City of Port Colborne
Water and Stormwater Master Servicing Plan
Volume 2 – Plan and Policy

November 2026



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Water and Stormwater Master Servicing Plan
Volume 2 – Plan and Policy
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1 Introduction

1.1 Background

The City of Port Colborne (City) is located in southern Ontario along the north shore of Lake Erie and is bisected by the Welland Canal. It is part of the Niagara Region (Region) and is adjacent to the Town of Wainfleet, Town of Fort Erie, and City of Welland.

Water servicing within the City operates under a two-tier system. The Region is responsible for water treatment, storage facilities, pumping stations, and major trunk infrastructure, while the City owns and operates the local water distribution system, including trunk and distribution watermains. The system is supplied by the Port Colborne Water Treatment Plant (WTP), which is a conventional surface water treatment facility that draws raw water from Lake Erie via the Welland Canal. Treated water is distributed through a network of watermains and storage facilities within a single pressure zone.

The City owns, maintains and operates the majority of the stormwater collection and management infrastructure, including catch basins, storm sewers, ditches, culverts, stormwater management facilities, and other related structures. Stormwater runoff is conveyed through a combination of minor and major systems and ultimately discharges to local receiving watercourses and Lake Erie.

Reliable and accessible public infrastructure is critical to supporting existing and future communities. Coordinated infrastructure planning, land use planning, and investment are required to deliver efficient, safe, and cost-effective water and stormwater services.

The Master Servicing Plan (MSP) provides a comprehensive review of existing systems and identifies growth-related servicing strategies, with consideration for long-term sustainability and optimization of existing infrastructure.

1.2 Master Servicing Plan

The City is undertaking a Water and Stormwater Master Servicing Plan to develop a comprehensive strategy and vision for the City's short- and long-term water and stormwater infrastructure needs. The MSP reviews existing system conditions and performance, considers the impacts of growth, and identifies strategies to meet current and future servicing requirements.

The Study establishes a long-term management strategy to guide water and stormwater infrastructure planning through 2051 and beyond and includes an actionable Capital Program and Implementation Plan to support the strategy. The MSP will provide the framework for system capacity allocations, infrastructure upgrades, and financial planning, supporting the City's continued growth and sustainable management of its water and stormwater systems.

1.3 Master Servicing Plan Objectives

The MSP is designed to deliver a strategic, integrated framework for the management, enhancement, and expansion of the City's water distribution and stormwater management systems through 2051 and beyond. This MSP addresses the needs of both systems to ensure reliable service delivery, environmental protection, and support for the City's growth aspirations. The key objectives of the MSP are as follows:

- **Provide Safe and Reliable Services**: Ensure a consistent supply of potable water that complies with the Safe Drinking Water Act, 2002, and effective stormwater management to safeguard public health, property, and infrastructure under current and future conditions.
- **Accommodate Growth**: Evaluate and plan infrastructure capacity to support projected population increases, seasonal tourism demands, and potential industrial development, particularly along the Welland Canal, in accordance with the City's Official Plan.
- **Enhance System Resilience**: Develop adaptive strategies to mitigate the impacts of climate change, including increased storm intensity and fluctuations in Lake Erie water levels, ensuring the longevity and reliability of water and stormwater systems.
- **Meet Regulatory Standards**: Adhere to provincial legislation, Ministry of the Environment, Conservation and Parks (MECP) guidelines, Niagara Region policies, and Niagara Peninsula Conservation Authority (NPCA) requirements, while fulfilling the Municipal Class Environmental Assessment (EA) process.
- **Optimize Infrastructure Performance**: Identify opportunities to reduce non-revenue water losses, improve stormwater conveyance efficiency, and leverage existing assets to deliver cost-effective, sustainable solutions.
- **Protect Environmental Quality**: Minimize impacts on Lake Erie and local watercourses by enhancing stormwater quality, controlling runoff volumes, and incorporating low-impact development (LID) practices where feasible.
- **Foster Collaboration**: Engage residents, businesses, Niagara Region, NPCA, and other stakeholders to align the MSP with community needs, regional priorities, and environmental goals.

These objectives underpin a holistic servicing strategy that ensures Port Colborne's water and stormwater systems are robust, sustainable, and capable of supporting the community's long-term prosperity.

1.4 Master Servicing Plan Documentation Layout

The MSP Report, including all supporting volumes, is the documentation placed on public record for the prescribed minimum 30-day 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 MSP Report is organized into 5 volumes as described below.

1.4.1 Volume 1 - Executive Summary

Volume 1 provides a brief overview of the MSP. It summarizes the information contained in Volume 2, 3, 4 and 5, including the problem statement, purpose of the study, significant planning, environmental and technical considerations, and description of the preferred water and stormwater servicing strategies including depiction of the projects and documentation of the capital programs.

1.4.2 Volume 2 – Plan & Policy

Volume 2 details the master planning process including the Master Plan Class EA process, related studies, legislative and policy planning context, water and stormwater servicing performance objectives, population, and employment growth forecasts, existing environmental and servicing conditions, and future considerations.

1.4.3 Volume 3 – Water Master Plan

Volume 3 consists of the principal document summarizing the study objectives, approach, methodologies, technical analyses, evaluation, and selection of the preferred water servicing strategy. This volume contains baseline water system data and performance information. This volume also documents the water servicing strategy development with detailed information on the projects and capital program associated with the preferred water servicing strategy and implementation plan.

1.4.4 Volume 4 – Stormwater Master Plan

Volume 4 consists of the principal document summarizing the study objectives, approach, methodologies, technical analyses, evaluation, and selection of the preferred stormwater servicing strategy. This volume contains baseline stormwater system data and performance information. This volume also documents the stormwater servicing strategy development with detailed information on the projects and capital program associated with the preferred stormwater servicing strategy and implementation plan.

1.4.5 Volume 5 – Indigenous, Public, and Agency Consultation

Volume 5 contains all relevant documentation of the public consultation process including notifications, comments and responses, and distribution information. Presentation material from the Public Information Centre (PIC) 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.

2 Master Planning Process

The Municipal Class EA process clearly defines approaches for completing Master Plans within the Class EA context. This MSP is based on Approach 1 of the Class EA process, as outlined in the Municipal Class Environmental Assessment (MCEA) (February 2024), which involves preparing a master plan document at the conclusion of Phases 1 and 2. This MSP provides an overall framework and supporting information for infrastructure planning. This section describes the environmental assessment process and the specific requirements for preparing master plans, reflecting updates from the MCEA approved in February 2024, including alignment with the Environmental Assessment Act and its regulations.

2.1 Environmental Assessment Act

Ontario's Environmental Assessment Act (EAA) was passed in 1975 and came into force in 1976. The EAA requires proponents to examine and document the potential environmental effects of major projects or activities, as well as 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 17.6(2) of the EAA, an EA document must consist of:

- A description of the purpose of the project,
- A description of and a statement of the rationale for:
    - The project
    - The alternative methods of carrying out the project, and

    - Alternatives to the project.
- 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
    - The effects that will be caused or that might reasonably be expected to be caused to the environment, and
    - 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 project, the alternative methods of carrying out the project and the alternatives to the project.
- An evaluation of the advantages and disadvantages to the environment of the project, the alternative methods of carrying out the Part II.3 project and the alternatives to the project; and
- A description of any consultation about the project by the proponent and the results of the consultation.

2.2 Principles of Environmental Planning

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

- Consultation with affected parties → Consultation with the public and government review agencies is an integral part of the planning process. Consultation allows the proponent to identify and address concerns cooperatively before final decisions are made. Consultation should begin as early as possible in the planning process.
- Consideration of a reasonable range of alternatives → Alternatives include functionally different solutions, "alternatives to" the proposed undertaking, and "alternative methods" of implementing the preferred solution. The "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.
- 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 a way that allows it to be repeated with similar results.

2.3 Class Environmental Assessments

Class Environmental Assessments (Class EAs) were approved in 1987 for municipal projects with predictable, mitigable impacts. The Municipal Class EA, prepared by the Municipal Engineers Association (MEA), was updated in 2000, 2007, 2011, 2015, 2023, and most recently in February 2024. This process applies to recurring, similar, and limited-scale projects with predictable impacts that are responsive to mitigation, covering water, wastewater, stormwater management, and road projects. It includes five phases:

- **Phase 1:** Identify the problem or opportunity.
- **Phase 2:** Identify and evaluate alternative solutions, selecting a preferred solution with public and stakeholder input.
- **Phase 3:** Examine alternative methods for the preferred solution, taking into account existing conditions, environmental impacts, and stakeholder input.
- **Phase 4:** Document the process in a Project File Report (Schedule B) or Environmental Study Report (Schedule C) for public review.
- **Phase 5:** Implement and monitor the project.

Projects are classified as Exempt, Eligible for Screening to Exempt, Schedule B, or Schedule C based on impact severity, as shown in **Figure 2-1**. Exempt projects (formerly Schedule A/A+) are minor or emergency activities approved without further assessment. Eligible for Screening to Exempt projects may be exempted via screening of archaeological potential. Schedule B projects require Phases 1 and 2, with consultation and a Project File Report. Schedule C projects complete all five phases, including an Environmental Study Report (ESR). Consultation with the public, agencies, and Indigenous Communities is mandatory across applicable phases.

For both Schedule B and C projects, the planning process and results are documented in a Project Report (i.e., Project File or an ESR) which is filed for a 30-day public review. If there are still outstanding issues after the public review period, requests may be made to the Minister of the Environment Conservation and Parks (MECP) for a Section 16 Order. A Section 16 Order is also known as bumping-up the project to a Schedule C Class EA or an Individual EA. Provided

that no significant impacts are identified and no requests for a Section 16 Order are received, a Schedule B or C project is approved, and work may proceed directly to implementation.

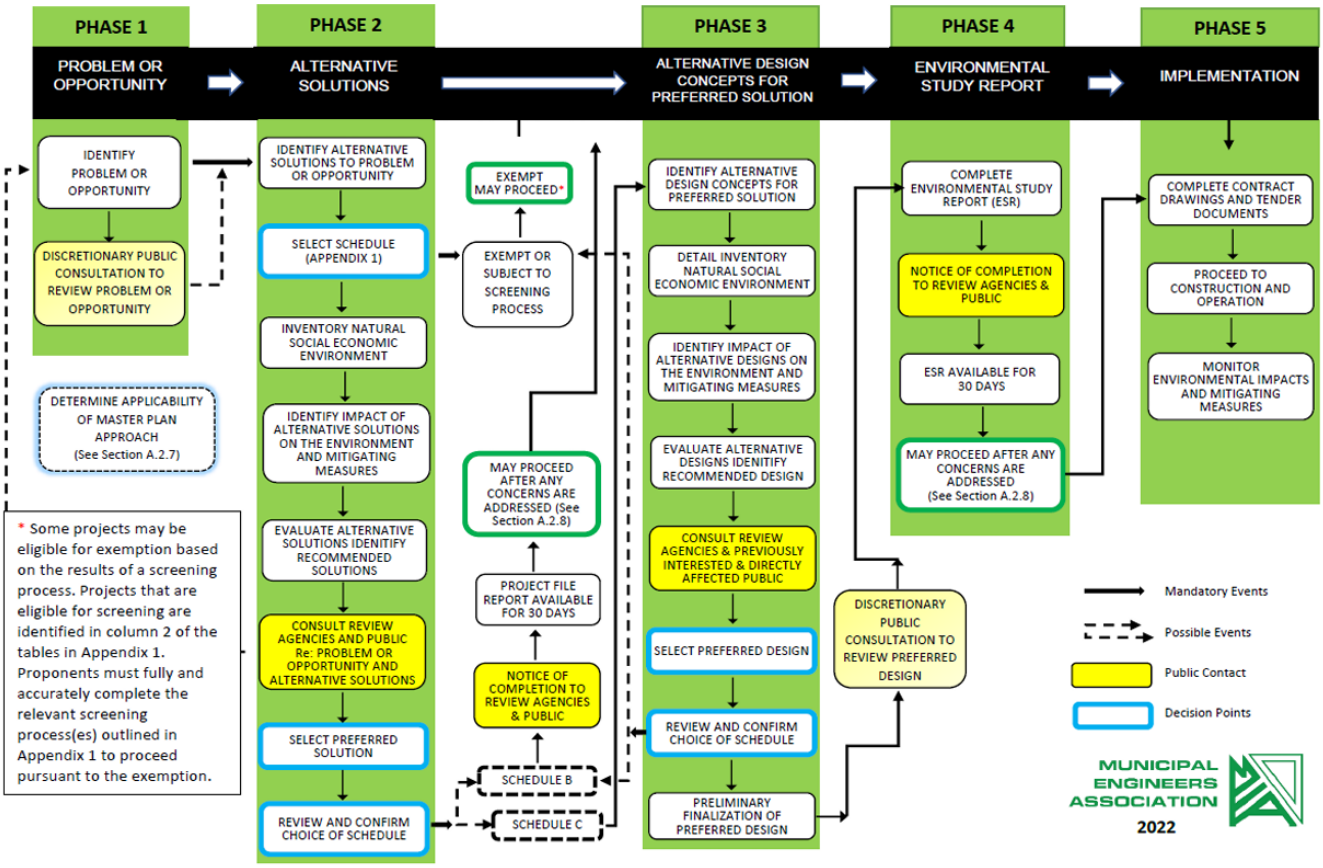

Figure 2-1: MCEA Project Classification and Exemption Screening (Municipal Engineers Association, 2022)

2.4 Master Planning Process

Municipalities value comprehensive, long-range planning to address infrastructure needs. The MCEA (February 2024) defines master plans as "*long-range plans that integrate infrastructure requirements for existing and future land use with environmental assessment planning principles, examining systems or groups of related projects to outline a framework for subsequent projects.*"

Master plans are broad, system-focused, and geographically distributed, with implementation phased over time.

This study follows Approach 1, completing Phases 1 and 2, integrating the five key EA principles: consultation, alternative consideration, environmental impact assessment, alternative evaluation, and traceable documentation.

The MSP allows Exempt projects to proceed immediately, supports Schedule B projects with additional evaluation and agency commitments, and identifies Schedule C projects for separate

studies to complete Phases 3 and 4, including an ESR. A Section 16 Order may only be requested for an individual project(s) (i.e. Schedule B or C projects) identified in the Master Plan.

2.5 Indigenous Community and Public Consultation

The public consultation process is essential for informing and obtaining input from potentially interested and affected parties during the study process. These include the local community, the public, government agencies, special interest groups and other stakeholders. Indigenous communities must also be consulted with regarding Treaty and Aboriginal rights through early, meaningful engagement. This process fosters reconciliation, protects cultural heritage and traditional knowledge, and addresses potential adverse impacts to the environment.

The 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 the public and other stakeholders and to Indigenous Communities at key stages of the study process;
- Solicit community, regulatory, Indigenous Community, and local area municipality (LAM) staff input;
- Meet MCEA consultation requirements; and,
- To fulfill the consultation requirements of the MCEA document:
    - Build on past communication protocols and consultation plans from previous Class EA and municipal planning initiatives to ensure consistency and continuity;
    - Meet Indigenous Community, public and agency notification and consultation requirements for Phases 1 and 2 of the MEA Municipal Class EA (October 2000, as amended in 2015; and,
    - Complete additional tasks to enhance the proposed consultation program and overall Class EA process.

