City of Port Colborne Water and Stormwater Master Servicing Plan

Volume 1 – Executive Summary

November 2026



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Submission Details and Version Control

City of Port Colborne
Water and Stormwater Master Servicing Plan
Volume 1 – Executive Summary
November 2026

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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

2.1 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 Environmental Study Report.

2.2 Problem 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 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.*

2.3 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 water and stormwater study areas, including the limits of existing infrastructure, are shown in **Figure 2-1** and **Figure 2-2**, respectively.

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

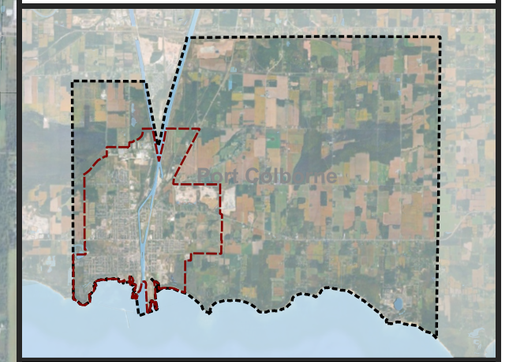

Figure 2-1
Existing Water System

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0 0.75 1.5 km

PORT COLBORNE

City of Port Colborne

Water and Stormwater Master Plan

Existing Stormwater System

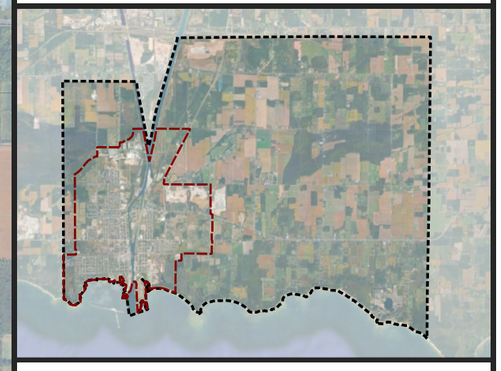
- ≥ 450 mm
- <450 mm
- Culvert
- Ditch

Existing Facilities

- Storm Facility
- Outfalls
- Storm Outlet

General Features

- Municipal Boundary Area
- Urban Area Boundary
- Waterbody



0 1 2 km

Figure 2-2
Existing Stormwater System

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June 2026
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2.4 Public Consultation

Public and agency consultation is a key component of the Class EA planning process. It provides an important opportunity to inform and engage potentially interested and affected stakeholders throughout the study. A complete record of the Public Consultation process, including all comments received, is provided in **Volume 5**.

2.5 Planning Context

Section 7 in **Volume 2** summarizes the various historical and current growth forecasts that have been prepared over the past decade, providing context for the growth assumptions adopted in this MSP. These forecasts inform the future system modelling and the development of infrastructure improvement strategies intended to address the long-term servicing needs of the City. Key background documents reviewed include the 2013 Official Plan (growth to 2031), the 2023 Growth Analysis Review (Dillon Consulting), the 2024 Development Charges Background Study (Watson & Associates), the 2024 East Side Employment Lands Servicing Review (GEI), and the ongoing Pollution Prevention Control Plan project.

2.6 Water Demand Projections

As part of this Master Servicing Plan, water demand criteria were reviewed and updated to reflect current system conditions, historical usage trends, and anticipated future growth.

The water demand criteria have been used to project future demands, assess system capacity, and support the development of the water capital program. The following water design criteria were applied:

- Residential Average Day Demand: 240 Lpcd
- Employment Average Day Demand: 270 Lpcd
- Maximum Day Peaking Factor: 1.57

The review of water use and system performance also considered non-revenue water (NRW) to ensure that demand projections are representative of actual system conditions, while recognizing opportunities for reduction through ongoing operational improvements.

A summary of existing water demands and projected water demands based on the criteria is provided in **Table 2-1**.

Table 2-1: Water Demand Projections

		2025	Buildout
ADD (L/s)	Residential	26.1	79.4
	Employment	25.5	198
	NRW	34.8	34.8
	Total	**86.4**	**312.1**
MDD (L/s)	Residential	41.0	124.6
	Employment	40.0	310.9
	NRW	34.8	34.8
	Total	**115.8**	**470.2**

2.7 Stormwater Servicing Needs

The stormwater servicing concepts and strategies presented in the following sections consider both improvements within the City's existing infrastructure system, as well as new infrastructure and upgrades required to support the expansion areas.

An increase in stormwater runoff volume, peak flow rates, and a potential reduction in water quality are expected due to the conversion of previously pervious areas. Future development will be required to manage runoff volume, peak flows, and water quality to meet pre-development conditions or better. Stormwater controls within the expansion areas will be determined on a site-specific basis. As such, in most instances, new development areas that incorporate the onside management requirements are anticipated to have a negligible increase to existing system peak flows and are not anticipated to trigger system upgrades, with the following exceptions:

- Outlets with existing deficiencies in the downstream conveyance systems.
- Development discharging to system outlets not requiring detention control, where there is sufficient downstream conveyance capacity to support the increase in system runoff.

3 Planning and Growth Projections

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.

These forecasts inform the future system modelling and the development of infrastructure improvement strategies intended to address the long-term servicing needs of the City. Key background documents reviewed include the 2013 Official Plan (growth to 2031), the 2023 Growth Analysis Review (Dillon Consulting), the 2024 Development Charges Background Study (Watson & Associates), the 2024 East Side Employment Lands Servicing Review (GEI), and the ongoing Pollution Prevention Control Plan project.

The Buildout Scenario establishes the City's ultimate servicing envelope, while the 2051 Growth Scenario defines the infrastructure upgrades required within the planning horizon. Detailed assumptions and summarized results for each scenario are provided in **Table 3-1** and **Table 3-2**, with corresponding mapping included in **Figure 3-1**.

3.1.1 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 3-1: 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 3-2: 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

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

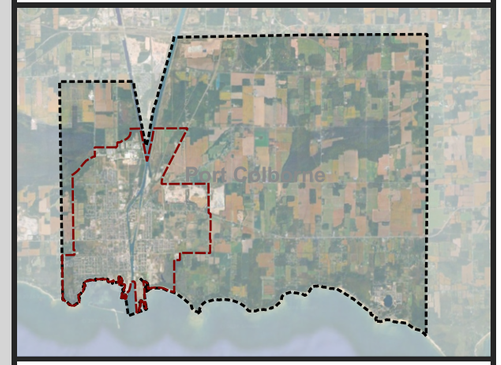

Figure 3-1
Anticipated Development

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4 Servicing Principles and Criteria

To ensure the City's water and stormwater systems operate efficiently and that 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.

4.1 Level of Service and Performance Criteria

The recommended performance objectives and design 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 outlined in **Volume 3**, and the stormwater design criteria are provided in **Volume 4**.

4.2 Basis of Water System Analysis

Table 4-1 summarizes the servicing criteria used to assess system performance, determine upgrade requirements, and assess the effectiveness of system upgrades.

Table 4-1: Water System Servicing Criteria

Description			Criteria
Water Demand	Per Capita Rate	Residential	240 LPCD
		Employment	270 LPCD
	Peaking Factor	Max Day	1.57
		Peak Hour	1.5 – 2.0 times Max Day Demand
Fire Flow	Flow Target	Dead End Residential	50 L/s
		Single/Semi	100 L/s
		Townhouse/Row House	150 L/s
		Multi Family	200 L/s
		Commercial	175 L/s
		Institutional	200 L/s
		Industrial	250 L/s
System Performance	Pressure	Max Day Demand	Preferred 345 – 480 kPa (50 – 70 psi) Allowable 275 – 550 Kpa (40 – 80 psi) Max allowable 700kPa (100psi)
		Peak Hour Demand	
		Average Day Demand	
		Min Hour Demand	
		Max Day + Fire	>140 kPa (20 psi)

4.3 Stormwater Design Criteria and Level of Service Summary

The stormwater technical criteria used as part of this MSP are summarized in **Table 4-2** and **Table 4-3**.

