Prepared by:

Town of South Bruce Peninsula
2015 Water, Wastewater and Stormwater Master Servicing Plan Study and Gould Street Sanitary Sewer Upgrade Class Environmental Assessment

Town of SOUTH BRUCE PENINSULA

FINAL

GMBP File: 214128

November 6, 2015

GUELPH | OWEN SOUND | LISTOWEL | KITCHENER | EXETER | HAMILTON | GTA
1260-2ND AVE. E., UNIT 1, OWEN SOUND ON N4K 2J3 P: 519-376-1805 WWW.GMBLUEPLAN.CA

Executive Summary - Introduction

Background

Wiarton is a small community located in the Town of South Bruce Peninsula on the west shores of Colpoy's Bay, an inlet off Georgian Bay. The existing population in Wiarton is currently approximately 2,291 (2011 Census). There is a significant amount of growth planned for Wiarton which largely consists of residential units in Greenfield areas with some intensification areas. The largest planned growth area is the South Lands which has a retirement subdivision development application.

The Master Servicing Plan (MSP) for water, wastewater and stormwater services is being undertaken to identify a preferred strategy to support existing servicing needs and projected growth in Wiarton. This MSP sets out to develop, evaluate, and select a preferred water, wastewater and stormwater servicing strategy to support existing needs and projected development within the community of Wiarton to the year 2029.

The Gould Street Sanitary Sewer Upgrade Class EA is also being carried in parallel to this MSP and is intended to inform the process of identifying, evaluating and selecting the preferred wastewater servicing strategy to meet both short and long term servicing needs of Wiarton.

The Town of South Bruce Peninsula owns and operates its own water system, which draws water from Colpoy's Bay, located on Georgian Bay. The maintenance of the water and wastewater systems is completed under contract by the Ontario Clean Water Agency (OCWA).

Wiarton is located in Southern Ontario, 30 kilometres from the City of Owen Sound and 210 kilometres from the City of Toronto. The Master Servicing Plan study area covers the urban area of Wiarton as shown in Figure ES.1.

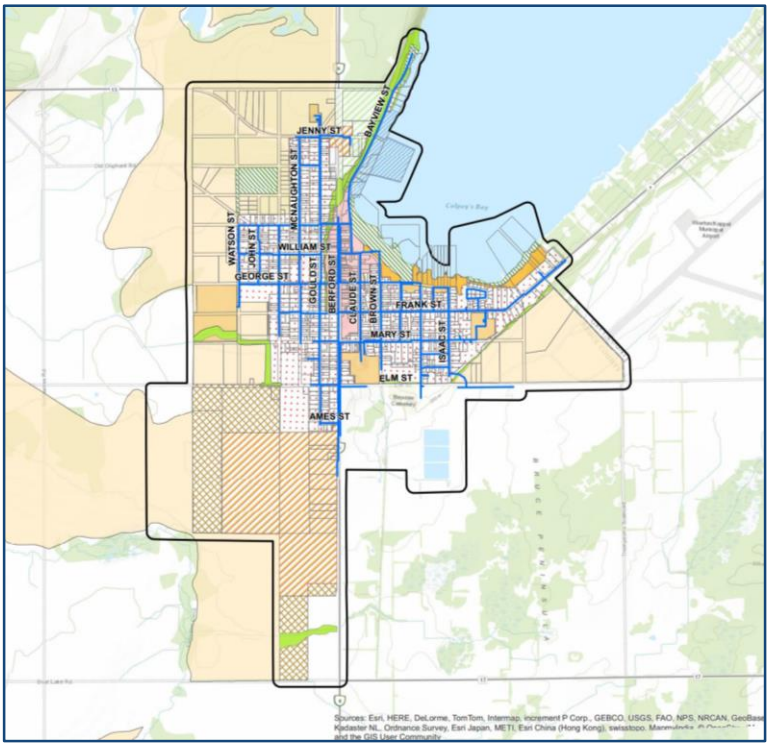


Figure ES.1. Study Area

Objectives

Master Servicing Plan

The Master Servicing Plan for water, wastewater and stormwater services comprehensively documents the development, evaluation and selection of the preferred servicing strategies to meet the servicing needs of the community.

The key objectives of the Wiarton Master Servicing Plan (MSP) are to:

- Define how developments are to be serviced and identify what components are to be provided by the Town and by the Developer
- Provide the preferred servicing strategy for the remaining vacant land south of the Town and for infilling within the existing developed areas
- Provide infrastructure planning tools (hydraulic models) for use in analyzing future development proposals
- Provide a capital works program for the upgrade of existing services
- Complete the MEA Class EA process for all Schedule A, A+ and B projects
- Define any Schedule C projects required to meet development goals and identify the timing for these projects
- Provide a capital cost estimate for all servicing components

The study takes into consideration all potential future developments when recommending upgrades to existing systems. Priority has been given to upgrades that support development. The MSP is based on existing and available system information.