As part of this MSP, a communication and consultation plan has been developed. The main objective of the plan is to proactively engage the community, regulatory agencies, regional staff, and Indigenous Communities. More specifically, the plan is designed to:

- Ensure Indigenous Communities, 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 Indigenous Communities, and stakeholders early and often throughout the study process; and,
- Contact external agencies to obtain legislative approvals or regulatory approvals, or to collect pertinent technical information.

The full Public Consultation process is detailed in **Volume 5 – Indigenous, Public, and Agency Consultation.**

3 Related Studies and Background Information

The following completed studies were reviewed and considered throughout the master planning process in the development of the preferred servicing strategies.

3.1 Niagara Region Water and Wastewater Master Plan Update

The 2021 Regional Master Plan Update (2021 MSPU) culminated in approximately $3 billion of recommended water and wastewater infrastructure projects to support long-term growth in the Region. Relevant to this Study, the Region's 2021 MSPU recommended the following for the Port Colborne water system:

- Elimination of the Felden Avenue Reservoir and Pumping Stations,
- Construction of a second Elevated Tank on the east side of the Welland Canal, and
- Construction of new large diameter regional watermains on Second Concession Road from Highway 140 to the Barrick Road Elevated tank, and on Highway 140 Street from Chippawa Road to Second Concession Road.

The Region of Niagara is currently updating this Master Plan (2026) to reflect current conditions and update Provincial growth plans. This study will build on the 2021 Water and Wastewater Master Servicing Plan.

It is noted that the growth forecast used in the Region's 2021 MSPU are now considered out of date for Port Colborne due to the recently announced development projects.

3.2 2023 Infrastructure Needs Study

In 2023, the City prepared an Infrastructure Needs Study (GM BluePlan, 2023). For the stormwater system, the project recommended an allowance of $10 million for storm sewer rehabilitation activities and $32 million for sewer upsizing. A total of $14 million of the upsizing recommendations were attributed to growth. The projects were recommended after a comprehensive review of the available data. However, it was recognized that additional data is necessary to build and calibrate a hydraulic model of the stormwater system to have confidence in the capital program.

For the water system, the project recommended a total of $60 million over 15 years to replace the majority of the cast-iron watermain in the system to improve fire flows. The report highlights that this MSP is necessary to understand growth-related water distribution system needs.

3.3 2025 Pollution Prevention Control Plan

The 2025 Pollution Prevention Control Plan (GEI, 2025) is an update to the City 2027 Pollution Prevention Control Plan. The 2025 PPCP involved the development of an infrastructure plan

servicing strategy to manage the wastewater system in anticipation of future growth expected in the City by 2051 and beyond. The final capital program recommends $33 million in sewer upgrades.

3.4 2023 Growth Analysis Review

In 2023, the City completed a Growth Analysis Review (Dillon, 2023). The report provides the City with an estimate of capacity for residential and employment growth, which directly impacts water distribution and stormwater management needs. The following points summarize the relevance to this Water and Stormwater MSP:

1. **Policy and Regulatory Context**:
    - The report outlines the Provincial Policy Statement and the Growth Plan for the Greater Golden Horseshoe, which includes directives for efficient land use and infrastructure planning, including water and stormwater systems.
2. **Existing Conditions**:
    - The report assesses the current built-up areas, designated greenfield areas, and employment areas, all of which require adequate water distribution and stormwater management systems.
3. **Growth Management Implications**:
    - Recommendations for future growth are made to ensure that infrastructure plans, such as water distribution and stormwater management, align with the anticipated residential and employment growth.
4. **Recommendations and Next Steps**:
    - The report recommends updating the City's Development Charges By-law to reflect the infrastructure needs, including water distribution and stormwater systems, to support the projected growth.

By addressing these aspects, the document provides a framework for understanding and planning the necessary water distribution and stormwater management infrastructure to accommodate future growth in Port Colborne.

3.5 2024 Development Charges Background Study

The City completed a Development Charges Background Study in 2024, conducted by Watson & Associates. The Study identified a total of 12 projects for the City's water system, as shown in **Figure 3-1**. It is noted that Stormwater infrastructure is not a category in the Background Study, and therefore, no projects are identified.

Table 5-7
Infrastructure Cost Included in the Development Charges Calculation
Water Services

Prj.No	Increased Service Needs Attributable to Anticipated Development 2024 to 2036	Timing (year)	Gross Capital Cost Estimate (2024$)	Post Period Benefit	Other Deductions	Net Capital Cost	Less:		Potential D.C. Recoverable Cost		
							Benefit to Existing Development	Grants, Subsidies and Other Contributions Attributable to New Development	Total	Residential Share 78%	Non-Residential Share 22%
1	East Side Lands Water Infrastructure	2026-2030	23,100,000	-		23,100,000	-		23,100,000	18,018,000	5,082,000
2	W-3 - Main Street 300mm (1065m)	2030-2035	5,705,200	-		5,705,200	5,134,700		570,500	444,990	125,510
3	W-4 - Main Street East 300mm (675m)	2030-2035	1,865,100	-		1,865,100	1,193,700		671,400	523,692	147,708
4	W-5 - Highway 3 300mm (1640m - New Watermain)	2030-2035	4,182,600	-		4,182,600	-		4,182,600	3,262,428	920,172
5	W-7 - Lorraine Road 300mm (885m - New Watermain)	2035-2040	2,257,200	-		2,257,200	-		2,257,200	1,760,616	496,584
6	W-8 - Killaly Street East 300mm (1670m - New Watermain)	2030-2035	4,259,200	-		4,259,200	-		4,259,200	3,322,176	937,024
7	W-9 - Clarke Street 250mm (1320m - New Watermain)	2037	3,343,100	-		3,343,100	2,674,500		668,600	521,508	147,092
8	W-10 - King Street 250mm (845m)	2030	2,469,500	-		2,469,500	1,086,600		1,382,900	1,078,662	304,238
9	W-11 - Elm Street 250mm (710m)	2030	2,075,100	-		2,075,100	1,058,300		1,016,800	793,104	223,696
10	W-12 - Sugarloaf Street 250mm (1225m)	2030	3,102,800	-		3,102,800	2,234,000		868,800	677,664	191,136
11	W-13 - Elgin Street 300mm (440m - New Watermain)	2035-2040	1,122,300	-		1,122,300	-		1,122,300	875,394	246,906
12	W-14 - Rosemount Ave 300mm (770m - New Watermain)	2035-2040	1,636,600	-		1,636,600	-		1,636,600	1,276,548	360,052
	Post Period Adjustment			30,050,568		(30,050,568)	-		(30,050,568)	(23,439,443)	(6,611,125)
	Reserve Fund Adjustment					-	95,763		(95,763)	(74,695)	(21,068)
	Total		**55,118,700**	**30,050,568**	**-**	**25,068,132**	**13,477,563**	**-**	**11,590,569**	**9,040,644**	**2,549,925**

Figure 3-1: Identified Water System Projects in Port Colborne to Accommodate Growth (Watson, 2024)

3.6 East Side Employment Lands Servicing Review

In 2024, the City completed the East Side Employment Lands Servicing Review (GEI, 2024). The report developed water demand projections for the large parcels planned for development on the north-east side of the City. These estimates are used in this MSP because they represent the most current development plans in the City.

3.7 City of Port Colborne – Design and Development Manual

In 2024, the City developed the Design and Development Manual. The manual is intended as a guideline to:

- Establish a uniform criterion of expected standards.
- Promote consistency in the quality and consistency of design and construction for development and capital/operating projects.
- Provide a sound engineering basis for subdivision and site plan design.
- Improve processing of development applications.

The Design and Development Manual are used to help inform the system performance criteria.

3.8 City Infrastructure Information

3.8.1 GIS

The City maintains all water and stormwater infrastructure in a geographic information system (GIS). This information is utilized throughout the MSP to facilitate the analysis and present the results.

3.8.2 Water Billing

Water billing is a crucial piece of data for understanding future water demands. The water billing data were analyzed to understand consumption levels and trends in water demand.

3.8.3 Drinking Water Licence Permit

The Drinking Water Licence Permit (DWLP) for the Port Colborne water system is a foundational document that outlines the key elements and management requirements of the City's water system. The DWLP document is used to inform the system of its existing conditions and the system's performance criteria.

3.8.4 Stormwater System CLI ECA

The City stormwater system consolidated linear infrastructure environmental certificate of approval (CLI ECA) is a foundational document that outlines the key elements and management requirements of the City's stormwater system. The CLI ECA document is used to inform the system of existing conditions and the system performance criteria.

3.9 Field Investigation

3.9.1 Stormwater Flow Monitoring

30 flow monitors were installed from June to October 2024 throughout the storm sewer network. The data is used to calibrate the hydraulic model of the stormwater system.

3.9.2 Hydrant Testing Program

Hydrant pressure and flow tests were completed at 47 locations throughout the water distribution system. The data is used to calibrate the hydraulic model of the water distribution system.

3.10 Regional Data

3.10.1 Water Model

The Region updated their water model as part of the 2021 MSPU. This model served as the baseline for this MSP, with appropriate updates made to reflect infrastructure changes since 2021.

3.10.2 SCADA Data

The Region's water system SCADA data was provided for the years 2022 to 2024. The data is used to confirm water system demands and peaking factors and to calibrate the hydraulic model of the water distribution system.

4 Problem and Opportunity Statement

4.1 Planning and Opportunity Context

The City of Port Colborne is at a critical point in its water and stormwater management, facing pressures from aging infrastructure, increasing environmental pressure, and emerging growth opportunities. Positioned along Lake Erie and bisected by the Welland Canal, the City must address challenges such as deteriorating watermains, localized flooding, and stormwater quality concerns, while seizing opportunities to modernize systems and support sustainable development.

Key planning considerations include:

- **Aging Infrastructure**: Much of the City's water distribution and stormwater conveyance network consists of older materials (e.g., cast iron pipes, pre-1970s sewers), contributing to leaks, breaks, and capacity constraints.
- **Climate and Environmental Factors**: Intensifying storms and fluctuating Lake Erie levels increase flood risks, particularly in low-lying areas near the lakefront and canal, necessitating resilient infrastructure solutions.
- **Growth and Economic Potential**: Planned residential growth, seasonal tourism, and industrial prospects along the Welland Canal require a dependable water supply and stormwater management to enable development without compromising service levels.

Opportunities to advance the City's servicing vision include:

- **System Upgrades**: Replacing aging pipes and sewers can reduce maintenance costs, improve water efficiency, and enhance stormwater conveyance, ensuring long-term reliability.
- **Sustainable Practices**: Implementing low impact development (LID) techniques (e.g., rain gardens, permeable surfaces) and modern stormwater management facilities can effectively manage runoff, improve water quality discharged into Lake Erie, and complement Niagara Peninsula Conservation Authority's (NPCA) watershed management efforts.
- **Regional Integration**: Collaboration with Niagara Region on water supply enhancements and NPCA on floodplain strategies can optimize resources and align with broader servicing goals.

- **Community Resilience**: Enhanced water and stormwater systems can protect public safety, bolster property values, and reinforce Port Colborne's appeal as a lakeside community and economic hub.

This MSP capitalizes on these opportunities to develop a servicing strategy that ensures safe, efficient, and environmentally sound water and stormwater management, supporting Port Colborne's growth and resilience through 2051 and beyond.

4.2 Planning and Opportunity Statement

The problem and opportunity statement defines the principal starting point for undertaking this Class EA and assists in defining the project's scope. The problem and opportunity statement for the 2026 Water and Stormwater Master Servicing Plan is as follows:

The 2026 Water and Stormwater Master Servicing Plan will identify and develop a long-term water and stormwater servicing strategy and capital forecast to achieve the desired infrastructure performance objectives for existing and future residents and businesses, with consideration for expanding services to support critical employment opportunities. This will support projected future growth in the community to 2051 and consider potential impacts beyond 2051.

5 Study Area

The City of Port Colborne is located in southern Ontario along the north shore of Lake Erie and is bisected by the Welland Canal. The City is part of the Regional Municipality of Niagara and is in close proximity to the City of Welland and the City of Niagara Falls.

The City is strategically connected to surrounding municipalities via Highway 3 and regional road networks, providing access to the industrial and commercial areas of the Niagara Region.

The City of Port Colborne has a total area of approximately 122 km^2, with a 2021 Statistics Canada population of 20,033 residents and 5,120 employees. The study area for the Master Servicing Plan encompasses the water and stormwater systems within the municipal boundaries. The study area is shown in **Figure 5-1**.

Pelham

Niagara Falls

Welland

Wainfleet

Port Colborne

Fort Erie

Forkes Road

Third Concession Road

Second Concession Road

Main Street East

Killaly Street East

Killaly Street West

Main Street West

Highway 140

Chippawa Road

Miller Road

White Road

Brookfield Road

Neff Road

Wilhelm Road

Elm Street

West Side Road

Steele Street

Welland Street

Lorraine Road

Pinecrest Road

Highway 3

Sherkston Road

Holloway Bay Road North

Pleasant Beach Road

0 1 2 km

PORT COLBORNE

City of Port Colborne

Water and Stormwater Master Plan

General Features

- Municipal Boundary Area
- Urban Area Boundary
- Waterbody

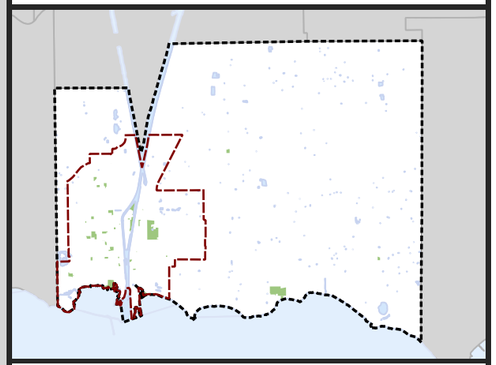

Figure 5-1
Study Area

Agile INFRASTRUCTURE

April 2026
P01.002.01
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6 Planning Context

6.1 Provincial and Federal Legislation and Policy Context

Port Colborne, like all municipalities in Ontario, must operate within the administrative, legislative, and financial framework established by senior levels of government. **Table 6-1** and **Table 6-2** summarize the key provincial and national initiatives that provide directives or require consideration in this MSP process.