Table 4-2: Summary of City's Stormwater System Design Manual Criteria

Category		Criteria
Flood Control (Development)	Discharge to a Watercourse	Post-development to pre-development peak flow control 2 through a 100-year design storm.
	Discharge to Storm Sewer – Known Capacity	100-year post-development controlled to storm sewer capacity.
	Discharge to a Storm Sewer – Unknown Capacity	100-year post-development to 5-year pre-development peak flow.
	Road Right of Way	Demonstrate no Negative Impact Meets Permissible Depth of Flooding as listed in **Table 4-3**.
	Municipal Drain	100-year post-development to 2-year pre-development peak flow.
Erosion Control	• Provide controls for receivers sensitive to erosion. • Target retention of 90th percentile storm (Runoff Volume Control Target).	
Water Budget	• Maintain pre-development infiltration/evapotranspiration - Where Feasible • Minimum Requirement - Retain/reuse/infiltrate the first 5 mm of rainfall	
Water Quality	Achieve 80% TSS removal ("Enhanced" level). Use oil-grit separators, inserts, filtration tech, or equivalent.	
Minor System	Capacity	• Sized to Convey 5-Year Design Storm • Minimum 300 mm size
	Slope / Velocity	• 300 mm @ 0.3% • Minimum Velocity 0.75 m/s • Maximum Velocity 6.0 m/s
Major System	Capacity	• Size to Convey 100-Year Design Storm • Where the Roadway provides the Major System Function. Ensure Design Meets Permissible Depth of Flooding as listed in **Table 4-3**.

Table 4-3: Summary of City's Stormwater System Design Manual – Prescribed Flooding Levels

Location	Design Storm		
	5-Year	25-Year	100-Year
Walkways	Minor surface	As required	As required
Open Spaces	flow up to 25 mm on walkways	For overland flow outlets	For overland flow outlets
Local	No ponding	0.05m above the crown	0.15m above the crown
Collector	1.0 m wide in the gutter or 0.10m deep at the low point catchbasins	Up to crown	0.10 m above the crown, maximum depth of flooding of 0.3 m
Private Property	Minor ponding in swales	No structural damage, ponding in yard areas below building openings - no basement flooding	No structural damage from overland flow
Public Property	Minor ponding in swales or ditches	No structural damage, ponding in flat areas, no erosion	No structural damage, ponding in flat areas, some erosion

5 Water Servicing Strategy

The following steps outline the approach used to develop, screen, and select the preferred servicing strategy:

- Review baseline system conditions, opportunities, and constraints;
- Develop high-level servicing concepts, including potential infrastructure and management approaches;
- Screen concepts based on technical feasibility, potential impacts, and implementation challenges;
- Eliminate concepts with significant constraints and carry forward viable alternatives;
- Develop and evaluate servicing alternatives using technical, environmental, social/cultural, and financial criteria;
- Apply a reasoned argument approach to identify the preferred alternative, considering advantages, disadvantages, and trade-offs; and,
- Develop conceptual cost estimates to support the evaluation and selection process.

5.1 Opportunities and Constraints

Existing and future water opportunities and constraints were identified through discussions with City staff and through hydraulic analyses.

System Supply and Capacity

- Water system supplied by the Region, with system performance largely influenced by Regional operations.
- Regional treatment, storage, and pumping capacity are assumed to expand as required to support future growth.
- The system is currently operated as a single pressure zone, which is expected to be maintained.

Based on a review of existing system conditions and projected demands, the following key constraints and opportunities were identified.

Constraints

- Aging cast-iron and asbestos cement watermains.
- Areas with lower available fire flow.
- High water loss.
- Localized lower pressures at higher elevations (generally still above minimum targets).

Opportunities

- Improve system looping and fire flow capacity in future growth areas.
- Coordinate water system improvements with planned Regional wastewater projects.
- Continue watermain lining in areas with a history of breaks and higher leakage.
- Planned Regional projects (e.g. new canal crossing, new ET, Fielden reservoir decommissioning) to support system reliability and expansion.

5.2 Preferred Water Servicing Strategy Overview

The City's preferred water servicing strategy to address system growth and hydraulic performance requirements is Concept C+B: Sub-Trunk Loops & Targeted Upgrades. However, in acknowledgement that the City still needed to address rehabilitation and/or replacement of all its cast iron watermain to address ongoing watermain break and water loss issues, the final capital program also includes the full replacement/lining of all remaining cast iron watermains.

Figure 5-1, presents final watermain upgrade and rehabilitation program consisting of a combined approach that integrates new system looping with targeted replacement of undersized watermains. Building on the City's Capital Program, this concept focuses on improving system reliability and reducing fire flow deficiencies, while aligning upgrades with areas of cast iron watermains and historical watermain breaks. While the recommended program largely addresses the identified system deficiencies, some limitations remain, including the presence of dead-end watermains in areas with higher fire flow requirements.

Key elements of the preferred servicing strategy include:

- **Balanced Approach:** Provides a mix of system resiliency through sub-trunk looping while addressing fire flow deficiencies across the system.
- **Targeted Investment:** Focuses on both deficient areas and loop connectivity to maximize effectiveness of upgrades.
- **Flexibility in Implementation:** Supports a phased approach, allowing Capital Program upgrades to proceed first, followed by looping and localized upgrades as needed.
- **Meets Requirements:** Achieves fire flow criteria for more than 95% of the system.
- **Optimized System Performance:** Enhances system reliability and redundancy while mitigating localized deficiencies.
- **Cost Efficiency:** Targeted upgrades reduce overall watermain replacement compared to full cast iron replacement, helping to manage long-term lifecycle costs.

The preferred servicing strategy is based on the following key assumptions and design considerations:

- **Watermain Sizing Basis & Replacement vs. Lining**
    - Watermains with a documented history of breaks are assumed to be replaced as part of the planning analysis; however, these segments should be further inspected to confirm their condition and determine whether lining may be viable as an alternative to full replacement.
    - Lining is considered for watermains with acceptable hydraulic capacity and no performance related issues.
- **Fire Flow Requirements**
    - Fire flow demands are based on City criteria and validated through hydraulic analysis.
    - Sub-trunk looping improves redundancy while mitigating localized deficiencies.
- **Break History and Condition**
    - Replacement priorities are guided by historical break frequency, known cast iron segments, and critical service areas such as schools, hospitals, and high fire flow zones.
- **Future Flexibility**
    - The combined looping and targeted upgrades approach allows incremental improvements as future development proceeds, helping defer major capital costs.
- **System Coordination**
    - Aligns with the City's Capital Program to coordinate upgrades with planned municipal construction, including stormwater and wastewater infrastructure, where possible.

Figure 5-1 shows the preferred servicing strategy for Sub-Trunk Loops and Target Upgrades.

PORT COLBORNE

City of Port Colborne

Water and Stormwater Master Plan

Capital Program Projects
- Lining/Replacement Program
- Looping Program
- Growth Program
- Looping and Growth

Buildout Infrastructure
- < 150 mm
- 150 mm
- 200 - 250 mm
- > 300 mm
- Region Watermains
- Storage
- WTP

Growth Areas
- Growth Areas

General Features
- Municipal Boundary
- Area Urban Area Boundary
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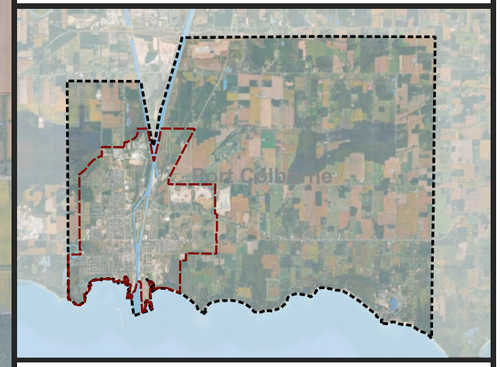

0 0.75 1.5 km

Figure 5-1
Capital Program

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5.3 Water Capital Program Summary

The preferred water servicing strategy has been developed to support the servicing needs of the existing and future growth areas within the City of Port Colborne. The capital costs for each project of the Preferred Strategy were estimated according to the costing methodology within **Volume 2**. A detailed listing of all projects, including individual project numbers, is provided in **Table 5-3** and **Table 5-4**. **Table 5-1** summarizes the projects by type (i.e. new watermains, lining of existing watermains, upsizing of existing watermains, and watermain replacement/potential lining). **Table 5-2** further summarizes the capital program by Benefit to Existing classification, distinguishing projects that primarily address existing system needs from those required to support growth-related servicing requirements.

