NOTICE OF COMMENTS RECEIVED
Following Completion of the Public Review Period

The Regional Municipality of Niagara filed the 2016 Water and Wastewater Master Servicing Plan Update report for the 45-day public review period from **Thursday June 15, 2017** to **Monday July 31, 2017**.

All comments received were tracked in the attached summary table and responses were issued where required. A copy of all comments and responses are attached in Volume 5. Revisions to the 2016 Water and Wastewater Master Servicing Plan Update include the following:

Volume 1

- **Figure 1.15** to reflect decommissioning/ownership of the Grassy Brook Sewage Pumping Station

Volume 3

- Capital Project **W-P-001** and **W-P-002** Municipality ownership revised from Welland to Pelham
- Capital Project **W-P-003** Municipality ownership revised from Lincoln to Grimsby
- Modifications to *2041 Collection Schematics* including **Figure 3.A.19**, **Figure 3.B.20**, **Figure 3.C.17**, **Figure 3.D.18**, **Figure 3.E.18**, and **Figure 3.F.19** to reflect the updated water system schematics

Volume 4

- Table of Contents – Spelling correction
- Tables: 1,7,8,9,10,11,12,13 in all parts
- Existing serviced population and employment numbers in introductions for all parts
- Example calculations for peak dry weather flow and peak wet weather flow for all parts
- Capital Project **WW-FM-003** Municipality ownership revised from Welland to Pelham
- Capital Project **WW-SPS-037** Municipality ownership revised from Pelham to Thorold
- Capital Project **WW-SS-003** and **WW-SS-004** Municipality ownership revised from West Lincoln to Grimsby
- Capital Project **WW-II-006**, **WW-II-007** Municipality ownership revised from West Lincoln to Lincoln
- Modifications to **Figure 4.F.1**, **Figure 4.F.2**, **Figure 4.F.4**, **Figure 4.F.5**, **Figure 4.F.6**, **Figure 4.F.7** to reflect decommissioning/ownership of the Grassy Brook Sewage Pumping Station
- Modifications to *2041 Collection Schematics* including **Figure 4.A.13**, **Figure 4.C.8**, **Figure 4.E.6**, **Figure 4.F.8**, **Figure 4.K.8** to reflect the updated wastewater system schematics
- Part F – *Niagara Falls Wastewater System*, **F.6.2 Pumping Stations** text change to reflect decommissioning of Grassy Brook Pumping Sewage Pumping Station.

2016 Water and Wastewater Master Servicing Plan Update
Summary of 45-Day Review Comments

#	From	To	Date Received	Type	Comment	Action	Status
1	Nancy Bozzato (Town of Pelham)	Natasha Devos (Regional Municipality of Niagara)	6/6/2017	E-mail	• Attached letter from Town of Pelham relating to the Fenwick Supply - Regional Water/Wastewater Master Plan • Includes a report considered by Pelham Council (June 5, 2017). Pelham Council reviewed this together with the 2016 Water and Wastewater Regional Master Servicing Plan Update information	• Request that steps be taken to ensure Regional Council is aware of this correspondence • No further action required	Complete
2	Andrea Clemencio (Town of Pelham)	Phill Lambert (Regional Municipality of Niagara)	6/6/2017	E-mail	• Council requested to see if other capital solutions for security concerns can be considered • To verify if an additional main or twinned main can serve as a return, rather than a feed to integrate and loop Fenwick into the system as a whole, rather than at the end of the Feeder main had been considered	• Phill Lambert provided response and forwarded email to GM BluePlan, Mayor of Pelham, Ron Tripp, & Regional contacts • Following 45-day review period, GM BluePlan will instigate and provide an additional response	Follow-up will be provided to Council
3	Dave Augustyn (Mayor - Town of Pelham)	Phill Lambert (Regional Municipality of Niagara)	6/6/2017	E-mail	• Highlighted that the "Security of Supply" project is currently in the Region's 2012 bylaw • Expressed interest to continue with Security of Supply project and will be informing Council	• Mayor to inform Council • No further action required	Complete
4	Tikvah Mindorff (Niagara Sustainability Initiative)	Natasha Devos (Regional Municipality of Niagara)	6/9/2017	E-mail	• Shared formal letter from Board of Directors - Niagara Sustainability Initiative "Comments on Niagara 2041" • Includes summary of How We Grow - Municipal Comprehensive Review, How We Go - Transportation Master Plan, and How We Flow - Water and Wastewater Master Servicing Plan (MSP)	• Region forwarded presentation to Ron Tripp (Niagara Region) to confirm in Council Agenda • Recommended action: Refer to consideration of PWC - Formal letter response provided to Niagara Sustainability Initative from Niagara 2041 team and signed by Ron Tripp	Complete
5	Phill Lambert (Regional Municipality of Niagara)	Julien Bell, Chris Hamel (GM BluePlan)	6/12/2017	E-mail	• Recap of Regional Council meeting held June 8, 2017 • Mayor of Pelham spoke about Town's concerns for security of supply to Fenwick • Mayor Dave and Pelham Council believes this should be in the new DC bylaw	• To be discussed and evaluated following the 45-day review period	Follow-up will be provided to Council
6	[redacted] (Resident)	Phill Lambert (Regional Municipality of Niagara)	6/22/2017	E-mail	• Would like to know when the Region plans to decommission the Sewage Lagoon servicing Stevensville and Douglastown/Black Creek	• Phill responded with a brief summary of the Water and Wastewater MSP Stevensville/Douglastown Lagoons • Provided link with direction to Volume 4- Part G Stevensville-Douglastown Wastewater System for additional information	Complete
7	Carmela Dipardo (City of Thorold)	Phill Lambert (Regional Municipality of Niagara)	6/23/2017	E-mail	• Confirmed receipt of 2016 Water and Wastewater MSP Update on June 20, 2017 at Thorold City Council meeting	• No further action required	Complete
8	[redacted] (Resident)	Phill Lambert (Regional Municipality of Niagara)	6/26/2017	E-mail	• Attached correspondence regarding the decommissioning of the Stevensville/Douglastown Sewage Waste Lagoon • To clarify why criteria for closure was different than closure of Port Robinson and Niagara-on-the-Lake	• Phill responded with a brief summary of the Water and Wastewater MSP Stevensville/Douglastown Lagoons • Provided link with direction to the Volume 4- Part G Stevensville-Douglastown Wastewater System for additional information	Complete
9	Phill Lambert (Regional Municipality of Niagara)	Lindsay Bowman (GM BluePlan)	6/29/2017	E-mail	• Provided recap of meeting with Richard Epp held at Regional Headquarters • Discussed analysis of Volume 4 in great detail to provide a good system understanding	• Resident may provide formal written comments to MOECC regarding the 1982 OMB decision in that the Lagoon should be decommissioned	Complete
10	Kelly M. Walsh (Town of Fort Erie)	Phill Lambert (Regional Municipality of Niagara)	7/6/2017	E-mail	• Would like clarification on two items: - The need for Region to provide a new main on Gilmore from Petit to Concession - The security of supply to Ridgeway/Crystal Beach • Provided attachment which includes a suggested alternative for the new main	• Detailed review was completed based on Fort Erie submission by GM BluePlan and Regional Staff • Response memo provided to Town of Fort Erie • No further action required	Complete
11	Suzanne McInnes (Niagara Peninsula Conservation Authority)	Phill Lambert (Regional Municipality of Niagara)	7/7/2017	E-mail	• NPCA comments are focused on the proposed inlet channel upgrades at the Decew Water Treatment Plant scheduled for 2017-2021 • Would like more information about channel upgrades because it may require some work for NPCA to update modelling for the intake protection zone within the work plan • Provided link to a workshop held in June regarding the Source Protection Plan work plan	• Regional W&WW staff met with NPCA staff to review	Complete
12	Nicole Coffer (Regional Municipality of Niagara)	Tikvah Mindorff (Niagara Sustainability Initiative)	7/6/2017	E-mail	• Attached letter from Ron Tripp that includes commentary and response to Niagara 2041- How We Grow, How We Flow, and How We Go • Copy was shared with Regional Council through email distribution	• Phill forwarded email to GM BluePlan • No further action required	Complete
13	[redacted] (Resident)	Phill Lambert (Regional Municipality of Niagara)	7/10/2017	E-mail	• Expressed concerns for the omission of the Sewage Lagoon closure • Requested response promptly to clarify omission	• Phill forwarded email to GM BluePlan • Phill responded to concerned resident with further context of the Study on June 26, 2017	Complete
14	[redacted] (Resident)	Phill Lambert (Regional Municipality of Niagara)	7/17/2017	E-mail	• Provided context on the area of Provincially Significant Wetlands (PSWs) noted within the Niagara MSP • Request that revisions be made to reflect PSW's in Figure 2.16 of the MSP	• Phill responded to email - Figure 2.16 was intended to provide an approximate location of potential future development in the Urban Area Boundary • Natural existing conditions are listed within Section 9 of the report • Provided opportunity to continue conversation	Complete
15	Tammy Cheyne (Regional Municipality of Niagara)	Phill Lambert (Regional Municipality of Niagara)	7/17/2017	E-mail	• [redacted](Resident) provided written letter expressing concerns for the omission of the Sewage Lagoon closure • [redacted](Resident) attached a Health and Safety letter with newspaper articles and additional information for Stevensville/Douglastown Lagoons	• Phill responded to concerned resident with further context of the W&WW MSP Study which focused on accomodating growth to 2041 on June 26, 2017 • Lagoon is operating in accordance with MOECC ECA	Complete
16	Phill Lambert (Regional Municipality of Niagara)	Lindsay Bowman (GM BluePlan)	7/26/2017	E-mail	• Would like clarification for Stevensville Lagoon's rated capacity values (Regional vs. ECA data)	• Rated capacity will be revised based on MOECC ECA values • No further action required	Complete
17	Garry Hunter (Hunter and Associates)	Phill Lambert (Regional Municipality of Niagara)	7/31/2017	E-mail	• Would like information on determination of the capacity of the Kalar Pumping Station in the City of Niagara Falls • Enclosed previous hydrographs of Wet Well Water Levels and Dry Weather Flows prepared from pumping station data supplied by the Region	• Phill responded following consultation with GM BluePlan • Provided additional context and references to areas of the report in which the capacity was calculated	Complete
18	[redacted] (Resident)	Phill Lambert (Regional Municipality of Niagara)	8/1/2017	E-mail	• To consider green infrastructure and reductions before overloaded stormwater systems • Advocate for conservation and restoration of Niagara's natural lands	• Phill forwarded email to GM BluePlan	Complete
19	Garry Hunter (Hunter and Associates)	Phill Lambert (Regional Municipality of Niagara)	8/3/2017	E-mail/Phone	• Provided summary and follow-up to previous phone conversation • Enclosed prior explanatory letter to Region for the Hydrographs • Believes the Kalar Road SPS Projected Peak Weather Flows by Catchment are significantly underestimated based on existing conditions and monitoring history	• Phone conversation with Mr. Hunter took place • Phill discussed content with GM BluePlan	Complete
20	Phill Lambert (Regional Municipality of Niagara)	Lindsay Bowman (GM BluePlan)	8/15/2017	E-mail	• Reviewed Secondary Plan in Niagara Falls for Grassy Brook SPS and Volume 4 MSP • Area was flagged for SPS capacity and FM upgrades, but projects were not carried forward • To revise for final version of MSP	• Would like verification on Grassy Brook Sewage Pumping Station ownership • Information forwarded to Greg Epp (Regional Municipality of Niagara)	Complete
21	Greg Epp (Regional Municipality of Niagara)	Phill Lambert (Regional Municipality of Niagara)	8/15/2017	E-mail	• Confirmed that Niagara Region has ownership of Grassy Brook Sewage Pumping Station • To include new information within the final Master Servicing Plan document	• Region provided information to GM BluePlan • GM BluePlan suggested decommissioning the station and convey flows via gravity to the new South Niagara Falls Wastewater Treatment Plant • GM BluePlan updated MSP Volume 4 respective text, figures, and project sheet for further clarification	Complete

Niagara Region

2016 Water and Wastewater Master Servicing Plan Update

HOW WE **FLOW**

Volume II - Background & Planning Context

Final Report

June, 2017

BluePlan ENGINEERING

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1. INTRODUCTION

1.1 Background

Niagara Region currently services the urban area of the municipalities of Grimsby, West Lincoln, Lincoln, St. Catharines, Thorold, Welland, Pelham, Port Colborne, Niagara-on-the-Lake, Niagara Falls, and Fort Erie. Water and wastewater servicing is operated under a two-tier system. Niagara Region is responsible for water treatment, transmission mains, storage facilities and major booster pumping stations; as well as wastewater treatment, trunk sewers and sewage pumping stations. The area municipalities are responsible for local water distribution networks and local sewer collection systems.

Niagara Region is part of the Greater Golden Horseshoe (GGH) area situated around the western and southern 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* and recent amendments, identifies substantial population and employment growth for the GGH to year 2041.

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, Niagara Region initiated an integrated process under the umbrella Niagara 2041 to complete a Municipal Comprehensive Review, a new Transportation Master Plan, and a Water and Wastewater Master Servicing Plan Update.

The 2016 Master Servicing Plan Update (MSP) provides a review, evaluation and development of water and wastewater servicing strategies for all servicing within the urban areas of the Region. The 2016 MSP uses updated population and employment growth forecasts based on a 2041 planning horizon.

The Study Area for the MSP covers primarily the urban areas of the local municipalities in Niagara Region serviced by the lake-based systems. The Township of Wainfleet is not included in the scope of this MSP.

Figure 2.1 Study Area

The 2016 MSP builds on previous work undertaken as part of the 2011 Master Servicing Plan and previous long term infrastructure planning studies. The 2016 MSP is a critical component in 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 year 2041.

1.2 Integrated Planning Process

Niagara, as a whole, must proactively plan for and facilitate growth in order to conform with Provincial land use plans (*Places to Grow*). The Region is currently planning the best way to accommodate anticipated and targeted population and employment growth over the next 25

years. Under the umbrella “Niagara 2041” the Region will be establishing a growth strategy that will be urban in nature.

The establishment of the growth strategy involves completing (3) three projects:

1) Municipal Comprehensive Review (MCR) – ***How We Grow***

   Look at the land available across Niagara, ensure there is enough land to sustain the expected growth to year 2041 and examine how the land is distributed throughout Niagara

2) Transportation Master Plan (TMP) – ***How We Go***

   Look at current travel methods across Niagara and look to improve transportation systems including options for walking, cycling and public transit to better serve Niagara’s future needs

3) Water and Wastewater Master Servicing Plan (MSP) – ***How We Flow***

   Ensure Niagara has the infrastructure to provide critical water and wastewater services to the growing Region in a sustainable and financially responsible way

These three projects are inter-connected and collectively form the foundation to support and foster Niagara’s growth and input into the Niagara Region Development Charge Study. The Master Plans will identify the preferred servicing solution and associated infrastructure needs to support projected growth as set out in the Municipal Comprehensive Review.

1.3 Master Servicing Plan Update Report Objectives

The MSP comprehensively documents the development, evaluation and selection of the preferred water and wastewater servicing strategies to meet the servicing needs of existing users and future development to 2041.

The MSP evaluates the ability of existing and planned water and wastewater infrastructure in Niagara Region to efficiently and effectively service the Region’s existing users, service anticipated growth, and to evaluate and develop recommended servicing strategies.

The key objectives of the 2016 MSP are as follows:

- Review planning forecasts to 2041 and determine the impacts on servicing needs for the Region’s lake-based water and wastewater infrastructure;
- Evaluate the ability of existing and planned water and wastewater infrastructure to efficiently and effectively service the Region’s existing users and anticipated growth;

- 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 water and wastewater servicing strategies including:
    - Level of service to existing users and approved growth
    - Operational flexibility and system security and reliability
    - 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 servicing strategies
    - Ensuring the strategies are cost effective
- Consider and develop sustainable servicing solutions with lifecycle considerations;
- Update the capital program cost estimating methodology and utilize updated industry trends and more detailed information from relevant Region studies and projects to provide appropriate capital 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;
- Provide extensive consultation with the public and stakeholders; and
- Complete the Master Servicing Plan Update in accordance with the Municipal Engineers Association (MEA) Class Environmental Assessment (EA) process for Master Plans.

This study follows the approved master planning process as outlined in Section A.2.7 (Approach #2 in Appendix 4) of the MEA Class EA (October 2000, as amended in 2007, 2011 & 2015). This approach involves preparing a master plan document at the conclusion of Phase 1 and 2 of the Class EA process. This approach allows for Schedule A, A+ and specific Schedule B projects identified in the MSP to move forward to implementation. The MSP provides evaluation and documentation to support identified Schedule B Class EA requirements with applicable review agency commitments prior to the respective implementation. As well the MSP identifies Schedule B or 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 Phase 3

and 4 of the Class EA process with an Environmental Study Report (ESR) filed for public review.

1.4 Master Servicing Plan Class EA Report Outline

The 2016 MSP 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 2016 MSP documentation is organized into five volumes as illustrated in Figure 2.2 and as described in the following figure:

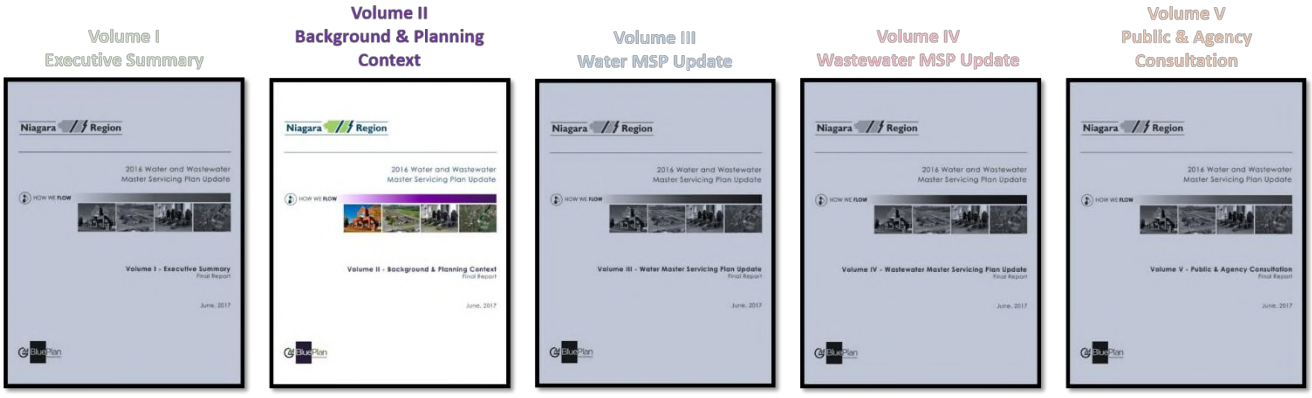


Figure 2.2 Master Servicing Plan Document Layout

Volume I – Executive Summary

Volume I provides a brief overview of the 2016 Master Servicing Plan Update. It summarizes the information contained in Volumes II, III, IV and V, including problem statement, purpose of the study, significant planning, policy and technical considerations, and description of the preferred water and wastewater servicing strategies including depiction of the projects and documentation of the capital programs.

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.

Volume III – Water Master Servicing Plan Update 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 for each of the water systems. This volume contains baseline water system data and performance information. This volume documents the water servicing strategy development with detailed information on the projects and capital program associated with the preferred water servicing strategy.

Volume IV – Wastewater Master Servicing Plan Update 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 for each of the wastewater systems. This volume contains baseline wastewater system data and performance information. This volume documents the wastewater servicing strategy development with detailed information on the projects and capital program associated with the preferred wastewater servicing strategy.

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.

1.5 Master Servicing 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 10 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. Planning and Growth Projections
8. Niagara Region Water and Wastewater Policies and Design Guidelines
9. Natural Environment/Existing Conditions
10. Existing Water and Wastewater Systems

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

2. MASTER PLANNING PROCESS

The Municipal Class EA process clearly defines approaches for completion of Master Plans within the Class EA context. This 2016 MSP is based on Approach 2 of the Class EA process, which involves preparing a master plan document at the conclusion of Phases 1 and 2 of the Class EA Process. This Master Plan provides an overall framework and supporting information.

This section describes the environmental assessment process and the specific requirements for the preparation of master plans.

2.1 Class Environmental Assessment Process

Ontario's Environmental Assessment Act (EAA) was passed in 1975 and was proclaimed in 1976.The EAA 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 EAA in 1981.

The EAA's comprehensive definition of the environment is:

- Air, land or water;
- Plant and animal life, including human life;
- 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 human activities; and,
- Any part of a combination of the foregoing and the interrelationships between any two or more of them, in or of Ontario.

The purpose of the EAA 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). It is the objective of EAA proponents to ensure that decisions result from a rational, objective, transparent, replicable, and impartial planning process.

As set out in Section 6.1(2) of the EAA, an EA document must include the following:

- A description of the purpose of the undertaking;
- A description of and a statement of the rationale for,
    - 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;
- 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 (RSO1990, c.18, s.2); and,
- A description of any consultation about the undertaking by the proponent and the results of the consultation.

2.1.1 Principles of Environmental Planning

The EAA sets a framework for a systematic, rationale 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 "Do Nothing" alternative must also be considered.

- Identification and consideration of the effects of each alternative on all aspects of the environment. This 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.

