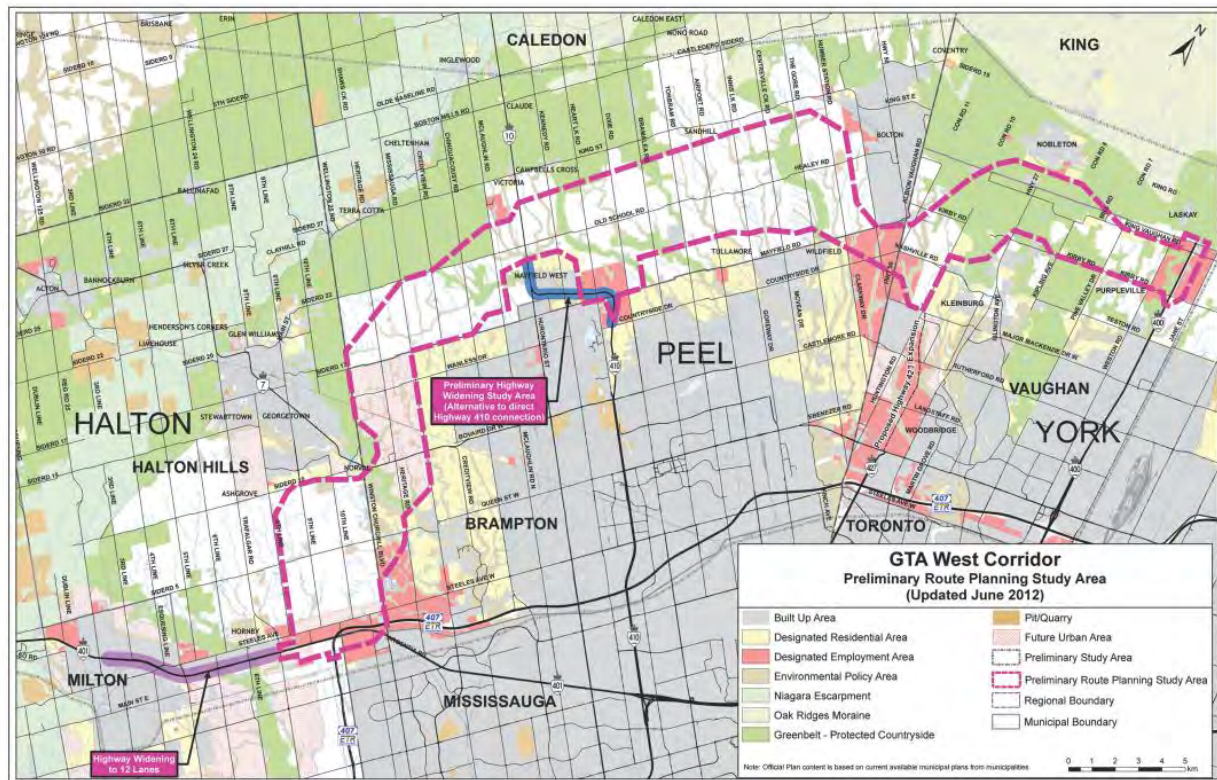
The 2013 Master Plan has also considered through review of available information future planned infrastructure in the Region, including the following considerations.

#### 8.1.1 Light Rail Transit Corridor

The Hurontario-Main Light Rail Transit (LRT) project is a proposed light rail transit corridor that will run from Lake Ontario to downtown Brampton, with proposed route alignment along Hurontario and Main Streets. There is currently no firm time frame for implementation; however, the implementation stage could potentially begin as early as 2014, though the first construction activities are likely to be later.<sup>29</sup>

#### 8.1.2 Future Highway Corridor

A new 400-series highway is being planned for the northwest part of the GTA. The preliminary route is shown in Figure 2.6.



**Figure 2.4. Preliminary route for the GTA West 400 Series highway (June 2012)**

<sup>29</sup> <http://lrt-mississauga.brampton.ca>. Accessed 23 November 2012.



## **8.2 Impact on Existing and Planned Water and Wastewater Infrastructure**

Both of these proposed projects could have the following impacts on existing and planned water and wastewater infrastructure:

- Relocation of infrastructure could be required; and
- The creation of the LRT may lead to increased growth and intensification along this corridor, leaving to increased loadings on the water and wastewater systems.