Table 5-1: Capital Program Summary by Project Type

	Length (m)	Estimated Cost ($)
New Watermains including Growth Areas	19,224	$ 80,019,000
Line Existing Watermains	21,865	$ 46,649,000
Upsize Existing Watermains	11,665	$ 39,273,000
Watermain Replacements (potential lining)	4,936	$ 17,187,000
Total	**57,690**	**$ 183,128,000**

Table 5-2: Benefit to Existing Summary

	% DC Eligible Cost	Length (m)	Estimated Cost ($)
BE-1	100	8,095	$ 37,731,000
BE-2	90	6,721	$ 26,530,000
BE-3	70	1,494	$ 5,608,000
BE-4	50	7,869	$ 28,482,000
BE-5	20	5,788	$ 14,951,000
BE-6	0	23,889	$ 56,002,000
Dev	0	3,834	$ 13,824,000
Total		**57,690**	**$ 183,128,000**

5.3.1 Collaboration with Region

Acknowledging that the water system is jointly owned and operated by the Region and the City of Port Colborne, the continued operation and expansion of the water system to support existing users and accommodate projected growth relies upon the cooperation of the upper and lower tier municipalities.

Table 5-3: Watermain Rehabilitation Capital Program Summary

Description			Scope			Total Cost Summary		Cost Allocation		
Project	Project Letter	Project Description	Project Type	Length (m)	Diameter (mm)	Total Project Cost	Priority	Total BTE Cost	Total DC Cost	Total Developer Cost
W-M-01	A	Lining of 137 m of 150 mm watermain along Cedar Street.	Watermain CIPP Rehab	137	150	$256,000	Low	$256,000	$0	$0
W-M-01	C	Lining of 153 m of 150 mm watermain along Orchard Drive.	Watermain CIPP Rehab	153	150	$285,000	Low	$285,000	$0	$0
W-M-01	D	Lining of 125 m of 200 mm watermain along Oakridge Crescent.	Watermain CIPP Rehab	125	200	$251,000	Low	$251,000	$0	$0
W-M-01	F	Lining of 28 m of 200 mm watermain along Walnut Street.	Watermain CIPP Rehab	28	200	$57,000	Low	$57,000	$0	$0
W-M-01	G	Lining of 45 m of 150 mm watermain along Oakridge Crescent.	Watermain CIPP Rehab	45	150	$86,000	Low	$86,000	$0	$0
W-M-01	H	Lining of 79 m of 150 mm watermain along Lakewood Crescent.	Watermain CIPP Rehab	79	150	$149,000	Low	$149,000	$0	$0
W-M-01	I	Lining of 120 m of 150 mm watermain along Oakridge Crescent.	Watermain CIPP Rehab	120	150	$224,000	Low	$224,000	$0	$0
W-M-01	K	Lining of 20 m of 150 mm watermain along Oakridge Crescent.	Watermain CIPP Rehab	20	150	$38,000	Low	$38,000	$0	$0
W-M-01	L	Lining of 249 m of 150 mm watermain along Rose Avenue.	Watermain CIPP Rehab	249	150	$462,000	Low	$462,000	$0	$0
W-M-01	M	Lining of 212 m of 150 mm watermain along Gaspare Drive.	Watermain CIPP Rehab	212	150	$394,000	Low	$394,000	$0	$0
W-M-04	A	Lining of 326 m of 150 mm watermain along Clarence Street.	Watermain CIPP Rehab	326	150	$604,000	High	$604,000	$0	$0
W-M-04	B	Lining of 76 m of 150 mm watermain along Linwood Avenue.	Watermain CIPP Rehab	76	150	$142,000	Low	$142,000	$0	$0
W-M-04	C	Lining of 83 m of 150 mm watermain along Clare Avenue.	Watermain CIPP Rehab	83	150	$155,000	Low	$155,000	$0	$0
W-M-06	A	Lining of 32 m of 200 mm watermain along Sugarloaf Street.	Watermain CIPP Rehab	32	200	$65,000	High	$32,500	$32,500	$0
W-M-06	C	Lining of 23 m of 200 mm watermain along Sugarloaf Street.	Watermain CIPP Rehab	23	200	$48,000	High	$24,000	$24,000	$0
W-M-06	E	Lining of 401 m of 200 mm watermain along Sugarloaf Street.	Watermain CIPP Rehab	401	200	$805,000	High	$402,500	$402,500	$0
W-M-06	F	Lining of 97 m of 150 mm watermain along Sugarloaf Street.	Watermain CIPP Rehab	97	150	$181,000	Medium	$181,000	$0	$0
W-M-06	G	Lining of 3 m of 200 mm watermain along Park Street.	Watermain CIPP Rehab	3	200	$7,000	Low	$7,000	$0	$0
W-M-06	H	Lining of 199 m of 150 mm watermain along Ash Street.	Watermain CIPP Rehab	199	150	$370,000	Medium	$296,000	$74,000	$0
W-M-06	I	Lining of 126 m of 200 mm watermain along Elm Street.	Watermain CIPP Rehab	126	200	$255,000	Medium	$204,000	$51,000	$0
W-M-06	J	Lining of 114 m of 150 mm watermain along Elm Street.	Watermain CIPP Rehab	114	150	$212,000	Medium	$169,600	$42,400	$0
W-M-06	K	Lining of 15 m of 150 mm watermain along Kent Street.	Watermain CIPP Rehab	15	150	$29,000	Medium	$29,000	$0	$0
W-M-06	O	Lining of 103 m of 150 mm watermain along Kent Street.	Watermain CIPP Rehab	103	150	$193,000	Medium	$193,000	$0	$0
W-M-06	P	Lining of 65 m of 150 mm watermain along Park Street.	Watermain CIPP Rehab	65	150	$121,000	Medium	$121,000	$0	$0
W-M-06	Q	Lining of 35 m of 150 mm watermain along Elm Street.	Watermain CIPP Rehab	35	150	$66,000	Medium	$66,000	$0	$0
W-M-07	A	Lining of 271 m of 150 mm watermain along Steele Street.	Watermain CIPP Rehab	271	150	$502,000	Low	$502,000	$0	$0
W-M-07	R	Lining of 11 m of 150 mm watermain along Brady Street.	Watermain CIPP Rehab	11	150	$22,000	Low	$22,000	$0	$0
W-M-07	T	Lining of 17 m of 150 mm watermain along Brady Street.	Watermain CIPP Rehab	17	150	$33,000	Low	$33,000	$0	$0
W-M-07	W	Lining of 99 m of 150 mm watermain along Fielden Avenue.	Watermain CIPP Rehab	99	150	$184,000	Medium	$147,200	$36,800	$0
W-M-07	X	Lining of 202 m of 150 mm watermain along McCain Street.	Watermain CIPP Rehab	202	150	$375,000	Medium	$375,000	$0	$0
W-M-07	Z	Lining of 87 m of 150 mm watermain along Charles Street.	Watermain CIPP Rehab	87	150	$163,000	Medium	$130,400	$32,600	$0
W-M-07	AA	Lining of 7 m of 150 mm watermain along First Avenue.	Watermain CIPP Rehab	7	150	$14,000	Medium	$14,000	$0	$0
W-M-07	B	Lining of 63 m of 150 mm watermain along Brock Street.	Watermain CIPP Rehab	63	150	$118,000	Medium	$118,000	$0	$0
W-M-07	E	Lining of 187 m of 150 mm watermain along Steele Street.	Watermain CIPP Rehab	187	150	$348,000	High	$348,000	$0	$0
W-M-07	G	Lining of 7 m of 150 mm watermain along Steele Street.	Watermain CIPP Rehab	7	150	$14,000	High	$11,200	$2,800	$0
W-M-07	H	Lining of 6 m of 150 mm watermain along Steele Street.	Watermain CIPP Rehab	6	150	$13,000	High	$13,000	$0	$0
W-M-07	J	Lining of 81 m of 150 mm watermain along Steele Street.	Watermain CIPP Rehab	81	150	$151,000	High	$151,000	$0	$0
W-M-07	L	Lining of 12 m of 150 mm watermain along Helen Street.	Watermain CIPP Rehab	12	150	$23,000	Medium	$23,000	$0	$0
W-M-07	N	Lining of 116 m of 150 mm watermain along Helen Street.	Watermain CIPP Rehab	116	150	$217,000	Medium	$217,000	$0	$0