2.1.2 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, 2011 and 2015. 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, 2011 and 2015), outlines the procedures to be followed to satisfy Class EA requirements for water, wastewater, stormwater management and road projects. The process includes five phases:

- Phase 1: Identification of the Problem or Opportunity;

- Phase 2: Identification and Evaluation of Alternative Solutions to determine a Preferred Solution while taking input from the public and other stakeholders into consideration;
- Phase 3: Examination of Alternative Methods of implementation of the Preferred Solution based on the existing conditions, anticipated environmental effects, while taking input from the public and other stakeholders into consideration;
- Phase 4: Documentation of the Class EA process in the form of an Environmental Study Report (ESR) for public review; 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 following four "schedules" depending on the degree of the expected impacts. Figure 2.3 illustrates the Municipal Class EA planning and design process with the phases required for each schedule.

Schedule A projects are minor or emergency operational and maintenance activities and are approved without the need for further assessment. These projects are typically smaller in scale and do not have a significant environmental effect.

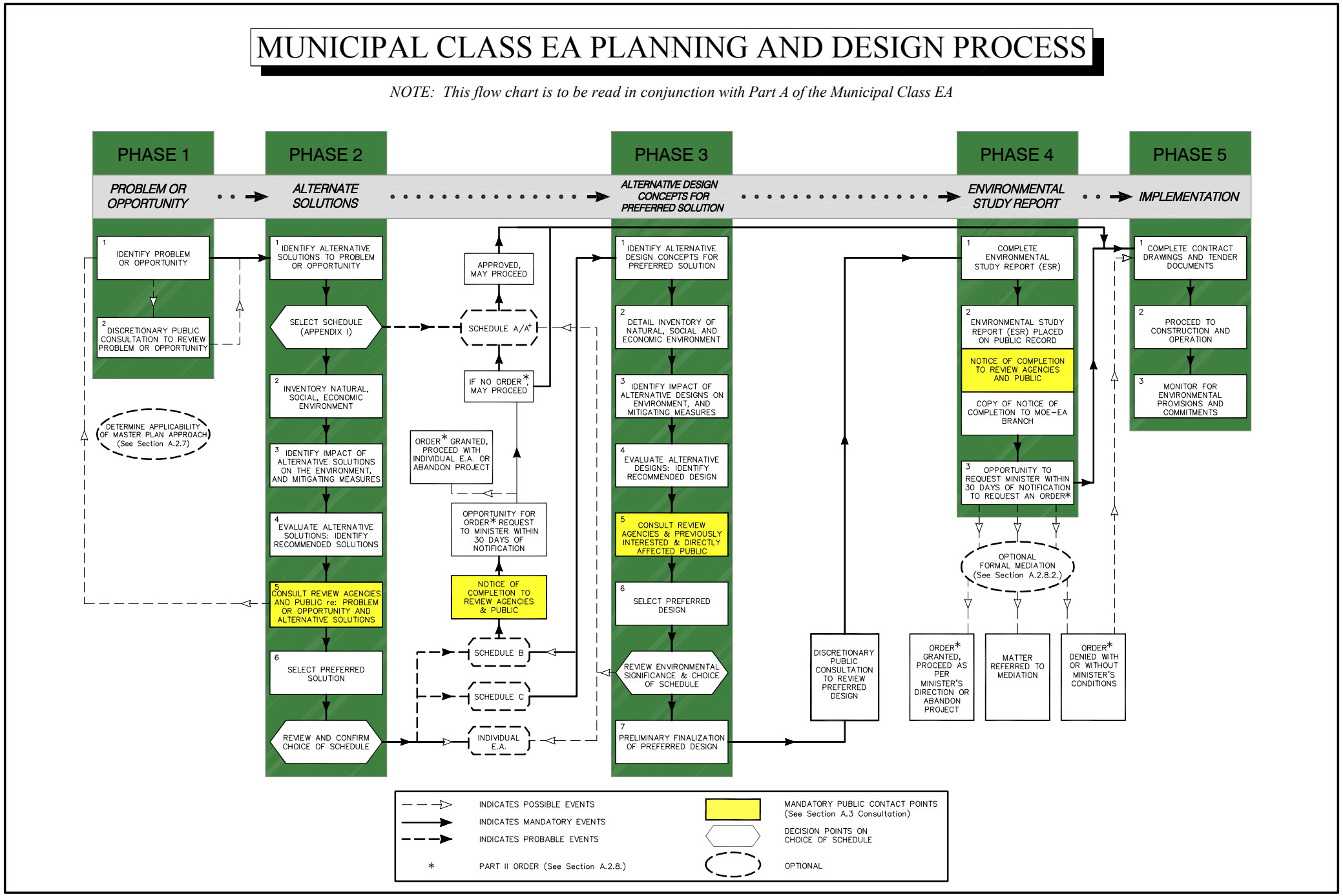
Schedule A+ projects are also pre-approved; however, the public is to be advised prior to the project implementation. Projects of this class do not usually have the potential for adverse environmental impacts. Typical projects that fall in this category are within existing road allowance, and utility corridors.

Schedule B projects require a screening of alternatives for their environmental impacts and Phases 1 and 2 of the planning process must be completed. The proponent is required to consult with the affected public and relevant review agencies. Provided that 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 2.3: Municipal Class EA Planning and Design Process



2.1.3 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.
- 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 2.1.1. The Master Servicing Plan (MSP) must document public and agency consultation at each phase of the process and a reasonable range of alternative solutions must be identified and systematically evaluated.

This MSP is designed to build on the part of the decision-making completed in the PCP reports and present a refined overall strategy for all the communities in the study area. The approach for the MSP is to confirm the existing projects and where applicable, evaluate and develop any new components. This approach would also be scrutinized through a public and agency consultation process and be fully documented.

This study follows Approach 2 of the approved master planning Class EA process. This approach allows for Schedule A, A+ and specific Schedule B projects identified in the MSP to move forward to implementation. The MSP provides evaluation and documentation to support identified Schedule B Class EA requirements with applicable review agency commitments prior to the respective implementation. As well the MSP identifies Schedule B or 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 Phase 3 and 4 of the Class EA process with an Environmental Study Report (ESR) filed for public review.

2.2 Public Consultation

The public consultation process is essential for informing and obtaining input from potentially interested and affected parties during the study process.

Objectives of Phase 1 of the MEA Municipal Class EA process with respect to public consultation are as follows:

- Present clear and concise information to stakeholders at key stages of the study process;
- Solicit community, regulatory and City staff input; and
- Meet Municipal Class EA consultation requirements.
- To fulfill the consultation requirements of the MEA Municipal Class EA document:
    - Build on past communication protocols and consultation plans from previous Class EA and municipal planning initiatives, to ensure consistency and continuity.
    - Meet public and agency notification and consultation requirements for Phases 1 and 2 of the MEA Municipal Class EA (October 2000, as amended in 2007); and
    - Complete additional tasks to enhance the proposed consultation program and overall Class EA process.

As part of the current project, a communication and consultation plan has been developed. The main objective of the plan is to proactively engage the community, regulatory agencies and Regional staff. More specifically, the plan is designed to:

- Ensure the general public, Regional and municipal 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 early and often throughout the study process; and

- Contact external agencies to obtain legislative or regulatory approvals, or to collect pertinent technical information.

The complete Public Consultation process is documented in Volume V – Public Consultation.

2.2.1 Phase 1 Public Consultation

Public Information Centre #1

Several consultation methods have been used to address the requirements of the Municipal Class EA. The first round of Public Information Centres (PICs) was held during Phase 1 of the Class EA study process to:

- Introduce the study to the public
- Describe the Class EA process
- Identify the problem and opportunity statement
- Outline the overall study process
- Provide baseline information such as existing systems, land use, catchment areas and environmental features
- Elicit public input and answer any questions

The Region compiled a mailing list that documented contact information for relevant and interested stakeholders. Agencies and local area municipalities, as well as interested members of the community, were sent a combined Notice of Study Commencement and Public Information Centre #1 on November 10, 2015. The Notice was also published in nine local newspapers on November 5 and 12, 2015.

- Fort Erie Times
- Port Colborne – In Port News
- Niagara Advance
- News Now (which serves Grimsby, Lincoln, West Lincoln, Winona)
- Niagara Falls Review
- Thorold News
- Pelham News
- St. Catharines Standard

- The Welland Tribune

The first PIC was conducted at three separate locations:

- Tuesday November 17, 2015 from 4 – 8 pm in the Council Chambers, Town of Grimsby Town Hall.
- Wednesday November 18, 2015 from 4 – 8 pm at the Vale Health and Wellness Centre, Port Colborne.
- Thursday, November 19, 2015 from 4 – 8 pm at the Kiwanis Aquatic Centre, St. Catharines.

A total of 105 people attended PIC #1. The PIC #1 Summary Report, which includes public comments and the materials presented at the first PIC are included in *Volume V – Public Consultation*. All public information received during the study was be collected in accordance with the *Municipal Freedom of Information and Protection of Privacy Act*. With the exception of personal information, all comments received from the public were included as part of the public record and study documentation prepared for public review.

2.2.2 Phase 2 Public Consultation

Public Information Centre #2

The Region hosted a second round of PICs during the second phase of study. The goals of PIC #2 were to:

- Review the progress on the study to date
- Describe the Class EA process
- Outline the overall study process
- Identify the Key Principals and Policies
- Provide baseline information such as existing systems, land use, catchment areas and environmental features
- Identify the current state and projected future state of water and wastewater infrastructure to accommodate anticipated growth
- Identify and seek input in to water and wastewater servicing alternatives to meet future needs
- Receive public input and answer any questions

The initial mailing list was maintained and updated with feedback from comments received after PIC #1. The contacts on the updated stakeholder list were sent a Notice of PIC #2 on June 8, 2016. The Notice was also published in 10 local newspapers on June 2 and 9, 2016.

- Fort Erie Times
- Port Colborne – In Port News
- Niagara Advance
- News Now (which serves Grimsby, Lincoln, West Lincoln, Winona)
- Thorold News
- Pelham News
- Niagara This Week
- Niagara Falls Review
- St. Catharines Standard
- The Welland Tribune

PIC #2 was also advertised on the Niagara Region website at least 3 weeks prior to the events as well as being posted on the Niagara Region Facebook and Twitter accounts.

PIC #2 was conducted at the following three locations:

- Wednesday June 15, 2016 from 4:00 – 8:00 p.m. in the Leisureplex Banquet Hall, Town of Fort Erie.
- Thursday June 16, 2016 from 4:00 – 8:00 p.m. in the Council Chambers, Township of West Lincoln.
- Wednesday June 22, 2016 from 4:00 – 8:00 p.m. at the Front Foyer of Civic Square, City of Welland.

A total of 64 people attended PIC #2 at the various locations. *Volume V – Public Consultation* comprises the PIC #2 Summary Report which includes the comments received as well as the materials presented to the public.

2.2.3 Phase 3 Public Consultation

Public Information Centre #3

As part of public consultation during Phase 3, a third round of PICs was held. The aim of PIC #3 was to:

- Review the progress on the study to date
- Describe the Class EA process
- Outline the overall study process
- Identify the Key Principals and Policies
- Provide baseline information such as existing systems, land use, catchment areas and environmental features
- Identify the current state and projected future state of water and wastewater infrastructure
- Identify and seek input in to water and wastewater servicing alternatives to meet future needs
- Receive public input and answer any questions

The mailing list was continued to be maintained and updated with feedback from comments received since PIC #2. The contacts on the updated stakeholder list were sent a Notice of PIC #3 on November 30, 2016. The Notice was also published in 10 local newspapers on November 17 and 24, 2016.

- Fort Erie Times
- Port Colborne – In Port News
- Niagara Advance
- News Now (which serves Grimsby, Lincoln, West Lincoln, Winona)
- Thorold News
- Pelham News
- Niagara This Week
- Niagara Falls Review
- St. Catharines Standard

- The Welland Tribune

The PIC #3 was conducted at the following four locations:

- Wednesday November 30, 2016 from 4 – 8 pm at the Gale Centre, City of Niagara Falls.
- Tuesday December 6, 2016 from 4 – 8 pm at the Niagara Region Headquarters (Atrium), City of Thorold.
- Wednesday December 7, 2016 from 4 – 8 pm in the Community Centre, Town of Niagara-on-the-Lake.
- Thursday December 8, 2016 from 4 – 8 pm in Fleming Centre, Town of Lincoln.

A total of 123 people attended PIC #3. *Volume V – Public Consultation* comprises the PIC #3 Summary Report which includes the comments received as well as the materials presented to the public.

2.2.4 Public Access to Information

All project publications, presentation materials and other documentation has been made available to the general public through the Region's website (https://www.niagararegion.ca/2041/default.aspx). Notices of upcoming PICs were also posted on this website.

For those without Internet access, the Region also maintained a contact list, and mailed relevant project materials to all who had expressed interest in the process.

2.2.5 Stakeholder and Agency Meetings

Regional staff held several meetings with local municipal staff to discuss the development and evaluation of the servicing strategies and exchange dialogue on a number of relevant issues related to Niagara Region's water and wastewater systems.

An introductory meeting with the local area municipalities was held on Tuesday December 15, 2015 to discuss the MSP vision, key policies and the potential impact on local water and wastewater systems.

As the study evolved, the Region hosted the following meetings with local municipalities to discuss the proposed strategies:

- Tuesday, December 15, 2015 – Servicing Policy Review Workshop
- Friday October 21, 2016 – Preliminary Servicing Review Workshop
- Tuesday November 1, 2016 – Water and Wastewater Servicing Strategies Workshop (Grimsby, Lincoln, West Lincoln, Niagara Falls and Fort Erie)
- Tuesday November 8, 2016 – Water and Wastewater Servicing Strategies Workshop (Welland, Port Colborne, Niagara-on-the-Lake, St. Catharines and Thorold)
- Wednesday, May 17, 2017 – Final Draft 2016 MSP Review Workshop

3. RELATED STUDIES AND BACKGROUND INFORMATION

The Region has undertaken several strategic servicing studies which were used as a starting point for this master servicing plan. The reports that are relevant to this study are:

- Regional Official Plan
- Niagara 2041
- 2003 Water and Wastewater Master Servicing Plan
- North-East Servicing Study (2008)
- 2011 Water and Wastewater Master Servicing Plan
- Pollution Control Plans across each local Municipality

3.1 Regional Official Plan

The Regional Official Plan is a comprehensive document that sets out policies for the physical, economic and social development of the Niagara Region. The Regional Official Plan documents and consolidates the objectives, policies and strategies that have to be adopted for the planning and development of Niagara Region. The Regional Official Plan supplements the Planning Act but more specifically addresses the Region's physical and economic background, regional strategies for development and conservation, economic development, tourism, urban areas, agricultural areas, natural resources, transportation, public utilities, community services and implementation.

Niagara 2031 was the last Municipal Comprehensive Review undertaken by the Region and resulted in a growth management strategy to guide growth to 2031. To implement Niagara 2031, Regional Council adopted Regional Official Plan Amendment 2-2009 (RPPA 2-2009) Sustainable Community Policies on May 28, 2009 to bring the official plan into conformity with the Provincial Growth Plan. Niagara 2031 established a new urban vision for the long term growth and development of Niagara and new policies to foster the development of sustainable, complete urban communities.

Amendment 2 to the Growth Plan, which came into effect in June 2013, provided updated forecasts of population for 2031and extended population and employment forecasts to the years 2036 and 2041. The Provincial Growth Plan forecasts Niagara to grow to a population of 610,000 and employment of 265,000 by 2041. The Niagara 2041 Growth Strategy composed of the Municipal Comprehensive Review (MCR), Transportation Master Plan (TMP) and 2016

Water and Wastewater Master Servicing Plan Update (MSP) was created as a coordinated response to achieve and support Niagara's new forecasted growth numbers by ensuring that land use planning and infrastructure decisions are integrated.

The MCR is a multi-year and multi-phase study attempting to answer 3 important questions

- Is there sufficient land to accommodate future population and employment growth for the next 25 years?
- Where should this growth be accommodated across Niagara Region?
- How should this growth be accommodated across Niagara Region to meet the strategic objectives of Regional Council?

Phase 1 and 2 of the MCR (Current Conditions and Trends) investigated how the Region has grown since the Region's Niagara 2031 Growth Strategy. Phase 3 of the MCR (Options for Growth) investigated in detail three potential growth options (Current Policy, Market Driven and Strategic Growth) with input received input from the public and stakeholders. Phase 4 of the MCR (Land Needs) will examine the land use implications of the preferred growth option.

3.2 Niagara 2041

The Niagara 2041 growth management strategy is currently being updated and builds on the previously completed growth management strategy, Niagara 2031. This review is designed to guide the growth within the Niagara Region over a 25 year period. The review identifies the areas with the priority and potential for growth within the Niagara Region and how the Region will accommodate this growth.

The establishment of the growth strategy involves completing (3) three projects:

1) Municipal Comprehensive Review (MCR) – ***How We Grow***

   Look at the land available across Niagara, ensure there is enough land to sustain the expected growth to year 2041 and examine how the land is distributed throughout Niagara

2) Transportation Master Plan (TMP) – ***How We Go***

   Look at current travel methods across Niagara and look to improve transportation systems including options for walking, cycling and public transit to better serve Niagara's future needs

3) Water and Wastewater Master Servicing Plan (MSP) – ***How We Flow***

Ensure Niagara has the infrastructure to provide critical water and wastewater services to the growing Region in a sustainable and financially responsible way

These three projects are inter-connected and collectively form the foundation to support and foster Niagara's growth and input into the Niagara Region Development Charge Study. The Master Plans will identify the preferred servicing solution and associated infrastructure needs to support projected growth as set out in the Municipal Comprehensive Review.

3.3 2003 Water and Wastewater Master Servicing Plan

The 2003 Master Servicing Plan identified a 10-year capital works program for the wastewater and water systems. A large number of projects were recommended in both the Regional and local systems.

Key recommendations for the Regional wastewater and water systems included treatment plant expansions, new gravity sewers, sewage pumping station expansions and decommissioning of facilities, such as Lagoons and sewage pumping stations. It also recommended water system interconnections, plant upgrades, storage increase and pumping station upgrades on the water systems.

3.4 2011 Water and Wastewater Master Servicing Plan

The Region completed its most recent Master Servicing Plan in 2011. It was built on several strategic servicing studies that the Region had previously undertaken including the 2003 Master Servicing Plan, the recommendation of multiple Pollution Control Plans and Risk Assessment Studies. The previous Master Servicing Plan completed Phases 1 and 2 of the MEA Municipal Class EA process and identified Schedule B and C projects.

3.5 Pollution Control Plans

The following historical Pollution Control Plans were completed prior to the 2011 MSP. All of these studies were joint efforts involving the Region and local area municipalities:

- Fort Erie (Anger Ave, Crystal Beach and Stevensville/Douglastown plants)
- Baker Road
- Niagara Falls
- St. Catharines and Thorold (Port Dalhousie and Port Weller plants)
- Port Colborne

These studies aim to develop pollution control plans that will meet the requirements of the Ministry of the Environment (MOE) Procedures F-5-5 and F-5-1 (further described in Section 6.1 of this report).

Table 2.1 details the key recommendations from the Pollution Control Plans (PCPs) included in the Region's 2011 Master Servicing Plan.

Table 2.1 Niagara Wastewater Systems from Pollution Control Plans Recommendations (2011 Master Servicing Plan)

Wastewater System	Recommendations
Anger Avenue	• Complete Crescent Park drainage work to reduce extraneous flows (tributary to Dominion Road Sewage Pumping Station). • Rehabilitation works to reduce extraneous flows in the Lakeshore, Rose, Bardol and Catherine Sewage Pumping Station sewershed areas. • Complete storm sewer construction.
Baker Road	• Expand plant to 120 MLD peak capacity for primary treatment; 62 MLD peak capacity for secondary treatment. • Increase capacity of Robert Road and Ontario Street pumping stations. • Combined Sewer Overflow (CSO) storage tanks at Woodview, Smithville and Orchard Road pumping stations. • I/I reduction program in Lincoln, followed by storage if required to reduce basement flooding.
Crystal Beach	• Rehabilitation studies and works to reduce extraneous flow in the Crystal Beach Wastewater Treatment Plant sewershed; construction of storm sewers
Stevensville/ Douglastown	• No work identified.
Welland	• Construct primary treatment facility for CSOs in the vicinity of the Wastewater Treatment Plant (Environmental Assessment ongoing).
Queenston	• N/A – No Pollution Control Plan
Niagara Falls	• Sewer separation in areas tributary to Dorchester Road Sewage Pumping Station, Bender Hill Sewage Pumping Station, Stanley Avenue. • High rate treatment at High Lift pumping station. • CSO weir adjustments at Taro North, General Abrasive, Royal manor Pumping Station. • Increase capacity of trunk sewer along Kalar Road. • Source control of I/I in area tributary to South Side Low Lift Sewage Pumping Station.
Niagara-on-the-Lake	• N/A – No pollution Control Plan.

Wastewater System	Recommendations
Port Dalhousie	• Six sites for CSO storage tanks. Additional investigations required to assess opportunities for upstream separation, source control, or storage that would reduce the size of the CSO tanks. • Increase pipe capacity from Michigan Avenue CSO to Wastewater Treatment Plant.
Port Robinson	• N/A – No Pollution Control Plan.
Port Weller	• Three sites for CSO storage tanks. Additional investigations required to assess opportunities for upstream separation, source control, or storage. • Convey Forster and Linwell overflows to new Guy Road tank. • Further investigation into system issues up- and downstream of Peel Street Sewage Pumping Station (ongoing).
Seaway (Port Colborne)	• Expand Wastewater Treatment Plant to peak flow capacity of 83,000 m^3/d. [1] • Ongoing I/I investigation and removal, especially in Nickel, Omer, Industrial Pak, Union and Fares Pumping Station sewersheds. • Capacity expansion of pumps at Clark Sewage Pumping Station. • I/I reduction pilot program in Arena West sewershed. • Replacement of sewers on Elm and Omer Avenues.