Gould Street Sanitary Sewer Upgrade Class EA

The Gould Street Sanitary Sewer Upgrade Class EA is being carried out in conjunction with this MSP and is intended to inform the process of identifying, evaluating and selecting the preferred wastewater servicing strategy to meet the servicing needs of Wiarton.

Specifically, the Gould Street Sanitary Sewer Upgrade Class EA aims to:

- Document the process undertaken to identify, evaluate and select a preferred solution to address the existing Gould Street Sanitary Sewer while ensuring that it aligns with the long term wastewater servicing strategy
- Complete a transparent and comprehensive EA process with effective public and agency consultation, engagement and input; and,
- Provide Project File (s) as supporting documentation for any Schedule A, A+ and B projects identified

Problem/Opportunity Statement

Master Servicing Plan

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

- *There is significant development being considered in the Wiarton area. To define how developments are to be serviced, a comprehensive Master Servicing Plan for stormwater, wastewater, and water systems is being undertaken;*

- *The current capacity of the system is uncertain; thus, there is a need to identify the current capacity of existing water, wastewater, and stormwater services; and,*
- *Upgrades of the existing systems are required and the master plan will ensure that services are implemented in a timely manner.*

Gould Street Sanitary Sewer Upgrade Class EA

The problem/opportunity statement for the Gould Street Sanitary Sewer Upgrade Class EA expands on the problem/opportunity statement for the MSP as follows:

- *There is an existing sanitary sewer that is in very poor condition located on private property that conveys flows from the west area to SPS#1 and needs to be addressed;*
- *Analysis of the wastewater system has confirmed that existing peak flows exceed the pumping and forcemain capacity out of SPS#1. There is opportunity through the long term wastewater servicing strategy to reduce extraneous flows in the system; and,*
- *There is opportunity to optimize use of the existing wastewater system, leverage planned infrastructure capacity, and minimize the need for infrastructure upgrades.*

Documentation Layout

The Wiarton Master Servicing Plan and Gould Street Sanitary Sewer Upgrade Class EA Report is the documentation placed on public record for public review. The documentation describes all required phases of the planning process.

The Master Servicing Plan Report is organized into six chapters:

1. Introduction
2. Background and Planning Context
3. Water Master Servicing Plan
4. Wastewater Master Servicing Plan
5. Stormwater Master Servicing Plan

Chapter 1 – Introduction

Chapter 1 provides a brief overview of the Wiarton Master Servicing Plan. It summarizes the information contained in Chapters 2, 3, 4, 5, and 6, including problem statement, purpose of the study, significant planning, environmental and technical considerations, description of the analysis performed and final solutions and recommendations.

Chapter 2 – Background and Planning Context

Chapter 2 details the master planning process including related studies, legislative and policy planning context, and water, wastewater and stormwater servicing principles and policies. This chapter also introduces the existing infrastructure conditions for the water, wastewater and stormwater systems.

Chapter 3 – Water Master Servicing Plan

Chapter 3 focuses on the water system and provides the approach, methodologies, technical analyses, evaluation and selection of the preferred water servicing strategy. This chapter outlines the water policies, design criteria and level of service needed to be achieved by the water distribution system. Further in Chapter 3 is the detailed evaluation and decision-making as well as the preferred water servicing strategy and associated capital program.

Chapter 4 – Wastewater Master Servicing Plan

Chapter 4 focuses on the wastewater system and provides the approach, methodologies, technical analyses, evaluation and selection of the preferred wastewater servicing strategy. This chapter outlines the wastewater policies, design criteria and level of service relevant to the wastewater collection system. Further in Chapter 4 is the detailed evaluation and decision-making as well as the preferred wastewater servicing strategy and associated capital program.

Chapter 4 also includes the documentation supporting the Gould Street Sanitary Sewer Upgrade Class EA, and rationale within the context of this MSP. Detailed documentation supporting the Schedule 'B' project identified through the Master Plan and Class EA process is provided in the Project File provided in Appendix I.

Chapter 5 – Stormwater Master Servicing Plan

Chapter 5 focuses on the stormwater system and provides the approach, methodologies, technical analyses, evaluation and selection of the preferred stormwater management strategy. This chapter outlines the stormwater policies, design criteria and level of service needed to be achieved by the stormwater system. Further in Chapter 5 is the detailed evaluation and decision-making as well as the preferred stormwater management strategy and associated capital program.

Background and Planning Context

Master Planning Process

The Municipal Engineer's Association (MEA) Municipal Class Environmental Assessment (EA) process defines approaches for completing master plans within the context of the Class EA process. This Master Servicing Plan (MSP) is based on Approach 2, which involves preparing a master plan document at the conclusion of Phases 1 and 2 of the Class EA process. This approach allows for all Schedule A, A+ and specific Schedule B projects identified in the Master Servicing Plan to move forward to implementation.