Description			Scope			Total Cost Summary		Cost Allocation		
Project	Project Letter	Project Description	Project Type	Length (m)	Diameter (mm)	Total Project Cost	Priority	Total BTE Cost	Total DC Cost	Total Developer Cost
W-M-07	O	Lining of 116 m of 150 mm watermain along McCain Street.	Watermain CIPP Rehab	116	150	$217,000	Medium	$217,000	$0	$0
W-M-07	Q	Lining of 14 m of 150 mm watermain along McCain Street.	Watermain CIPP Rehab	14	150	$28,000	Medium	$28,000	$0	$0
W-M-09	A	Lining of 96 m of 150 mm watermain along Main Street West.	Watermain CIPP Rehab	96	150	$179,000	High	$179,000	$0	$0
W-M-09	C	Lining of 499 m of 150 mm watermain along Main Street West.	Watermain CIPP Rehab	499	150	$924,000	High	$739,200	$184,800	$0
W-M-09	D	Lining of 62 m of 300 mm watermain along Main Street West.	Watermain CIPP Rehab	62	300	$144,000	High	$115,200	$28,800	$0
W-M-09	F	Lining of 727 m of 300 mm watermain along Main Street West.	Watermain CIPP Rehab	727	300	$5,133,000	High	$2,566,500	$2,566,500	$0
W-M-10	X	Lining of 205 m of 150 mm watermain along Donlea Drive.	Watermain CIPP Rehab	205	150	$380,000	Low	$380,000	$0	$0
W-M-10	B	Lining of 249 m of 150 mm watermain along Coronation Drive.	Watermain CIPP Rehab	249	150	$462,000	Low	$462,000	$0	$0
W-M-10	C	Lining of 7 m of 150 mm watermain along Coronation Drive.	Watermain CIPP Rehab	7	150	$14,000	Low	$14,000	$0	$0
W-M-10	D	Lining of 7 m of 150 mm watermain along Omer Avenue.	Watermain CIPP Rehab	7	150	$14,000	Low	$7,000	$7,000	$0
W-M-10	E	Lining of 6 m of 150 mm watermain along Steele Street.	Watermain CIPP Rehab	6	150	$13,000	High	$13,000	$0	$0
W-M-10	G	Lining of 3 m of 150 mm watermain along Steele Street.	Watermain CIPP Rehab	3	150	$7,000	High	$7,000	$0	$0
W-M-10	I	Lining of 12 m of 150 mm watermain along Steele Street.	Watermain CIPP Rehab	12	150	$23,000	High	$23,000	$0	$0
W-M-10	L	Lining of 9 m of 150 mm watermain along Borden Avenue.	Watermain CIPP Rehab	9	150	$19,000	High	$19,000	$0	$0
W-M-10	N	Lining of 93 m of 150 mm watermain along Borden Avenue.	Watermain CIPP Rehab	93	150	$174,000	High	$87,000	$87,000	$0
W-M-10	P	Lining of 141 m of 200 mm watermain along Fielden Avenue.	Watermain CIPP Rehab	141	200	$283,000	Low	$141,500	$141,500	$0
W-M-10	Q	Lining of 51 m of 150 mm watermain along Fielden Avenue.	Watermain CIPP Rehab	51	150	$96,000	Low	$48,000	$48,000	$0
W-M-10	S	Lining of 11 m of 150 mm watermain along Franklin Avenue.	Watermain CIPP Rehab	11	150	$22,000	Low	$11,000	$11,000	$0
W-M-10	T	Lining of 5 m of 150 mm watermain along Steele Street.	Watermain CIPP Rehab	5	150	$11,000	High	$8,800	$2,200	$0
W-M-10	V	Lining of 15 m of 150 mm watermain along Steele Street.	Watermain CIPP Rehab	15	150	$29,000	High	$23,200	$5,800	$0
W-M-10	W	Lining of 2 m of 400 mm watermain along Royal Road.	Watermain CIPP Rehab	2	400	$6,000	Low	$4,800	$1,200	$0
W-M-11	A	Lining of 120 m of 200 mm watermain along Hawthorne Boulevard.	Watermain CIPP Rehab	120	200	$242,000	Low	$242,000	$0	$0
W-M-11	C	Lining of 18 m of 150 mm watermain along Runnymede Road.	Watermain CIPP Rehab	18	150	$35,000	Low	$35,000	$0	$0
W-M-11	E	Lining of 160 m of 150 mm watermain along Runnymede Road.	Watermain CIPP Rehab	160	150	$297,000	Low	$297,000	$0	$0
W-M-11	G	Lining of 260 m of 150 mm watermain along Thorncrest Road.	Watermain CIPP Rehab	260	150	$482,000	Low	$482,000	$0	$0
W-M-12	F	Lining of 271 m of 150 mm watermain along Ramey Avenue.	Watermain CIPP Rehab	271	150	$502,000	Low	$502,000	$0	$0
W-M-13	B	Lining of 158 m of 150 mm watermain along Berkley Avenue.	Watermain CIPP Rehab	158	150	$295,000	Low	$295,000	$0	$0
W-M-14	A	Lining of 16 m of 150 mm watermain along Crescent Avenue.	Watermain CIPP Rehab	16	150	$32,000	Low	$32,000	$0	$0
W-M-24	A	Lining of 1533 m of 150 mm watermain along Clarence Street, Ridgewood Avenue, Division Street and Stanley Street.	Watermain CIPP Rehab	1,533	150	$2,836,000	High	$2,836,000	$0	$0
W-M-24	B	Lining of 158 m of 200 mm watermain along Clarence Street, Ridgewood Avenue, Division Street and Stanley Street.	Watermain CIPP Rehab	158	200	$319,000	High	$319,000	$0	$0
W-M-25	A	Lining of 1325 m of 150 mm watermain along Omer Avenue and Oakwood Street.	Watermain CIPP Rehab	1,325	150	$2,452,000	High	$1,961,600	$490,400	$0
W-M-26	A	Lining of 5494 m of 150 mm cast iron watermain.	Watermain CIPP Rehab	5,494	150	$10,161,000	Low	$10,161,000	$0	$0
W-M-26	B	Lining of 1466 m of 200 mm cast iron watermain.	Watermain CIPP Rehab	1,466	200	$2,939,000	Low	$2,939,000	$0	$0
W-M-26	C	Lining of 1510 m of 250 mm cast iron watermain.	Watermain CIPP Rehab	1,510	250	$3,260,000	Low	$3,260,000	$0	$0
W-M-26	D	Lining of 2909 m of 300 mm cast iron watermain.	Watermain CIPP Rehab	2,909	300	$6,727,000	Low	$6,727,000	$0	$0
W-M-26	E	Lining of 105 m of 350 mm cast iron watermain.	Watermain CIPP Rehab	105	350	$260,000	Low	$260,000	$0	$0