[1] Planned peak flow expansion: 45 MLD peak primary + 62.2 MLD peak secondary.

Since completion of the 2011 Master Servicing Plan the Region has completed the City of Thorold Pollution Control and Infrastructure Plan. Table 2.2 details the key recommendations from the Pollution Control Plan that has been reviewed and influenced the preparation and recommendations of the 2016 Master Servicing Plan.

Table 2.2 Thorold Pollution Control and Infrastructure Plan Recommendations (Post 2011 Master Servicing Plan)

Wastewater System	Recommendations
Port Dalhousie	• Additional field investigation of suspended overflows, model impact of retrofits to existing suspected Sanitary Sewer Overflow, pre and post retrofit flow monitoring • Harmonization, integration and validation of City of Thorold and St. Catharines model • 3 year program of sub catchment flow monitoring, 3 month intervals, assuming the use of the City's existing 6 SIGMA flow metres • Additional modeling in areas with existing temporary overflows • Ongoing, targeted and systematic elimination of extraneous flows on both public and private property • Consolidation of City and Regional Facility information sources • Semi-annual GIS and model update
Port Weller	• Additional field investigation of suspended overflows, model impact of retrofits to existing suspected Sanitary Sewer Overflow, pre and post retrofit flow monitoring • Harmonization, integration and validation of City of Thorold and St. Catharines model • 3 year program of sub catchment flow monitoring, 3 month intervals, assuming the use of the City's existing 6 SIGMA flow metres • Additional modeling in areas with existing temporary overflows • Ongoing, targeted and systematic elimination of extraneous flows on both public and private property • Consolidation of City and Regional Facility information sources • Semi-annual GIS and model update • Documentation of Standard Operating Procedure for operation and maintenance of storage facilities
Welland	• N/A

The following Pollution Control Plans are currently underway or about to start and will not be completed in time to influence the 2016 Master Servicing Plan Update:

- Fort Erie (Anger Ave, Crystal Beach and Stevensville/Douglastown plants)
- St. Catharines and Thorold (Port Dalhousie and Port Weller plants)
- Grimsby, Lincoln and West Lincoln (Baker Road plant)
- Niagara Falls (Niagara Falls plant) – to be completed by June 2017

3.6 North-East Servicing Study (2008)

The objective of the North-East Servicing Study was to evaluate existing infrastructure, and address existing and future requirements for both dry weather and wet weather flows in the North-east area of the Niagara Region.

The study included the following WWTPs:

- Niagara Falls
- Niagara-on-the-Lake
- Port Dalhousie
- Port Weller
- Queenston

Recommendations from this study are summarised in Table 2.3.

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Table 2.3 Niagara Region Wastewater Systems Recommendations from North-East Servicing Study

Wastewater System	Recommendations
Niagara Falls	• Wet weather flow facility at High Lift Sewage Pumping Station • Expansion of Niagara Falls Wastewater Treatment Plant (WWTP) to increase its rated capacity • Wet weather flow facility at Niagara Falls WWTP (currently under construction)
Niagara-on-the-Lake	• Expansion of Niagara-on-the-Lake to increase its rated capacity (Environmental Assessment (EA) completed) • Plant expansion underway (Capacity increased to account for 2011 Master Servicing Plan recommendations)
Port Dalhousie	• Wet weather flow facility at Port Dalhousie WWTP (EA complete)
Port Weller	• Wet weather flow facility at Port Weller East (EA complete) • Further study of Peel Street Sewage Pumping Station sewershed and downstream Port Weller trunk
Queenston	• No capital works proposed
General	• Consider purchase of land for new WWTP in South Niagara Falls or East Thorold, for development beyond 2026

3.7 Niagara Region 2012 Development Charge Background Study

The Development Charge (DC) Background Study (2012) presents the growth-related net capital costs for the expected future development up to 2031 in the community. In accordance with the requirements of the Development Charges Act, 1997, the Niagara Region's current development charges by-law is in force and effect for a period of five years, which required that a new development charges background study be completed and a new by-law approved by Regional Council by 2017. Currently, an updated DC Background Study and By-Law is underway for 2017.

Development Charges are fees levied against new development to pay for the capital costs of servicing growth. It follows the principal that "growth pays for growth" and its purpose is to make sure that the upfront financial burden is not borne by existing taxpayers.

The Development Charges Background Study has the following key objectives:

- To prepare growth forecast and capital program needed to service growth
- To calculate development charges consistent with the Development Charges Act, 1997 and its associated regulation
- To review current development charges policies and develop new development charges bylaw(s) and policies which conform to the Development Charges Act

3.8 Fort Erie Water Distribution System Master Plan

The Town of Fort Erie is currently completing the 2016 Fort Erie Water Distribution System Master Plan. This Master Plan is aimed at providing the Town of Fort Erie with the information and tools necessary to guide capital investments in both the short term, 10 year Water System Capital Budget, and furthermore the Town's long term, 100 year Asset management Plan, capital and maintenance investment strategy. This concurrent study has provided input that has been reviewed and considered during the 2016 MSP process.

3.9 Local Area Billing Rates

Water billing records from the City of Niagara Falls were reviewed and cross-referenced against available plant production records and flow monitoring records. These results were utilized to establish baseline flow and demand rates in the existing system.

3.10 Local Area Servicing Studies

Further to the above listed studies there have been multiple Local Area Servicing Studies that were completed or were being prepared concurrently during the preparation of the 2016 MSP. These studies, plan development and Regional and Local Planning discussions informed the preparation of projected growth and spatial allocation of population and employment projections used in the preparation of the MSP as outlined in Section 7 – Planning and Growth. These Local Area Servicing Studies were reviewed and considered through the process of establishing servicing strategy options, evaluation and selection of preferred recommended servicing solutions. A sample of these studies/initiatives include Bridgeburg - Fort Erie, 5th

Wheel Development – Grimsby, Miller's Creek Shipyards – Fort Erie, Thunderwaters Secondary Plan Area and Smithville urban expansion.

3.11 Local Flow Monitoring Studies

GM BluePlan has completed/supported flow monitoring for several local municipalities (Welland, Niagara Falls, West Lincoln, Grimsby, Thorold) and this data was leveraged to enhance the model update and the calibration process.

3.12 Updated Local Water and Wastewater Models

Building on the Region's model, several local municipalities (Grimsby, Saint Catharines, Port Colborne, Niagara Falls and Fort Erie) have developed, enhanced and updated models of their water system which was leveraged during the 2016 MSP Update.

3.13 Niagara Region Water and Wastewater Project Design and Technical Specifications Manual Update

The Design Manual Update provides the Region with details on the design of Regional facilities that are used in the implementation of capital works projects including both the water distribution and wastewater collection systems. The design details are updated to ensure a uniform standard is achieved for both water and wastewater facilities.

4. PROBLEM AND OPPORTUNITY STATEMENT

The problem and opportunity statement defines the principal starting point in the undertaking of the Master Servicing Plan Update Class EA and assists in defining the scope of the project. The problem and opportunity statement for the 2016 Water and Wastewater Master Servicing Plan Update is defined as follows:

- In 2011, the Region completed a Water and Wastewater Master Servicing Plan update which looked at planned growth to 2031.
- With an updated planning horizon to 2041, the Master Servicing Plan needs to be updated to determine how the Region's Water and Wastewater Infrastructure will support growth in a sustainable and financially responsible manner.
- The Master Servicing Plan Update will develop a long-term servicing strategy and capital forecast to ensure the maintenance of services for existing residents and businesses as well as to support future growth in the community through 2041.
- The Master Servicing Plan Update will support growth in a sustainable and financially responsible manner.

5. STUDY AREA

The Niagara region is located in southern Ontario, Canada, between Lake Ontario and Lake Erie. Niagara has a total area of 1,852 km^2 with a population of 447,366 and 195,993 employees in 2014. The Region is comprised of 12 local municipalities as shown in Figure 2.4. The Study Area covers the municipalities of Grimsby, West Lincoln, Lincoln, St. Catharines, Thorold, Welland, Pelham, Port Colborne, Niagara-on-the-Lake, Niagara Falls, and Fort Erie. The Township of Wainfleet was not included in the study scope as it is not currently municipally serviced.

Niagara Region

2016 MASTER SERVICING PLAN

- Study Area
- Hamlets
- Urban Area
- Municipal Boundary
- Greenbelt Plan
- Environmental Protection Areas
- Environmental Conservation Areas

Lake Ontario

City of Hamilton

United States of America

Haldimand County

Lake Erie

Niagara-on-the-Lake ("Old Town")

Virgil

Town of Niagara-on-the-Lake

St. Catharines

City of St. Catharines

Grimsby

Town of Grimsby

Prudhomes

Beamsville

Jordan Station

Vineland

Jordan

Town of Lincoln

Campden

Queenston

Glendale

St. David's

Thorold North

Thorold

Thorold South

City of Thorold

Smithville

Township of West Lincoln

Niagara Falls

Town of Pelham

Fenwick

Fonthill

Port Robinson

City of Welland

Welland

City of Niagara Falls

Douglastown

Stevensville

Township of Wainfleet

City of Port Colborne

Port Colborne

Town of Fort Erie

Fort Erie

Crystal Beach

N

0 5 10 Kilometers

Figure 2.4

Study Area

Baseline System Understanding

BluePlan

April 2017
715023-Vol2-Study Area
NAD 1983 UTM Zone 17N

6. PLANNING CONTEXT

6.1 Provincial and Federal Legislation and Policy Context

Niagara Region, like all municipalities in Ontario, must operate within the administrative, legislative and financial framework established by senior levels of government. The key provincial and national initiatives that provide directives, and are considered under the Master Servicing Plan process, are summarized below.

Provincial Policy Statement

The 2005 Provincial Policy Statement (PPS) provided policy direction on matters of provincial interest related to land use planning and development. As a key part 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.

In 2014, the Provincial Policy Statement was revised to better integrate economic, social and environmental considerations; respond to rural and northern challenges; clarify policies to better support implementation; and, provide direction for emerging issues

Key infrastructure policies relevant to water and wastewater services include the following:

- Infrastructure, electricity generation facilities and transmission and distribution systems, and public service facilities shall be provided in a coordinated, efficient and cost-effective manner that considers impacts from climate change while accommodating projected needs. Planning for infrastructure, electricity generation facilities and transmission and distribution systems, and public service facilities shall be coordinated and integrated with land use planning so that they are: (a) financially viable over their life cycle, which may be demonstrated through asset management planning; and, (b) available to meet current and projected needs. (Policy 1.6.1)

- Planning authorities should promote green infrastructure to complement infrastructure. (Policy 1.6.2)

- Before consideration is given to developing new infrastructure and public service facilities: (a) the use of existing infrastructure and public service facilities should be

optimized; and (b) opportunities for adaptive re-use should be considered, wherever feasible. (Policy 1.6.3)

More specifically, the 2014 Provincial Policy Statement recommended that sewage and water services should:

- Direct and accommodate expected growth in a manner that promotes the efficient use and optimization 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 feasible, 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 (Policy 1.6.6.1)

Other recommended policies include the following:

- Municipal sewage services and municipal water services are the preferred form of servicing for settlement areas. Intensification and redevelopment within settlement areas on existing municipal sewage services and municipal water services should be promoted, wherever feasible. (Policy 1.6.6.2)
- Where municipal sewage services and municipal water services are not provided, municipalities may allow the use of private communal sewage services and private communal water services. (Policy 1.6.6.3)
- Where municipal sewage services and municipal water services or private communal sewage services and private communal water services are not provided, individual on-site sewage services and individual on-site water services may be used provided that site conditions are suitable for the long-term provision of such services with no

negative impacts. In settlement areas, these services may only be used for infilling and minor rounding out of existing development. (Policy 1.6.6.4)

- Partial services shall only be permitted in the following circumstances: (a) where they are necessary to address failed individual on-site sewage services and individual on-site water services in existing development; or (b) within settlement areas, to allow for infilling and minor rounding out of existing development on partial services provided that site conditions are suitable for the long-term provision of such services with no negative impacts.

The 2005 Provincial Policy Statement was used as input to Niagara Region's Regional Policy Plan Amendment 2-2009 Sustainable Community Policies, which updated the Region's Policy Plan to be aligned with the original Statement and the Places to Grow Plan. Since the adoption of Amendment 2-2009, the Region has continued to advance key growth management objectives, including the Regional Council Strategic Priorities, the ongoing Municipal Comprehensive Review (MCR or Niagara 2041), and other infrastructure plans.

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 2005 Greenbelt 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. A review of the Greenbelt Plan was initiated in 2015 and culminated in the completion of the Proposed Greenbelt Plan in 2016. The final release of the refined Greenbelt Plan is anticipated in 2017.

Niagara Escarpment Plan

The 2005 Niagara Escarpment 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:

a) to protect unique ecologic and historic areas;

b) to maintain and enhance the quality and character of natural streams and water supplies;

c) to provide adequate opportunities for outdoor recreation;

d) 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;

e) to ensure that all new development is compatible with the purpose of this Act as expressed in section 2;

f) to provide for adequate public access to the Niagara Escarpment; and,

g) to support municipalities within the Niagara Escarpment Planning Area in their exercise of the planning functions conferred upon them by the Planning Act.

In 2015, the Ontario government launched a review of the Niagara Escarpment Plan, and began finalizing its recommendations at the end of 2016. The updated Plan will be released in early 2017.

Places to Grow

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

- 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.

This Plan was used as input to Niagara Region's Regional Policy Plan Amendment 2-2009 Sustainable Community Policies (i.e. the Growth Management Strategy), which updated the Region's Policy Plan to be aligned with the 2011 Water and Wastewater Master Servicing Plan

and the Provincial Policy Statement. Like the Greenbelt Plan and Niagara Escarpment Plan, Places to Grow was updated in 2016 with final release anticipated in early 2017.

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.

Bill 13, Sustainable Water and Wastewater Systems Improvement and Maintenance Act, 2010

This Bill enacts the Sustainable Water and Wastewater Systems Improvement and Maintenance Act, 2010 and repeals the Sustainable Water and Sewage Systems Act, 2002. The Bill had it first reading on March 23rd, 2010. Key points of the Bill are as follows:

- Sets out the purposes of the Act, which include ensuring that public ownership of water services and wastewater services is maintained;
- Establishes the Ontario Water Board as an agent of the Crown and sets out the Board's objectives, powers and duties which relate to the regulation of water services and wastewater services;
- Sets out the responsibilities of municipalities or groups of municipalities that are designated as regulated entities by regulation; and,
- Regulated entities must prepare business plans for the provision of water services or wastewater services. The plan must contain, among other things, an assessment of

the full cost of providing water services or wastewater services to the public and a description of how the regulated entity intends to pay this full cost.

Fisheries Act

The Fisheries Act provides provisions on the conservation and the protection of freshwater and marine fish habitat in order to sustain fish species. In 2013, the Fisheries Policy statement was released to support the changes made to the Fisheries Act in 2012[1]. The changes made to the Fisheries Act focuses on the protection of the productivity of commercial, recreational and Aboriginal fisheries, improved implements for both compliance and protection, enhanced stakeholder partnerships (e.g. government agencies, local groups) and ensuring regulatory requirements are clear and consistent

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[2]:

- To foster innovative water, wastewater and stormwater 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 purpose of the *Act,* the MOECC may establish aspirational targets with respect to the conservation of water and other matters.

The *Act* requires certain municipalities, persons and entities to prepare, approve and submit to the MOECC municipal water sustainability plans for municipal water services, municipal wastewater services and municipal stormwater services under their jurisdiction. The Minister may establish performance indicators and targets for these services. The Act also authorizes creation 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.

[1] http://www.dfo-mpo.gc.ca/pnw-ppe/pol/index-eng.html. Accessed April 28, 2017
[2] *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. Accessed 30 September, 2011*

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. Key features of the *Act* include the following[3]:

- 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*.

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[4]. The Act requires the following:

- 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.

[3] https://www.ontario.ca/laws/statute/02s32. Accessed 27 April, 2017

[4] https://www.ontario.ca/laws/statute/06c22. Accessed 27 April, 2017

Ministry of the Environment and Climate Change Procedures F-5-1 and F-5-5

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. Guideline F-5 takes the approach that all sewage treatment works should 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 this Guideline are required to upgrade as soon as possible.

This procedure gives Effluent Design Objectives for biochemical oxygen demand (BOD), suspended solids, and total phosphorus; and Effluent Guidelines for the former two. An Effluent Design Objective for ammonia is given for conventional activated sludge treatment with nitrification. Sewage treatment works designed according to the Ministry "Guidelines for the Design of Sewage Treatment Works" should be able to produce annual average effluent quality approximately equal to the Effluent Design Objectives, but not to exceed the Effluent Guidelines criteria.

Procedure F-5-5 outlines the requirements for municipal and private combined and partially separated sewer systems. The goals of the Procedure are as follows:

- Eliminate dry weather overflows
- Minimize the potential for impacts on human health and aquatic life resulting from Combined Sewer Overflows (CSOs)
- Achieve as a minimum, compliance with body contact recreational water quality objectives for E.Coli at beaches impacted by CSOs for at least 95% of the period June 1 – September 30 for an average year
- Each operating authority of a combined sewer system is expected to:
    - Develop a Pollution Prevention and Control Plan
    - Meet minimum CSO controls
    - Provide additional controls for beaches impaired by CSOs where water quality is not meeting E.Coli objectives or where required by receiving water quality conditions

Pollution Control Plans have been completed for the majority of the sewersheds in the Niagara Region. These outline how the requirements of F-5-1 and F-5-5 will be met. The recommendations from these studies are summarized in Section 3.5 of this report.

Canada-wide Strategy for the Management of Municipal Wastewater Effluent

This 2009 Strategy was developed by the Canadian Council of Ministers of the Environment (CCME). It requires that all facilities achieve minimum National Performance Standards and develop and manage site-specific Effluent Discharge Objectives. 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. The 2014 Progress Report outlined the progress made by signatory federal, provincial and territorial jurisdictions on the commitments made in the 2009 Strategy.

CCME Strategic Vision for Water

In 2009, the Canadian Council of Ministers of the Environment (CCME) provided a framework for future actions and activities related to water through the development of a vision and action plan, 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 and rationale developed as part of the vision includes the following[5]:

- Goal 1: Aquatic ecosystems are protected on a sustainable watershed basis.

  Rationale: Enhance understanding and application of Integrated Water Resource Management to improve ecosystem health.

- Goal 2: The conservation and wise use of water is promoted.

  Rationale: Improve understanding of the full value of water to achieve behavioral change.

- Goal 3: Water quality and water quantity management is improved, benefitting human and ecosystem health.

[5] http://www.ccme.ca/en/current_priorities/water/water-vision.html. Assessed 27 April, 2017

Rationale: Promote nationally consistent approaches to water quality and quantity monitoring, guidelines and multi-jurisdictional public reporting. Encourage research and networks to enhance knowledge and understanding of ground and surface waters.

- Goal 4: Climate change impacts are reduced through adaptive strategies.

  Rationale: Enhance water quality and quantity monitoring networks to support water and adaptation needs.

- Goal 5: Knowledge about Canada's water is developed and shared.

  Rationale: Help to spearhead value added information on water quality and quantity by supporting jurisdictional reporting efforts to Canadians in a systematic and consistent fashion.

Canadian Environmental Protection Act - Inorganic Chloramines and Chlorinated Wastewater Effluents in Municipal Wastewater Effluent

The Canadian Environmental Protection Act (CEPA) required the elimination of toxic chlorine residuals from municipal wastewater effluent. All owners and operators of wastewater systems with daily volumes greater than 5,000 cubic metres of effluent were required to lower their total residual chlorine (TRC) levels to less than 0.02mg/L or lower by December 15, 2009. Owners of wastewater systems (i.e. Niagara Region) were required to submit information to the federal Minister of Environment once their Pollution Prevention Plan (P2 plan) was prepared and had fully implemented the activities outlined in their P2 plan.

6.2 Conservation Authority Regulation and Policy

The legislative mandate of the Conservation Authority, as set out in Section 20 of the Conservation Authorities Act, is to establish and undertake programs designed to further the conservation, restoration, development and management of natural resources.

Conservation Authorities are local agencies that protect and manage water and other natural resources at the watershed level. These agencies have a number of responsibilities and functions in the land use planning and development process.

The study area falls predominantly within the boundaries of Niagara Peninsula Conservation Authority (NPCA) watersheds, which cover approximately 1,666 km2 of the study area (Figure

2.4). Approximately 1.3 km2 of lands in the north-western portion of the study area fall within the jurisdiction of the Hamilton Conservation Authority (HCA).

NPCA and HCA act as a commenting agency on development applications under the Planning Actbased on regulations approved by their Board of Directors and the province. These Conservation Authorities have agreements with partnering municipalities to provide technical services regarding matters associated with natural heritage protection, hazardous land management and water resources (e.g., stormwater management).

In addition, Conservation Authorities have the delegated responsibility from the Ministries of Natural Resources and Municipal Affairs and Housing to implement Section 3.1 (Natural Hazards) of the Provincial Policy Statement (2014), consistent with the Provincial one-window planning initiative.

NPCA and HCA also administer Regulation 155/06 and Regulation 161/06, respectively, under Section 28 of the Conservation Authorities Act. In general, these regulations prohibit altering a watercourse, wetland or shoreline and prohibit development in areas adjacent to river and stream valleys, hazardous lands and wetlands, without the prior written approval from the Conservation Authority (i.e., issuance of a permit).