Table 6-1: Provincial Legislation and Policy Context

Initiative Name	When Established, What It Does, Other Relevant Info	Why It's Relevant to the Water and Stormwater Master Plan
Provincial Policy Statement (PPS) 2024	Established 2024 (effective Oct 20, 2024); Consolidates PPS 2020 and A Place to Grow, promotes housing and infrastructure planning; Aligns with Bill 185.	Ensures coordinated, climate-resilient stormwater infrastructure and encourages green infrastructure and hazard avoidance near Lake Erie (Policies 2.8.1.1-3, 2.6.1.1).
Planning Act	Established 1946, amended 2006, updated 2024 (Bill 185); Governs land use planning, mandates plan updates; Enhances municipal authority and public input.	Provides a legal framework for integrating stormwater strategies with development, ensuring community input and flexibility.
Water Opportunities and Water Conservation Act, 2010	Established 2010; Promotes innovative water/stormwater technologies, sustainability plans; Sets conservation targets; Has had legislative amendments and a consolidation period up to Dec 2021	Encourages cutting-edge stormwater solutions and efficiency, directly enhancing the MSP's sustainability focus.
Safe Drinking Water Act, 2002	Established 2002; Regulates drinking water systems for safety, sets standards and enforcement; Ongoing amendments but core unchanged.	Indirectly supports stormwater by protecting drinking water sources from runoff contamination, aligning with water quality goals.
Clean Water Act, 2006	Established 2006; Protects drinking water sources via community plans and science-based actions; Ongoing amendments to update technical rules, threat tables, and keep plans current.	Addresses runoff threats to water sources, supporting stormwater management to prevent pollution in Port Colborne.
Ministry of Environment, Conservation and Parks (MECP) Procedures F-5-1 and F-5-5	Established pre-2000s, unchanged; Sets sewage treatment and CSO standards; Pollution Control Plans completed in Niagara Region.	Governs stormwater in combined sewers, ensuring treatment and overflow controls protect water quality and public health.
Bill 23: More Homes Built Faster Act, 2022	Established 2022 (effective Nov 28, 2022); Speeds housing via planning reforms; Amends Planning Act, aligns with PPS 2024.	Drives growth, necessitating robust stormwater systems to manage increased runoff from new development in Port Colborne.
Environmental Assessment Act	Established in 1975, amended over time; Requires environmental impact assessments for infrastructure; Aligns with the Planning Act and PPS 2024.	Ensures stormwater projects assess ecological and climate impacts, reducing risks and enhancing MSP credibility. The MSP will meet Ontario EA Act requirements.
Ontario Water Resources Act	Established 1990; Regulates water supply, sewage, pollution; Sets discharge standards; Complements Clean Water Act.	Governs stormwater outfalls and quality, ensuring compliance and protecting Lake Erie from pollution in the MSP.
Drainage Act	Established in the 19th century, manages rural drainage systems, cost-sharing, and Aligns with the Conservation Authorities Act.	Integrates stormwater with municipal drains, supporting flood prevention in Port Colborne's urban-rural mix.
Conservation Authorities Act	Established 1946, amended 2021; Empowers NPCA for watershed management, flood control; Supports green infrastructure per PPS 2024.	Regulates stormwater near water bodies, ensuring MSP aligns with local watershed standards and flood protection.
Great Lakes Protection Act	Established 2015; Protects Great Lakes ecosystems, reduces runoff pollutants; Encourages collaboration with the Clean Water Act.	Enhances MSP's focus on Lake Erie water quality, aligning stormwater strategies with regional ecological goals.
Migratory Birds Convention Act	Established in 1917, updated periodically; Protects migratory birds from harm; Bans harmful runoff in bird habitats.	Requires MSP to protect Lake Erie bird habitats, necessitating the implementation of runoff controls and timing adjustments to ensure ecological harmony.
Ontario Heritage Act	Established in 1990, updated periodically; Allows municipalities and Province to identify, protect, and conserve properties, archaeological sites, built heritage resources, and cultural heritage landscapes of cultural heritage value or interest	Requires the MSP to consider archaeological sites, built heritage resources, and cultural heritage landscapes in the final recommendations and implementation.

Table 6-2: Federal Legislation and Policy Context

Initiative Name	When Established, What It Does, Other Relevant Info	Why It's Relevant to the Water and Stormwater Master Plan
Fisheries Act	Established 1868, amended 2019 (effective Jun 21, 2019); Protects fish habitats, bans harmful discharges; Overseen by Fisheries and Oceans Canada.	Requires stormwater practices to safeguard Lake Erie fish habitats, ensuring compliance with habitat protection (Sections 35, 36).
Canada-wide Strategy for the Management of Municipal Wastewater Effluent	Established 2009, regulations 2012; Sets wastewater treatment standards, controls CSOs; Updated in 2024 to streamline approvals. (Administered under Fisheries Act)	Mandates CSO management in combined systems, aligning with F-5-5 to minimize stormwater/wastewater impacts on local waterways.
CCME Strategic Vision for Water	Established 2009; Guides water management with sustainability goals; Strategic updates as needed.	Indirectly supports stormwater through ecosystem protection and adaptive strategies, enhancing MSP's sustainability focus.
Canadian Environmental Protection Act - Inorganic Chloramines and Chlorinated Wastewater Effluents	Established pre-2009, chlorine rules 2009; Reduces Total Residual Chlorine (TRC) in wastewater to <0.02 mg/L; Requires Pollution Prevention (P2) plans.	Influences stormwater treatment to protect aquatic life, ensuring effluents meet federal quality standards for Lake Erie.
Impact Assessment Act	Established 2019; Assesses projects with federal impact; Requires Indigenous consultation, climate focus; Replaces 2012 act.	Ensures large stormwater projects comply with federal oversight, enhancing climate resilience and Indigenous engagement in the MSP.
Canadian Navigable Waters Act	Established in the 1800s, updated in 2019; Protects navigation, regulates works in waterways; Tiered review process.	Requires stormwater structures to preserve Lake Erie navigability, ensuring MSP avoids conflicts with shipping and boating.
Species at Risk Act	Established 2002; Protects endangered species/habitats; Requires permits for disruptions; Covers aquatic and bird species.	Ensures MSP avoids harming Port Colborne's biodiversity, supporting ecological compliance near wetlands and shorelines.
Migratory Birds Convention Act	Established in 1917, updated periodically; Protects migratory birds from harm; Bans harmful runoff in bird habitats.	Requires MSP to protect Lake Erie bird habitats, necessitating the implementation of runoff controls and timing adjustments to ensure ecological harmony.

6.2 Conservation Authority Regulation and Policy Context

The Conservation Authorities Act (1946, amended 2021) provides the legislative foundation for Ontario's Conservation Authorities (CAs). Section 20 mandates them to "establish and undertake programs designed to further the conservation, restoration, development, and management of natural resources," with a focus on watershed-level stewardship. For Port Colborne's MSP, this authority is pivotal, as CAs regulate water resources, natural hazards, and ecological health, directly influencing stormwater management strategies.

The study area lies within the NPCA watersheds. As a local agency, the NPCA manage water, natural heritage, and hazardous lands, offering technical expertise to municipalities under Planning Act agreements. They review development applications, providing comments based on provincially approved regulations and board policies, ensuring stormwater aligns with watershed goals.

The NPCA holds delegated authority from the Ontario Ministry of Natural Resources (MNR) and Ministry of Municipal Affairs and Housing to implement Section 3.1 (Natural Hazards) of the Provincial Planning Statement, 2024 (PPS 2024), reflecting Ontario's one-window planning approach. This role ensures that development avoids floodplains and erosion-prone areas—critical for Port Colborne, located near Lake Erie—enhancing MSP resilience.

Under Section 28 of the Conservation Authorities Act, NPCA administers Ontario Regulation 155/06. This prohibits altering watercourses, wetlands, or shorelines, and restricts development in river/stream valleys, hazardous lands, or adjacent zones without prior CA permits. For the MSP, this means stormwater projects (e.g., outfalls or drainage systems) require NPCA approval, ensuring minimal ecological disruption.

Additionally, NPCA maintains a Level II agreement with Fisheries and Oceans Canada (DFO) to review projects under Section 35 of the Fisheries Act, which protects fish habitats and their habitats. Their responsibilities include:

- Assessing fish habitat presence and potential project impacts;
- Collaborating with proponents to mitigate harm to fish and fish habitat;
- Issuing letters of advice for projects unlikely to cause harmful alteration, disruption, or destruction (HADD) of fish habitat;
- Referring unmitigated proposals to DFO for Fisheries Act authorization.

This oversight ensures that the MSP integrates fish habitat protection, aligning with federal and provincial water quality objectives and reinforcing sustainable stormwater management in Port Colborne.

6.3 Niagara Region

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

2023 – 2026 Regional Council Strategic Priorities

In 2023, the Regional Council established "Growing Better Together: Council Strategic Priorities 2023–2026" to guide the Region's development and sustainability efforts. These priorities include:

- **Green and Resilient Region:** Focusing on environmental sustainability, climate change adaptation, and resilient infrastructure, with specific projects like the Water and Wastewater Master Servicing Plan and Combined Sewer Overflow Control Program.
- **Connected and Accessible Region:** Enhancing transportation and connectivity, thereby indirectly supporting the integration of stormwater infrastructure.
- **Vibrant and Inclusive Communities:** Promoting inclusive growth and community well-being, ensuring public input on water-related projects.
- **Economic Prosperity and Innovation:** Supporting economic development, which may influence funding for stormwater initiatives.
- **Efficient and Effective Government:** Ensuring efficient governance and service delivery is crucial for implementing MSP strategies.

These priorities underscore the Region’s commitment to managing growth while protecting natural resources and adapting to climate change, which is directly relevant for this MSP, as they emphasize resilient infrastructure and water management.

Regional Climate Change Strategy

Niagara Region has declared a climate change emergency and is actively developing a Climate Action Plan to reduce greenhouse gas emissions and enhance climate resilience. The Region follows the Partners for Climate Protection Five-Step Milestone Framework, which includes:

- Creating a baseline emissions inventory and forecast.
- Setting an emissions reduction target.
- Developing a local action plan, currently in progress.

- Implementing the local action plan.
- Monitoring and reporting progress.

Recent actions include upgrades to the Niagara Falls Wastewater Treatment Plant boiler, which are expected to reduce carbon emissions by approximately 350 tonnes, and the formation of a corporate Climate Change Working Group to develop projects and policies.

This strategy is particularly relevant for this MSP, as it addresses climate resilience, adaptation to increased rainfall, and emission reductions from water treatment processes, all of which have a direct impact on stormwater management.

Niagara Official Plan

The New Niagara Official Plan, adopted in 2022, integrates climate change policies, including objectives to reduce greenhouse gas emissions and increase resiliency. It provides a framework for land use planning that accounts for climate change impacts and adaptation strategies, with specific policies on natural heritage and water resource systems.

This is relevant for this MSP by aligning stormwater strategies with regional land-use planning, ensuring climate-resilient infrastructure and protecting water quality.

Niagara Watershed Plan

The Niagara Watershed Plan, finalized in May 2022, supports the protection, enhancement, and restoration of natural resources within the watersheds, with a particular emphasis on water resources. It provides goals and policies for maintaining water quality and quantity, informed by stakeholder engagement and scientific analysis.

This is important for this MSP, as it informs stormwater management strategies at the watershed scale, ensuring alignment with regional water quality and ecological goals.

Stormwater Management Design Guidelines

Niagara Region finalized the Stormwater Management Design Guidelines in 2022, encouraging an ecosystem-first approach for planning, design, and review of stormwater management in new land development, redevelopment, and infrastructure renewal projects. These guidelines promote balanced and sustainable communities while protecting the natural environment, complementing Provincial and local legislation.

This is important for this MSP as it provides consistent, science-based standards for stormwater management, ensuring effective runoff control and environmental protection in Port Colborne.

6.4 City of Port Colborne Official Plan

The City of Port Colborne Official Plan was completed in 2013 and consolidated in 2017 and again in 2020. It outlines various policies and guidelines for the City's development, including sections on natural heritage, land use, community improvement, and other relevant topics.

Specifically, the document relates to water distribution and stormwater management in the following ways:

1. **Section 8: Servicing and Stormwater Management**
    - **Water and Sanitary Servicing (8.1)**: This section outlines the requirements for new developments to be connected to full municipal water services and municipal sanitary services within the urban area. It also outlines the policies for servicing areas outside urban areas, emphasizing the use of individual on-site sanitation services and water services.
    - **Stormwater Management (8.2)**: This section details the requirements for managing stormwater on-site to prevent adverse impacts on neighboring properties and the surrounding area. It includes the need for stormwater management plans and sediment and erosion control plans for new developments.
2. **Design Guidelines for Stormwater Management (8.2.1)**
    - This subsection provides guidelines for designing stormwater management facilities that serve as visual features within the community, integrating them into subdivision and neighborhood designs, and ensuring they are naturalized with native plants.
3. **Source Water Protection (8.3)**
    - This section identifies intake protection zones (IPZ-1 and IPZ-2) that are susceptible to contamination and outlines policies to protect these areas from significant threats to municipal drinking water.

These sections collectively ensure that water distribution and stormwater management are effectively planned and managed to support sustainable development and protect public health and the environment in Port Colborne.

In 2024, the City of Port Colborne initiated the process for its new Official Plan. The new Official Plan will guide the City's planning and development initiatives through the year 2056 and is being developed to align with the Provincial Policy Statement (2024).

7 Planning and Growth Projections

7.1 Past and Current Growth Forecasts

This section summarizes the various past and current growth forecasts produced for Port Colborne.

For the purposes of this Master Servicing Plan, future growth projections will utilize 2021 as the current baseline year. The 2021 date is used as it aligns with the Census year, allowing for accurate accounting of populations.

7.1.1 Official Plan

The City completed an official plan in 2013 (updated in 2017 and 2020) with growth forecasts to 2031. Those forecasts are summarized below.

Table 7-1: 2013 Official Plan Population Forecasts

Year	Absolute Growth		Growth Relative to 2021	
	Population	Jobs	Population	Jobs
2006	19,300	6,800	-3,300	-1,550
2011	20,000	7,730	-2,600	-620
2016	21,200	7,860	-1,400	-490
2021	22,600	8,350	0	0
2026	23,500	8,770	900	420
2031	24,100	9,070	1,500	720

7.1.2 2023 Growth Analysis Review

In 2023, the City prepared a Growth Analysis Review (Dillon Consulting; 2023). One of the project goals was to provide the City with an estimate of the capacity for residential and employment growth. The process involved identifying all vacant lands in the City, and categorizing each one based on its development status or long-term development opportunity. The study then looked at forecasted residential unit construction rates to identify the number of units expected to be occupied by 2051 and to estimate the 'years of supply' remaining of residential housing.

To convert the Growth Analysis Review outcome residential units into equivalent population using the population per unit values as listed in **Table 7-2**. For perspective, Table 3-1 of the 2024 Development Charges Background Study includes the following population per unit information:

- Historical city-wide actual persons per unit of approximately 2.3
- Forecasted persons per unit of 2.2 in 2036

Table 7-2: Growth Analysis Review Summary

	Policy Area		Total
	Built Up Area (units)	Designated Greenfield (units)	
Development Pipeline[1]	865	3,284	4,149
Vacant Lands	427	1,362	1,789
Intensification/ Redevelopment	510	0	510
Total Units	1,802	4,646	6,448
Number of Units Expected by 2051	690	1610	2,300
# Low Density Units	513	2505	3,018
# Medium Density Units	381	1737	2,118
# High Density Units	918	394	1,312
Total Units	1,812	4,636	6,448
People Per Unit - Low Density	3.0	3.0	
People Per Unit - Medium Density	2.5	2.5	
People Per Unit - High Density	2.0	2.0	
Total Population - Build Out	**4,328**	**12,646**	**16,973**
Total Population - 2051	**1,657**	**4,382**	**6,039**
Average People Per Unit	**2.39**	**2.73**	**2.63**

7.1.3 2024 Development Charges Background Study

The City completed a Development Charges Background Study in 2024, conducted by Watson & Associates. The population and employment forecasts are summarized in **Table 7-3** below.

Table 7-3: Development Charges Population Forecasts

	Absolute Growth		Growth Relative to 2021	
Year	Population	Jobs[1]	Population	Jobs
2011	18,424	5,035	-1,609	-200
2016	18,306	4,870	-1,727	-365
2021[2]	20,033	5,235	0	0
2024	20,397	5,312	364	77
2036	24,255	6,478	4,222	1,243

1 – Excluding Work from Home and No Fixed Place of Work employees

2 – 2021 Jobs number not provided in report. Value has been estimated based on population values.

7.1.4 East Side Employment Lands Servicing Review

In 2024, the City completed the East Side Employment Lands Servicing Review (GEI; 2024). The report developed water demand projections for six large parcels with significant development plans on the north-east side of the City, including the major residential development area (refer to **Figure 7-1**).