The MSP provides systematic evaluation and documentation to support any identified Schedule B Class EA requirements with applicable review agency commitments prior to their respective implementation. As well, the MSP will identify required Schedule B and C projects that will proceed with separate studies to fully meet the Class EA requirements and allow for greater detail in the evaluation of alternatives and design concepts. Schedule C projects will continue to Phases 3 and 4 of the Class EA process with an Environmental Study Report (ESR) filed for public review.

"Class" Environmental Assessments (Class EAs) were approved by the Minister of the Environment in 1987 for municipal projects having predictable and mitigable impacts. The Municipal Class EA process was revised and updated in 1993, 2000, 2007 and 2010. The Class EA approach streamlines the planning and approvals process for municipal projects that are:

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

The Municipal Class Environmental Assessment, prepared by the Municipal Engineers Association (October 2000, as amended in 2007 and 2010), outlines the procedures to be followed to satisfy Class

EA requirements for water, wastewater, stormwater management and road projects. The Class EA process includes five phases:

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

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

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

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

- Master plans are broad in scope and focus on the analysis of a system for the purpose of outlining a framework for the provision of future works and developments;
- Specific projects recommended in a master plan are part of a larger management system and are distributed geographically throughout the study area. The implementation of specific projects may occur over an extended time frame; and,
- Unlike an individual project, a Master Servicing Plan itself cannot be subject to a Part II Order or a "bump-up" request, as it is not a "Scheduled" activity. The MSP follows the EA process, but is not intended to build a project at the outcome.

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

This Master Servicing Plan is the first of its kind in Wiarton and has incorporated information gathered through previous studies to present a long term municipal servicing strategy for the study area. The approach of this Master Servicing Plan is to:

- Establish a baseline understanding of the study area and its water, wastewater and stormwater systems
- Identify opportunities and constraints in the existing water, wastewater and stormwater systems
- Assess infrastructure capacity to service future growth using planning projections provided by the Town
- Identify and evaluate alternative servicing strategies to select a preferred servicing strategy for the water, wastewater and stormwater systems

This approach was scrutinized through a public and agency consultation process and is fully documented.

Growth Projections

Population growth including intensification, in the form of population or 'units' and spatial area, was supplied by the Town. There were no employment projections provided.

Table 1. Population Growth by Area

Growth Area Description	Residential Growth Units (@2.5 ppu)	Residential Growth Population	Employment Growth	Comment
Division St	24	60	0	
McNaughton St	50	125	0	intensification
Frank St 1	34	85	0	
Elm St 1	28	70	0	
William St	20	50	0	
Elm St 2	16	40	0	intensification
Frank St 2	20	50	0	
Retirement Subdivision	1,500 [1]	2,850	0	
Centennial Cr	43	108	0	
TOTALS	**1,735**	**3,438**	**0**	

[1] Growth Units @1.9 persons per unit (ppu).

Water Master Servicing Plan

Existing Water System

Wiarton draws all of its municipal water supply from Georgian Bay and treats it at the Wiarton Water Treatment Plant (WTP) located at the north end of Bayview St at Colpoy's Bay. The plant is operated by the Ontario Clean Water Agency (OCWA). The Wiarton WTP also provides treated water to Oxenden (via the Wiarton system) and Oliphant (via truck transportation). Oxenden consists of seasonal and permanent homes with 171 connections and 23 vacant lots. Oliphant consists of approximately 225 residents.

Design Criteria

The design criteria was reviewed as part of this Master Servicing Plan to ensure water demands are accurate and will support sizing and timing of future infrastructure such as pipes and facilities. Table 2 summarizes the Town of South Bruce Peninsula water design criteria used at a Master Servicing Planning level.

Table 2. Water Design Criteria

Scenario	Average Day Demand	Maximum Day Factor[1]	Peak Hour Factor[1]
Existing Residential / Employment	450 L/employee/day	2.25 (for communities of size 2,001-3000)	3.38 (for communities of size 2,001-3000)
Future Residential / Employment	450 L/person/day	2.0 (for communities of size 3,001 – 10,000)	3.0 (for communities of size 3,001 – 10,000)

[1] *Based on MOECC peaking criteria.*

System fire flow requirements were based on MOECC criteria as follows:

- Existing Conditions: 110 L/s fire flow for 2 hours for a population of 2,291 (used 3,000)
- Future Conditions: 159 L/s fire flow for 3 hours for a population of 5,729 (used 6,000)

System fire flow requirements were developed based on a review of industry standards and Fire Underwriters Survey (FUS) criteria for the purpose of this Master Servicing Plan, as follows:

- Single Family Homes: 37 L/s
- Multi-Family Homes: 75 L/s
- Town Centre / Institutional: 120 L/s

Assessment of the water system under existing and future demand conditions indicate that:

- The Water Treatment Plant has sufficient capacity to support existing and future growth; and,
- The Water Tower has sufficient capacity to support requirements but should be monitored for available capacity as development comes online.