Finally, both NPCA and HCA have Level 2 agreements with Fisheries and Oceans Canada (DFO) to review projects under Section 35 of the Fisheries Act, which deals with management and protection of fish habitat. Under these agreements, the responsibilities of NPCA and HCA are:

- Determination of the presence of fish habitat, as well as potential impacts to fish and fish habitat resulting from a proposed project.
- Working with the proponent to mitigate potential impacts to fish and fish habitat resulting from the proposal.
- Issuing a letter of advice for projects that will likely not constitute a harmful alteration, disruption or destruction of fish habitat (often referred to as a HADD).
- If necessary, referring the proposal to Fisheries and Oceans Canada for authorization under the Fisheries Act, if the impacts cannot be mitigated.

6.3 Regional Municipality of Niagara

The key regional initiatives that provide directives, and are considered under the Master Servicing Plan process, are summarized below.

2015-2018 Regional Council Strategic Priorities

In 2015, Regional Council established five broad strategic priorities to enable a more prosperous and sustainable Niagara, while fostering an environment for economic prosperity

- Moving People and Goods
- Fostering Innovation, Investment and Entrepreneurship
- Building a labour-ready Workforce
- Positioning Niagara Globally
- Doing Business Differently

The Regional Council Strategic Priorities demonstrated the Region's continued efforts to advance key growth management objectives for all facets of infrastructure, including water and wastewater programs and initiatives.

Niagara 2041

The Niagara 2041 Municipal Comprehensive Review is currently being updated and builds on the previously completed growth management Niagara 2031. This growth management review is designed to guide the growth within the Niagara Region over a 25 year period. The review identifies the areas with the priority and potential for growth within the Niagara Region and how the Region will accommodate this growth.

The MCR is a multi-year and multi-phase study attempting to answer 3 important questions

- Is there sufficient land to accommodate future population and employment growth for the next 25 years?
- Where should this growth be accommodated across Niagara Region?

- How should this growth be accommodated across Niagara Region to meet the strategic objectives of Regional Council?

Phase 1 and 2 of the MCR (Current Conditions and Trends) investigated how the Region has grown since the Region's Niagara 2031 Growth Strategy. Phase 3 of the MCR (Options for Growth) investigated in detail three potential growth options (Current Policy, Market Driven and Strategic Growth) with input received input from the public and stakeholders. Phase 4 of the MCR (Land Needs) will examine the land use implications of the preferred growth option.

The establishment of the growth strategy involves completing (3) three projects:

4) Municipal Comprehensive Review (MCR) – ***How We Grow***

   Look at the land available across Niagara, ensure there is enough land to sustain the expected growth to year 2041 and examine how the land is distributed throughout Niagara

5) Transportation Master Plan (TMP) – ***How We Go***

   Look at current travel methods across Niagara and look to improve transportation systems including options for walking, cycling and public transit to better serve Niagara's future needs

6) Water and Wastewater Master Servicing Plan (MSP) – ***How We Flow***

   Ensure Niagara has the infrastructure to provide critical water and wastewater services to the growing Region in a sustainable and financially responsible way

These three projects are inter-connected and collectively form the foundation to support and foster Niagara's growth and input into the Niagara Region Development Charge Study. The Master Plans will identify the preferred servicing solution and associated infrastructure needs to support projected growth as set out in the Municipal Comprehensive Review.

Regional Official Plan

The Study area is currently governed by the land use policies set forth in the Office Consolidation of the Policy Plan, referred to as the Regional Niagara Official Plan July 10, 2007, with subsequent amendments in 2008, 2009 and 2014.

The Regional Official Plan is the long-range, community planning document that is used to guide the physical, economic and social development of the Regional Municipality of Niagara. Generally, it contains objectives, policies and mapping that implement the Regions approach to managing growth, growing the economy, protecting the natural environment, resources and agricultural land, and providing infrastructure.

The Regional Official Plan implements the Niagara Region Growth Management Strategy (Niagara 2031) and its content aligns with the Provincial Growth Plan for the Greater Golden Horseshoe (2006), the Provincial Policy Statement (2014) and the Greenbelt Plan (2005).

This sets out a regional strategy for development and conservation. The Plan established Urban Area Boundaries to define the location and extent of city and town development.

In 2009, Regional Council adopted Regional Policy Plan Amendment 2-2009 Sustainable Community Policies, as amended by Council's Committee of the Whole. The Amendment updated the Region's Policy Plan in order to implement the strategic directions of Niagara's Growth Management Strategy (Niagara 2031) and aligned the Plan with the Province's Places to Grow Plan and the Provincial Policy Statement. It established a new urban vision for the long term growth and development of Niagara and new policies to foster the development of sustainable, complete urban communities.

The Niagara Region initiated a five year review in 2013, under a campaign titled “Imagine Niagara”. Section 8 of the 2014 Official Plan identifies the six infrastructure objectives, and 21 recommended water and wastewater system policies, as included in Appendix 2A.

Regional Climate Change Strategy

In 2013, Niagara Region created a climate change program to guide the reduction of greenhouse gas emissions and the risk from anticipated climate change as well as maximizing its benefit. This program sets out five milestones to reduce greenhouse gas emissions:

- Create a greenhouse gas emissions inventory and forecast
- Set an emissions reductions target
- Develop an action plan
- Carry out the action plan
- Monitor progress and report results

These milestones, adopted by Niagara Region, follow the Milestone Framework provided by the Federation of Canadian Municipalities. Currently, Niagara Region has completed three of the five milestones of the FCM Partners for Climate Protection Program. The final two milestones are targeted for completion in 2017.

7. PLANNING AND GROWTH PROJECTIONS

7.1 Municipal Comprehensive Review & Growth Scenarios

7.2 Planning Projections

Amendment 2 to the Province's Growth Plan came into effect on June 17, 2103. This amendment updated schedule 3 population and employment forecasts to 2031 and extended forecasts to a 2041 horizon.

Based on the need to conform to Amendment 2, the Region, with support from Hemson Consultants Limited, recently completed a growth management strategy exercise that resulted in updated residential population and employment forecasts for the use in concurrently running studies, including the Water and Wastewater Master Plan and the Transportation Master Plan. The distribution of population and employment growth among the lower tier municipalities within the study area are presented in Table 2.4 and Table 2.5 below. For the purpose of the Master Plan 2014 has been used as the base year. Population and employment for 2014 was estimated by linear interpolation using 2011 and 2016 data sets.

Table 2.4 Projected Population Statistics - 2011 to 2041.

Municipal Comprehensive Review Strategic Growth Option Forecast Total Population by Local Municipality								
Municipality	**Total Population Including Net Undercoverage**							
	2011	**2014 ***	**2016**	**2021**	**2026**	**2031**	**2036**	**2041**
Fort Erie	30,760	31,216	31,520	32,310	34,720	37,780	41,220	43,940
Grimsby	26,000	27,224	28,040	29,430	31,400	33,200	35,140	37,150
Lincoln	23,080	23,884	24,420	24,990	26,230	28,060	30,030	31,590
Niagara Falls	85,200	88,326	90,410	92,830	99,990	108,770	117,670	124,580
Niagara-on-the-Lake	15,810	17,112	17,980	19,750	21,420	22,850	24,700	26,580
Pelham	17,040	17,352	17,560	17,900	19,410	21,560	23,720	25,260
Port Colborne	18,910	18,838	18,790	18,600	19,210	20,080	21,050	21,820
St. Catharines	134,890	135,940	136,640	136,930	142,560	150,590	160,040	167,480
Thorold	18,410	18,944	19,300	19,680	21,500	23,850	26,470	28,470
Wainfleet	6,520	6,532	6,540	6,590	6,760	6,990	7,260	7,480
Welland	51,980	53,000	53,680	54,130	56,540	59,600	63,160	66,180
West Lincoln	14,200	14,608	14,880	16,170	18,930	22,630	26,530	29,460
Niagara Region	**442,800**	**452,976**	**459,760**	**469,310**	**498,670**	**535,960**	**576,990**	**609,990**

* Note: The Master Servicing Plan Update has an established baseline condition of year 2014. 2014 represents the best available system information and system calibration data for the water and wastewater models at the time of study initiation. The Master Servicing Plan Update has projected growth from year 2014 to establish the 2041 infrastructure needs.

Table 2.5 Projected Employment Statistics - 2011 to 2041.

Municipal Comprehensive Review Strategic Growth Option Forecast Employment by Local Municipality								
Municipality	**Total Place of Work Employment**							
	2011	**2014 ***	**2016**	**2021**	**2026**	**2031**	**2036**	**2041**
Fort Erie	11,290	11,992	12,460	13,270	13,960	14,920	15,940	17,240
Grimsby	7,720	9,010	9,870	10,780	11,440	12,380	13,310	14,630
Lincoln	9,740	10,664	11,280	11,870	12,300	13,040	13,710	14,600
Niagara Falls	41,030	43,628	45,360	47,790	49,630	52,060	54,570	57,720
Niagara-on-the-Lake	10,650	12,066	13,010	13,720	14,150	14,660	15,230	16,030
Pelham	4,090	4,360	4,540	4,880	5,220	5,750	6,280	6,930
Port Colborne	5,860	5,806	5,770	5,900	6,080	6,350	6,640	7,000
St. Catharines	60,180	61,668	62,660	65,530	67,820	71,480	75,240	80,240
Thorold	7,360	7,786	8,070	8,480	8,870	9,390	9,960	10,660
Wainfleet	1,160	1,244	1,300	1,350	1,400	1,470	1,550	1,650
Welland	22,090	22,990	23,590	24,490	25,170	26,220	27,300	28,760
West Lincoln	4,280	4,802	5,150	5,770	6,370	7,270	8,280	9,560
Niagara Region	**185,450**	**196,016**	**203,060**	**213,830**	**222,410**	**234,990**	**248,010**	**265,020**

* Note: The Master Servicing Plan Update has an established baseline condition of year 2014. 2014 represents the best available system information and system calibration data for the water and wastewater models at the time of study initiation. The Master Servicing Plan Update has projected growth from year 2014 to establish the 2041 infrastructure needs.

7.2.1 Land Use Analysis

The growth management strategy exercise was completed at a high level with population and employment projected on a five year interval and allocated to Traffic Analysis Zones (TAZs). TAZs are the basic geographic unit for inventorying demographic data and land use within a study area most commonly used in conventional transportation planning models. TAZs often cover larger geographical blocks which are appropriate for traffic analysis but less refined for the use in water and wastewater infrastructure analysis which requires a more granular level of detail to refine accuracy of results.

To help direct the Water and Wastewater Master Servicing Plan, the Region and its consultant partner, GM BluePlan, completed a land use analysis exercise to further refine the large spatially allocated TAZ's population and employment projections to smaller geographic areas. The analysis included a review of vacant residential and employment land, strategic areas for planned intensification nodes and corridors, and land associated with the Region's current development planning process, such as Draft Plans of Subdivision and building permits. This process converted the residential and employment projections from the growth management study into more detailed allocations which enabled a spatial analysis to existing water and wastewater service areas.

This exercise enabled the completion of residential and employment projections at five-year intervals between 2014 and 2041. The resulting growth area maps are provided in Appendix 2B.

7.2.2 Service Area

Completion of the land use analysis exercise enabled the projected growth to be spatially assigned to the existing water and wastewater service areas. The distribution of the population and employment within the separate water and wastewater service areas is presented in Table 2.6 to Table 2.9

Table 2.6 Projected Population Statistics by Water Service Area – 2014 to 2041

Water System	Population						
	2014 Pop	2021 Pop	2026 Pop	2031 Pop	2036 Pop	2041 Pop	Growth 2014 - 2041
Decew	170,312	177,129	186,493	198,026	212,715	223,558	53,246
Fort Erie	30,419	31,881	34,109	37,096	40,611	43,134	12,715
Grimsby	43,719	48,696	53,774	60,554	65,474	70,963	27,245
Niagara Falls	86,274	91,772	98,397	106,511	114,902	121,624	35,350
Port Colborne	16,417	16,320	16,906	17,728	18,696	19,428	3,011
Welland	68,288	71,244	75,695	81,294	86,977	91,772	23,485
Total	**415,429**	**437,042**	**465,374**	**501,209**	**539,375**	**570,479**	**155,052**

* Note: The Master Servicing Plan Update has an established baseline condition of year 2014. 2014 represents the best available system information and system calibration data for the water and wastewater models at the time of study initiation. The Master Servicing Plan Update has projected growth from year 2014 to establish the 2041 infrastructure needs.

Table 2.7 Projected Employment Statistics by Water Service Area – 2014 to 2041

Water System	Employment						
	2014 Emp	2021 Emp	2026 Emp	2031 Emp	2036 Emp	2041 Emp	Growth 2014 - 2041
Decew	80,412	86,653	89,821	94,544	99,471	106,205	25,790
Fort Erie	10,839	11,729	12,231	12,944	13,699	14,698	3,859
Grimsby	14,793	18,047	19,378	21,306	23,255	25,952	11,159
Niagara Falls	43,604	47,554	49,285	51,636	54,010	57,191	13,587
Port Colborne	5,655	5,733	5,876	6,116	6,358	6,679	1,024
Welland	27,304	29,315	30,345	31,944	33,562	35,777	8,473
Total	**182,607**	**199,031**	**206,936**	**218,490**	**230,355**	**246,502**	**63,892**

* Note: The Master Servicing Plan Update has an established baseline condition of year 2014. 2014 represents the best available system information and system calibration data for the water and wastewater models at the time of study initiation. The Master Servicing Plan Update has projected growth from year 2014 to establish the 2041 infrastructure needs.

Table 2.8 Projected Population Statistics by Wastewater Service Area – 2014 to 2041

Wastewater System	Population						
	2014 Pop	2021 Pop	2026 Pop	2031 Pop	2036 Pop	2041 Pop	Growth 2014 - 2041
Anger Avenue	16,264	16,591	18,259	19,901	22,499	23,930	7,663
Baker Road	52,779	58,704	64,761	72,127	78,159	84,207	31,425
Crystal Beach	10,794	11,579	12,101	12,928	13,783	14,289	3,496
Niagara Falls	87,045	92,917	100,281	109,242	118,251	125,366	38,323
Niagara-on-the-Lake	10,295	11,451	13,074	14,160	14,807	15,435	5,138
Port Dalhousie	71,500	73,485	77,321	82,702	90,840	95,750	24,252
Port Weller	81,113	83,638	86,044	90,226	94,852	99,572	18,460
Queenston	1,798	1,798	1,819	1,852	1,874	1,897	99
Seaway	16,427	16,331	16,917	17,741	18,708	19,441	3,014
Stevensville Douglastown	3,421	3,761	3,796	4,317	4,379	4,965	1,544
Welland	68,723	72,025	76,953	82,897	88,638	93,788	25,064
Total	**420,159**	**442,280**	**471,326**	**508,093**	**546,790**	**578,640**	**158,478**

* Note: The Master Servicing Plan Update has an established baseline condition of year 2014. 2014 represents the best available system information and system calibration data for the water and wastewater models at the time of study initiation. The Master Servicing Plan Update has projected growth from year 2014 to establish the 2041 infrastructure needs.

Table 2.9 Projected Employment Statistics by Wastewater Service Area – 2014 to 2041

Wastewater System	Employment						
	2014 Emp	2021 Emp	2026 Emp	2031 Emp	2036 Emp	2041 Emp	Growth 2014 - 2041
Anger Avenue	8,971	9,729	10,177	10,826	11,518	12,427	3,456
Baker Road	19,129	22,702	24,174	26,312	28,502	31,358	12,231
Crystal Beach	1,559	1,633	1,681	1,719	1,762	1,815	256
Niagara Falls	43,869	47,845	49,586	51,926	54,326	57,495	13,626
Niagara-on-the-Lake	6,046	6,819	7,035	7,229	7,464	7,781	1,736
Port Dalhousie	44,166	47,206	49,066	51,911	54,853	58,928	14,760
Port Weller	27,179	29,303	30,322	31,898	33,531	35,713	8,535
Queenston	1,216	1,280	1,298	1,318	1,339	1,375	159
Seaway	5,666	5,767	5,933	6,209	6,491	6,868	1,202
Stevensville Douglastown	435	601	653	745	832	957	524
Welland	27,383	29,417	30,446	32,055	33,672	35,891	8,507
Total	**185,619**	**202,302**	**210,371**	**222,148**	**234,290**	**250,608**	**64,992**

* Note: The Master Servicing Plan Update has an established baseline condition of year 2014. 2014 represents the best available system information and system calibration data for the water and wastewater models at the time of study initiation. The Master Servicing Plan Update has projected growth from year 2014 to establish the 2041 infrastructure needs.

8. NIAGARA REGION WATER AND WASTEWATER POLICIES AND DESIGN GUIDELINES

Development of water and wastewater principles and policies are integral to provide guidelines and direction to the Master Servicing Plan Update process, as well as to the identification and evaluation of servicing strategies.

To set the stage for completing the Master Servicing Plan Update and to develop a foundation principle for the study, a vision statement was established:

Providing for Today, Vision for Tomorrow

"To establish a cost effective infrastructure program that meets the service needs of existing users, meets regulatory and legislative requirements, supports growth, and addresses the priority areas of climate change, energy management, infrastructure optimization, system security, and resiliency."

Through the course of the Master Servicing Plan Update, priority policy areas were brought forward including:

- Health and safety;
- System reliability and security;
- Reserve capacity for operational flexibility and level of service;
- Impacts of climate change;
- Considerations to energy use and efficiency;
- Recognition of impacts from water efficiency and conservation; and
- Addressing issues related to the full lifecycle of water and wastewater services.

A comprehensive list of general, water and wastewater policies were established. As a result from the priority policy areas, key principle and policy statements were developed as highlighted below:

- Niagara Region will endeavor to maintain sufficient reserve capacity in its water and wastewater infrastructure and facilities to provide operational flexibility and meet potential changes in servicing conditions
- Niagara Region shall endeavor to provide reliability, redundancy and security in its water and wastewater systems with attention to high risk and critical areas

- Niagara Region shall be aware of and consider the potential impact of climate change on the planning and sizing of infrastructure
- Niagara region shall design water and wastewater facilities with consideration to energy use
- Niagara Region will consider levels of storage beyond MOE Guidelines where appropriate in order to provide operational flexibility, energy management and system security
- Niagara Region will review a combination of servicing strategies including infrastructure and non-infrastructure (e.g. i/i reduction) solutions to meet wet weather level of service and provide sufficient wastewater capacity
- Niagara Region will approach Guidelines F-5-5 and F-5-1 such that new development will not put the Region out of compliance with regulations and the Region will consider opportunities to not increase wet weather overflows beyond current conditions

8.1 Policy and Guidelines

Building on the Building on the Vision Statement for the Master Servicing Plan Update, specific servicing principles and policies have been developed to guide and provide direction for the development and evaluation of servicing strategies.

In general, Niagara Region is looking to build and maintain efficient, effective, well managed water and wastewater systems that provide high level of service to the end users.

In order to capture these goals, the servicing principles and policies have been structured as outline below. Detailed servicing policies are provided in Appendix 2C.

General Servicing Policies

G.01 Municipal Servicing

G.02 Environmental Protection

G.03 Planning Horizon

G.04 Reserve Capacity

G.05 System Reliability and Security

G.06 Location of Municipal Services and Facilities

G.07 Climate Change

G.08 Energy Efficiency

G.09 Integrated Infrastructure Program

G.10 Level of Service

G.11 Region and Local Municipality Consistency

G.12 Sustainability

Water Servicing Policies

W.01 Health & Safety

W.02 Raw Water Sources

W.03 Treatment & Distribution Water Quality

W.04 Water Demand Projections

W.05 Distribution Requirements

W.06 Fire Flow Requirements

W.07 Storage Requirements

W.08 Operational Flexibility

W.09 Water Efficiency and Consumption Trends

W.10 Water Supply and Distribution Security

Wastewater Servicing Policies

WW.01 Health & Safety

WW.02 Receiving Water Bodies

WW.03 Wastewater Treatment and Collection Requirements

WW.04 Wastewater Flow Projections

WW.05 Sewer Use Criteria

WW.06 Separated Wastewater and Stormwater Systems

WW.07 Wastewater Collection and Pumping Systems

WW.08 Wet Weather Criteria

WW.09 Wet Weather Strategies

WW.10 Capacity Allocation

WW.11 Wet Weather Guidelines

The above noted policies address a wide range of servicing needs.

Under the 2016 Master Servicing Plan Update, the policies were developed and enhanced to address the vision statement priorities of climate change, energy management, infrastructure optimization, system security and resiliency. Of particular note, the area of wet weather management was also enhanced in the policies.

8.2 Design Criteria and Level of Service Objectives

In addition to the above noted policies, this document provides summary detail on the water and wastewater design criteria used under the Master Servicing Plan. The design criteria outlines the methodology and values used to estimate growth related flows as well as the decision making rationale related to infrastructure capacity and the trigger for upgrades. Detailed design criteria is provided in Appendix 2C.