These parcels have unique water demands due to the nature of the industrial development planned for the sites. Therefore, the estimates in **Table 7-4** will be used in this MSP, because they represent the most current development plans in the City and tailored to these planned significant developments.

Table 7-4: Growth Forecast

Development Name	Land use	Units	Area (ha)	Density	Population (Jobs / Person)	Average Day Demand (L/s)[2]	Maximum Day Demand (L/s)[3]
East Side Employment Lands (ESEL)	Industrial	-	130.0	40 people per hectare	5,200	16.25	25.5
Site 1[4]	Industrial	-	92.0	-	-	27.8	50.3
Site 2[4]	Industrial	-	58.0	-	-	78.3	87.5
Unnamed Industrial Development	Industrial	-	100.0	40 people per hectare	4,000	12.5	19.6
Site 3[4]	Industrial	-	31.0	-	-	15.6	31.3
Elite Homes	Residential - Singles	1,027	44.7	2.929 People Per Unit[1]	3,008	8.4	13.1
Elite Homes	Residential - Towns	1,215	52.5	2.093 People Per Unit[1]	2,543	7.1	11.1
Elite Homes	Commercial	-	3.0	40 people per hectare	100	0.3	0.5
Total			**511.2**			**166.2**	**238.9**

1 – From Niagara Region Development Charges Background Study (2022)
2 – 270 L/capita/day for Jobs and 240 L/capita/day for Residential per Niagara Region Master Servicing Plan.
3 – Maximum Day Peaking Factor of 1.57 from ESEL Servicing Review.
4 – Average and Maximum Day Demand previously calculated by developer based on anticipated processes – values do not use criteria from Notes 2 and 3.

PORT COLBORNE

City of Port Colborne

Water and Stormwater Master Plan

Growth Areas
- Development Database
- Development Review
- INS Future Development Area
- INS Pipeline Lands
- INS Vacant Lands

Zoning
- Commercial
- Farm
- Government
- Industrial
- Institutional
- Land
- Residential
- Special Purpose

General Features
- Municipal Boundary Area
- Urban Area Boundary
- Parks
- NPCA Approximate Regulation Lands
- Waterbody

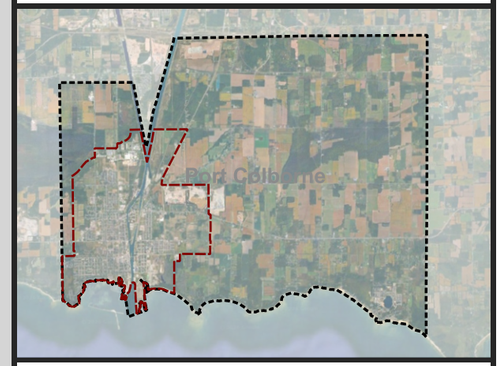

Figure 7-1
Anticipated Development

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June 2026
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7.1.5 Pollution Prevention Control Plan Project

The City is completing this Water and Stormwater MSP in sync with the Pollution Prevention Control Plan (PPCP) project. The information presented below is from Q3 of 2024 and is considered the most accurate based on the most recent development plans related to the East Side Employment Lands and other important large-scale planned developments.

The following points summarize the latest planning information:

1. There are 16 parcels in the 'Development Review Process' category. This means that owners have submitted their development plans and are waiting on City approval to begin the process of constructing properties.
2. There are 6 parcels in the 'Development Database' category. This means that owners have had preliminary discussions with the City regarding developing the land, and have submitted preliminary plans for what they want to construct.
3. There are 20 parcels in the 'Development Pipeline' category. This means that owners have had preliminary discussion with the City regarding developing the land, but have not submitted any information to the City.
4. There are 8 parcels in the 'Future Development' category. These parcels have longer timelines but are designated for greenfield residential and are considered more favourable for development.
    - Through consultation with the City, the Development Pipeline Parcels South of Second Concession Road and East of Highway 140, currently comprising the Port Colborn Quarries, should be excluded from the future growth planning considerations.
5. There are 92 'Vacant Lands' category. This means that the parcels are vacant and designated for residential development.

The PPCP report contained a Residential and Employment population forecast for parcel, as well as the area. **Table 7-5** summarizes the information. It is apparent that the estimated residential growth of 18,435 is indicative of a 'greater than build-out' scenario when compared against the information in **Table 7-2** which suggests an ultimate build-out growth of approximately 17,000 people using an average density of 2.63 people per unit. The PPCP forecasts exceed this estimate and also do not include any growth on the Vacant Lands parcels.

7.1.6 Additional Growth Information

Additional information has recently become available for the ESEL parcel. These updates are summarized in **Table 7-6**.

Table 7-5: PPCP Population and Employment Forecasts (Build-Out Scenario)

Status	Number of Properties	Residential Population per PPCP	Employment Population per PPCP	Area (ha)
Development Review	16	6,023	23,142	526
Development Database	6	1,876	0	77
Development Pipeline	21	4,149	0	112
Future Development[1]	8	6,387	6,570	201
Vacant Land	92	0	0	114
Total	**144**	**18,435**	**29,712**	**1,030**

1 – Through consultation with the City, the Development Pipeline Parcels South of Second Concession Road and East of Highway 140, currently comprising the Port Colborn Quarries, should be excluded from the future growth planning considerations. Resulting in a 5,825 reduction in residential growth (reduced to 787) and a 6,570 reduction in employment growth (reduced to 0).

7.1.7 Summary of Population Growth Forecasts

Table 7-7 summarizes population forecasts and timelines from each of the individual data sources. Due to the unique nature of the East Side Employment Lands development, a comparison of jobs forecasts is not presented.

Table 7-6: Updated East Side Employment Lands Growth Forecast

Development Name	Land use	Units	Area (ha)	Density	Population (Jobs / Person)	Average Day Demand (L/s)[2]	Maximum Day Demand (L/s)[3]
ESEL Excl. Site 4	Industrial	-	135	40 people per hectare	5,200	16.875	26.5
Site 4[4]	Industrial	-	10	Process-Based	-	18.1	29.7
Site 1[4]	Industrial	-	92.0	Process-Based	-	27.8	50.3
Site 2[4]	Industrial	-	58.0	Process-Based	-	78.3	87.5
Unnamed Industrial Development	Industrial	-	100.0	40 people per hectare	4,000	12.5	19.6
Site 3[4]	Industrial	-	31.0	Process-Based	-	15.6	31.3
Elite Homes	Residential - Singles	1,027	44.7	2.929 People Per Unit[1]	3,008	8.4	13.1
Elite Homes	Residential - Towns	1,215	52.5	2.093 People Per Unit[1]	2,543	7.1	11.1
Elite Homes	Commercial	-	3.0	40 people per hectare	100	0.3	0.5
Total			**526.2**			**184.9**	**269.6**

1 – From Niagara Region Development Charges Background Study (2022)
2 – 270 L/capita/day for Jobs and 240 L/capita/day for Residential per Niagara Region Master Servicing Plan.
3 – Maximum Day Peaking Factor of 1.57 from ESEL Servicing Review.
4 – Average and Maximum Day Demand previously calculated by developer based on anticipated processes – values do not use criteria from Notes 2 and 3.

Table 7-7: Population Forecast Summary

Information Source	2021 Population	2031		2031		2051		Build-Out	
		Population	Growth Relative to 2021	Population	Growth Relative to 2021	Population	Growth Relative to 2021	Population	Growth Relative to 2021
2013 Official Plan	22,600	24,100	1,500						
2024 Development Charges Background Study	20,033			24,255	4,222				
2023 Growth Report	20,033					26,072	6,039	36,826	16,793
Ongoing PPCP	20,033							38,468	18,435

7.2 Growth Forecast Scenario

For the purposes of this MSP, we have developed two (2) planning scenarios consisting of:

- **Buildout Scenario:** This represents the full buildout of the City's current urban boundary and additional development of the employment lands along the Welland Canal. This scenario is being used to identify potential long-term servicing needs and used to appropriately size infrastructure upgrades:
- **2051 Growth Scenario:** This represents the most likely 2051 growth scenario, as identified by the City. The MSP 2051 capital program will be based on the upgrades triggered by the infrastructure needed to service the development parcels and total residential and employment growth by 2051.

7.2.1 Buildout Scenario

The Buildout scenario is based on the following assumptions for each development status category:

- INS Pipelines Lands (21 parcels)
    - Population density and growth forecasts originally from the 2023 Growth Planning Report (Dillon; 2023. Table 3, Page 20).
    - Some updates completed as part of the ongoing PPCP project (GEI; 2025).
    - Highest density of 700 people per hectare, under 20 people per hectare for the three largest parcels.
- INS Future development (7 parcels)
    - Density of 70 people per hectare as 7 Residential parcels
- Develop Database (5 parcels)
    - Residential population of 4 parcels based on PPCP information (ranging from 70 to 399 people per hectare).
    - Density of 70 people per hectare for 1 parcel since the PPCP information indicated a value of 0.
- Development Review (16 parcels)
- 4 large industrial parcels are based on process flow information provided by the developer
    - 2 large industrial parcels are based on 40 jobs per hectare (Unnamed Industrial, ESEL)

    - 1 large mixed-use parcel is based on information provided by the developer (Elite Homes)
    - Residential or Employment of 10 parcels based on PPCP information (ranging from 90 to 441 people per hectare).
- Vacant lands (92 parcels)
    - Density of 70 people per hectare for 86 Residential parcels under 5 hectares
    - Density of 60 people per hectare for 6 Residential parcels over 5 hectares

Table 7-8 summarizes the total buildout growth scenario by population, water demands, and impervious area. Meanwhile, **Figure 7-1** highlights the individual development blocks.

7.2.2 2051 Growth Scenario

The 2051 Growth Scenario reflects the appropriate development scenario for the purposes of establishing the capital program to meet a target servicing need. The 2051 Growth Scenario has been estimated based on prioritizing the development likely to occur based on their Development Status. The priority order is as follows:

- Development Review and Development Database parcels
- Future Development Area parcels
- Pipeline Lands parcels
- Vacant Lands parcels

For the purposes of forecasting realistic 2051 servicing needs, an estimated percent completed is applied to each development status category.

Table 7-8: Buildout Scenario of Growth in Water Demand and Area Requiring Stormwater Servicing

Development Status	Residential Growth	Residential Average Day Demand Growth (L/s)	Employment Growth	Employment Average Day Demand Growth (L/s)[1]	Total Average Day Demand (L/s)	Area (ha)
Development Database	1,043	3			3	11
Development Review	6,132	17	10,271	173	190	526
INS Future Development Area	787	2			2	11
INS Pipeline Lands	4,149	12			12	112
INS Vacant Lands	7,057	20			20	114
Total	**19,167**	**53**	**10,271**	**173**	**226**	**774**

1 - Includes Process-Based Flows for 4 industrial parcels.
MDD for process flows, non-process flows based on Peaking Factors in Volume 3

Table 7-9: 2051 Scenario of Growth in Water Demand and Area Requiring Stormwater Servicing

Status	% Complete by 2051	2051 Forecasted Values					
		Residential Growth	Residential Average Day Demand Growth (L/s)	Employment Growth	Employment Average Day Demand Growth (L/s)[1]	Total Average Day Demand (L/s)	Area (ha)
Development Database	100%	1,043	3	0	0	3	11
Development Review	100%	6,132	17	10,271	173	190	526
INS Future Development Area	100%	787	2	0	0	2	11
INS Pipeline Lands	50%	2,075	6	0	0	6	56
INS Vacant Lands	20%	1,411	4	0	0	4	23
Total		**11,447**	**32**	**10,271**	**173**	**204**	**627**

1 - Includes Process-Based Flows for 4 industrial parcels.
MDD for process flows, non-process flows based on Peaking Factors in Volume 3

8 Servicing Principles and Design Criteria

To ensure the City's water and stormwater system operates efficiently and that it's performance can meet existing and future needs of the system's users, clear system performance criteria must be established. As part of this MSP, the design criteria and hydraulic performance criteria were reviewed to confirm that system performance objectives appropriately inform the sizing and timing of future infrastructure, such as watermains, while also supporting the identification and planning of upgrades required to address system deficiencies.

8.1 Level of Service and Performance Criteria

The recommended LOS objectives and performance criteria are based on a review of the City's Design and Development Manual, the Regional Municipality of Niagara 2021 Water and Wastewater Master Servicing Plan Update (MSPU), applicable Ministry and agency requirements, available background studies, and existing system performance.

The design criteria were reviewed as part of this MSP to confirm that they are accurate and to support the sizing and timing of future infrastructure. The water design criteria are outlines in Volume 3, and the stormwater design criteria are provided in Volume 4.

9 Natural Environment Existing Conditions

9.1 Policy Context

9.1.1 Provincial Policy Statement

The Provincial Policy Statement (PPS), issued under Section 3 of the Planning Act, came into effect on October 20, 2024, replacing the PPS issued May 1, 2020 (note that Port Colborne falls within Ecoregion 7E).

The natural heritage policies of the PPS (MMAH 2024) state that:

- 4.1.1 Natural features and areas shall be protected for the long-term;
- 4.1.2 The diversity and connectivity of natural features, and the long-term ecological function and biodiversity of natural heritage systems, should be maintained, restored, or, where possible, enhanced, recognizing linkages among natural heritage features, surface water, and groundwater features;
- 4.1.3 Natural heritage systems shall be identified in southern Ontario, including Ecoregion 7E, varying in size and form across settlement, rural, and agricultural areas;
- 4.1.4 Development and site alteration shall not be permitted in:
    - Significant wetlands, or
    - Significant coastal wetlands;
- 4.1.5 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:
    - Significant woodlands,
    - Significant valleylands,
    - Significant wildlife habitat,
    - Significant areas of natural and scientific interest, and/or
    - Other coastal wetlands not covered by policy 4.1.4(b);
- 4.1.6 Development and site alteration shall not be permitted in fish habitat except in accordance with provincial and federal requirements;
- 4.1.7 Development and site alteration shall not be permitted in the habitat of endangered and threatened species except in accordance with provincial and federal requirements;
- 4.1.8 Development and site alteration shall not be permitted on lands adjacent to the natural heritage features and areas identified in policies 4.1.3, 4.1.4, and 4.1.5 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 their ecological functions.

9.1.2 Species at Risk Act

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

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. The Fisheries Act received royal assent and became law as of June 21, 2019.

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

9.1.5 Migratory Birds Convention Act

The Migratory Birds Convention Act (MBCA) was established in 1917 and amended in 1994 and 2005, to protect migratory birds, their eggs, and their nests. The MBCA was created to implement the Migratory Birds Convention between Canada and the United States. The Act

lists protected families and subfamilies of migratory birds and lays out legislation surrounding activities that may impact migratory birds or nests, including when and where activities may occur.

9.1.6 Niagara Region Official Plan

The Niagara Official Plan, adopted in 2022, embeds climate change policies to cut greenhouse gas emissions and boost resiliency. It guides land use planning with adaptation strategies, prioritizing natural heritage and water resource systems. The plan aligns stormwater management with regional goals, promoting climate-resilient infrastructure and water quality protection.

Section 7, "Natural Environment," outlines the Core Natural Heritage System, updated in 2022. Section 7. A applies region-wide, allowing development in Earth Science Areas of Natural and Scientific Interest (ANSIs) if no significant negative impacts occur (Policy 7.A.4.1) and permitting linear utilities if alternatives are absent and impacts minimized (Policy 7.A.4.3). Section 7. B details the Core Natural Heritage System (Policy 7.B.1.1), comprising:

- Core Natural Areas (Environmental Protection Areas and Environmental Conservation Areas)
- Potential Natural Heritage Corridors
- Greenbelt Natural Heritage and Water Resources Systems;
- Fish Habitat.