Table 5-4: Watermain Capital Program Summary

Description			Scope				Total Cost Summary		Cost Allocation			
Project	Project Letter	Project Description	Pipe Type	Type	Length (m)	Diameter (mm)	Total Project Cost	Priority	Total BTE Cost	Total DC Cost	Total Developer Cost	Council Project Type
W-M-01	B	Replacement of 132 m of 150 mm watermain along Cedar Street.	Watermain	Replacement	132	150	$397,000	Low	$397,000	$0	$0	Replacement
W-M-01	E	Replacement of 123 m of 200 mm watermain along Walnut Street.	Watermain	Replacement	123	200	$371,000	Low	$371,000	$0	$0	Replacement
W-M-01	J	Replacement of 124 m of 150 mm watermain along Oakridge Crescent.	Watermain	Replacement	124	150	$389,000	Low	$389,000	$0	$0	Replacement
W-M-02	A	Upsizing of 1225 m of 300 mm watermain along Sugarloaf Street.	Watermain	Upsizing	1,225	300	$4,982,000	High	$2,491,000	$2,491,000	$0	Looping
W-M-03	A	Upsizing of 1125 m of 300 mm watermain along Stanley Street.	Watermain	Upsizing	1,125	300	$3,824,000	Low	$1,912,000	$1,912,000	$0	Looping
W-M-05	A	Upsizing of 1076 m of 300 mm watermain along Marina Drive.	Watermain	Upsizing	1,076	300	$3,971,000	High	$1,191,300	$2,779,700	$0	Growth
W-M-06	B	Replacement of 77 m of 200 mm watermain along Sugarloaf Street.	Watermain	Replacement	77	200	$247,000	High	$123,500	$123,500	$0	Growth
W-M-06	D	Upsizing of 111 m of 200 mm watermain along Sugarloaf Street.	Watermain	Upsizing	111	200	$355,000	High	$177,500	$177,500	$0	Growth
W-M-06	L	Replacement of 208 m of 150 mm watermain along Kent Street.	Watermain	Replacement	208	150	$663,000	Medium	$663,000	$0	$0	Replacement
W-M-06	M	Replacement of 109 m of 300 mm watermain along Clarence Street.	Watermain	Replacement	109	300	$382,000	Medium	$382,000	$0	$0	Replacement
W-M-06	N	Upsizing of 450 m of 200 mm watermain along Charlotte Street.	Watermain	Upsizing	450	200	$1,430,000	Medium	$1,144,000	$286,000	$0	Looping
W-M-07	C	Replacement of 64 m of 150 mm watermain along Steele Street.	Watermain	Replacement	64	150	$205,000	Low	$205,000	$0	$0	Replacement
W-M-07	D	Replacement of 234 m of 150 mm watermain along Steele Street.	Watermain	Replacement	234	150	$745,000	Low	$745,000	$0	$0	Replacement
W-M-07	F	Replacement of 150 m of 150 mm watermain along Steele Street.	Watermain	Replacement	150	150	$478,000	Low	$382,400	$95,600	$0	Replacement
W-M-07	I	Upsizing of 65 m of 150 mm watermain along Steele Street.	Watermain	Upsizing	65	150	$207,000	Low	$207,000	$0	$0	Replacement
W-M-07	K	Replacement of 27 m of 150 mm watermain along Steele Street.	Watermain	Replacement	27	150	$88,000	Low	$88,000	$0	$0	Replacement
W-M-07	M	Replacement of 103 m of 150 mm watermain along Helen Street.	Watermain	Replacement	103	150	$311,000	Low	$311,000	$0	$0	Replacement
W-M-07	P	Replacement of 99 m of 150 mm watermain along McCain Street.	Watermain	Replacement	99	150	$298,000	Low	$298,000	$0	$0	Growth
W-M-07	S	Replacement of 200 m of 150 mm watermain along Brady Street.	Watermain	Replacement	200	150	$601,000	Low	$601,000	$0	$0	Replacement
W-M-07	U	Replacement of 199 m of 150 mm watermain along Neff Street.	Watermain	Replacement	199	150	$598,000	Low	$598,000	$0	$0	Replacement
W-M-07	V	Replacement of 170 m of 150 mm watermain along Fielden Avenue.	Watermain	Replacement	170	150	$541,000	Low	$541,000	$0	$0	Replacement

Description			Scope				Total Cost Summary		Cost Allocation			
Project	Project Letter	Project Description	Pipe Type	Type	Length (m)	Diameter (mm)	Total Project Cost	Priority	Total BTE Cost	Total DC Cost	Total Developer Cost	Council Project Type
W-M-07	Y	Replacement of 65 m of 200 mm watermain along Union Street.	Watermain	Replacement	65	200	$197,000	Low	$197,000	$0	$0	Replacement
W-M-08	A	Upsizing of 1935 m of 200 mm watermain along Knoll Street.	Watermain	Upsizing	1,935	200	$5,977,000	Low	$4,781,600	$1,195,400	$0	Looping
W-M-09	B	Replacement of 67 m of 150 mm watermain along Main Street West.	Watermain	Replacement	67	150	$214,000	High	$214,000	$0	$0	Replacement
W-M-09	E	Replacement of 118 m of 300 mm watermain along Main Street West.	Watermain	Replacement	118	300	$414,000	Low	$207,000	$207,000	$0	Looping
W-M-10	A	Replacement of 256 m of 150 mm watermain along Coronation Drive.	Watermain	Replacement	256	150	$770,000	Low	$770,000	$0	$0	Replacement
W-M-10	F	Replacement of 103 m of 150 mm watermain along Steele Street.	Watermain	Replacement	103	150	$329,000	Low	$329,000	$0	$0	Replacement
W-M-10	H	Replacement of 98 m of 150 mm watermain along Steele Street.	Watermain	Replacement	98	150	$313,000	Low	$313,000	$0	$0	Replacement
W-M-10	J	Upsizing of 107 m of 200 mm watermain along Wallace Avenue.	Watermain	Upsizing	107	200	$322,000	Low	$322,000	$0	$0	Replacement
W-M-10	K	Upsizing of 113 m of 200 mm watermain along Oak Street.	Watermain	Upsizing	113	200	$341,000	Low	$341,000	$0	$0	Replacement
W-M-10	M	Replacement of 215 m of 150 mm watermain along Borden Avenue.	Watermain	Replacement	215	150	$665,000	Low	$665,000	$0	$0	Replacement
W-M-10	O	Replacement of 103 m of 150 mm watermain along Borden Avenue.	Watermain	Replacement	103	150	$320,000	Low	$160,000	$160,000	$0	Growth
W-M-10	R	Replacement of 192 m of 150 mm watermain along Franklin Avenue.	Watermain	Replacement	192	150	$578,000	Low	$289,000	$289,000	$0	Replacement
W-M-10	U	Replacement of 257 m of 150 mm watermain along Steele Street.	Watermain	Replacement	257	150	$817,000	Low	$653,600	$163,400	$0	Growth
W-M-11	B	Replacement of 144 m of 150 mm watermain along Runnymede Road.	Watermain	Replacement	144	150	$433,000	Low	$433,000	$0	$0	Replacement
W-M-11	D	Replacement of 110 m of 150 mm watermain along Runnymede Road.	Watermain	Replacement	110	150	$332,000	Low	$332,000	$0	$0	Replacement
W-M-11	F	Replacement of 161 m of 150 mm watermain along Thorncrest Road.	Watermain	Replacement	161	150	$486,000	Low	$486,000	$0	$0	Replacement
W-M-11	H	Upsizing of 199 m of 200 mm watermain along Saturn Road.	Watermain	Upsizing	199	200	$598,000	Low	$598,000	$0	$0	Replacement
W-M-12	A	Upsizing of 230 m of 250 mm watermain along Canal Bank Road.	Watermain	Upsizing	230	250	$756,000	Low	$604,800	$151,200	$0	Growth
W-M-12	B	Upsizing of 72 m of 250 mm watermain along Amelia Street.	Watermain	Upsizing	72	250	$239,000	Low	$191,200	$47,800	$0	Growth
W-M-12	C	Upsizing of 112 m of 250 mm watermain along Port Colborne Drive.	Watermain	Upsizing	112	250	$370,000	Low	$185,000	$185,000	$0	Growth
W-M-12	D	Upsizing of 565 m of 200 mm watermain along Mellanby Avenue.	Watermain	Upsizing	565	200	$1,796,000	Low	$1,796,000	$0	$0	Replacement
W-M-12	E	Upsizing of 162 m of 200 mm watermain along Church Street.	Watermain	Upsizing	162	200	$488,000	Low	$488,000	$0	$0	Replacement