8.2.1 Water Demand Design Criteria

The Master Servicing Plan Update has used the following design criteria to project water demands, determine capacity requirements and establish the water infrastructure program:

- Residential Average Day Demand: 300 Lpcd
- Employment Average Day Demand: 300 Lped

- Maximum Day Factors: based on rolling average for each system from last 5 years
- Residential Peak Hour Factor: 4
- Employment Peak Hour Factor: 2

8.2.2 Wastewater Flows Design Criteria

The Master Servicing Plan Update has used the following design criteria to project wastewater flows, determine capacity requirements and establish the wastewater infrastructure program:

- Residential Average Day Demand: 275 Lpcd
- Employment Average Day Demand: 275 Lped
- Peak Factor based on Harmon formula with values between 2 and 4 with consideration to the catchment area performance
- Utilize an extraneous flow rate of 0.286 L/ha/s as the wet weather level of service for triggering and sizing Regional wastewater infrastructure

9. NATURAL ENVIRONMENT EXISTING CONDITION

9.1 Policy Context

9.1.1 Provincial Policy Statement (PPS)

The PPS was issued under Section 3 of the *Planning Act*, and came into effect on April 30, 2014 and replaces the PPS issued March 1, 2005. (Note Niagara Regions falls within Ecoregion 7E)

The natural heritage policies of the PPS (MMAH 2014) indicate that:

- 2.1.1 Natural features and areas shall be protected for the long term;
- 2.1.2 The diversity and connectivity of natural features in an area, and the long-term ecological function and biodiversity of natural heritage systems, should be maintained, restored or, where possible, improved, recognizing linkages between and among natural heritage features and areas, surface water features and ground water features;
- 2.1.3 Natural heritage systems shall be identified in Ecoregions 6E and 7E, recognizing that natural heritage systems will vary in size and form in settlement areas, rural areas and prime agricultural areas;
- 2.1.4 Development and Site alteration shall not be permitted in:

    a) Significant wetlands in Ecoregions 5E, 6E and 7E; and

    b) Significant coastal wetlands

- 2.1.5 Unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions, development and site alteration shall not be permitted in:

    a) Significant wetlands in the Canadian Shield north of Ecoregions 5E, 6E and 7E;

    b) Significant woodlands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Mary's River);

    c) Significant valleylands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Mary's River);

    d) Significant wildlife habitat

e) Significant areas of natural and scientific interest; and

f) Coastal wetlands in Ecoregions 5E, 6E and 7E that are not subject to policy 2.1.4(b).

- 2.1.6 Development and Site alteration shall not be permitted in fish habitat except in accordance with provincial and federal requirements;
- 2.1.7 Development and Site alteration shall not be permitted in habitat of endangered species and threatened species except in accordance with provincial and federal requirements; and
- 2.1.8 Development and site alteration shall not be permitted on adjacent lands to the natural heritage features and areas identified in policies 2.1.3, 2.1.4 and 2.1.5 unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated that there will be no negative impacts on the natural features or on their ecological functions.

9.1.2 Species at Risk Act (SARA)

At a federal level, species at risk designations for species occurring in Canada are initially determined by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). If approved by the federal Minister of the Environment, species are added to the federal List of Wildlife Species at Risk (Government of Canada 2002). Species that are included on Schedule 1 as endangered or threatened are afforded protection of critical habitat on federal lands under the Species at Risk Act (SARA). On private or provincially-owned lands, only aquatic species listed as endangered, threatened or extirpated and migratory birds are protected under SARA, unless ordered by the Governor in Council.

9.1.3 Endangered Species Act (ESA)

Species at risk designation for species in Ontario are initially determined by the Committee on the Status of Species at Risk in Ontario (COSSARO), and if approved by the provincial Minister of Natural Resources and Forestry, species are added to the provincial Endangered Species Act (ESA), which came into effect June 30, 2008 (Ontario 2007). The legislation prohibits the killing or harming of species identified as endangered or threatened in the various schedules to the Act. The ESA also provides habitat protection to all species listed as threatened or endangered. As of June 30, 2008, the Species at Risk in Ontario (SARO) List is contained in O. Reg. 230/08.

9.1.4 Fisheries Act

The purpose of the Fisheries Act is to maintain healthy, sustainable and productive Canadian fisheries through the prevention of pollution, and the protection of fish and their habitat. In 2012, changes were made to the Fisheries Act to enhance Fisheries and Oceans Canada (DFO) ability to manage threats to Canada's commercial, recreational and Aboriginal (CRA) fisheries.

Projects affecting waterbodies supporting Canada's CRA fisheries must comply with the provisions of the Fisheries Act. The proponent is responsible for determining if the project is likely to cause impacts to CRA fish and if these impacts can be avoided or mitigated.

9.1.5 Niagara Region Official Plan

Niagara Region's Official Plan (Office Consolidation, July2007) is the overarching policy document guiding land use within the Region. This document contains the Region's strategic objectives for development and conservation, as well as policies that implement provincial legislation and provide planning context to lower tier municipalities.

Section 7 of the Region's Official Plan (incorporated through Amendment 187 on April 16, 2008) defines the Region's Core Natural Heritage System and contains the Region's environmental policies. Section 7.A contains policies that apply throughout the Region (i.e., lands falling either within or outside of the Core Natural Heritage System). These include:

7.A.4.1 Development and site alteration may be permitted within an Earth Science Area of Natural and Scientific Interest (ANSI) shown on the Core Natural Heritage Map if it has been demonstrated that there will be no significant negative impacts on the earth science features for which the area was identified or on ecological functions related to the ANSI.

7.A.4.3 Linear public utilities and infrastructure may be permitted within an Earth Science ANSI if there is no reasonable alternative location and they are designed to avoid or minimize negative impacts.

Section 7.B of the Region's Official Plan contains additional policies that apply to lands falling within the Core Natural Heritage System, which is defined in Policy 7.B.1.1 to consist of:

a) Core Natural Areas, classified as either Environmental Protection Areas or Environmental Conservation Areas;

b) Potential Natural Heritage Corridors connecting the Core Natural Areas;

c) Greenbelt Natural Heritage and Water Resources Systems; and

d) Fish Habitat.

Policy 7.B.1.3 of the Region's Official Plan defines Environmental Protection Areas to include:

"…provincially significant wetlands; provincially significant Life Science Areas of Natural and Scientific Interest (ANSIs); and significant habitat of threatened and endangered species. In addition, within the Greenbelt Natural Heritage System, Environmental Protection Areas also include wetlands; significant valleylands; significant woodlands; significant wildlife habitat; habitat of species of concern; publicly owned conservation lands; savannahs and tallgrass prairies; and alvars."

Policy 7.B.1.4 of the Region's Official Plan defines Environmental Conservation Areas to include:

"…significant woodlands; significant wildlife habitat; significant habitat of species of concern; regionally significant Life Science ANSIs; other evaluated wetlands; significant valleylands; savannahs and tallgrass prairies; and alvars; and publicly owned conservation lands."

Although included within the Core Natural Heritage System, significant habitat of threatened and endangered species is not included in the Core Natural Heritage Map

Policy 7.B.1.3 of the Region's Official Plan states that:

"…these habitats will be identified through the Planning and Development review process. Where such habitat is identified development and site alteration shall be subject to the policies for Environmental Protection Areas."

Finally, Policy 7.B.1.14 of the Region's Official Plan states:

"…Notwithstanding other policies in this Plan essential public uses of a linear nature including utilities, communication facilities and transportation routes may be permitted within the Core Natural Heritage System or adjacent lands where an Environmental Assessment for the proposed use has been approved under Provincial or Federal legislation."

9.2 Ecological Features and Functions

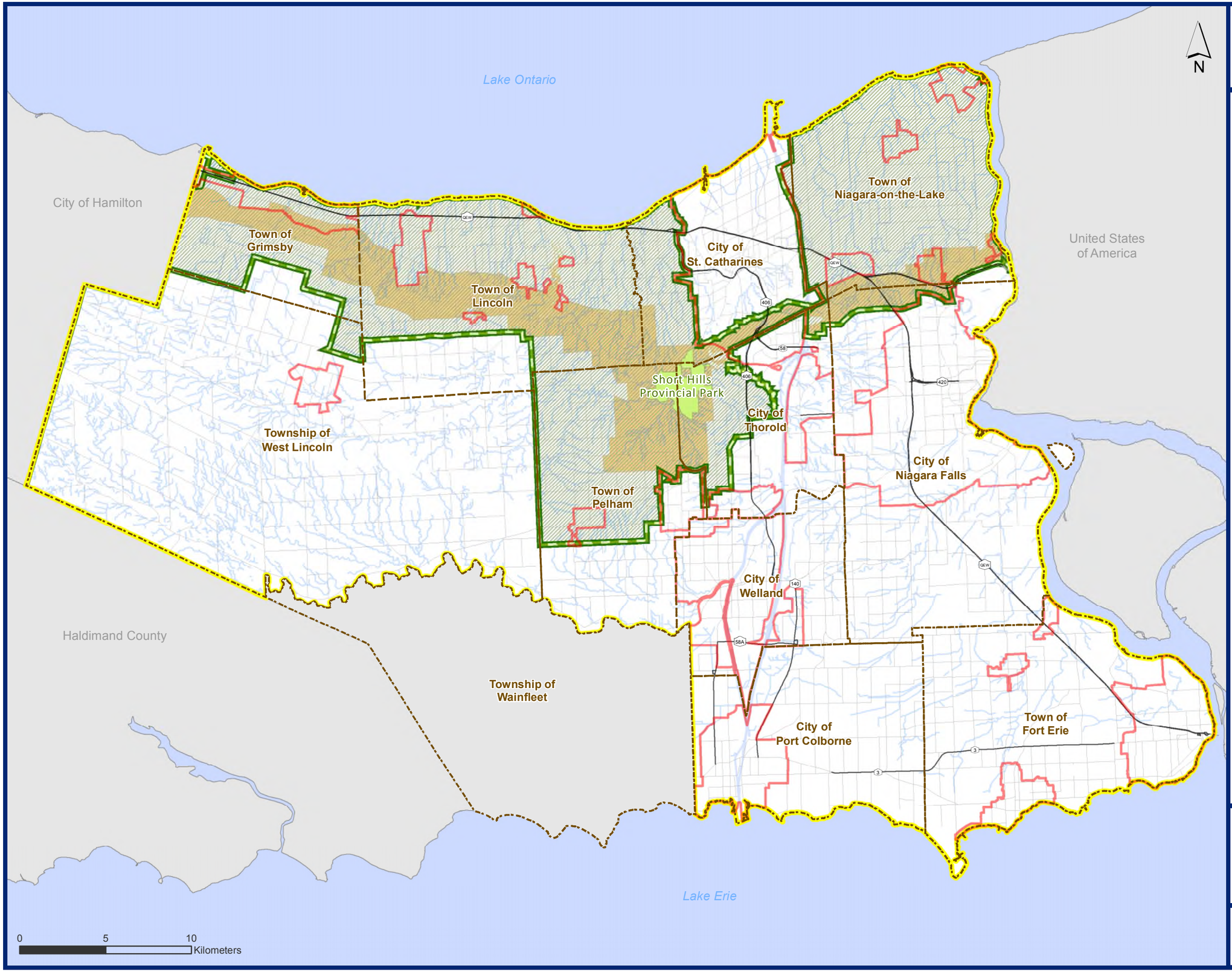
This section describes the existing environmental conditions within the study area at a more detailed level, by ecological feature or function.

9.2.1 Niagara Escarpment Plan

Approximately 13,591 ha of lands designated within the Niagara Escarpment Plan Area occur within the study area. These lands occur through the northern portion of the study area within the Town of Grimsby, Town of Lincoln, City of Thorold, City of St. Catharines, Town of Pelham, Town of Niagara-on-the-Lake, and City of Niagara Falls **(**Figure 2.5**)**. This portion of the study area contains a high concentration of provincially and regionally significant Areas of Natural and Scientific Interest (ANSIs), woodlots and Conservation Areas, as well as Short Hills Provincial Park.

Niagara Region

2016 MASTER SERVICING PLAN



Environmental Features

- Greenbelt Boundary
- Niagara Escarpment
- Protected Countryside
- Provincial Parks
- Lakes, Rivers, and Creeks

Other Features

- Study Area
- Urban Area
- Municipal Boundary
- Highways
- Arterial Roads

Figure 2.5

Existing Conditions

Provincial Policy Areas

BluePlan

May 2017
715023-G-2-Existing Conditions (Provincial Policy)
NAD 1983 UTM Zone 17N

9.2.2 Greenbelt Protected Countryside

Approximately 34,113 ha of lands designated as Greenbelt – Protected Countryside occur within the study area. These lands extend in a southerly direction from the Lake Ontario shoreline to the Niagara Escarpment in the eastern portion of the study area, generally to the southern boundary of Grimsby in the west, and as far south as Pelham Corners (Town of Pelham) in the central portion of the study area (). The Protected Countryside is made up of an Agricultural System and a Natural System. Both of these system designations occur within the study area.

9.2.3 Wetlands

The designation of wetlands as either regionally or provincially significant is completed through a standardized assessment process developed by the Ontario Ministry of Natural Resources and Forestry (OMNRF), the Ontario Wetland Evaluation System (OWES). Provincially significant wetlands are protected under section 2.1 of the Provincial Policy Statement (2014), which prohibits development and site alteration in provincially significant wetlands and coastal wetlands. In addition, development and site alteration on adjacent lands is permitted only if the ecological function of the adjacent lands has been evaluated and it has been demonstrated that there will be no negative impacts on the natural features or ecological functions. Wetlands are also included in the Natural Areas System of the Niagara Escarpment Plan (2010) and in the Core Natural Heritage System of Niagara Region's Official Plan

9.2.4 Niagara Region Core Natural Heritage System

The Niagara Region's Core Natural Heritage System consists of:

- Core Natural Areas, classified as either Environmental Protection Areas or Environmental Conservation Areas;
- Potential Natural Heritage Corridors connecting the Core Natural Areas;
- The Greenbelt Natural Heritage and Water Resources Systems; and
- Fish Habitat.

These elements of the Core Natural Heritage System within the study area are depicted in the Niagara Region Official Plan (Schedule C), and provided in Figure 2.6.

As defined in the Region's Official Plan Environmental Protection Areas include provincially significant wetlands, provincially significant Life Science Areas of Natural and Scientific Interest

(ANSIs), and significant habitat of threatened and endangered species. In addition, within the Greenbelt Natural Heritage System, Environmental Protection Areas also include wetlands, significant valleylands, significant woodlands, significant wildlife habitat, significant habitat of species of concern, publicly owned conservation lands, savannahs and tallgrass prairies, and alvars. Environmental Conservation Areas include significant woodlands, significant wildlife habitat, significant habitat of species of concern, regionally significant Life Science ANSIs, other evaluated (e.g., regionally significant) wetlands, significant valleylands, savannahs and tallgrass prairies, alvars, and publicly owned conservation lands.

Although included within the Core Natural Heritage System, significant habitats of threatened and endangered species are not included in the Core Natural Heritage Areas. Rather, the Region's Official Plan states that these habitats are identified through the Planning and Development review process.

Lake Ontario

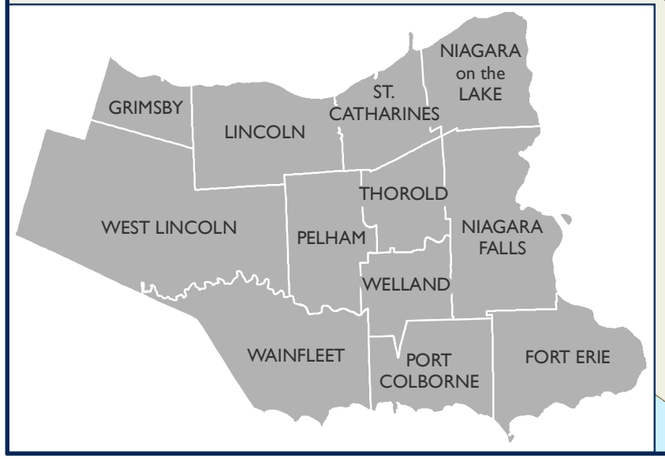
CITY OF HAMILTON

HALDIMAND COUNTY

UNITED STATES OF AMERICA

Niagara River

Lake Erie



- ENVIRONMENTAL PROTECTION AREA
- ENVIRONMENTAL CONSERVATION AREA
- GREENBELT PLAN
- GREENBELT NATURAL HERITAGE SYSTEM
- NIAGARA ESCARPMENT PLAN (NEP) AREA
- EARTH SCIENCE ANSI
- FISH HABITAT
- FISH HABITAT
- MUINICIPAL DRAIN
- POTENTIAL NATURAL HERITAGE CORRIDOR
- URBAN AREA
- NIAGARA REGION
- MUNICIPAL BOUNDARY
- PROVINCIAL ROAD
- REGIONAL ROAD

NIAGARA REGION OFFICIAL PLAN

Niagara Region

0 2.5 5 10

Kilometers

Published November 2015

Core Natural Heritage

SCHEDULE C

9.2.5 Life Sciences ANSIs

Areas of Natural and Scientific Interest (ANSIs) are defined in the Provincial Policy Statement (2014) as:

"..areas of land and water containing natural landscapes or features that have been identified as having life science or earth science values related to protection, scientific study or education."

OMNRF evaluates ANSIs to determine whether they are provincially or regionally (locally) significant. This evaluation takes into consideration the value of the area for conservation, scientific study and education. Both provincially and regionally significant ANSIs are included in the Escarpment Natural Areas under the Niagara Escarpment Plan. ANSIs are designated as Earth Science or Life Science depending on whether they contain significant geological features (e.g., rock, fossil and landform features) or biological feature (e.g., natural landscapes, ecological communities, plant and animal species), respectively. Provincially and regionally significant Life Science ANSIs are included in Niagara Region's Core Natural Heritage System.

9.2.6 Provincial Parks

Short Hills Provincial Park (660 ha) is in the centre of the Niagara Peninsula bordering the City of St. Catharines, City of Thorold, and the Town of Pelham **(**Figure 2.5). Located at the southern edge of the Niagara Escarpment, the park contains small, but steep hills ("short hills"). Located in the Carolinian Zone, the park is home to many rare plant species including Sassafras and Black gum trees. Wildlife recorded in the park include mammals such as Brush wolves and White tailed deer, as well as bird species which include Great horned owl, Indigo bunting, Bobolink, and Scarlet Tanager. Amphibians and Reptiles found in the park include Eastern milksnake, Butler snake, Leopard frog, American toad, Red-backed salamander, and the Brown snake (Friends of Short Hills Park, 2010).

9.2.7 Conservation Areas

The Niagara Peninsula Conservation Authority (NPCA) owns conservation lands across the study area. These 25 Conservation Areas, which cover a total area of approximately 1,130.4 ha, are mapped in Figure 2.7. The Study Area falls predominately within the boundaries of the NPCA watershed which covers approximately 1,666 km2 of the study area with a further 1.3 km2 of lands in the north-west within the jurisdiction of the Hamilton Conservation Authority (HCA).

Lake Ontario

City of Hamilton

United States of America

Haldimand County

Lake Erie

Town of Grimsby

Town of Lincoln

Township of West Lincoln

Township of Wainfleet

Town of Pelham

City of St. Catharines

Town of Niagara-on-the-Lake

City of Thorold

City of Niagara Falls

City of Welland

City of Port Colborne

Town of Fort Erie

QEW

406

58

420

140

58A

3

N

0 5 10 Kilometers

Niagara Region

2016 MASTER SERVICING PLAN

Environmental Features

- Environmental Protection Areas
- Environmental Conservation Areas
- OMNRF Provincially Significant Wetlands
- Lakes, Rivers, and Creeks

Other Features

- Study Area
- Urban Area
- Municipal Boundary
- Highways
- Arterial Roads

Figure 2.7

Existing Conditions

Ecological Features

BluePlan

May 2017
715023-G-2-Existing Conditions (Ecological)
NAD 1983 UTM Zone 17N

9.2.8 Carolinian Canada Signature Sites

Although the Carolinian Life Zone makes up less than 1% of Canada's total land area, it contains a greater number of species than any other ecosystem in Canada, including approximately one third of Canada's rare and endangered species and many other species which are not found anywhere else in the country (Carolinian Canada, 2010). In 1984, 38 sites were identified as critical natural areas for the conservation of the Carolinian Life Zone in Canada. Six of these Carolinian Canada Signature Sites are located within the study area, where they cover a total area of approximately 5,200 ha.

9.2.9 Fish and Fish Habitat

Fish communities are generally classified according to the thermal preference of the dominant species of the fish community found within the waterbody or watercourse. Watercourses classified as coldwater have a mean summer surface water temperature of less than 19°C or contain characteristic cold water fish (e.g., salmon, trout or sculpin species) or invertebrate species. Watercourses classified as coolwater have a mean summer surface water temperature between 19°C and 25°C or contain characteristic fish (e.g., Walleye or Northern Pike) or invertebrate species. Warmwater watercourses have a mean summer surface water temperature greater than 25°C, contain a fish community often characterized by Largemouth bass, Bluegill, carp, bullheads, or Bowfin, or characteristic invertebrate species. A watercourse is classified as "unknown" if there is no temperature information or data are not sufficient to classify as either cold, cool, or warm.

Within Niagara Region, watercourses have also been classified into three fish habitat categories (critical, important, marginal), based on the sensitivity and significance of the existing and potential fish habitats, for the purpose of assisting with resource management decisions (OMNRF, 2000). The OMNRF's database contains records of 97 fish species occurring within Niagara Region. The study area encompasses portions of the Lake Ontario Watershed, Niagara River Watershed, and Lake Erie Watershed (Figure 2.4).

9.3 Natural Environment

9.3.1 Physiography

The study area falls within three physiographic regions, including the Iroquois Plain, Niagara Escarpment, and Haldimand Clay Plain (Chapman and Putnam, 1984).