Environmental Protection Areas (Policy 7.B.1.3) include provincially significant wetlands, Life Science ANSIs, and habitats of threatened and endangered species. Additionally, within the Greenbelt, these areas encompass wetlands, significant valleylands, woodlands, wildlife habitats, and rare ecosystems, such as savannahs. Environmental Conservation Areas (Policy 7.B.1.4) cover significant woodlands, wildlife habitats, regionally significant ANSIs, and other natural features. Threatened and endangered species habitats, although part of the system, are unmapped and identified through planning reviews (Policy 7.B.1.3), with development subject to strict protection.

Policy 7.B.1.14 permits essential linear utilities (e.g., transportation, communication) within the system, provided they are approved by provincial or federal Environmental Assessments, thereby balancing infrastructure needs with conservation. The 2022 plan enhances these policies by incorporating climate-focused objectives, integrating resilience and sustainable land use across Niagara’s framework.

9.2 Ecological Features and Function

This section provides a detailed description of the existing environmental conditions within the study area, organized by ecological feature or function.

9.2.1 Wetlands

The designation of wetlands as either regionally or provincially significant is completed through a standardized assessment process developed by the MNR, the Ontario Wetland Evaluation System (OWES). Provincially significant wetlands are protected under Section 2.1 of the Provincial Policy Statement (2024), 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 (2017), the Core Natural Heritage System of Niagara Region's Official Plan, and the City of Port Colborne Official Plan.

9.2.2 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.

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 valley lands, significant woodlands, significant wildlife habitat, significant habitat of species of concern, publicly owned conservation lands, savannahs, 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 valley lands, savannahs, 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. **Figure 9-1** shows the natural heritage system in Port Colborne.

PORT COLBORNE

City of Port Colborne

Water and Stormwater Master Plan

- NPCA Approximate Regulation Lands
- Groundwater Protection Areas
- Intake Protection Zone
- Parks

General Features

- Municipal Boundary Area
- Urban Area Boundary
- Waterbody

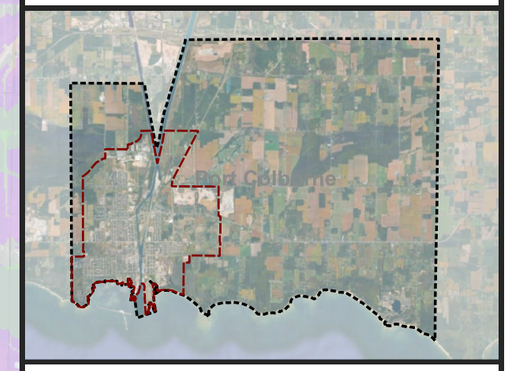

Figure 9-1
Natural Heritage System

Agile INFRASTRUCTURE

April 2026
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9.2.3 Life Sciences ANSIs

ANSIs are defined in the Provincial Policy Statement (2024) 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."

The MNR 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 features (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.

9.2.4 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. 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 includes 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).

9.2.5 Conservation Areas

The Study Area falls within the boundaries of the NPCA watershed. The NPCA owns conservation lands across the study area. There are two Conservation Areas, Mud Lake and Humberstone Marsh.

9.2.6 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 cold water 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 cool water 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 and contain a fish community often characterized by Largemouth bass, Bluegill, carp, bullheads, or Bowfin, as well as 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, to assist with resource management decisions (MNR, 2000). The MNR's database contains records of 97 fish species that occur within the Niagara Region. The study area encompasses portions of the Lake Ontario Watershed, Niagara River Watershed, and Lake Erie Watershed.

9.3 Natural Environment

9.3.1 Physiography

The study area falls predominantly in the Haldimand Clay Plain, with small amounts of limestone plain and Peat and Muck. There is a small area of sand plain on the shore of Lake Erie, with an esker running south easterly.

9.3.2 Haldimand Clay Plain

The Haldimand Clay Plain extends south from the Niagara Escarpment to Lake Erie. The region is composed of a series of parallel belts or terraces, with the highest elevation adjacent to the Escarpment. The overburden material increases 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.

9.3.3 Carolinian Forest Ecoregion

The study area lies within Ecoregion 7E, the Carolinian Forest Ecoregion, as defined by the MNR as a region characterized by consistent vegetation patterns shaped by climate and flat, sediment-rich landforms. Covering less than 2% wetlands, it boasts Canada's highest biodiversity, with ~2,200 plant species, 70 trees, and 400 birds (MNR, 2007). The Niagara Escarpment, a globally significant landform, traverses the northern study area, encompassing diverse habitats, such as wooded slopes, cliffs, and forests, that support over 1,500 plant species, 325 bird species, 55 mammal species, and 34 reptile and amphibian species (Niagara Escarpment Commission, 2010b). It includes key sites, such as Short Hills Provincial Park, and significant ANSIs. Part of the Deciduous Forest Region, the Carolinian Zone features a warm, moist climate and fertile soils, characterized by oaks, hickories, and rare species such as

Sassafras. Despite its small size (less than 1% of Canada), it holds a third of Canada's endangered species, including the Grey Fox, Massasauga Rattlesnake, and Red-bellied Woodpecker (Carolinian Canada, 2010).

9.3.4 Aquatic Environment

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

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 nutrient pollution and rural runoff, sedimentation, contaminants from industrial 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 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.

9.4 Lakes and Waterways

Port Colborne is shaped by a network of lakes and rivers that define its aquatic environment. The most prominent water body is Lake Erie, which borders Port Colborne to the south. This shallow, warm-water lake supports a diverse fish population, including largemouth bass and bluegill species, and serves as a critical drainage endpoint for the region's southern watershed. As noted in regional ecological studies, small streams and tile drains from the Haldimand Clay Plain flow south into Lake Erie, covering a watershed area of less than 20 km^2 near Port Colborne.

The Welland Canal is another defining feature, not a natural river, but a vital engineered waterway that bisects Port Colborne. Connecting Lake Erie to Lake Ontario, it facilitates shipping and influences local hydrology by managing water flow across the Niagara Peninsula. The canal's southern entrance at Port Colborne integrates it into the broader Niagara River Watershed, which drains central Niagara lands and includes four basins. While the Niagara River lies east of Port Colborne, its watershed's influence extends via the canal, indirectly linking the city to this 58 km river that drops 51 m at Niagara Falls.

Nearby, the Welland River, which flows east through the Niagara Region, does not directly enter Port Colborne but contributes to the Niagara River Watershed, thereby impacting regional water dynamics. Smaller tributaries, such as Twenty Mile Creek, located further north, carve through the Niagara Escarpment into Lake Ontario, outside Port Colborne's immediate vicinity, but are part of the interconnected system. Together, Lake Erie, the Welland Canal, and the Niagara River Watershed form a rich aquatic landscape, striking a balance between natural drainage and human engineering, while supporting biodiversity and underpinning Port Colborne's identity as a waterfront community.

9.5 Geological and Hydrogeological Conditions

Port Colborne exhibits distinct geological and hydrogeological conditions shaped by its position within the Haldimand Clay Plain and proximity to the Welland Canal and Niagara Escarpment. Geologically, the area lies on the Haldimand Clay Plain, characterized by lacustrine clays deposited by pro-glacial Lakes Warren and Lundy. These fine-grained sediments overlay sedimentary bedrock, forming a flat, low-relief landscape with terraces that slope southward toward Lake Erie. The nearby Onondaga Escarpment, a limestone feature south of the city, influences local topography and drainage patterns. The region's geological history is tied to glacial retreat, leaving a clay-rich overburden that affects groundwater movement and soil stability.

Hydrogeologically, Port Colborne is part of the Lake Erie Watershed, with small streams and tile drains facilitating drainage into the lake. Groundwater flow is slow due to the low permeability of the clay plain, though sand and gravel lenses within the Quaternary sediments may act as localized aquifers. The Welland Canal, which terminates at Port Colborne, artificially connects Lake Erie to Lake Ontario, altering the natural hydrology by channelling water and potentially influencing shallow groundwater levels along its path. The Niagara River Watershed, linked via the canal, extends its hydrogeological influence, though direct groundwater interaction with the river is limited.

Industrial activities, such as quarrying by Port Colborne Quarries Inc., highlight the area's aggregate potential, with operations targeting deposits located below the water table. Hydrogeological studies for such projects assess the impacts on groundwater, noting the clay's role in limiting vertical flow; however, fractures or coarser layers may enable localized movement. The region's water table is shallow, which supports the Port Colborne Water Treatment Plant's efforts to secure its supply. Overall, Port Colborne's geology and hydrogeology reflect a clay-dominated, low-permeability system, which is modulated by glacial deposits and human engineering, thereby sustaining both natural and industrial functions.

10 Existing Water and Stormwater Systems

10.1 Existing Water System

The City's water system comprises of a two-tier management, with Niagara Region responsible for supply, treatment, storage, pumping, and transmissions, and the City responsible for local distributions. Due to the two-tier management, the system performance and capacity are highly influenced by the operation of the Region's infrastructure.

Figure 10-1 highlights the City's water system. The Region-owned Port Colborne Water Treatment Plant (WTP) supplies the City's water system. The water system operates under a single pressure zone, with floating storage provided by a single elevated tank (the Barric Road ET) that generally manages the system pressures. The Fielden Avenue Reservoir and Pump Station provides additional peak and emergency storage needs.

While the system is generally well looped within the local distribution system, the major constraint is the Welland Canal, which bisects the system in two. There are only two (2) Welland Canal crossings, one Region and one City, interconnecting the treatment and storage on the west side to the east side (and significant growth areas to the east). The Region is currently adding a second canal crossing, completing a transmission loop, which is anticipated to be completed by Q3 2027. While the water system primarily services the existing urban boundary, there is currently one extension that services major employment property (Pinty's) outside the urban boundary along Second Concession Road.

10.2 Existing Stormwater System

The City's stormwater system is owned, operated, and maintained by the City of Port Colborne and consists of a combination of minor and major drainage infrastructure, including storm sewers, catch basins, ditches, culverts, and stormwater management facilities. System performance is influenced by local drainage patterns, receiving watercourse capacity, and lake levels within Lake Erie and the Welland Canal.

Figure 10-2 highlights the City's stormwater system. Runoff is conveyed through a combination of piped systems and overland flow routes and ultimately discharged to Lake Erie, the Welland Canal, and associated local watercourses. The system services the existing urban area, with some infrastructure extending into rural and industrial areas.

A key constraint to the stormwater system is the Welland Canal, which bisects the City and limits hydraulic connectivity between east and west drainage areas. As a result, stormwater systems generally operate as independent drainage catchments with limited opportunities for interconnection. In addition, portions of the system are influenced by flat topography and high lake levels, which can reduce drainage capacity and increase the potential for localized ponding during significant storm events.

PORT COLBORNE

City of Port Colborne

Water and Stormwater Master Plan

Existing Watermains
- < 150 mm
- 150 mm
- 200 - 250 mm
- > 300 mm
- Region Watermains

Existing Facilities
- PS
- Storage
- WTP

General Features
- Municipal Boundary Area
- Urban Area Boundary
- Waterbody

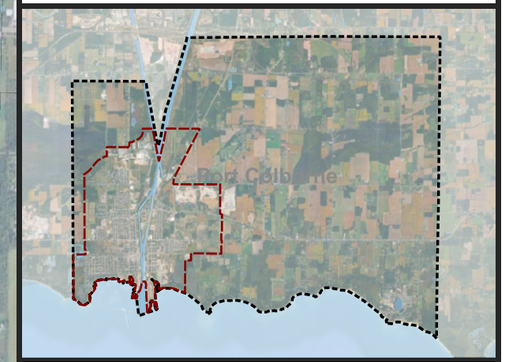

Figure 10-1
Existing Water System

Agile INFRASTRUCTURE

June 2026
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0 0.75 1.5 km

PORT COLBORNE

City of Port Colborne

Water and Stormwater Master Plan

Existing Stormwater System

- ≥ 450 mm
- <450 mm
- Culvert
- Ditch

Existing Facilities

- Storm Facility
- Outfalls
- Storm Outlet

General Features

- Municipal Boundary Area
- Urban Area Boundary
- Waterbody

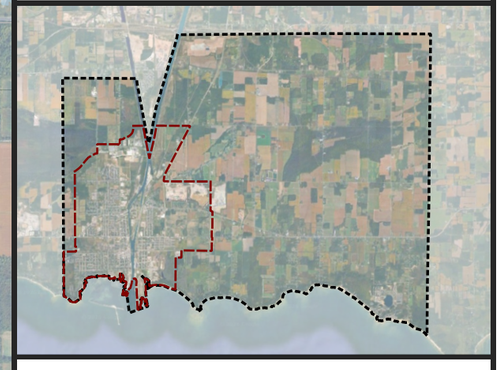

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Figure 10-2
Existing Stormwater System

Agile INFRASTRUCTURE

June 2026
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11 Evaluation Methodology

11.1 Development and Evaluation of Servicing Concepts

Servicing concepts were identified based on a combination of potential infrastructure and management strategies, alignments, locations and/or approaches that could be implemented to achieve the desired servicing objectives.

Each servicing concept was evaluated based on the following general criteria:

- **Technical Feasibility / Implementation Challenges:**
    - Does the servicing concept partially or fully achieve the desired objectives, and can it be implemented within reasonable financial and schedule constraints?
    - Are there potential technical, regulatory, and/or stakeholder issues that could delay or prevent implementation of the concept?
- **Potential Impacts (Environmental and Social Cultural):** Does the servicing concept pose a risk of significant adverse effects on the community, the environment, or cultural heritage resources?

Each concept was reviewed against the above criteria to identify favourable and unfavourable factors. The servicing alternatives may incorporate parts of one or multiple servicing concepts with the goal of fully addressing the desired servicing objectives.

Each servicing alternative was evaluated relative to others, using the scoring approach highlighted in **Table 11-1** and the criteria outlined in **Table 11-2**.

Table 11-1: Evaluation Scoring Approach

	Potential Impacts	Servicing or Implementation Challenges
High	Generates a beneficial impact	No substantial technical or implementation challenges and/or no substantial requirements for mitigation measures
Medium	Limited /no negative impacts.	Potential for moderate technical or implementation challenges and/or potential need for moderate mitigation measures
Low	Generates a negative impact	Substantial technical or implementation challenges and/or substantial needs for mitigation measures

The "Reasoned Argument Approach" was applied to identify the preferred servicing alternative. This approach determines the preferred alternative through a clear, logic-based rationale, outlining the advantages, disadvantages, and trade-offs among the alternatives.