Description			Scope				Total Cost Summary		Cost Allocation			
Project	Project Letter	Project Description	Pipe Type	Type	Length (m)	Diameter (mm)	Total Project Cost	Priority	Total BTE Cost	Total DC Cost	Total Developer Cost	Council Project Type
W-M-12	G	Upsizing of 32 m of 150 mm watermain along Christian Stoner Str.	Watermain	Upsizing	32	150	$97,000	Low	$97,000	$0	$0	Replacement
W-M-13	A	Upsizing of 539 m of 200 mm watermain along Chippawa Road.	Watermain	Upsizing	539	200	$1,666,000	Low	$833,000	$833,000	$0	Growth
W-M-13	C	Upsizing of 212 m of 250 mm watermain along Ramey Road.	Watermain	Upsizing	212	250	$697,000	Low	$697,000	$0	$0	Replacement
W-M-14	B	Upsizing of 270 m of 200 mm watermain along Welland Street.	Watermain	Upsizing	270	200	$858,000	Medium	$429,000	$429,000	$0	Growth
W-M-14	C	Upsizing of 221 m of 200 mm watermain along Killaly Street East.	Watermain	Upsizing	221	200	$703,000	Medium	$351,500	$351,500	$0	Growth
W-M-14	D	Upsizing of 1265 m of 250 mm watermain along Clarke Street.	Watermain	Upsizing	1,265	250	$4,039,000	High	$2,019,500	$2,019,500	$0	Looping
W-M-15	A	Upsizing of 154 m of 200 mm watermain along Welland Street.	Watermain	Upsizing	154	200	$490,000	Low	$392,000	$98,000	$0	Replacement
W-M-15	B	Upsizing of 89 m of 250 mm watermain along Fraser Street.	Watermain	Upsizing	89	250	$278,000	Low	$139,000	$139,000	$0	Growth
W-M-15	C	Upsizing of 108 m of 200 mm watermain along Fraser Street.	Watermain	Upsizing	108	200	$325,000	Low	$325,000	$0	$0	Replacement
W-M-15	D	Upsizing of 93 m of 200 mm watermain along Fraser Street.	Watermain	Upsizing	93	200	$297,000	Low	$297,000	$0	$0	Replacement
W-M-15	E	Upsizing of 134 m of 250 mm watermain along Fares Street.	Watermain	Upsizing	134	250	$441,000	Low	$220,500	$220,500	$0	Growth
W-M-15	F	Upsizing of 280 m of 250 mm watermain along Rodney Street.	Watermain	Upsizing	280	250	$996,000	Low	$996,000	$0	$0	Replacement
W-M-15	G	Upsizing of 75 m of 200 mm watermain along Welland Street.	Watermain	Upsizing	75	200	$260,000	Medium	$260,000	$0	$0	Replacement
W-M-16	A	626 m of new 300 mm watermain along Sugarloaf Street and Lancaster Drive.	Watermain	Growth	626	300	$2,473,000	Low	$0	$0	$2,473,000	Looping
W-M-16	B	430 m of new 200 mm watermain along south of Sugarloaf Street.	Watermain	Growth	430	200	$1,544,000	Low	$0	$0	$1,544,000	Growth
W-M-17	A	608 m of new 300 mm watermain along Extension of Rosemount Avenue, Elgin Street and Killaly Street West.	Watermain	Growth	608	300	$3,154,000	Low	$315,400	$2,838,600	$0	Looping
W-M-17	B	488 m of new 300 mm watermain along Extension of Rosemount Avenue, Elgin Street and Killaly Street West.	Watermain - Open Cut	Growth	488	300	$1,928,000	Low	$192,800	$1,735,200	$0	Looping
W-M-18	A	Upsizing of 36 m of 300 mm watermain along Killaly Street West.	Watermain	Upsizing	36	300	$128,000	Low	$38,400	$89,600	$0	Looping
W-M-18	B	382 m of new 300 mm watermain along Killaly Street West and Main Street West.	Watermain	Growth	382	300	$1,509,000	Low	$452,700	$1,056,300	$0	Looping
W-M-19	A	2344 m of new 300 mm watermain along Main Street West to Barrick Road.	Watermain	Growth	2,344	300	$9,255,000	Low	$925,500	$8,329,500	$0	Looping
W-M-19	B	1607 m of new 200 mm watermain along Main Street West to Barrick Road.	Watermain	Growth	1,607	200	$5,763,000	Low	$576,300	$5,186,700	$0	Growth

Description			Scope				Total Cost Summary		Cost Allocation			
Project	Project Letter	Project Description	Pipe Type	Type	Length (m)	Diameter (mm)	Total Project Cost	Priority	Total BTE Cost	Total DC Cost	Total Developer Cost	Council Project Type
W-M-20	A	727 m of new 300 mm watermain along Barrick Road to West Side Road.	Watermain	Growth	727	300	$2,871,000	Low	$0	$0	$2,871,000	Growth
W-M-21	A	802 m of new 200 mm watermain along Oxford Boulevard to Parkside Drive.	Watermain	Growth	802	200	$2,767,000	Low	$1,383,500	$1,383,500	$0	Growth
W-M-21	B	733 m of new 300 mm watermain along Parkside Drive and Meadowlark Drive.	Watermain	Growth	733	300	$2,631,000	Low	$0	$0	$2,631,000	Growth
W-M-21	C	61 m of new 150 mm watermain along Westfield Place.	Watermain	Growth	61	150	$201,000	Low	$0	$0	$201,000	Growth
W-M-21	D	66 m of new 150 mm watermain along Aintree Place.	Watermain	Growth	66	150	$217,000	Low	$0	$0	$217,000	Growth
W-M-21	E	578 m of new 200 mm watermain along Sherwood Drive and Springside Drive.	Watermain	Growth	578	200	$1,886,000	Low	$0	$0	$1,886,000	Growth
W-M-21	F	321 m of new 150 mm watermain along Springside Drive.	Watermain	Growth	321	150	$1,048,000	Low	$0	$0	$1,048,000	Growth
W-M-21	G	292 m of new 150 mm watermain along Parkside Drive.	Watermain	Growth	292	150	$953,000	Low	$0	$0	$953,000	Growth
W-M-22	A	1443 m of new 300 mm watermain along Main Street East.	Watermain	Growth	1,443	300	$5,698,000	Low	$0	$5,698,000	$0	Growth
W-M-22	B	892 m of new 300 mm watermain along Lorraine Road.	Watermain	Growth	892	300	$3,327,000	Low	$0	$3,327,000	$0	Growth
W-M-22	C	507 m of new 200 mm watermain along Lorraine Road.	Watermain	Growth	507	200	$1,654,000	Low	$0	$1,654,000	$0	Growth
W-M-22	D	1036 m of new 300 mm watermain along Killaly Street East.	Watermain	Growth	1,036	300	$3,978,000	Low	$397,800	$3,580,200	$0	Growth
W-M-22	E	Upsizing of 610 m of 300 mm watermain along Killaly Street East.	Watermain	Upsizing	610	300	$2,342,000	Low	$234,200	$2,107,800	$0	Growth
W-M-22	F	28 m of new 300 mm watermain connecting existing Elizabeth Street Region watermain to East growth lands.	Watermain	Growth	28	300	$110,000	Low	$11,000	$99,000	$0	Growth
W-M-23	A	5253 m of new 500 mm watermain along ESEL Lands.	Watermain	Growth	5,253	500	$27,052,000	Low	$0	$27,052,000	$0	Growth
W-M-27	B	Replacement of 588 m of 200 mm watermain along for watermain breaks.	Watermain	Replacement	588	200	$2,522,000	Low	$2,522,000	$0	$0	Growth
W-M-27	C	Replacement of 232 m of 250 mm watermain along for watermain breaks.	Watermain	Replacement	232	250	$1,262,000	Low	$1,262,000	$0	$0	Growth
W-M-27	D	Replacement of 208 m of 300 mm watermain along for watermain breaks.	Watermain	Replacement	208	300	$1,221,000	Low	$1,221,000	$0	$0	Growth

6 Stormwater Servicing Strategy

6.1 Opportunities and Constraints

Existing and future stormwater opportunities and constraints were identified through discussions with City staff, review of available GIS and infrastructure data, and preliminary hydraulic analyses.