9.3.2 Iroquois Plain

Below the Niagara Escarpment, the lowlands bordering Lake Ontario were inundated by a body of water known as Lake Iroquois during last glacial period. Today, the Lake Iroquois Plain is characterized by lacustrine sand and clay deposits along the former lake bottom. The old Lake Iroquois shoreline is marked by distinct features including cliffs, bars, gravel beaches and boulder pavements. The region is characterized by generally level topography, with a slight slope towards the Lake Ontario shore. It extends west from the Niagara River to the Trent River in the east, and can reach thicknesses of up to 20 m (Sharpe et al.1999).

9.3.3 Niagara Escarpment

Stretching over 700 km from the Bruce Peninsula to the Niagara River, the Niagara Escarpment is Ontario's most distinct landform. This region, which was designated a UNESCO World Biosphere Reserve in 1990, bisects the study area in an east-westerly direction and separates the northern lowland area adjacent to Lake Ontario from the elevated areas above the Niagara Escarpment. Along much of its length, the region is covered by a thin layer of stony loam, while the brow of the Escarpment is characterized by a ridge of vertical cliffs of dolostone bedrock.

9.3.4 Haldimand Clay Plain

The Haldimand Clay Plain extends south from the Niagara Escarpment to Lake Erie. The region is made up of a series of parallel belts or terraces with the highest elevation adjacent to the Escarpment. The overburden material increase in depth towards the south and consists of lacustrine clays, which were deposited during the period of inundation by pro-glacial Lakes Warren and Lundy. Higher relief and ridges in the west generally direct drainage to the east, including Twenty Mile Creek and the Welland River. Some watercourses, such as Twenty Mile Creek, have carved deep valleys through the Escarpment and drain into Lake Ontario.

9.3.5 Carolinian Forest Ecoregion

The study area occurs within Ecoregion 7E (Lake Erie – Lake Ontario Ecoregion, also called the Carolinian Forest Ecoregion). An ecoregion is a provincial Ministry of Natural Resources and Forestry (OMNRF) term which is defined as "an area of land within which the response of vegetation to the features of landform follows a consistent pattern" and is "defined by a characteristic range and pattern of climatic variables" (OMNRF, 2007). Ecoregion 7E is generally characterized by very flat relief created by the deep, fined grained sediments from glacial and post glacial lakes that blanket the sedimentary bedrock. Wetlands and water are

found on less than 2% of the ecoregion (OMNRF, 2007). Ecoregion 7E has the greatest diversity of species in Canada, and is home to approximately 2,200 species of herbaceous plants, 70 species of trees, and 400 species of birds (OMNRF, 2007).

The Niagara Escarpment, which is recognized provincially and internationally as a significant landform, traverses the northern portion of the study area in an east-westerly direction. Although the Niagara Escarpment occupies a relatively small portion of the study area, it contains a variety of habitats including wooded slopes, crevices, exposed bedrock, cliff faces, waterfalls, and large tracts of forest which account for its high biological diversity. The Niagara Escarpment supports over 1,500 species of vascular plants, 325 bird species, 55 mammal species and 34 species of reptiles and amphibians (Niagara Escarpment Commission, 2010b). The portion of the study area that falls within the Niagara Escarpment contains a high concentration of provincially and regionally significant Areas of Natural and Scientific Interest (ANSIs), woodlots, Conservation Areas, and Short Hills Provincial Park.

The study area is within the Deciduous Forest Region based on Rowe's (1972) description of the Forest Regions of Canada. The Niagara section of the deciduous forest region contains many trees, shrubs and herbs from the deciduous forest to the south, as a result of the favourable climatic and soil conditions.

The Carolinian Zone is a component of the Deciduous Forest Region, occupying the southeastern portion of the Forest Region from Grand Bend on Lake Huron and Toronto on Lake Ontario, extending southward to Lake Erie. The Carolinian Zone is characterized by a warmer and moister lake effect climate, occurring on fertile soils. Dominant tree species include oaks and hickories with associates including Black walnut, Sycamore and Sassafras. Although the Carolinian Zone makes up less than 1% of Canada's total land area, it contains a greater number of species than any other ecosystem in Canada, including approximately one third of Canada's rare and endangered species and many other species which are not found anywhere else in the country (Carolinian Canada, 2010).

The mammal species found in the study area include those common to southern Ontario, such as White-tailed Deer, Coyote, Red fox, Raccoon, Striped Skunk, Woodchuck, Eastern Gray Squirrel, Eastern Chipmunk, Meadow Vole, and Eastern Cottontail, as well as species characteristic of the Carolinian Zone, such as the Grey Fox and Woodland Vole (Carolinian Canada, 2010).

There are observational records of more than 44 species of reptiles and amphibians occurring within Niagara Region, which represent more than half of the reptile and amphibian species

found in Ontario (Yagi et al.2009). A number of these species have been designated at risk, including Fowler's Toad, Blandings Turtle, Eastern Hognosed Snake and Massasauga Rattlesnake (NHIC, 2010).

The study area contains a notably high species richness and abundance of birds. There are historical and recent records of over 360 bird species occurring within Niagara Region (Black & Roy, 2009). These include species common to southern Ontario such as the Canada goose, Turkey vulture and Mallard duck, as well as species characteristic of the Carolinian Zone, including the Red-bellied woodpecker and Yellow-breasted chat.

9.3.6 Aquatic Environment

The study area encompasses portions of three watersheds: the Lake Ontario Watershed, Niagara River Watershed, and Lake Erie Watershed.

Lands in the northern portion of the study area drain into Lake Ontario. The Lake Ontario Watershed generally starts above the Niagara Escarpment, where the watercourses in the western portion of the study area drain in an easterly direction before turning north to flow over the Escarpment and into Lake Ontario. The watershed falls within the municipal boundaries of the Town of Grimsby, Township of West Lincoln, Town of Lincoln, Town of Pelham, City of St. Catharines, City of Thorold, City of Welland, City of Niagara Falls, and Town of Niagara-on-the-Lake. This watershed contains five drainage basins.

Lands in the central portion of the study area drain into the Niagara River, a channel or isthmus approximately 58 km in length that flows from Lake Erie to Lake Ontario. Near the midpoint of the Niagara River, an abrupt elevation drop of 51 m at Niagara Falls separates the Lower and Upper segments of the River. In 1987, the Niagara River was designated as an Area of Concern by the International Joint Commission due to degraded water quality resulting from nutrients and rural runoff, sedimentation, contaminants from industry and municipal sources, and combined sewer overflows (Environment Canada, 2010). The Niagara River Watershed contains four drainage basins.

Lands in the southern portion of the watershed drain into Lake Erie. This drainage occurs primarily through small streams and tile drains that have been created to drain the Haldimand Clay Plain, generally flowing south from the Onondaga Escarpment to Lake Erie. The entire Lake Erie Watershed covers less than 20 km2. Within the study area, this watershed contains two drainage basins.

10. EXISTING WATER AND WASTEWATER SYSTEMS

10.1 Existing Water System

Niagara Region currently services the urban area of the municipalities of Grimsby, West Lincoln, Lincoln, St. Catharines, Thorold, Welland, Pelham, Port Colborne, Niagara on the Lake, Niagara Falls, and Fort Erie. The existing water distribution system managed by the Region consists of six water treatment plants, 311 km of watermains, 14 booster stations with a further 6 at treatment plants, 25 storage facilities reservoirs and 15 re-chlorination stations. Figure 2.8 shows a map of the existing water distribution system. Detailed description of the water system is included in Volume III – Water MSP Update.

10.2 Existing Wastewater System

Niagara Region currently services the urban area of the municipalities of Grimsby, West Lincoln, Lincoln, St. Catharines, Thorold, Welland, Pelham, Port Colborne, Niagara on the Lake, Niagara Falls, and Fort Erie. Based on current GIS data, the existing wastewater system managed by the Region consists of ten wastewater treatment plants, one lagoon systems, approximately 303 km of trunk wastewater linear infrastructure including sewers and forcemains, and 109 sewage pumping stations. Figure 2.9 shows a map of the existing wastewater system. Detailed description of the wastewater system is included in Volume IV – Wastewater MSP Update.

Niagara Region

2016 MASTER SERVICING PLAN

Water Facilities

- Water Treatment Plant
- Pumping Station
- Reservoir
- Elevated Tank

Water Network

- Transmission Mains
- Distribution Mains

Water Pressure Zones

- DeCew Falls
- Fort Erie
- Grimsby
- Port Colborne
- Welland

Other Features

- Hamlets
- Urban Area
- Municipal Boundary
- Greenbelt Plan
- Environmental Protection Areas
- Environmental Conservation Areas

Lake Ontario

Grimsby W.T.P.

City of Hamilton

Town of Grimsby

Town of Lincoln

City of St. Catharines

Town of Niagara-on-the-Lake

United States of America

DeCew Falls W.T.P.

City of Thorold

Niagara Falls W.T.P.

City of Niagara Falls

Township of West Lincoln

Town of Pelham

Welland W.T.P.

City of Welland

Haldimand County

Township of Wainfleet

City of Port Colborne

Port Colborne W.T.P.

Town of Fort Erie

Rosehill W.T.P.

Lake Erie

N

0 5 10 Kilometers

Figure 2.8

Existing Water Infrastructure

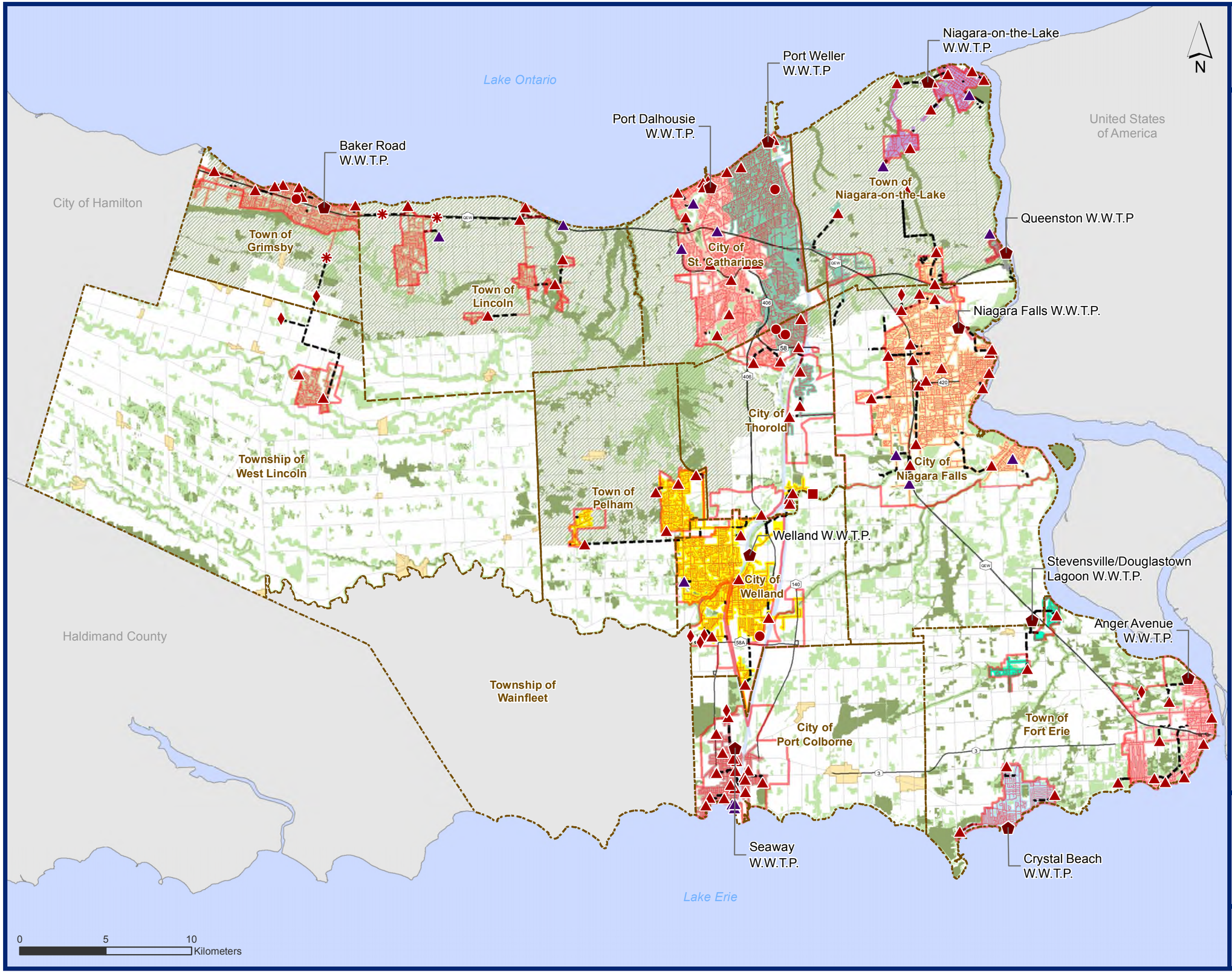
Baseline System Understanding

BluePlan

April 2017
715023-W-1-Existing Water System
NAD 1983 UTM Zone 17N

Niagara Region

2016 MASTER SERVICING PLAN



Wastewater Facilities

- Wastewater Treatment Plant
- Pumping Station (Regional)
- Pumping Station (Municipal)
- Combined Sewage Detention Facility
- Lagoon
- Leachate Pumping Station
- Odour Control Facility

Wastewater Network

- Sanitary Forcemains
- Sanitary Sewers

Wastewater Catchments

- Baker Road
- Port Dalhousie
- Port Weller
- Niagara-on-the-Lake
- Queenston
- Niagara Falls
- Stevensville Douglastown Lagoons
- Anger Avenue
- Crystal Beach
- Seaway
- Welland

Other Features

- Hamlets
- Urban Area
- Municipal Boundary
- Greenbelt Plan
- Environmental Protection Areas
- Environmental Conservation Areas

Figure 2.9

Existing Wastewater Infrastructure

Baseline System Understanding

BluePlan

April 2017
715023-WW-1-Existing Wastewater System
NAD 1983 UTM Zone 17N

APPENDIX 2A:
REGIONAL POLICY PLAN – INFRASTRUCTURE

8. Infrastructure

8.A Objectives for Infrastructure

Objective 8.A.1 To provide a framework and policy linkages for the coordination of *infrastructure* planning, land use planning, and *infrastructure* investment to implement this Plan.

Objective 8.A.2 To optimize the use of existing *infrastructure*.

Objective 8.A.3 To provide a framework where urban *development* occurs only in areas with full municipal services and where public/private *utility infrastructure* has or will be established to serve the anticipated growth and *development*.

Objective 8.A.4 To provide necessary public utilities in accordance with the servicing needs of existing and future *development* conforming to stated priorities and with economic, safety and environmental considerations.

Objective 8.A.5 To establish priorities for the staging of works, particularly with regard to water supply and sewage disposal systems, necessary for the current and future servicing requirements of the Region. The following priorities shall be applicable, but are not intended to be absolute due to other objectives and servicing needs.

a) To meet minimum water quality objectives and minimum pollution abatement objectives, as established by the Region in consultation with appropriate Provincial and Federal Ministries, for the provision of services to existing municipal *development* having deficiencies in their existing municipal systems.
b) To meet the needs of existing *development* in terms of capacity for both water supply and sewage disposal.
c) To meet the needs for new *development* in an orderly and efficient manner. Industrial *development* which creates employment opportunities shall be assigned a higher priority than residential *development*. Priority for new *development* must also be co-ordinated with the availability of all other major services.
d) To recognize other objectives and policies of this Plan.
e) To recognize financial considerations.

Objective 8.A.6 To provide for the disposal and treatment of solid wastes in a manner which is economically, ecologically, and aesthetically acceptable.

8.B Water and Wastewater Systems

Policy 8.B.1 The Region will provide, insofar as possible, adequate water supply, sewage collection and disposal and, in co-operation with the local municipalities, will provide storm drainage facilities to meet the existing and future *development* needs within the approved *urban areas* of the Region.

Policy 8.B.2 The Region, in consultation with local municipalities, will prepare design criteria for water and sewer works to be used in the design and approval of such facilities.

Policy 8.B.3 The Region will prepare by-laws to regulate the use of its water supply and sewage treatment facilities.

Policy 8.B.4 The Region will undertake jointly with local municipalities, the determination of *development* densities (through zoning by-laws or other means) in accordance with present and proposed water and sewer works capacities. This will ensure that servicing is co-ordinated with local zoning by-laws and staging of *development*.

Policy 8.B.5 The Region will review its servicing policies from time to time in the light of both changing conditions of supply and demand for services and significant changes in economics and technology.

Policy 8.B.6 The Region may introduce levies and shall establish rates for Regional water and sewage capital and operating costs to permit orderly expansion of such facilities.

Policy 8.B.7 Lands abutting existing and proposed sewage treatment facilities shall be zoned to permit only such compatible land uses as industrial or open space. Where such zoning cannot be developed, then suitable separation areas must be incorporated between the treatment facilities and the proposed *development* to minimize the impact of odour problems that may be generated at such facilities. The separation distance will be dependent on the nature of the *development*, the treatment facility and other physically-related factors.

Policy 8.B.8 All new *development* which is proposed to be connected to existing *combined sewer* facilities shall be served with separated systems within the property limits of the *development*. The continued separation of storm and sanitary flows beyond the boundaries of the *development* will be dependent upon the available capacity within the existing sewer system, the treatment plant and the proximity of suitable storm outlets to the *development*.

Policy 8.B.9 Municipal sewage services and water services are the required form of servicing for *development* in *Urban Areas*.

Policy 8.B.10 The Region and the local municipalities should generate sufficient revenues to recover the *full cost* of providing *municipal water and wastewater systems*.

Policy 8.B.11 The Region will continue to plan and design *municipal water and wastewater systems* that return water to the Great Lakes *watershed* from which the withdrawal originates.

Policy 8.B.12 Construction of new, or expansion of existing, *municipal water and wastewater systems* should only be considered where the following conditions are met:

a) Strategies for water conservation and other water demand management initiatives are being implemented in the existing service area;
b) Plans for expansion or for new services are to serve growth in a manner that supports achievement of the *intensification target* and density target in this Plan; and
c) Plans have been considered in the context of applicable inter-provincial, national, bi-national, or state-provincial Great Lakes Basin agreements and are in compliance with the Great Lakes-St. Lawrence River Basin Sustainable Water Resources Agreement.

Policy 8.B.13 Local municipalities are encouraged to implement and support innovative stormwater management plans and strategies as part of *redevelopment* and intensification.

Policy 8.B.14 The Region requires that each municipality include in its official plan priority and staging policies for both water supply and sewage disposal systems which recognizes the locations and amounts of land needed for future urban *development* and which is co-ordinated with Regional priorities and requirements.

Policy 8.B.15 The Region requires that each *local municipality*'s staging policies conform with the approved urban *development* areas as designated in this Plan.

Variations with respect to priority and staging policies will only be permitted where:

a) full support and documentation for the variation is provided with a proposed local official plan amendment prepared by the area municipality;
b) the proposed *development* can be provided with water and sewer services in accordance with the Region's priorities and at reasonable cost;
c) the *development* is necessary and desirable in the municipality;
d) the proposal complies with all the other objectives and policies of this Plan; and
e) the proposed *development* is adequately served or can be adequately served by other facilities such as roads.

Policy 8.B.16 The boundaries of urban service areas, sewer areas, water areas (if any) or any other special areas which involve a tax charge on residents within that area and are intended to cover the cost of existing or proposed sewer or water works must comply with current Regional and local Plans.

Policy 8.B.17 On the basis of current technology in both water and sewage facilities, specific benefits accrue, from a capital cost and operating cost point of view, in the reduction in the number of plants that must be built or maintained. The Region will, therefore, continue its program to limit the number of such installations, consistent with the quality of services already provided, and this shall not be deemed to be in conflict with policy statements which recognize the continuation of separated urban centres.

Policy 8.B.18 Any extensions of the existing water supply or sewage disposal systems of the local municipalities must have the prior approval of the Region, and within the area of the Niagara Escarpment Plan, must conform with the Niagara Escarpment Plan Policies.

Policy 8.B.19 The Region will consult and co-operate with other authorities having jurisdiction for the issuance of permits for private water supply and sewage disposal systems to ensure a common objective. The following guidelines are proposed:

a) Existing soils and drainage facilities should be compatible to permit such private Installations.
b) Proper consideration shall be given to abutting existing *development* to ensure that problems will not be created for the existing or proposed *development*.
c) The operation of septic tank installations must not result in the pollution of watercourses.
d) Within the Niagara Escarpment Plan area, private water supply and sewage disposal systems are subject to the requirements of the Niagara Escarpment Plan policies.