Table 11-2: Evaluation Criterion

Category	Criteria	Description
Technical	Meets existing and future servicing objectives	How well does the alternative meet the desired technical performance objectives and/or address the study's problem and opportunity statement, including the ability to support future growth needs?
	Supports growth servicing, phasing, and alignment with the existing system	How effectively does the alternative maximize the use and capacity of the existing infrastructure while minimizing the need for new construction or upgrades? Includes consideration of flexibility in servicing growth areas and avoiding the need for significant upfront upgrades.
	Minimizes operational complexity and phasing constraints	Does the alternative maintain or decrease the system's operational and maintenance needs and complexity?
	Provides system operational reliability, and resilience to climate change	Does the alternative improve the system's operational flexibility, system redundancy, impacts of single-element failures, effects of power failures, or impacts of significant climate events? Includes resilience to accommodate the impact of climate change.
	Minimizes implementation risk	How effectively does the alternative avoid potential implementation and construction delays and/or cost escalations due to constructability issues, complex infrastructure, site and utility constraints or /conflicts, mitigation and offset requirements, traffic and public control requirements, and other uncertainties? Includes considerations related to land acquisition, permitting and approvals.
Environmental	Minimizes impacts to natural heritage systems	Does the alternative minimize potential impacts on existing natural heritage systems and required mitigation, and/or compensation measures?
	Minimizes impacts to wildlife and species at risk	Does the alternative minimize potential impacts on wildlife and species at risk, and the required mitigation and/or compensation measures?
	Minimize contributions to climate change.	Does the alternative minimize life-cycle potential contributions to climate change, including greenhouse gas contributions related to construction, operations, and maintenance activities?
Social and Cultural	Minimizes long-term impacts on residents, businesses, and the community	Does the alternative minimize long-term effects on residents, businesses, and the community, including impacts on property/amenity use, traffic, noise, odour, and aesthetic considerations?
	Minimizes construction impacts on residents, businesses, and the community	Does the alternative minimize construction impacts on residents, businesses, and the broader community, including effects on property or amenity use, traffic, noise, odour, dust, and aesthetics?
	Minimizes impacts to local cultural heritage and archeological features	Does the alternative minimize impacts to existing cultural heritage and archeological features, and the required mitigation and/or compensation measures?
Financial	Capital Cost	Does the alternative minimize the total capital cost? Including potential cost ranges resulting from project scope, implementation, and market uncertainty/volatility.
	Operational and maintenance costs	Does the alternative minimize the total expected annual operation and maintenance cost as a percentage of capital cost? Including potential cost ranges due to project scope and/or market uncertainty/volatility.

12 Project Costing

12.1 Project Uncertainty and Cost Estimate Confidence

Cost estimates used for the MSP have been developed using a classification system based on the procedures established in the Guide to Costing developed by the Treasury Board of Canada Secretariat (May 2023) and the classification system of the Association for the Advancement of Cost Engineering (AACE). These classes represent various phases of planning and design, which are associated with appropriate cost estimation methods and accuracy levels. The classifications are utilized to ensure that all stakeholders involved with preparing, evaluating, and using project cost estimates understand the accuracy level expected from the estimates, and the level of risk associated with these estimates.

It is assumed for the purposes of the MSP that estimates will follow a Class 4 estimate, as described in **Section 12.4** while establishing the level of accuracy that can be expected as the plans mature through planning to design.

12.2 Cost Estimating Strategy

The cost estimating strategy used in this MSP is to:

1. Establish a cost estimating methodology that can efficiently produce reliable cost estimates for each recommended project.
2. Benchmark actual project costs against the estimates to provide perspective on the accuracy of cost estimating methodology.

12.3 Cost Estimating Methodology Overview

The cost estimating methodology consists of four steps, summarized below. Section 3 provides detailed descriptions.

Step 1 – Baseline Construction Costs

Establish baseline costs for infrastructure supply and installation:

- **Linear assets (watermains, storm sewers):** First-principles analysis of quantities and costs, including excavation, bedding, pipe, backfill, restoration, and appurtenances, normalized to unit costs. Total baseline cost is calculated by multiplying unit costs by project quantities.
- **Stormwater ponds:** Lump-sum estimates based on pond size.
- **Low Impact Development (LID) infrastructure:** Volumetric unit costs based on storage capacity and treatment level.

Step 2 – Adjustment for Scope and Complexity

Baseline costs are adjusted to reflect project-specific factors and market trends in Port Colborne and Southern Ontario, including: road restoration, general construction overhead, site complexity, special conditions (e.g., contaminated soils, environmental considerations), market/inflation adjustments, and significant project-specific items (e.g., river crossings, Regional connections).

Step 3 – Non-Construction Soft Costs

Soft costs are added for items such as land acquisition, preliminary engineering and studies, design, contract administration, inspection, and City-related project management, permitting, consultation, or legal costs.

Step 4 – Project Contingency

An overall project contingency is applied to account for unknowns and potential scope changes.

12.4 Cost Estimate Classification

The AACE classifies cost estimates by project maturity, based on typical evaluation, authorization, and execution phases. **Table 12-1** summarizes the characteristics of the five estimate classes.

A Class 4 estimate is appropriate for this MSP, as recommendations are based on limited information and desktop analyses rather than detailed site investigations. This corresponds to 1% to 15% project definition (**Table 12-1**). Class 4 estimates have a higher level of uncertainty, rely on historical data and analogous projects, and carry an accuracy range of -30% to +50%, suitable for initial budgeting and feasibility assessments.

Table 12-1: AACE Cost Estimate Classes

Class	Project Definition	Typical Usage	Methodology	Expected Accuracy Range
Class 5	0% to 2%	Screening or feasibility	Stochastic (factors and/or models or judgement)	-50% / +100%
Class 4	1% to 15%	Concept study or feasibility	Primarily stochastic	-30% / +50%
Class 3	10% to 40%	Budget authorization or control	Mixed but primarily stochastic	-20% / +30%
Class 2	30% to 75%	Control or bid/tender	Primarily deterministic	-15% / +20%
Class 1	65% to 100%	Check estimate or bid/tender	Deterministic	-10% / +15%

12.5 Sources of Cost Estimating Information

The values presented in this section are derived from a continuously updated costing database, reflecting current market conditions and common construction and rehabilitation practices. Key components include:

Baseline Open-Cut Construction Costs

- **Linear assets:** Trench widths for each pipe diameter are used to calculate excavation, granular bedding, backfill, and restoration quantities. Appurtenance quantities (e.g., maintenance holes, hydrants) are based on typical spacing and normalized per meter. Recent market unit costs are applied to derive baseline construction costs.
- **Discrete stormwater infrastructure:** Costs are based on recent market conditions for new stormwater facilities.

Scope and Complexity Uplifts

Adjustments are applied to reflect project-specific factors, informed by tender analyses across Southern Ontario:

- **Road Restoration:** Additional roadworks beyond trench restoration.
- **General Construction Overhead:** Mobilization, demobilization, site cleanup, traffic control, temporary utilities.
- **Site Complexity:** Local site constraints, including existing utilities, traffic, and surrounding environment.
- **Special Conditions:** Contaminated soils, environmental or archaeological considerations.
- **Market Conditions:** Year-over-year material and labour cost trends, supplemented by construction cost indices.
- **Special Construction Items:** Lump-sum allowances for unique project needs, such as highway or river crossings and large valve chambers.

Non-Construction Soft Costs

Additional allowances include:

- **Land Acquisition:** Purchase, easements, staging areas based on local real estate trends.
- **Preliminary Engineering and Studies:** Surveys, geotechnical, hydraulic, and other assessments.

- **Design, Contract Administration, and Inspection:** Preliminary/detailed design, tendering, and inspection services.
- **City-Related Internal Costs and Project Contingency:** Based on internal budgeting processes.

The baseline open-cut construction costs, scope and complexity uplifts, and non-construction soft cost factors outlines above are documented in detail in the Costing Memo provided in **Appendix A**.

12.6 Uncertainty of Cost Estimates

Construction costing with limited project definition, as in this MSP, is inherently challenging. The estimated costs are based on supplier prices, tender analyses, and historic projects from municipalities across Central and Southern Ontario, with adjustments for varying local conditions. As projects advance from conceptual to detailed design, additional factors may arise. Therefore, these cost estimates should be reviewed and updated as design and construction budgets are developed.

12.7 Development Charges Contribution

12.7.1 Benefit to Existing

For each project, the estimated growth vs. benefit to existing related contributions will be identified using the relative categorizations in **Table 12-2**. The classification will allow the City's future Development Charges study to appropriately classify projects and assign appropriate Development Charges Contribution Ratios.

Table 12-2: Development Charges Benefit to Existing Classifications.

Development Charges Category	Description	Development Charge Contribution (%)
BE-1	Project that solely services growth.	100
BE-2	Project needed to service growth but also benefits existing users.	90
BE-3	Project needed to support growth while also providing operational improvements.	70
BE-4	Project that supports growth and existing users equally.	50
BE-5	Project that primarily addresses existing system issues but also supports growth.	20
BE-6	Project that benefits existing users or addresses an existing system issue.	0
Dev	Project entirely within a new development area. Cost to be Developer's responsibility	Part of local servicing costs.

12.7.2 Out-of-Period Benefit

For each project, the estimated in-period vs. out-of-period contributions will be identified using the relative categorizations in **Table 12-3**. The classification will allow the City's future Development Charges study to appropriately classify projects and assign appropriate Development Charges Contribution Ratios.

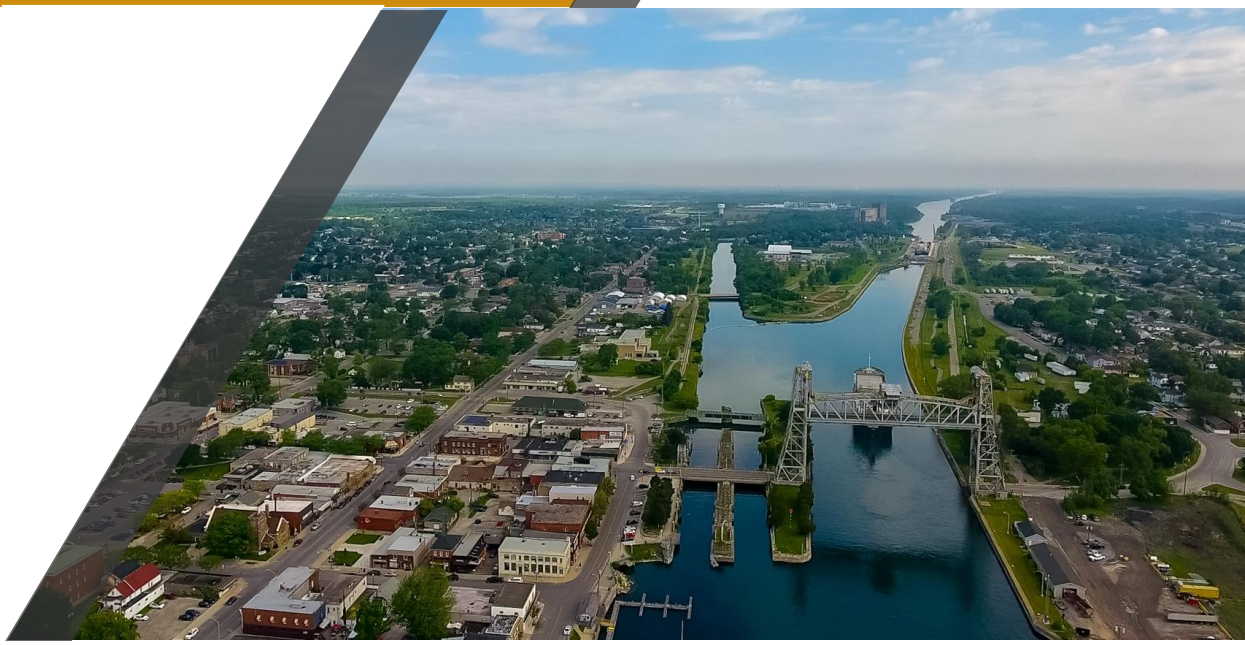
Table 12-3: Development Charges Out of Period Classification

Development Charges Category	Description	Out of Bylaw Split (%)
OB-1	No Change in project sizing based on growth horizon.	0
OB-2	No Change in project sizing based on growth horizon – Buildout growth is more than 50% greater than in-period growth.	20
OB-3	Sizing changes based on the growth horizon.	Upsizing Cost

Appendix A – Costing Methodology

City of Port Colborne
Water and Stormwater Master Servicing Plan

Costing Methodology – Final



Agile
INFRASTRUCTURE

City of Port Colborne – Water and Stormwater Master Servicing Plan

Costing Methodology – Final

PROJECT NO. P01-002-01

Prepared For:

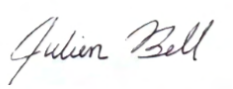
City of Port Colborne

Prepared By:



Nick Larson, P.Eng.
President

Reviewed By:



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1 PURPOSE AND OBJECTIVES

1.1 Project Context

The City of Port Colborne (City) is undertaking a Water and Stormwater Master Servicing Plan Study (MSP) to develop an overall management strategy and vision for the City's short- and long-term water and stormwater upgrade needs. The Study will:

- Review existing conditions and performance of the current water and stormwater systems.
- Consider the impacts that growth will have on the water and stormwater systems.
- Identify and assess strategies for meeting existing and future water and stormwater servicing needs.
- Establish an overall management strategy and vision for meeting short- and long-term water and stormwater infrastructure needs through to the year 2051 and beyond.
- Develop an executable Capital Program and Action Plan to drive the vision forward.

The City will use the Water and Stormwater Master Servicing Plans to inform future water and stormwater system capacity allocations, infrastructure upgrades, and financial planning decisions.

1.2 Memo Objective

The purpose of this memo is to outline the costing methodology used for the financial assessment of the recommended projects based on the results of the technical analysis completed for the MSP, providing stakeholders with an early view of relative potential costs for various options.

2 Costing Methodology Overview

2.1 Project Uncertainty and Cost Estimate Confidence

Cost estimates used for the MSP have been developed using a classification system based on the procedures established in the Guide to Costing developed by the Treasury Board of Canada Secretariat (May 2023) and the classification system of the Association for the Advancement of Cost Engineering (AACE). These classes represent various phases of planning and design, which are associated with appropriate cost estimation methods and accuracy levels. The classifications are utilized to ensure that all stakeholders involved with preparing, evaluating, and using project cost estimates understand the accuracy level expected from the estimates, and the level of risk associated with these estimates.

It is assumed for the purposes of the MSP that estimates will follow a Class 4 estimate, as described in Section 3.1, while establishing the level of accuracy that can be expected as the plans mature through planning to design.

2.2 Cost Estimating Strategy

The cost estimating strategy used in this MSP is to:

1. Establish a cost estimating methodology that can efficiently produce reliable cost estimates for each recommended project.
2. Benchmark actual project costs against the estimates to provide perspective on the accuracy of cost estimating methodology.

2.3 Cost Estimating Methodology Overview

The cost estimating methodology has four steps, as summarized below. Section 0 contains the details of each step.