System Understanding and Capacity

- The stormwater system is primarily managed by the City, with designed portions generally conveying flows effectively to outlets.
- Non-designed and semi-designed systems, particularly in older neighbourhoods, contribute to localized flooding during higher-intensity rainfall events.
- System configuration and condition are uncertain in some areas, with a mix of design standards and incomplete documentation.
- Outlet capacity is influenced by downstream water levels in Lake Erie and the Welland Canal, particularly in low-lying areas (<177 m).

Constraints

- Non-designed systems with limited formal overland flow routes.
- Constrained outlet capacity due to lake and canal water levels.
- Localized flooding in older neighbourhoods with inadequate conveyance.
- Uncertainty in system configuration and condition across much of the network.
- High cost and complexity associated with system upgrades, making full system replacement infeasible.
- Prioritization required based on risk and history of flooding issues.

Opportunities

- Targeted upgrades in older and non-designed areas to improve conveyance and reduce reliance on overland flow.
- Focus on trunk conveyance improvements to outlets, where practical, to maximize system performance.
- Develop a long-term rehabilitation and replacement strategy to manage improvements over time.
- Coordinate stormwater improvements with broader City infrastructure initiatives to optimize investment.

- Apply consistent design criteria and performance standards in new development and infill areas to maintain or improve current service levels.

6.2 Preferred Stormwater Servicing Strategy

The preliminary preferred stormwater servicing strategy is organized into major drainage areas and local servicing areas, with both system-wide and localized upgrades identified. The strategy has been developed to address existing deficiencies, while ensuring that future growth, expansion, and intensification are accommodated in a manner that maintains or improves post-development conditions relative to existing conditions.

A summary of the preliminary preferred stormwater servicing strategy is as follows:

Major Drainage Areas:

- **Clark Street Drainage Area:** Implement trunk sewer realignment along Russell Avenue, full reconstruction of the local sewer network north of Killaly Street to improve reliability.
- **Clark Street Outlet:** Undertake capacity upgrades, implement flood protection and storage improvements, and integrate real-time control measures to optimize system performance.
- **Elm Street & King Street North:** Implement outlet flood protection measures and targeted local sewer upgrades, including new trunk sewers along Neff Street and Fielden Avenue, and local improvements along Charles, Minto, and Erie Streets.
- **Elm Street & King Street South:** Inspect and rehabilitate outlets to maintain structural integrity and implement flow protection measures to enhance reliability.
- **Sugarloaf Area**: Implement outlet flood protection and improve conveyance to existing outlets, including construction of new trunk sewers along Rosemount Avenue, Sugarloaf Street, and Stanley Street, upgrades on Steele Street and Ash Street, and partial flow diversion to reduce trunk demand.

Local Servicing Areas:

- **Chippawa Road Area:** Address existing capacity limitations and improve overall system reliability by redirecting flows to the Wellington Street trunk sewer, upgrading the Wellington Street sewer to provide adequate conveyance, and implementing localized drainage improvements along Chippawa Road and Berkey Avenue.
- **Third Avenue Area:** Improve local conveyance and reduce flooding risk through targeted upgrades to sewers and roadside ditches along Killaly Street and West Side

Road, drainage improvements along Third Avenue and Sheba Crescent, and coordination with planned growth.

- **Omer Avenue Area:** Enhance system capacity and performance through construction of new sub-trunk sewers along Fielden Avenue and Omer Avenue/Steele Street, partial flow re-direction along Main Street, and coordinated timing with planned wastewater upgrades.
- **Lakeshore Road Area:** Maintain overall system performance by relying on available outlet capacity, while recognizing potential impacts from elevated lake levels. Improvements to Lakeshore Road West have addressed previous conveyance constraints, and no major upgrades are currently recommended beyond monitoring and minor localized improvements as needed.

Outlet Upgrades

- **Capacity Upgrades:** Implement capacity upgrades to the Bell Street and Rosemount Avenue outfalls to accommodate increased peak flows due to the upgrading of the existing non-designed and semi-designed systems.
- **Flooding Protection:** For existing outlets discharging to Lake Erie and the Welland Canal south of Lock 8, rehabilitate and install new backflow protection to protect against high lake level conditions
- **New Outlet:** Explore potential overflow option for the Quary Ponds.

The strategies summarized above will require additional, subcatchment-specific investigations and fieldwork to refine design details, confirm infrastructure requirements, and finalize implementation priorities.

6.3 Stormwater Capital Program Summary

The preferred stormwater servicing strategy has been developed to support the servicing needs of the existing and future growth areas within the City of Port Colborne. The capital costs for each project of the Preferred Strategy were estimated according to the costing methodology within **Volume 2**. A detailed listing of all projects, including individual project numbers, is provided in **Table 6-3** and **Table 6-4**. **Table 6-1** summarizes the projects by Area. **Table 6-2** further summarizes the capital program by Benefit to Existing classification, distinguishing projects that primarily address existing system needs from those required to support growth-related servicing requirements.

Table 6-1: Capital Program Summary by Project Type

	Length	Estimated Cost ($)
Omer	1,155	$ 5,659,000
King Street	1,520	$ 6,679,000
Sugarloaf	2,766	$ 24,241,000
Clarke	4,887	$ 25,304,000
Chippawa	784	$ 2,832,000
Third Ave	634	$ 2,823,000
Lakeshore	359	$ 1,206,000
Corvette	158	$ 484,000
Total	**12,262**	**$ 69,228,000**
Outlet Improvements		**$ 10,594,000**

Table 6-2: Benefit to Existing Summary

	% DC Eligible Cost	Estimated Cost ($)
BE-1	100	$ -
BE-2	90	$ 16,927,000.00
BE-3	70	$ 4,388,000.00
BE-4	50	$ 4,623,000.00
BE-5	20	$ 45,608,000.00
BE-6	0	$ 8,276,000.00
Total		**$ 79,822,000.00**