Policy 8.B.20 The Region requires that each application by a *local municipality* for a municipal water main extension or extensions or for municipal connections to existing Regional water mains outside the *urban areas* boundaries shall be supported by detailed information illustrating its compliance with the following criteria:

a) It has the support of the local Council.
b) It is for legally existing or proposed *agricultural* and *agriculturally related uses* or for other legal permitted uses.
c) It will not jeopardize the ability of the Region to provide adequate water supply for existing urban *development*, for potential urban *development* within the *urban areas* boundaries, and for the *development* served by this or previous extensions outside the *urban areas* boundaries. The determination of the compliance with this criterion can only occur after due consideration of the size of the permanent connections to be made thereto.
d) It will not jeopardize the ability of the *local municipality* to provide an adequate water distribution system for existing urban *development*, for potential urban *development* within the *urban areas* boundaries, and for the *development* served by this and previous extensions outside the *urban areas* boundaries.
e) It will not contribute to or stimulate non-agricultural *development* other than in approved hamlets. Extensions to hamlets will be considered only if it can be adequately demonstrated that the cumulative effect of the extension to existing *development* and to any future *development* within the hamlet poses no potential health problems and that the other criteria set out in this policy including, in particular, the long term operation of existing private sewage systems and adequate lot sizes, can be met.

f) There are adequate local controls to regulate the use of water for irrigation or other uses which could place unreasonable demands on the water supply system.

g) There is confirmation from Regional Health Services that the existing waste disposal systems are satisfactory or will be upgraded to accommodate the increased loads which may result from a municipal water supply extension beyond the urban boundary and will not adversely affect any adjoining *agricultural uses* and all sewage disposal systems are in compliance with the requirements of Ontario Regulations 374/81 under **The Environmental Protection Act** or subsequent amendments thereto.

h) The financing system is satisfactory to the *local municipality*, is entirely locally or self-financed, is not based on expectations of additional *development*, and does not place an undue cost on properties with large frontages.

i) An inventory of existing vacant lots of record that may become serviced by the proposed extension is shown.

j) That any municipal connection outside the *urban areas* boundaries to an existing Regional water main which is a local service connection from the Regional water main to the abutting lands of the consumer must be:
   (i) to a maximum of 2 centimetres (3/4 inch) in diameter,
   (ii) only for the benefit of a use immediately abutting the Regional water main, and
   (iii) the only municipal local service connection servicing the lands in question.

k) That any municipal connection to the existing Fourth Avenue Regional water main outside the *urban areas* boundaries which is a municipal water main extension or extensions shall be constructed in a closed loop.

Policy 8.B.21 All new urban *development* areas must be provided with separate storm drainage systems. All new private *development* must also be provided with separate storm drainage connections. Where feasible and economical, existing municipal combined sewage and storm drainage systems shall be separated.

Policy 8.B.22 **Master Servicing Plans**

Policy 8.B.22.1 Master planning for transportation, water and wastewater shall be undertaken and updated by the Region to serve *development* for a 20 year or greater period;

Policy 8.B.22.2 Master plans shall be coordinated with phasing of growth

Policy 8.B.22.3 Prior to approval of *development* (i.e. plans of subdivision, site plan, etc.) local municipalities shall ensure that required water and wastewater *infrastructure* and servicing capacity is available to support that *development*.

APPENDIX 2B:
GROWTH AREA MAPS

Niagara Region

2016 MASTER SERVICING PLAN

Growth Areas

- Residential Growth Areas
- Employment Growth Areas
- Residential and Employment Growth Areas

Other Features

- Traffic Analysis Zones
- Urban Area
- Municipal Boundary
- Highways
- Arterial Roads

Lake Ontario

City of Hamilton

United States of America

Haldimand County

Lake Erie

N

Niagara-on-the-Lake ("Old Town")
Virgil
Town of Niagara-on-the-Lake
St. Catharines
Grimsby
Town of Grimsby
Prudhomes
Beamsville
Jordan Station
Vineland
Jordan
Town of Lincoln
Campden
Glendale
Queenston
St. David's
City of St. Catharines
Thorold North
Thorold
Smithville
Thorold South
City of Thorold
Niagara Falls
Township of West Lincoln
Town of Pelham
Fonthill
Port Robinson
Fenwick
City of Welland
Welland
City of Niagara Falls
Douglastown
Stevensville
Township of Wainfleet
City of Port Colborne
Port Colborne
Town of Fort Erie
Fort Erie
Crystal Beach

0 5 10 Kilometers

Figure 2.10

Traffic Analysis Zones (TAZ) and Growth Areas

BluePlan

April 2017
715023-P-1-TAZ and Growth Shapes
NAD 1983 UTM Zone 17N

Niagara Region

2016 MASTER SERVICING PLAN

Growth Areas

- Residential Growth Areas
- Employment Growth Areas
- Residential and Employment Growth Areas

Other Features

- Urban Area
- Municipal Boundary

Lake Ontario

City of Hamilton

QEW

Casablanca Boulevard

South Service Road

Grimsby

Livingston Avenue

Clarke Street

Main Street West

Mountain Street

Mountain Road

Main Street East

Town of Grimsby

Town of Lincoln

N

0 1 2 Kilometers

Figure 2.11

Growth Shapes

Town of Grimsby

BluePlan

April 2017
715023-P-1-Growth Shapes - Grimsby
NAD 1983 UTM Zone 17N

Niagara Region

2016 MASTER SERVICING PLAN

Growth Areas

- Residential Growth Areas
- Employment Growth Areas
- Residential and Employment Growth Areas

Other Features

- Urban Area
- Municipal Boundary

Figure 2.12

Growth Shapes

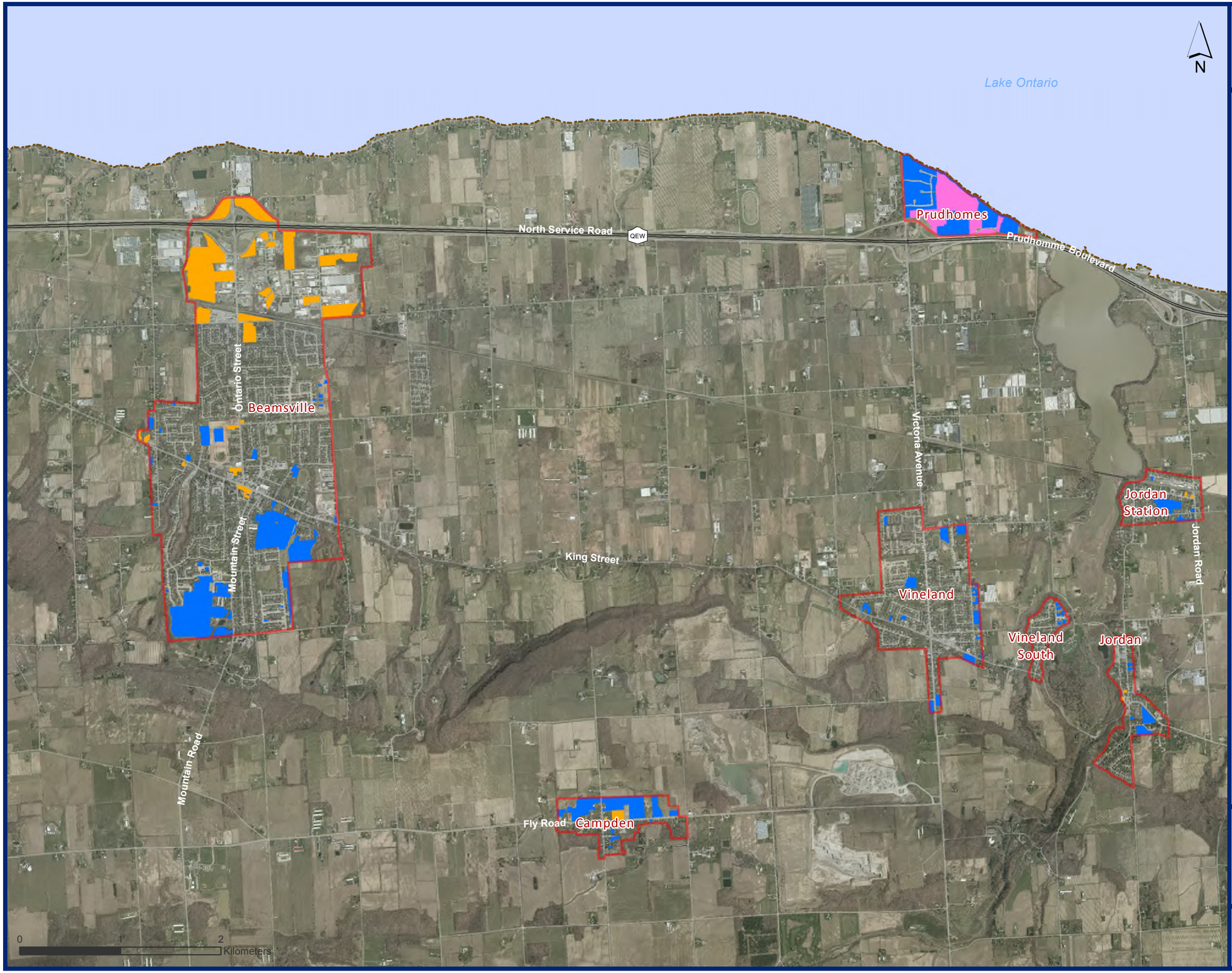
Township of West Lincoln

BluePlan

April 2017
715023-P-1-Growth Shapes - West Lincoln
NAD 1983 UTM Zone 17N

Niagara Region

2016 MASTER SERVICING PLAN



Growth Areas

- Residential Growth Areas
- Employment Growth Areas
- Residential and Employment Growth Areas

Other Features

- Urban Area
- Municipal Boundary

Figure 2.13

Growth Shapes

Town of Lincoln

BluePlan

April 2017
715023-P-1-Growth Shapes - Lincoln
NAD 1983 UTM Zone 17N

Niagara Region

2016 MASTER SERVICING PLAN

Growth Areas

- Residential Growth Areas
- Employment Growth Areas
- Residential and Employment Growth Areas

Other Features

- Urban Area
- Municipal Boundary

Figure 2.14

Growth Shapes

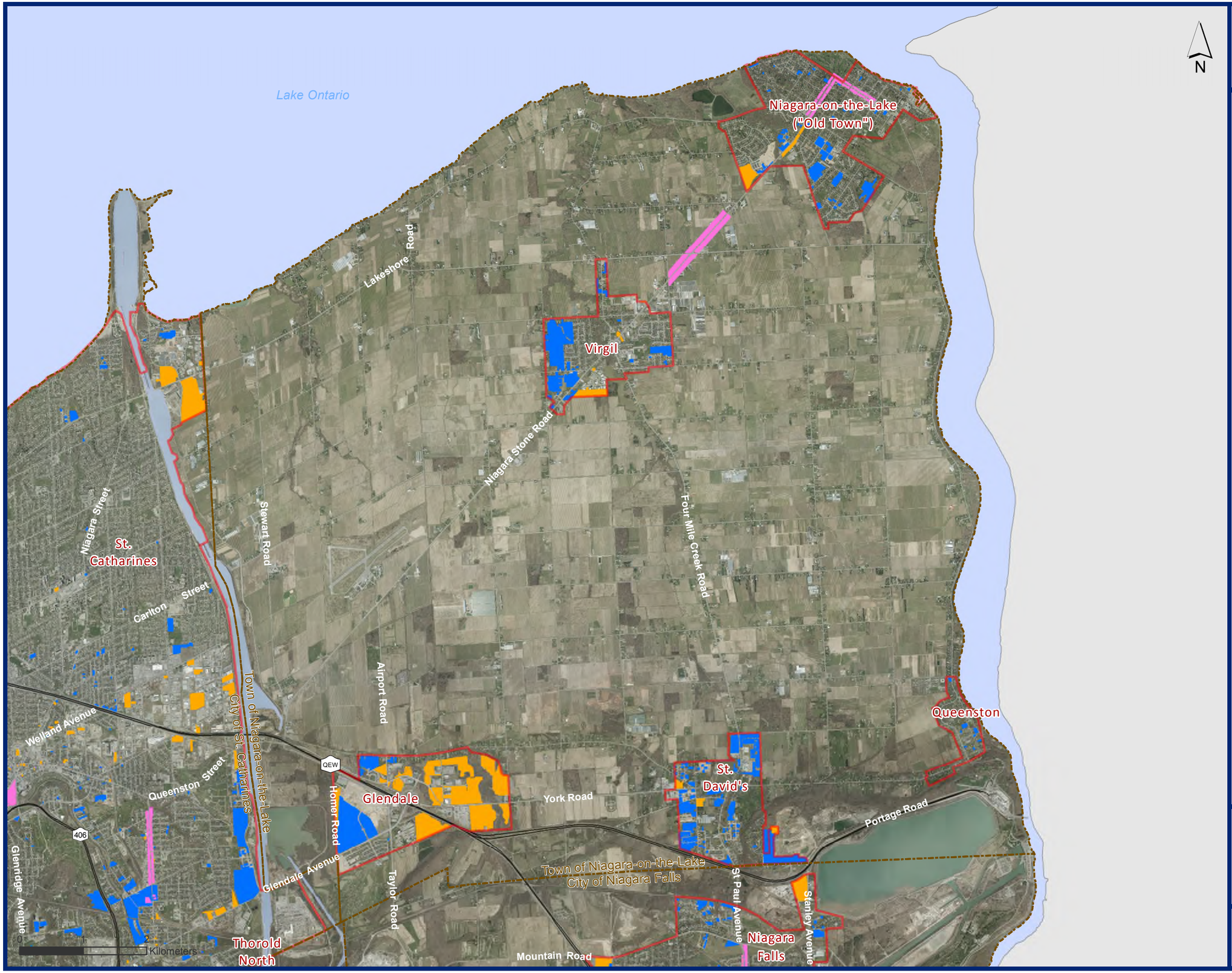
City of St. Catharines

BluePlan

April 2017
715023-P-1-Growth Shapes - St. Catharines
NAD 1983 UTM Zone 17N

Niagara Region

2016 MASTER SERVICING PLAN



Growth Areas

- Residential Growth Areas
- Employment Growth Areas
- Residential and Employment Growth Areas

Other Features

- Urban Area
- Municipal Boundary

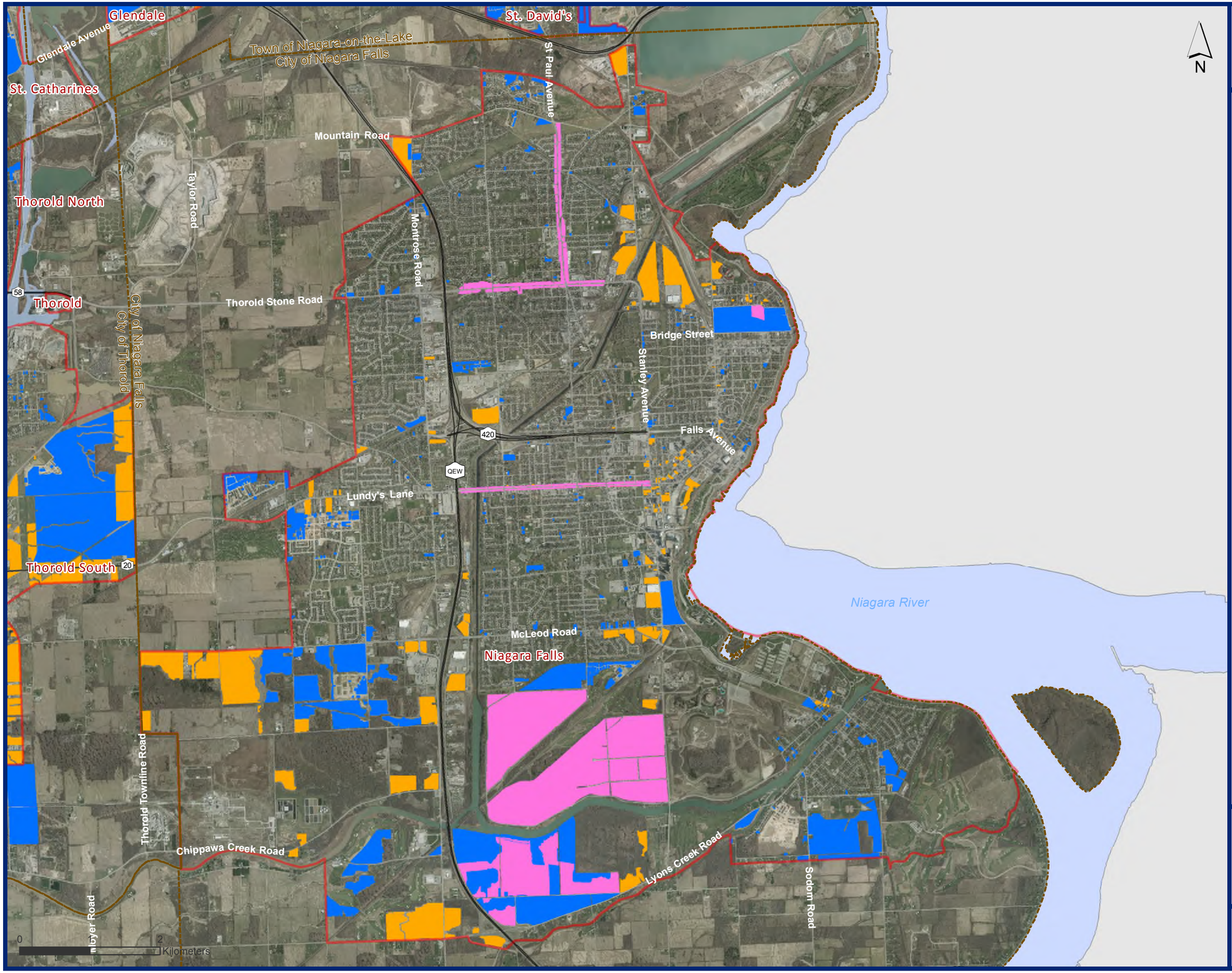
Figure 2.15

Growth Shapes

Town of Niagara-on-the-Lake

BluePlan

April 2017
715023-P-1-Growth Shapes - NOTL
NAD 1983 UTM Zone 17N



Niagara Region

2016 MASTER SERVICING PLAN

Growth Areas

- Residential Growth Areas
- Employment Growth Areas
- Residential and Employment Growth Areas

Other Features

- Urban Area
- Municipal Boundary

Figure 2.16

Growth Shapes

City of Niagara Falls

BluePlan

April 2017
715023-P-1-Growth Shapes - Niagara Falls
NAD 1983 UTM Zone 17N

Niagara Region

2016 MASTER SERVICING PLAN

Growth Areas

- Residential Growth Areas
- Employment Growth Areas
- Residential and Employment Growth Areas

Other Features

- Urban Area
- Municipal Boundary

Figure 2.17

Growth Shapes

City of Thorold

BluePlan

April 2017
715023-P-1-Growth Shapes - Thorold
NAD 1983 UTM Zone 17N

Niagara Region

2016 MASTER SERVICING PLAN

N

Highway 20 West

Highway 20 East

Highway 20

Fonthill

Port Robinson

Town of Pelham

City of Thorold

Fenwick

Rice Road

Town of Pelham

City of Welland

Woodlawn Road

Welland

South Pelham Road

0 1 2 Kilometers

Growth Areas

- Residential Growth Areas
- Employment Growth Areas
- Residential and Employment Growth Areas

Other Features

- Urban Area
- Municipal Boundary

Figure 2.18

Growth Shapes

Town of Pelham

BluePlan

April 2017
715023-P-1-Growth Shapes - Pelham
NAD 1983 UTM Zone 17N

Niagara Region

2016 MASTER SERVICING PLAN

N

Growth Areas

- Residential Growth Areas
- Employment Growth Areas
- Residential and Employment Growth Areas

Other Features

- Urban Area
- Municipal Boundary

Figure 2.19

Growth Shapes

City of Welland

BluePlan

April 2017
715023-P-1-Growth Shapes - Welland
NAD 1983 UTM Zone 17N

Niagara Region

2016 MASTER SERVICING PLAN

Growth Areas

- Residential Growth Areas
- Employment Growth Areas
- Residential and Employment Growth Areas

Other Features

- Urban Area
- Municipal Boundary

Forks Road
58
Welland
City of Welland
City of Port Colborne
140
Miller Road
Township of Wainfleet
City of Port Colborne
Port Colborne
Main Street West
Killaly Street West
3
Lake Erie
N
0 1 2 Kilometers

Figure 2.20

Growth Shapes

City of Port Colborne

BluePlan

April 2017
715023-P-1-Growth Shapes - Port Colborne
NAD 1983 UTM Zone 17N

Niagara Region

2016 MASTER SERVICING PLAN

Growth Areas

- Residential Growth Areas
- Employment Growth Areas
- Residential and Employment Growth Areas

Other Features

- Urban Area
- Municipal Boundary

Figure 2.21

Growth Shapes

Town of Fort Erie

BluePlan

April 2017
715023-P-1-Growth Shapes - Fort Erie
NAD 1983 UTM Zone 17N

APPENDIX 2C:
POLICY AND DESIGN CRITERIA PAPER

Niagara Region

Water and Wastewater Master Servicing Plan Update Principles and Policy

GMBP File: 715023

July 2016

GUELPH | OWEN SOUND | LISTOWEL | KITCHENER | EXETER | HAMILTON | GTA
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APPENDICES

NIAGARA REGION

WATER AND WASTEWATER MASTER SERVICING PLAN UPDATE

PRINCIPLES AND POLICY

GMBP FILE: 715023

1. INTRODUCTION

GM BluePlan Engineering Limited has been retained by Niagara Region to complete a Master Servicing Plan Update for water and wastewater services across the Region. The objective of the Study is to develop a comprehensive plan that will incorporate all facets of the management, expansion and funding of the water and wastewater systems for the urban service areas of the Region through to the year 2041.

Development of water and wastewater principles and policies are integral to provide guidelines and direction to the Master Servicing Plan Update process, as well as to the identification and evaluation of servicing strategies.

1.1 Study Background and Objectives

The provision of safe and sustainable water and wastewater services is an important issue to the public and to the Municipalities planning, operating and maintaining the systems. Execution of reasonable policies is essential to ensure proper planning and design principles are followed in developing the servicing strategies, implementing the system capital program, as well as in the operation and maintenance practices.