- ***Step 1 - Baseline Construction Costs***

  The first step is to establish baseline costs for the supply and installation of the infrastructure and related appurtenances:

  - For linear assets (watermains and storm sewers), this is done through a first-principles analysis considering quantities and costs associated with excavation (i.e. trench width and depth), granular bedding, the pipe itself, backfill, and restoration. Appurtenances (hydrants, valves services for watermains or maintenance holes, catchbasins, and catchbasin leads for storm sewers) are first estimated on a per-piece basis and then normalized to an additional linear unit cost by assuming a typical density (i.e. hydrants every 100 m, services assuming 40 ft lots and on both sides of the street). The result is an 'all-in' baseline unit construction cost that is appropriate for a stand-alone construction project. Unit

costs are then multiplied by the total infrastructure quantity in the particular planned project to establish baseline construction costs.
    - For stormwater ponds, this is done through a lump sum estimate by pond size
    - For Low Impact Development (LID) infrastructure, this is done using a volumetric unit cost based on storage capacity and treatment level required.
- ***Step 2 – Adjusting for Scope and Complexity***

  The second step is to adjust the baseline construction costs to account for factors that will impact the baseline estimates. The objective is to obtain a final appropriate 'total construction cost' that reflects the as-tendered recent market trends in Port Colborne and the surrounding areas in Southern Ontario. The following construction cost factors are included to adjust the baseline construction costs to the total construction costs:
    - **Road Restoration:** For additional road works beyond trench restoration that are not included in the baseline costs.
    - **General Construction Overhead:** Mobilization, demobilization, site cleanup, traffic control, temporary utilities.
    - **Site Complexity:** Existing utilities, traffic constraints, site constraints.
    - **Special Conditions:** Contaminated soils, archaeological, environmental issues.
    - **Market and Inflation Adjustment:** Material, labour cost fluctuations.
    - **Special Items:** Project-specific items such as Regional connections, river crossings, or other activities that have significant individual cost and therefore are costed separately.
- ***Step 3 – Including Non-Construction Soft Costs***

  The third step is to include allowances for soft costs, such as studies, engineering, or other non-construction costs that add to the total project costs. The factors included are as follows:
    - **Land Acquisition Needs:** Land purchase, easements, staging areas.
    - **Preceding Engineering and Study Costs:** Survey, geotechnical, hydrogeological, hydraulic, or other assessments that support the project.
    - **Design, Contract Administration and Inspection Services:** Preliminary and detailed design, tendering support, contract administration, inspection.
    - **City-Related Costs:** Project management, permitting, consultation, legal.

- ***Stage 4 Overall Project Contingency***

The fourth and final step is to apply an overall project contingency to add a buffer for unknowns and scope changes.

3 Costing Methodology

3.1 Cost Estimate Classification

The AACE categorizes cost estimate types by project maturity level. The classification system is based on the typical phases and gates of evaluation, authorization, and execution used by project stakeholders during a project life cycle. **Table 1** provides a summary of the characteristics of the five estimate classes.

A Class 4 estimate is appropriate for the MSP, since recommendations for improvements will be based on limited information on broad characteristics and desktop analysis as opposed to site specific data collected via detailed in-situ investigations. This aligns with the description 1% to 15% project definition as described in **Table 1** for Class 4 estimates.

A Class 4 estimate is characterized by its relatively high level of uncertainty and generally based on historical data and analogous project comparisons. It carries a cost estimate accuracy range of ***-30% to +50%*** typical for initial budgeting and feasibility assessments.

Table 1 AACE Cost Estimate Classes

Class	Project Definition	Typical Usage	Methodology	Expected Accuracy Range
Class 5	0% to 2%	Screening or feasibility	Stochastic (factors and/or models or judgement)	-50% / +100%
Class 4	1% to 15%	Concept study or feasibility	Primarily stochastic	-30% / +50%
Class 3	10% to 40%	Budget authorization or control	Mixed but primarily stochastic	-20% / +30%
Class 2	30% to 75%	Control or bid/tender	Primarily deterministic	-15% / +20%
Class 1	65% to 100%	Check estimate or bid/tender	Deterministic	-10% / +15%

3.2 Sources of Cost Estimating Information

The values presented in this section are derived from Agile's in-house costing database. Our costing database is continually updated to reflect real-world market changes with respect to both costs and common rehabilitation or construction practices. There is a wide range of information that is used to support our costing database, as described below.

- Baseline open-cut construction costs:
    - Linear asset construction costs are based on typical trench widths for each respective pipe diameter, used to derive excavation, granular, backfill and trench restoration quantities. Appurtenance quantities (i.e. maintenance holes, hydrants) are based on typical spacing normalized to a per-meter value. Recent market unit costs for each item are applied to the quantities to derive the baseline open-cut construction costs.
    - Discrete stormwater management construction costs are based on recent market conditions of new stormwater management infrastructure.
- Scope and Complexity Uplifts are derived from a range of information:
    - Road Restoration uplifts are based on ongoing tender analysis of integrated underground and road construction projects throughout Southern Ontario with a particular focus on the 'Part B – Roadworks' (or similar) section of the list of quantities and prices.
    - General Construction Overhead uplifts are based ongoing tender analysis of integrated underground and road construction projects throughout Southern Ontario with a particular focus on the 'Part A – General' (or similar) section of the list of quantities and prices.
    - Site Complexity uplifts are based ongoing tender analysis of integrated underground and road construction projects throughout Southern Ontario with a particular focus on the total costs of the project relative to its local community context (i.e. where is the project, what is the surrounding environment).
    - Special Condition uplifts are based ongoing tender analysis of integrated underground and road construction projects throughout Southern Ontario with a particular focus on the 'Part A – General' and 'Provisional' (or similar) section of the list of quantities and prices.
    - Market Condition uplifts are based ongoing tender analysis of integrated underground and road construction projects throughout Southern Ontario with a particular focus on the change in year-over-year construction costs in various

jurisdictions. An ongoing review of various construction cost indices also helps to derive the uplifts.

  - Special Construction Items are lump-sum additions to projects where there are larger known and specific construction needs, such as highway crossings, river crossings, or large valve chambers. The costs are based on ongoing tender analysis of integrated underground and road construction projects throughout Southern Ontario.

- Non-Construction Soft Cost Factors:
  - Land Acquisition costs are based on ongoing tracking of projects across Southern Ontario and local real estate values.
  - Preceding Engineering and Studies are based on monitoring consulting engineering project awards across Southern Ontario.
  - Design, Contract Administration and Inspection Costs are based on monitoring consulting engineering project awards across Southern Ontario.
  - City-Related Internal Costs are based on discussions with staff and align with the internal capital budget processes where appropriate.
  - Project Contingency are based on discussions with staff and align with the internal capital budget processes where appropriate.

3.3 Uncertainty of Cost Estimates

Construction costing with limited project definition, as in the case of this MSP, is a challenging process in the engineering industry. The suggested costs summarized in this report are based on supplier material costs, tender analysis, and historic project costs from multiple municipalities across Central and Southern Ontario. Many other factors have been considered to account for different conditions or configurations within the City. However, as projects progress from conceptual to preliminary to detailed design, additional factors not considered will likely be identified. As a result, the costs derived using the cost estimating methodology in this report should be continuously reviewed as budgets for design and construction are being established.

3.4 Baseline Unit Construction Costs – Open-Cut Watermains and Storm Sewers

The baseline unit construction costs for watermains and sewers constructed via open-cut include the costs for excavation, granular bedding, pipe installation, backfill, restoration, and allowances for appurtenances (hydrants, valves and services for watermains, maintenance holes, catchbasins and catchbasin leads for storm sewers). Refer to **Figure 1**, Table 2, and Table 3 for baseline unit construction costs.

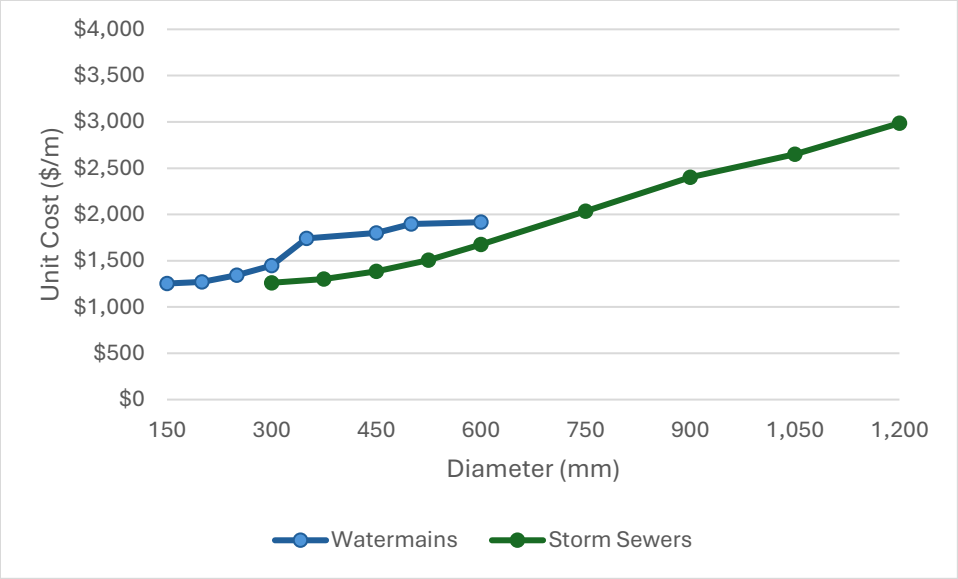


Figure 1 Open-Cut Watermain and Storm Sewer Baseline Unit Construction Costs

Table 2 Open-Cut Watermain Baseline Unit Construction Costs

Diameter (mm)	Watermain ($/m)[1]
150	$1,300
200	$1,300
250	$1,350
300	$1,450
350	$1,750
450	$1,850
500	$1,900
600	$1,950

1- Cost rounded up to closest $50/m

Table 3 Open-Cut Storm Sewer Baseline Unit Construction Costs

Diameter (mm)	Storm Sewer ($/m)[1]
300	$1,300
375	$1,350
450	$1,400
525	$1,550
600	$1,700
750	$2,050

900	$2,450
1050	$2,700
1200	$3,000
1350	$3,650
1500	$4,500
1850	$5,700
2100	$7,700

1- Cost rounded up to closest $50/m

3.5 Baseline Unit Construction Costs – Watermains and Storm Sewers CIPP Rehabilitation

The baseline unit construction costs for the rehabilitation of watermains and storm sewers using the cure-in-place-pipe (CIPP) method include the following costs:

- For watermains, these projects typically include installation of the main pipe liner, new valves and hydrants, appropriate reinstatement of service connections, and restoration of access pits.
- For storm sewers, they include the costs in a typical urban environment to install the main pipe liner. The costs do not include lateral connection seals (a.k.a. 'top-hats'), since controlling infiltration is not necessary in storm sewers.

Table 4 Watermain CIPP Rehabilitation Baseline Unit Construction Costs

Diameter (mm)	Unit Cost ($/m)
150	$1,200
200	$1,300
250	$1,400
300	$1,500
350	$1,600
400	$1,700
450	$1,800
500	$2,200
600	$2,400

Table 5 Storm Sewer CIPP Rehabilitation Baseline Unit Construction Costs

Diameter (mm)	Main-Line CIPP ($/m)
200	$300
250	$320
300	$350
375	$400
450	$450
525	$500
600	$550

750	$650
900	$750
1050	$850
1200	$950

3.6 Baseline Construction Costs – Stormwater Infrastructure

3.6.1 Low Impact Development Infrastructure

For the MSP, LID infrastructure could include bioswales, infiltration chambers, or other stormwater management assets as outlined in the Low Impact Development Stormwater Management Planning and Design Guide Version 1.0 and updated at *wiki.sustainabletechnologies.ca*.

Costs are based on the calculated LID storage volume needed to meet performance objectives. Pretreatment, using oil grit separators or catchbasin inserts, results in additional costs. Refer to **Table 6** for LID construction unit costs.

Table 6 LID Baseline Unit Construction Costs

Pre-Treatment Condition	Cost ($/m^3)
No Pretreatment	$400
Pre-Treatment Required	$700

3.6.2 Stormwater Management (SWM) Pond Infrastructure

For the purposes of the MSP, SWM pond construction costs are estimated as a lump sum covering excavation, grading, access roads, and standard inlet/outlet structures, based on the pond's required storage volume to meet performance objectives. Refer to Table 7 Table 6for SWM Pond baseline construction unit costs.

Table 7 SWM Pond Baseline Construction Costs

Pond Size	Description	Lump Sum Cost
Small	Up to 10,000 m^3	$600,000
Medium	From 10,000 to 50,000 m^3	$1,000,000
Large	Over 50,000 m^3	$1,500,000

3.7 Scope and Complexity Adjustments

As summarized in Section 0, the baseline construction costs from Section 3.2 require adjustments to account for factors that will impact the baseline estimates. The objective is to obtain a final, appropriate total construction cost that reflects the recent, as-tendered market trends for a similar community in Southern Ontario. The section describes the factors that are included to adjust the baseline construction cost.

3.7.1 Construction Factors

3.7.1.1 Road Restoration

Summary: Covers additional road restoration beyond that included in the Baseline costs.

Table 8 Road Restoration Unit Cost

Level	Description	Uplift Unit Cost ($/m)
Minimal	Basic road restoration above trench, included with Base Unit Costs	$0
Moderate	Restoration of the full road surface	$300
Full	Granular base, sub-base, asphalt, curb, gutter, sidewalk	$800

Note: Road restoration factor does not apply to stormwater management infrastructure or linear rehabilitation.

3.7.1.2 General Construction Overhead

Summary: Covers mobilization, demobilization, site cleanup, traffic control, and temporary utilities for project setup and management.

Table 9 Generation Construction Overhead

Level	Description	Cost Factor %
Low	Routine needs in simple, open sites with low traffic	15%
Medium	Moderate constraints requiring heightened controls	20%
High	Dense areas demanding extensive traffic management and utilities	25%

3.7.1.3 Site Complexity

Summary: Adjusts for existing utilities, rock excavation, traffic constraints, and site limitations impacting construction efficiency.

Table 10 Site Complexity Cost Escalation

Level	Description	Cost Factor %
Low	Greenfield with no utilities or traffic	0%
Medium	Suburban with some interferences	10%
High	Urban with dense utilities and heavy traffic, rock excavation	25%

3.7.1.4 Special Conditions

Summary: Accounts for contaminated soils, archaeological sites, or environmental restrictions requiring specialized handling.

Table 11 Special Conditions Cost Escalation

Level	Description	Cost Factor %
Low	No issues in clean sites	0%
Medium	Some soil contamination of heritage concerns	10%
High	High soil contamination, brownfield sites, and protected areas	25%

3.7.1.5 Market and Inflation Adjustment

Summary: Adjusts for fluctuations in material and labour costs specific to Southern Ontario.

Table 12 Market and Inflation Adjustment

Level	Description	Cost Factor %
Low	Stable markets	0%
Medium	Moderate inflation	5%
High	Volatile periods with supply chain issues	10%

3.7.1.6 Construction Allowance – Special Items

The Construction Allowance provides for site-specific conditions that result in additional costs associated with specific protocols and handling requirements in specialized situations. The following items have been included under this factor with appropriate costs anticipated as shown in **Table 13**.

Table 13 Special Construction Items Cost

Special Item	Item Cost
Large Watermain Connection (>450 mm)	$250,000
New Control Valve Chamber (No SCADA)	$250,000
New Control Valve Chamber (With SCADA)	$350,000
Large River Crossing	$3,000,000
Highway Crossing <=300mm	$800,000
Highway Crossing >300mm, <= 600 mm	$1,200,000
Highway Crossing > 600 mm	$1,700,000
Railway Crossing	$500,000
New Outlet	$1,200,000

3.7.2 Non-Construction 'Soft' Cost Factors

The non-construction related 'soft' cost factors are applied to the adjusted total construction cost to account for additional costs related to studies, engineering design services and internal City overhead that would not be captured in the final as-tendered total construction cost.

3.7.2.1 Land Acquisition Needs

Summary: Covers purchasing land, easements, or temporary staging areas for infrastructure placement.

Table 14 Land Acquisition Allowance

Level	Description	Cost Factor %
Low	No new land required in existing rights-of-way	0%
Medium	Minor easements	5%
High	Significant acquisitions in developed areas	10%

3.7.2.2 Preceding Engineering and Study Costs

Summary: Include survey, geotechnical, hydrogeological, hydraulic, or other assessments that support the project and are procured before the design process begins.