Table 6-3: Stormwater Capital Program Summary

Description					Infrastructure Details					Cost Summary		
Project	Project Letter	Project Description	Area	Type	Pipe Type	Length (m)	Diameter (mm)	Total Project Cost	Priority	Total BTE Cost	Total DC Cost	Total Developer Cost
S-W-06	A	Local Servicing Study - Clarke	Clarke	Study				$150,000	High	$45,000	$105,000	$0
S-W-28	A	Local Sewer Upgrade Allowance - Clarke Area	Clarke	Sewer	Storm Sewer	200	600	$933,000	Low	$933,000	$0	$0
S-W-29	A	Trunk Sewer Re-Alignment - Clarke Area	Clarke	Trunk	Storm Sewer	264	1,200	$1,839,000	High	$1,471,200	$367,800	$0
S-W-29	B	Trunk Sewer Re-Alignment - Clarke Area	Clarke	Trunk	Storm Sewer	241	1,500	$2,920,000	High	$2,336,000	$584,000	$0
S-W-29	C	Trunk Sewer Re-Alignment - Clarke Area	Clarke	Trunk	Storm Sewer	177	1,850	$2,655,000	High	$2,124,000	$531,000	$0
S-W-30	A	Culvert Replacement - Clarke Area	Clarke	Trunk	Storm Sewer	60	2,100	$1,517,000	High	$1,213,600	$303,400	$0
S-W-30	B	Culvert Replacement - Clarke Area	Clarke	Trunk	Storm Sewer	100	2,100	$1,244,000	High	$995,200	$248,800	$0
S-W-30	C	Outlet Upgrade and Flood Protection - Clarke	Clarke	Outlet	Storm Sewer	75	2,100	$1,350,000	High	$1,080,000	$270,000	$0
S-W-31	A	Ditch - Rehab and Excavation	Clarke	Storage	Storm Sewer	199		$183,000	High	$146,400	$36,600	$0
S-W-31	B	Ditch - Rehab and Excavation	Clarke	Storage	Storm Sewer	254		$234,000	High	$187,200	$46,800	$0
S-W-31	C	Ditch - Rehab and Excavation	Clarke	Storage	Storm Sewer	149		$138,000	High	$110,400	$27,600	$0
S-W-31	D	Ditch - Rehab and Excavation	Clarke	Storage	Storm Sewer	118		$110,000	High	$88,000	$22,000	$0
S-W-32	A	Local Sewer Reconstruction - Clarke Area	Clarke	Sewer	Storm Sewer	237	300	$937,000	Low	$749,600	$187,400	$0
S-W-32	B	Local Sewer Reconstruction - Clarke Area	Clarke	Sewer	Storm Sewer	229	300	$904,000	Low	$723,200	$180,800	$0
S-W-32	C	Local Sewer Reconstruction - Clarke Area	Clarke	Sewer	Storm Sewer	235	300	$929,000	Low	$743,200	$185,800	$0
S-W-32	D	Local Sewer Reconstruction - Clarke Area	Clarke	Sewer	Storm Sewer	238	450	$995,000	Low	$796,000	$199,000	$0
S-W-32	E	Local Sewer Reconstruction - Clarke Area	Clarke	Sewer	Storm Sewer	220	600	$1,063,000	Low	$850,400	$212,600	$0
S-W-32	F	Local Sewer Reconstruction - Clarke Area	Clarke	Sewer	Storm Sewer	230	600	$1,111,000	Low	$888,800	$222,200	$0
S-W-32	G	Local Sewer Reconstruction - Clarke Area	Clarke	Sewer	Storm Sewer	258	450	$1,077,000	Low	$861,600	$215,400	$0
S-W-32	H	Local Sewer Reconstruction - Clarke Area	Clarke	Sewer	Storm Sewer	251	450	$1,048,000	Low	$838,400	$209,600	$0
S-W-32	I	Local Sewer Reconstruction - Clarke Area	Clarke	Sewer	Storm Sewer	258	300	$1,019,000	Low	$1,019,000	$0	$0
S-W-32	J	Local Sewer Reconstruction - Clarke Area	Clarke	Sewer	Storm Sewer	244	300	$966,000	Low	$772,800	$193,200	$0
S-W-33	A	Local Sewer Reconstruction - Clarke Area	Clarke	Sewer	Storm Sewer	269	600	$1,263,000	High	$378,900	$884,100	$0
S-W-33	B	Local Sewer Reconstruction - Clarke Area	Clarke	Sewer	Storm Sewer	196	525	$885,000	High	$265,500	$619,500	$0
S-W-33	C	Local Sewer Reconstruction - Clarke Area	Clarke	Sewer	Storm Sewer	261	425	$1,058,000	High	$317,400	$740,600	$0
S-W-49	A	Johnston Street Pump Station - RTC	Clarke	Storage		1		$126,000	Low	$63,000	$63,000	$0

Table 6-4: Stormwater Pond and Low Impact Development Capital Program Summary

Description		Scope		Total Cost Summary		Cost Allocation		
Project	Project Description	Project Type	Quantity (m3)	Total Project Cost	Priority	Total BTE Cost	Total DC Cost	Total Developer Cost
S-W-M-01	655 m3 SWM pond.	SW Pond	655	$1,174,000	Triggered By Local Developer	$0	$0	$1,174,000
S-W-M-02	1725 m3 SWM pond.	SW Pond	1,725	$1,227,000	Triggered By Local Developer	$0	$0	$1,227,000
S-W-M-03	4499 m3 SWM pond.	SW Pond	4,499	$1,139,000	Triggered By Local Developer	$0	$0	$1,139,000
S-W-M-04	15367 m3 SWM pond.	SW Pond	15,367	$1,898,000	Triggered By Local Developer	$0	$0	$1,898,000
S-W-M-05	11907 m3 SWM pond.	SW Pond	11,907	$1,898,000	Triggered By Local Developer	$0	$0	$1,898,000
S-W-M-06	2993 m3 SWM pond.	SW Pond	2,993	$1,139,000	Triggered By Local Developer	$0	$0	$1,139,000
S-W-M-07	10107 m3 SWM pond.	SW Pond	10,107	$1,898,000	Triggered By Local Developer	$0	$0	$1,898,000
S-W-M-08	6352 m3 SWM pond.	SW Pond	6,352	$1,139,000	Triggered By Local Developer	$0	$0	$1,139,000
S-W-M-09	509 m3 SWM pond.	SW Pond	509	$1,227,000	Triggered By Local Developer	$0	$0	$1,227,000
S-W-M-10	694 m3 SWM pond.	SW Pond	694	$1,227,000	Triggered By Local Developer	$0	$0	$1,227,000
S-W-M-11	1417 m3 SWM pond.	SW Pond	1,417	$1,227,000	Triggered By Local Developer	$0	$0	$1,227,000
S-W-M-12	1675 m3 SWM pond.	SW Pond	1,675	$1,227,000	Triggered By Local Developer	$0	$0	$1,227,000
S-W-M-13	774 m3 SWM pond.	SW Pond	774	$1,227,000	Triggered By Local Developer	$0	$0	$1,227,000
S-W-M-14	68126 m3 SWM pond.	SW Pond	68,126	$2,705,000	Triggered By Local Developer	$0	$0	$2,705,000
S-W-M-15	68126 m3 SWM pond.	SW Pond	68,126	$2,705,000	Triggered By Local Developer	$0	$0	$2,705,000
S-W-M-16	70721 m3 SWM pond.	SW Pond	70,721	$2,705,000	Triggered By Local Developer	$0	$0	$2,705,000
S-W-M-17	20101 m3 SWM pond.	SW Pond	20,101	$1,898,000	Triggered By Local Developer	$0	$0	$1,898,000
S-W-M-18	127812 m3 SWM pond.	SW Pond	127,812	$2,705,000	Triggered By Local Developer	$0	$0	$2,705,000
S-W-M-19	48674 m3 SWM pond.	SW Pond	48,674	$1,898,000	Triggered By Local Developer	$0	$0	$1,898,000
S-W-M-20	111610 m3 SWM pond.	SW Pond	111,610	$2,705,000	Triggered By Local Developer	$0	$0	$2,705,000
S-W-M-21	36212 m3 SWM pond.	SW Pond	36,212	$1,898,000	Triggered By Local Developer	$0	$0	$1,898,000
S-W-M-22	36212 m3 SWM pond.	SW Pond	36,212	$1,898,000	Triggered By Local Developer	$0	$0	$1,898,000
S-W-M-23	4166 m3 SWM pond.	SW Pond	4,166	$1,139,000	Triggered By Local Developer	$0	$0	$1,139,000
S-W-M-24	12156 m3 SWM pond.	SW Pond	12,156	$1,898,000	Triggered By Local Developer	$0	$0	$1,898,000
S-W-M-25	8642 m3 SWM pond.	SW Pond	8,642	$1,139,000	Triggered By Local Developer	$0	$0	$1,139,000

6.3.1 Local Stormwater Network

The Capital Program identifies approximately 8 km of trunk storm system upgrades within the existing undesigned and semi-designed system, which can support future upgrades to the local stormwater system to improve the level of service provided. Approximately 17 km of additional local stormwater system upgrades, representing a potential additional $54M investment requirement to replace, rehabilitate, and upgrade the local stormwater collection system, are estimated to be required to improve the level of service within the existing undesigned and semi-designed system. A summary of potential additional local sewer lengths by neighbourhood and associated high-level costs is provided in **Table 6-5**.

Table 6-5: Local Stormwater Network Sewer Lengths and Costs

Neighbourhood	Sewer Length[1] (m)	Estimated Cost ($M)
Clarke	*Captured in Capital Program Project S-W-32 and S-W-33*	*($13.3 M)*
Elm & King North	6,500	$22.1M
Elm and King South	4,000	$13.6M
Sugarloaf	4,000	$11.7M
Omer	1,500	$3.7M
Chippawa	400	$1.1M
The Island	700	$1.9M

1- Lengths are approximate for the purposes of high-level budgetary estimation.

6.3.2 Outfall Flood Control

The Capital Program identifies the installation of flood control measures at multiple major outlets discharging to Lake Erie and the Welland Canal. These flood control structures would consist of flap gates (or other similar structures) that would prevent high levels from backing up into the system. The City will need to undertake appropriate inspection and assessment work to confirm the presence and condition of existing flood control structures and identify the most appropriate construction and/or rehabilitation measures to achieve the desired objectives.