Development of the water and wastewater policies has been based on existing documentation and related sources, including:

- The Niagara Region Official Plan
- Federal and Provincial policies and legislation
- Design and development standards
- Municipal By-laws, and
- Existing municipal policies and procedures

The objectives of the Principles and Policy Document include, but are not limited to the following:

- Providing direction for planning and identifying water and wastewater servicing issues that may impact growth options
- Providing direction for normal operation and maintenance of the water and wastewater systems (the policies do not replace normal operation and maintenance procedures or best practices)

- Providing direction for development and evaluation of servicing strategies for the Water and Wastewater Master Servicing Plan Update
- Ensuring appropriate design and costing criteria are utilized for developing and evaluating servicing strategies for the Water and Wastewater Master Plan Update
- Setting policies that are reasonably implemented
- Setting policies that are robust and sustainable

Although best management practices and criteria are updated over time, the context, intent and validity of the policies should remain intact.

Policy is the overall guiding principle. Criteria is the tactical implementation of policy.

1.2 Approach

The approach in establishing and implementing the water and wastewater policies is as follows:

1. Establish overall guiding vision for the Master Servicing Plan Update as the foundation for related servicing policies.
2. Develop general policies as well as separate water and wastewater policies.
3. Address issues related to the full cycle of water and wastewater services from the water source to the customer, from the customer to the treated wastewater discharge and final discharge to recipient water body.
4. Highlight key criteria and best practices related to each policy.
5. Review and discuss principles and policy with Region departments. Enhance the consultation of policy through a Niagara Region and Local Municipality workshop environment.
6. Consolidate the general, water and wastewater policies in the Policy Document.
7. Utilize the policy, and any developed criteria and/or best management practices, outlined in the Policy Document to guide the development and evaluation of servicing strategies for the Master Servicing Plan Update.
8. Implement and utilize the policies, guidelines, criteria and best practices within the day-to-day decision making for planning and operation of the water and wastewater systems.

2. MSP VISION STATEMENT

The 2016 Water and Wastewater Master Servicing Plan Update has established an overall Vision Statement to capture the foundational goals and objectives of the study.

Providing for Today, Vision for Tomorrow

To establish a cost effective infrastructure program that; meets the service needs of existing users, meets regulatory and legislative requirements; supports growth; and addresses the priority areas of climate change, energy management, infrastructure optimization, system security, and resiliency.

This vision statement encapsulates the Region's priorities for the current Master Servicing Plan Update and also enhances key issues of climate change and optimization.

The vision statement also provides guidance in developing the appropriate level of service for water and wastewater services.

The development of specific principles and policies under this document has evolved from the vision statement and similarly focused on the Region's priorities and key issues.

3. SERVICING PRINCIPLES AND POLICIES

Building on the Vision Statement for the Master Servicing Plan Update, specific servicing principles and policies have been developed to guide and provide direction for the development and evaluation of servicing strategies.

In general, Niagara Region is looking to build and maintain efficient, effective, well managed water and wastewater systems that provide high level of service to the end users.

In order to capture these goals, the servicing principles and policies have been structured as outline below. Further details for each policy are provided in the appendices.

Appendix A: General Servicing Policies

G.01	Municipal Servicing
G.02	Environmental Protection
G.03	Planning Horizon
G.04	Reserve Capacity
G.05	System Reliability and Security
G.06	Location of Municipal Services and Facilities
G.07	Climate Change
G.08	Energy Efficiency
G.09	Integrated Infrastructure Program
G.10	Level of Service
G.11	Region and Local Municipality Consistency
G.12	Sustainability

Appendix B: Water Servicing Policies

W.01	Health & Safety
W.02	Raw Water Sources
W.03	Treatment & Distribution Water Quality
W.04	Water Demand Projections
W.05	Distribution Requirements
W.06	Fire Flow Requirements
W.07	Storage Requirements
W.08	Operational Flexibility
W.09	Water Efficiency and Consumption Trends
W.10	Water Supply and Distribution Security

Appendix C: Wastewater Servicing Policies

WW.01	Health & Safety
WW.02	Receiving Water Bodies
WW.03	Wastewater Treatment and Collection Requirements
WW.04	Wastewater Flow Projections
WW.05	Sewer Use Criteria
WW.06	Separated Wastewater and Stormwater Systems
WW.07	Wastewater Collection and Pumping Systems
WW.08	Wet Weather Criteria
WW.09	Wet Weather Strategies
WW.10	Capacity Allocation
WW.11	Wet Weather Guidelines

The above noted policies address a wide range of servicing needs.

Under the 2016 Master Servicing Plan Update, the policies were developed and enhanced to address the vision statement priorities of climate change, energy management, infrastructure optimization, system security and resiliency. Of particular note, the area of wet weather management was also enhanced in the policies.

In addition to the above noted policies, this document provides summary detail on the water and wastewater design criteria used under the Master Servicing Plan. The design criteria outlines the methodology and values used to estimate growth related flows as well as the decision making rationale related to infrastructure capacity and the trigger for upgrades. This information is provided in:

Appendix D: Design Criteria and Standards

4. POLICY IMPLEMENTATION

This Policy Document has been structured such that additional policies may be added as required. The policy statements themselves have been worded such that they should remain relevant over time, though these can also be edited as required.

It is anticipated that through technological innovations, regulatory changes, and updated servicing priorities, some of the criteria or best practices will require updating in the future. The policy structure should allow this to be done without necessarily having to edit the actual policy statement.

5. SUMMARY

The Policy Document has been developed as part of the Niagara Region 2016 Water and Wastewater Master Servicing Plan Update.

The general, water and wastewater principles and policies developed in this document will provide guidance and direction to the Master Servicing Plan process.

The policies and principles should also form part of the Region's day to day planning, design, construction, operations and maintenance practices for the water and wastewater systems.

APPENDIX A:
GENERAL SERVICING POLICIES

Policy No.	Policy Area	Policy Statement	Servicing Implications
G.01	Municipal Servicing	*"Niagara Region shall provide adequate municipal servicing for water and wastewater in accordance with the population and employment projections in the time horizon of the Official Plan."*	• Planning and design of servicing strategies will optimize use of existing infrastructure where possible • Infrastructure will be planned and designed in accordance with growth projections in the Region's Official Plan • Timing of growth will be reviewed with consideration to a reasonable implementation schedule for infrastructure required to meet the projected growth • Municipal servicing will be implemented using typical standards (MOECC Guidelines, Region Design Criteria and Standards)
G.02	Environmental Protection	*"Niagara Region shall consider, protect and endeavour to minimize impact to the natural, built and cultural environment and heritage of the community"*	• Servicing studies shall consider the Region and Local Municipality Official Plan Environmental and Heritage Policies • Services will be planned through the appropriate Environmental Assessment process to ensure full regard for the natural and cultural heritage
G.03	Planning Horizon	*"Niagara Region shall ensure that the design of water and wastewater infrastructure recognizes the potential for growth beyond the time horizon of the Official Plan."*	• Recognize that the service life of infrastructure may be 60 years or more • Consider, where appropriate, potential for growth beyond the time horizon of the Official Plan for the planning and sizing of infrastructure
G.04	Reserve Capacity	*"Niagara Region will endeavor to maintain sufficient reserve capacity in its water and wastewater infrastructure and facilities to provide operational flexibility and meet potential changes in servicing conditions."*	• Recognize there is a time frame required to implement expansion of the infrastructure and facilities and initiate planning, the Environmental Assessment process, design and construction for expansion with consideration of the in-service date • Day to day operation and maintenance of infrastructure and facilities requires flexibility for operating conditions, fluctuating flows, equipment shutdowns, maintenance, emergency operations and other unforeseen conditions • Inability to maintain adequate operating capacity will trigger future expansions or upgrades of the infrastructure • Additional capacity for infrastructure and facilities will consider full rated capacity and appropriate reserve capacity defined through design criteria

Policy No.	Policy Area	Policy Statement	Servicing Implications
G.05	System Reliability and Security	*"Niagara Region shall endeavor to provide reliability, redundancy and security in its water and wastewater systems with attention to high risk and critical areas."*	• Recognize that all systems are susceptible to some level of failure or breakdown, or need to be taken out of service for regular maintenance. It is reasonable to provide a level of reliability to ensure an acceptable level of service is maintained • System reliability will be further defined through design criteria
G.06	Location of Municipal Services and Facilities	*"Niagara Region shall locate all of its services and facilities on public property or on municipally-owned easements."*	• The Region will ensure that any new and existing infrastructure be located within road right-of-ways, or on Region-owned property (including designated lots and easements) • Adequate property size will be maintained to facilitate all day-to-day activities and emergency response • Adequate property will be acquired to meet future infrastructure requirements
G.07	Climate Change	*"Niagara Region shall be aware of and consider the potential impact of climate change on planning and sizing of infrastructure."*	• Water and wastewater infrastructure and facilities will be designed with consideration to the potential impacts of climate change
G.08	Energy Efficiency	*"Niagara Region shall design water and wastewater facilities with consideration to energy use."*	• Facilities will be planned and designed with consideration to minimize overall lifecycle costs, including capital and operating/maintenance costs • Attention to energy use will provide significant opportunity to optimize lifecycle costs • Alternative infrastructure strategies should be considered to minimize energy (ie: water storage vs pumping)
G.09	Integrated Infrastructure Program	*"Niagara Region shall coordinate and integrate the MSP program with Region planning, programs and policies where appropriate."*	• Coordination and integration will ensure servicing policies and strategies are aligned • Key initiatives for integration include the Municipal Comprehensive Review and Transportation Master Plan

Policy No.	Policy Area	Policy Statement	Servicing Implications
G.10	Level of Service	*"Niagara Region shall outline the Level of Service Objectives through the Master Servicing Plan and endeavor to meet/exceed the minimum requirements as outlined in the objectives."*	• The Region will review and evaluate strategies developed through the Master Servicing Plan based on their ability to meet requirements outlined in the Level of Service Objectives
G.11	Region and Local Municipality Consistency	*"Niagara Region and Local Municipalities will endeavour to maintain consistent criteria, standards and policy with respect to approach and level of service for planning and design the water and wastewater systems to meet growth"*	• Niagara Region has responsibility to plan, build, operate and maintain the trunk water and wastewater systems including major facilities while the Local Municipalities plan, build, operate and maintain the local distribution and collection systems • It is critical that consistent criteria be utilized when analyzing both trunk and local system capacity • The trunk and local systems are integrated and should be planned accordingly
G.12	Sustainability	*"Niagara Region will endeavour to undertake sustainable planning, operation and maintenance of the Water and Wastewater Systems."*	• The Region will strive to plan, operate and maintain Water and Wastewater Systems that are Environmentally, Financially, Operationally, Legislatively, and Socially Sustainable • Financial Sustainability shall consider and utilize appropriate funding mechanisms including but not limited to Development Charges, local cost to development, rates and reserves to provide a long term balanced and equitable plan to fund the delivery of servicing

APPENDIX B:
WATER SERVICING POLICIES

Policy No.	Policy Area	Policy Statement	Servicing Implications
W.01	Health & Safety	*"Niagara Region will promote health, productivity and safety of the community through design, construction and maintenance of the Region's potable water infrastructure"*	• The Region will prepare a comprehensive strategy to manage existing and future water servicing needs • Ensure that planning and implementation of the potable water systems are consistent with legislative policies and guidelines • Municipal servicing will be implemented under typical standards (MOE Guidelines, Region criteria and standards)
W.02	Raw Water Sources	*"Niagara Region shall endeavor to enhance, protect and maintain quality, quantity and safety of its raw water sources"*	• Monitoring of water sources is required to ensure safe yield limit of the water taking is occurring • The Region shall consider policies related to the International Joint Commission on the Great Lakes
W.03	Treatment & Distribution Water Quality	*"Niagara Region shall meet or exceed legislated water quality criteria"*	• Water quality will meet, at a minimum, all legislated criteria • Implement industry best practices to ensure water quality is maintained • Review the economics, reliability and water quality impacts of implementing new technology
W.04	Water Demand Projections	*"Niagara Region shall utilize a water demand projection methodology that recognizes recent water supply data and current consumption trends"*	• Forward-looking water demand projections in the Master Servicing Plan must appropriately identify future water needs to ensure the best estimate for infrastructure capacity and timing • The Region will utilize a starting point methodology based on recent water supply conditions • The Region will establish current water design criteria and standards for new growth

Policy No.	Policy Area	Policy Statement	Servicing Implications
W.05	Distribution Requirements	*"Niagara Region shall provide potable water at adequate pressure and flow to its customers"*	• Provide pressures which meet current design criteria and standards • Review and optimize Pressure Zone Boundaries throughout the Region • Have an adequate combination of storage capacity, pumping capacity, and stand-by power to meet the desired level of service under emergency conditions
W.06	Fire Flow Requirements	*"Niagara Region shall consider the Ministry of the Environment Guidelines and the Fire Underwriters Guidelines for establishing the acceptable level of fire flow."*	• Provide pressures and flows which meet current design criteria and standards
W.07	Storage Requirements	*"Niagara Region shall adopt the Ministry of the Environment Guidelines as the minimum acceptable level of water storage."*	• Provide adequate level of storage which meets current design criteria and standards • Consider level of storage required under floating versus pumped conditions to meet equalization, fire and emergency storage as well as to meet operational flexibility requirements
W.08	Operational Flexibility	*"Niagara Region shall consider levels of storage beyond MOE Guidelines where appropriate in order to provide operational flexibility, energy management and system security"*	• Water storage can provide opportunities for optimization of pumping strategies • Water storage can provide additional level of service and security under emergency conditions, particularly for any areas across the Region with limited redundancy • Consideration should be given to optimizing lifecycle costs for the water system as storage can minimize pumping energy costs

Policy No.	Policy Area	Policy Statement	Servicing Implications
W.09	Water Efficiency and Consumption Trends	*"Niagara Region shall be aware of the impacts water efficiency and conservation has on the water network."*	• Continue to assess water demand conditions and determine reasonableness of trends (potential lower water use and consumption) • Utilize water efficiency studies where available • Apply where appropriate demand trends (efficiency) into future design criteria and growth forecasts • Apply awareness to how it will impact strategies and scheduling of future infrastructure
W.10	Water Supply and Distribution Security	*"Niagara Region shall plan, design, construct, operate and maintain the water system to balance level of service and security of supply to the customers"*	• The Region shall continue to implement standards, criteria, and standard operating procedures for the water system • There is an awareness and integration between the Regional water system, local distribution system and water services on private property • The Region will maintain appropriate standards for the Regional water system to protect the public and private infrastructure

APPENDIX C:
WASTEWATER SERVICING POLICIES

Policy No.	Policy Area	Policy Statement	Servicing Implications
WW.01	Health & Safety	*"Niagara Region will promote health, productivity and safety of the community through design, construction and maintenance of the Region's wastewater infrastructure"*	• The Region will prepare a comprehensive strategy to manage existing and future water servicing needs • Ensure that planning and implementation of the wastewater systems are consistent with legislative policies and guidelines • Municipal servicing will be implemented under typical standards (MOECC Guidelines, Region criteria and standards)
WW.02	Receiving Water Bodies	*"Niagara Region shall endeavor to enhance, protect and maintain quality, quantity and safety of its receiving water bodies"*	• Wastewater effluent discharges will meet, at a minimum, all legislated criteria • The Region shall consider policies related to the International Joint Commission on the Great Lakes
WW.03	Wastewater Treatment and Collection Requirements	*"Niagara Region shall meet as a minimum the requirements of the Environmental Compliance Approvals set out by governing bodies and the appropriate legislated treatment and collection criteria."*	• Wastewater quality (air and effluent) will meet as a minimum all legislated criteria. • Manage wet weather conditions (inflow / infiltration) through asset management programs to minimize extraneous flows and maximize efficient use of available wastewater infrastructure • Implement industry best practices to ensure effluent quality is maintained • Review the economics, reliability and effluent quality impacts of implementing new technology
WW.04	Wastewater Flow Projections	*"Niagara Region shall utilize a wastewater flow projection methodology that recognizes recent wastewater flow and treatment data and current consumption trends"*	• Forward-looking wastewater flow projections in the Master Servicing Plan must appropriately identify future wastewater needs to ensure the best estimate for infrastructure capacity and timing • The Region will utilize a starting point methodology based on recent wastewater flow conditions • The Region will establish current wastewater design criteria and standards for new growth

Policy No.	Policy Area	Policy Statement	Servicing Implications
WW.05	Sewer Use Criteria	*"Niagara Region shall maintain a sewer use program that sets the appropriate limits and procedures to control discharge"*	• Review and maintain a sewer use by-law, which is supported by Council • Maintain a monitoring program to ensure the discharges meet the limits set out in the by-law • The Region shall consider over-strength discharge and surcharge agreements to manage plant capacities
WW.06	Separated Wastewater and Stormwater Systems	*"Niagara Region shall plan and maintain separate wastewater and stormwater systems"*	• The Region will continue to build, maintain, and operate separated wastewater and stormwater systems • The Region will endeavor as part of I &I reduction measures to identify and remediate existing sanitary sewer cross connections and implement strategy to prevent future cross connections and stormwater impact on the wastewater system
WW.07	Wastewater Collection and Pumping Systems	*"Niagara Region shall provide adequate reliability and security in wastewater pumping systems"*	• Force main twinning should be examined to provide adequate velocities during different phases of development and also to provide security in operation. • Adequate retention capacity should be provided in the sewer system • The Region shall consider adequate level of facility storage, system storage and standby power to manage emergency conditions
WW.08	Wet Weather Flow Criteria	*"Niagara Region shall utilize current wet weather flow criteria to determine peak wet weather flows and size wastewater infrastructure"*	• Existing systems across the Region have a range of existing performance and levels of flow under wet weather flow conditions • Notwithstanding existing conditions, Niagara Region shall consider planning for new growth consistently across all systems • The level of service under wet weather conditions will be established through the Master Servicing Plan design criteria • Consideration to environmental, social and financial factors as well as the feasibility for implementation should be given when determining the wet weather criteria

Policy No.	Policy Area	Policy Statement	Servicing Implications
WW.09	Wet Weather Strategies	*"Niagara Region shall review a combination of servicing strategies including infrastructure and non-infrastructure (i.e. i/i reduction) solutions to meet wet weather level of service and provide sufficient wastewater capacity."*	• Providing wastewater system capacity at both the Region level and local collection system level requires a wide review of potential servicing strategies • The Region Master Servicing Plan will develop and evaluate a comprehensive list of alternatives against multiple-bottom-line criteria including lifecycle costs • The most cost-effective and beneficial strategy may include not providing additional infrastructure but creating additional capacity through flow reduction methods such as inflow/infiltration control
WW.10	Capacity Allocation	*"Niagara Region shall review opportunities to allocate capacity gained through implementation of wet weather strategies and system optimization for growth and non-growth benefit"*	• Provision of additional capacity within the wastewater system will need to consider the desired benefit • Additional capacity may be required to meet regulatory requirements or to improve level of service in the system
WW.11	Wet Weather Guidelines	*"Niagara Region shall approach Guidelines F-5-5 and F-5-1 such that new development will not put the Region out of compliance with the regulations and the Region shall consider opportunities to not increase wet weather overflows beyond current conditions"*	• The Region will continue to manage system performance under wet weather conditions • As required under F-5-5, baseline performance of the system has been established • New growth should no negatively impact the system and should not put the Region out of compliance with existing regulations • As additional flows from growth are added to the system, the Region should look for opportunities to not make overflow conditions worse than the current baseline conditions

APPENDIX D:
DESIGN CRITERIA AND STANDARDS

Water Design Criteria

1. Water Demand Projection Methodology

- Utilize starting point methodology
- Starting point based on rolling average consumption from last 5 years of data
- Growth demands applied to starting point using design criteria

2. Water System Criteria

- Generally operate water system between 40 – 100 psi
- Sizing water supply, transmission and storage facilities for maximum day demand
- Sizing water distribution system for peak hour flows and maximum day plus fire flow demands
- Plant and facility planning process triggered at 80% capacity
- Plant and facility expansion complete before 90% capacity reached

3. Water Consumption Criteria for Growth

- Residential criteria 300 lpcd
- Employment criteria 300 lped
- Maximum day factor based on rolling average from last 5 years of data
- Peak hour residential factor of 4
- Peak hour employment factor of 2

Wastewater Design Criteria

1. Wastewater Flow Projection Methodology

- Utilize starting point methodology
- Starting point based on rolling average flows from last 5 years of data
- Growth flows applied to starting point using design criteria

2. Wastewater System Criteria

- Sizing treatment facilities for average day flows
- Sizing of trunk sewer, pumping and collection system for peak wet weather flows
- Firm capacity based on largest pump out of service
- Plant and facility planning process triggered at 80% capacity
- Plant and facility expansion complete before 90% capacity reached
- System triggers as follows:
    - Review if sewer flows are greater than 50% of pipe full (by depth) under peak dry weather flow
    - Review if sewer flows are greater than 90% of pipe full (by depth) under peak wet weather flow
    - Review if pumping station flows based on 2 times peak dry weather flows are greater than firm capacity
    - Review if peak wet weather flows are greater than sewer capacity and pumping station firm capacity
    - Review if sewer system hydraulic grade line is within 1.8m depth from surface under peak wet weather flow
    - Plan the system based on a 2 year design storm
    - Under the 2 year design storm, allow for a maximum extraneous flow contribution from local catchment areas

3. Wastewater Flow Criteria for Growth

- Residential criteria 275 lpcd
- Employment criteria 275 lped
- Peaking factor based on Harmon formula with values between 2.0 and 4.0 with consideration to the catchment area performance
- Utilize extraneous flow rates of 0.286 L/ha/s as the wet weather level of service for triggering and sizing Regional wastewater infrastructure