Table 15 Preceding Engineering and Study Cost

Level	Description	Cost Factor %
Low	Routine survey and geotechnical investigations	3%
Medium	Additional studies to size infrastructure	5%
High	Significant studies to size infrastructure and prepare for project	10%

3.7.2.3 Design, Contract Administration and Inspection

Summary: Preliminary and detailed design, tendering support, contract administration, inspection services.

Table 16 Design, Contract Administration and Inspection Costs

Level	Description	Cost Factor %
Low	Routine for straight-forward linear projects	8%
Medium	Moderate additional effort for more complex linear projects or straight-forward vertical projects	12%
High	Extensive additional effort for complex vertical projects	15%

3.7.2.4 City-Related Internal Costs

Summary: Includes internal project management, permitting, public consultation, and legal fees.

Table 17 City-Related Internal Costs

Level	Description	Cost Factor %
Low	Minimal bureaucracy in rural areas	3%
Medium	Routine permits	5%
High	Extensive consultations and fees in cities	8%

3.7.3 Project Contingency

Summary: Provides buffer for unknown issues, scope changes, or risks in project execution.

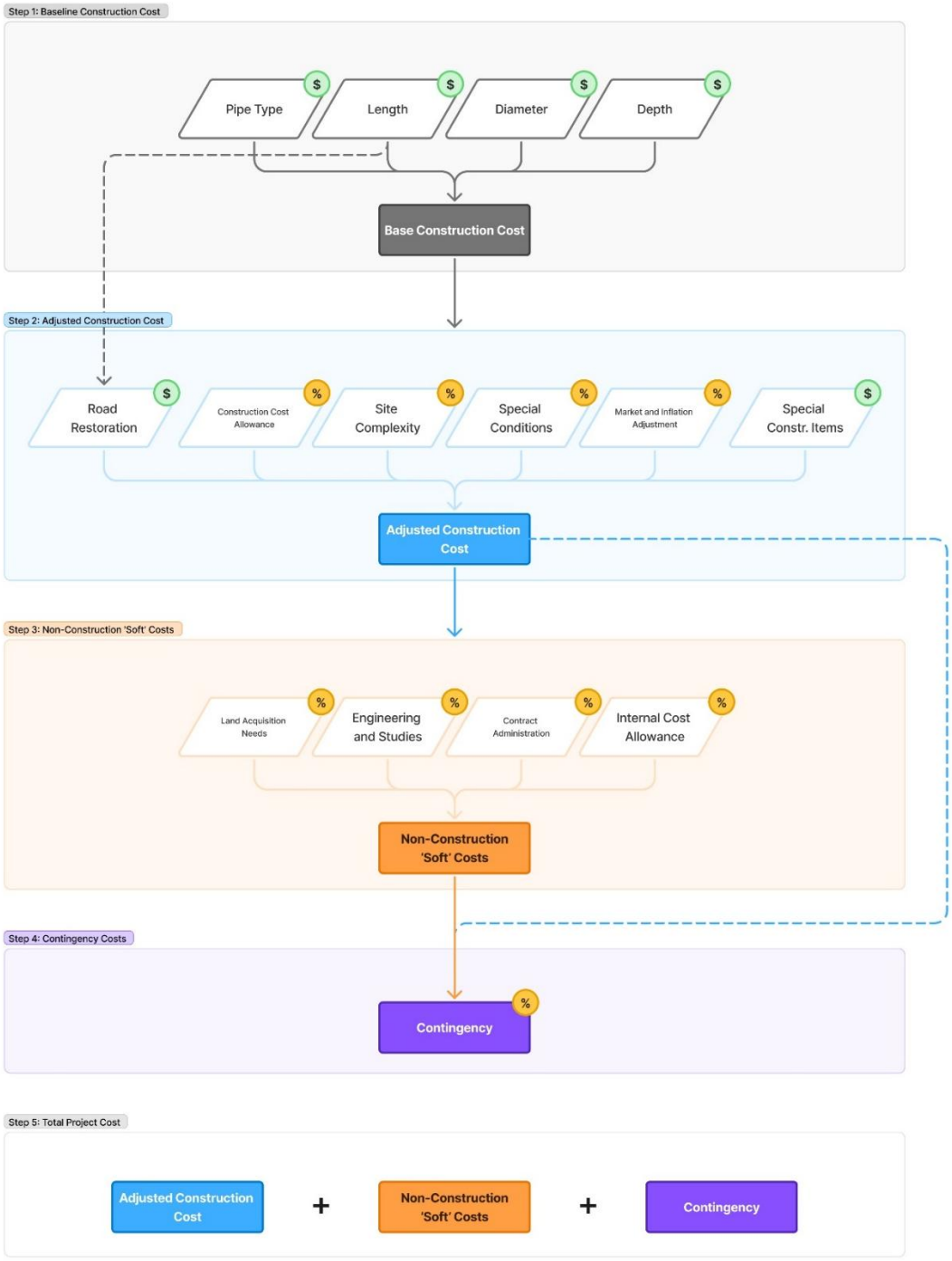
Table 18 Project Contingency Allowance

Level	Description	Cost Factor %
Low	Low-risk, well-defined projects	10%
Medium	Typical uncertainties	15%
High	High-risk with unknowns like utilities. Project in area of public concern	20%

4 Application of Cost Estimating Methodology

This section provides a flow chart of the cost estimating methodology described in Section 3 and an example application of the methodology to a conceptual project.

4.1 Cost Estimating Methodology Flow Chart



4.2 Costing Example

The following example demonstrates the cost calculation process for the construction of 500 m of 600 mm diameter storm sewer under rural roads and includes a railway crossing.

Step 1: Baseline Construction Cost

a) Pipe Type = Storm Sewer
b) Length = 1500 m
c) Diameter = 600 mm

From **Table 2**:

Base Unit Cost for 600 mm dia. storm sewer = $1,650/m

$$Baseline\ Construction\ Cost = Unit\ Cost \times Length$$
$$= \$1{,}600/m \times 500m$$
$$\boldsymbol{Baseline\ Construction\ Cost} = \boldsymbol{\$825{,}000}$$

Step 2: Adjusted Construction Cost

a) **Road Restoration:** Minimal – does not apply to stormwater infrastructure

$$Road\ Restoration\ Uplift = Uplift\ Unit\ Cost \times Length$$
$$= \$0 \times 500m$$
$$= \$0$$

b) **Construction Cost Allowance:** Low – rural roads with low traffic

$$Construction\ Cost\ Allowance = Uplift\ \% \times Baseline\ Construction\ Cost$$
$$= 15\% \times \$825{,}000$$
$$= \$123{,}750$$

c) **Site Complexity:** Low – greenfield with minimal traffic

$$Site\ Complexity = Uplift\ \% \times Baseline\ Construction\ Cost$$
$$= 0\% \times \$825{,}000$$
$$= \$0$$

d) **Special Conditions:** Low – no anticipated contamination concerns

$$\begin{aligned} Special\ Conditions &= Uplift\ \% \times Baseline\ Construction\ Cost \\ &= 0\% \times \$825{,}000 \\ &= \$0 \end{aligned}$$

e) **Market & Inflation Adjustment:** Medium – moderate inflation

$$\begin{aligned} Market\ \&\ Inflation\ Adjustment &= Uplift\ \% \times Baseline\ Construction\ Cost \\ &= 5\% \times \$825{,}000 \\ &= \$41{,}250 \end{aligned}$$

f) **Special Construction Items:** Railway crossing

$$Special\ Contruction\ Items = \$500{,}000$$

$$\begin{aligned} &Adjusted\ Construction\ Cost \\ &= Baseline + Road\ Restoration\ Uplift + Construction\ Cost\ Allowance \\ &+ Site\ Complexity + Special\ Conditions + Market\ \&\ Inflation\ Adjustment \\ &+ Special\ Construction\ Items \\ &= \$825{,}000 + \$0 + \$123{,}750 + \$0 + \$0 + \$41{,}250 + \$500{,}000 \end{aligned}$$

$$\boldsymbol{Adjusted\ Construction\ Cost} = \boldsymbol{\$1{,}490{,}000}$$

Step 3: Non-Construction Soft Costs

a) **Land Acquisition Needs:** none – municipal right-of-way

$$\begin{aligned} Land\ Acquisition\ needs &= Uplift\ \% \times Adjusted\ Construction\ Cost \\ &= 0\% \times \$1{,}490{,}000 \\ &= \$0 \end{aligned}$$

b) **Engineering and Study Costs:** Medium – standard studies needed

$$\begin{aligned} Engineering\ and\ Study\ Costs &= Uplift\ \% \times Adjusted\ Construction\ Cost \\ &= 12\% \times \$1{,}490{,}000 \\ &= \$178{,}800 \end{aligned}$$

c) **Contract Administration:** Medium – standard monitoring needed

$$\begin{aligned} Contraction\ Administration &= Uplift\ \% \times Adjusted\ Construction\ Cost \\ &= 6\% \times \$1{,}490{,}000 \\ &= \$89{,}400 \end{aligned}$$

d) **Internal Cost Allowance:** Medium – routine permits

$$\begin{aligned} Internal\ Cost\ Allowance &= Uplift\ \% \times Adjusted\ Construction\ Cost \\ &= 5\% \times \$1{,}490{,}000 \\ &= \$74{,}500 \end{aligned}$$

$$\begin{aligned} &Total\ soft\ costs \\ &= Land\ Acquisitions\ Needs + Engineering\ \&\ Study\ Costs \\ &+ Contract\ Administration + Internal\ Cost\ Allowance \\ &= \$0 + \$178{,}800 + \$89{,}400 + \$74{,}500 \end{aligned}$$

$$\boldsymbol{Total\ soft\ costs} = \$\mathbf{343{,}000}$$

Step 4: Project Contingency

a) **Project Contingency:** Medium – typical uncertainties

$$Contingency = Uplift\ \% \times (Adjusted\ Construction\ Cost + Total\ Soft\ Costs)$$
$$= 20\% \times (\$1{,}490{,}000 + \$343{,}000)$$

$$\boldsymbol{Contingency} = \$\mathbf{367{,}000}$$

Step 5: Total Project Cost

$$Total\ Project\ Cost = Adjusted\ Constructon\ Cost + Total\ Soft\ Costs + Contingency$$
$$= \$1{,}490{,}000 + \$343{,}000 + \$367{,}000$$

$$\boldsymbol{Total\ Project\ Cost} = \$\mathbf{2{,}200{,}000}$$

5 Port Colborne Benchmarking

Figure 5-1 shows:

- The cost estimate methodology applied on fictitious projects with both the maximum and minimum uplifts of all of the Site and Complexity uplift factors from Section 3.7; and
- The median unit watermain construction costs as derived from quotes received by the City and in other local markets from projects tendered in 2024 and 2025. The diameter indicated reflects the largest quantity pipe diameter in each project, since all project involved a range of watermain diameters 300mm and under.

It is noted that the City did not proceed with the quotation to replace the watermain due to the high cost, choosing to renew the watermains via CIPP rehabilitation.

It is apparent that the lower and upper envelopes of the open-cut watermain total construction costs are appropriately reflecting the actual as-tendered project costs in recent local watermain projects.

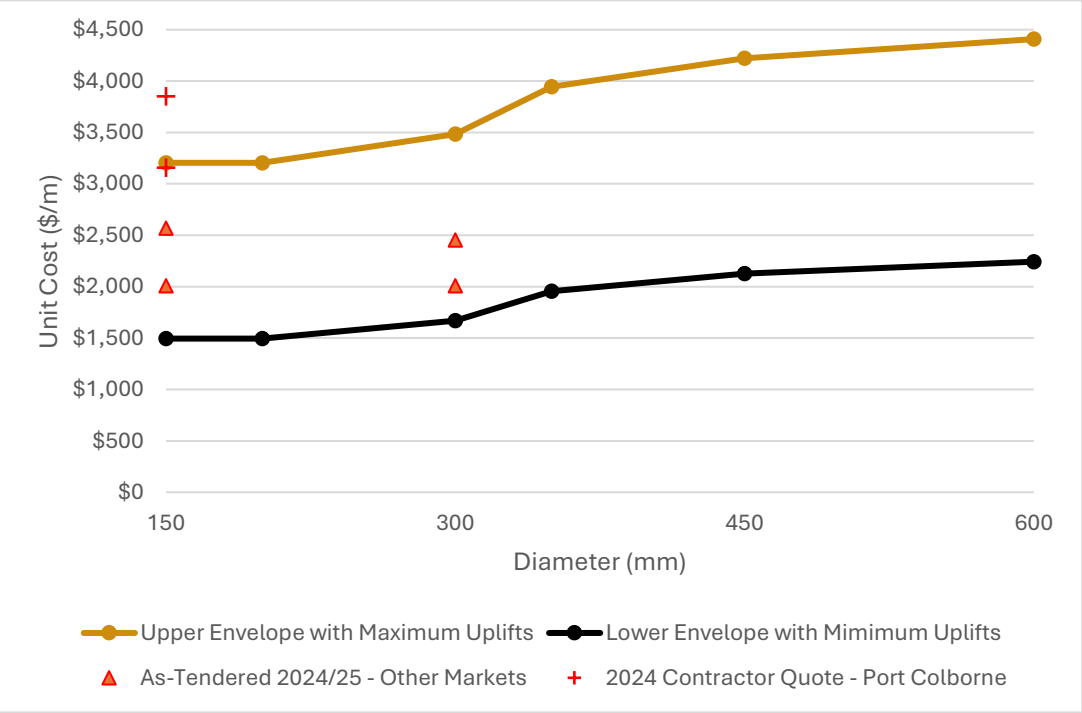


Figure 5-1: Open-Cut Watermains Cost Benchmarking

The City also tendered a CIPP watermain project in 2025 that enable a recent benchmark. The following points summarize bid results relative to the cost estimate methodology:

- The City received 2 bids on the project, with a low bid of $1,441 per m and a high of with a medium unit cost of $1,926 per m.
- The construction unit costs derived from the methodology results in a unit cost of $1,380 with minimum uplifts applied and $2,220 with the maximum uplifts applied.
- The costing methodology accurately reflects the recent markets conditions for CIPP in Port Colborne.

6 Development Charges Contribution

6.1 Benefit to Existing

For each project, the estimated growth vs. benefit to existing related contributions will be identified using the relative categorizations in **Table 6-1**. The classification will allow the City's future Development Charges study to appropriately classify projects and assign appropriate Development Charges Contribution Ratios.

Table 6-1: Development Charges Benefit to Existing Classifications.

Development Charges Category	Description	Development Charge Contribution (%)
BE-1	Project that solely services growth.	100
BE-2	Project needed to service growth but also benefits existing users.	90
BE-3	Project needed to support growth while also providing operational improvements.	70
BE-4	Project that supports growth and existing users equally.	50
BE-5	Project that primarily addresses existing system issues but also supports growth.	20
BE-6	Project that benefits existing users or addresses an existing system issue.	0
Dev	Project entirely within a new development area. Cost to be Developer's responsibility	Part of local servicing costs.

6.2 Out-of-Period Benefit

For each project, the estimated in-period vs. out-of-period contributions will be identified using the relative categorizations in **Table 6-2**. The classification will allow the City's future Development Charges study to appropriately classify projects and assign appropriate Development Charges Contribution Ratios.

Table 6-2: Development Charges Out of Period Classification

Development Charges Category	Description	Out of Bylaw Split (%)
OB-1	No Change in project sizing based on growth horizon.	0
OB-2	No Change in project sizing based on growth horizon – Buildout growth is more than 50% greater than in-period growth.	20
OB-3	Sizing changes based on the growth horizon.	Upsizing Cost