Preferred Water Servicing Strategy

Strategy 1 was determined to be the Preferred Water Servicing Strategy based on the 5-point evaluation to satisfy growth to 2029.

The main servicing needs for growth consists of upgrading conveyance infrastructure (on Gould St) to support growth in the South Lands area. The remainder of the proposed infrastructure is looping of watermains to improve level of service in the southwest end of the distribution system.

The main components that make up the Preferred Water Servicing Strategy consist of:

- New Lower Zone trunk watermain on Gould St to service South Lands and support future growth
- Looping of local watermains in the southwest area

Key benefits of the preferred Water Servicing Strategy include:

- Maximizing use of existing storage
- Reinforcing feed on Gould St, which will support future South Lands servicing needs
- Adding robustness to the existing water distribution system through looping of the network

The preferred Water Servicing Strategy can be seen in Figure 1. Each individual project is listed with its respective estimated capital cost in Table 3.

Capital Program for the Preferred Water Servicing Strategy

The capital projects are listed according to their project number and are shown in Table 3. Included in the Water Capital Program, is the project description, proposed timing, sizing, and estimated total project cost.

Implementation & Class EA Requirements

The Preferred Water Servicing Strategy will support the servicing needs of Wiarton to 2029. This Strategy will be implemented in accordance with each project's Class EA schedule. The Class EA requirements for each project have been identified in the Capital Program. Schedule A and A+ projects may move forward to design and construction, with A+ projects requiring public notification prior to implementation. The Preferred Water Strategy does not identify any Schedule B or Schedule C projects.

Approvals

All proposed projects are planned to be within the existing and future road rights of way and are subject to the road planning and approvals being met, including required investigations. It is recommended that all key projects undertake a pre-design consultation with the applicable review agencies. This early consultation prior to the detailed design will ensure sufficient technical and environmental information is available to support the preferred design and that the project scope is well understood. Ultimately this process will facilitate project approvals moving forward.

Town of SOUTH BRUCE PENINSULA

Wiarton Water, Wastewater and Stormwater Master Servicing Plan and Gould Street Sanitary Sewer Upgrade Class Environmental Assessment

Figure 13 - Preferred Water Servicing Strategy and Capital Program

N

JENNY ST
DANIEL ST
BAYVIEW ST
MCNAUGHTON ST
Division St
DIVISION ST
BOYD ST
WATSON ST
JOHN ST
DAWSON ST
WILLIAM ST
William St
McNaughton St
GEORGE ST
BERFORD ST
CLAUDE ST
SCOTT ST
TYSON ST
CENTENNIAL CR
Centennial Cr
FRANK ST
Frank St 2b
Frank St 2
Colpoy's Bay (Georgian Bay)
W05
Frank St 1
W01
BROWN ST
MARY ST
TAYLOR ST
ISAAC ST
CHARLES ST
EDWARD ST
W04
W06
W03
HUNTER ST
Elm St 2
W07
W02
GOULD ST
ELM ST
Elm St 1
AMES ST
Retirement Subdvn

Legend

- Proposed Watermain
- Existing Booster Pumping Station
- Existing Storage Facility
- Existing Watermain
- Pressure Zone 1
- Pressure Zone 2
- Phase I Growth Area
- Phase II Growth Area
- Property Parcel
- Master Servicing Plan Study Area
- Escarpment Natural Area
- Environmental Protection
- Special Policy Area

BluePlan ENGINEERING

214128-15-W
October 2015
Data Source: Town of South Bruce Peninsula
Scale: 1:10,000 | NAD 1983 UTM Zone 17N

WATER CAPITAL & IMPLEMENTATION PROGRAM

Project Number	Components	Project Name	Project Description	Project Trigger	Start Year	Year in Service	Class EA Schedule	Project Type	Size/ Capacity	Length (m)	Construction Assumption	Unit Cost (2014$)	Base Cost (2014$)	*Permitting, Environmental, Geotechnical, & Other (2014$)*	*Total Construction Cost (2014$)*	Total Engineering & Design (2014$)	Contingency (2014$)	Non Refundable HST (2014$)	Total Project Cost (2014$)	Grants and Subsidies (2014$)	Direct Developer Cost (2014$)	Benefit to Existing (2014$)	DC Comment
W01	Design and Construction	Gould St Watermain 1	1380 m - 250 mm watermain on Gould St from Division St to Ames St	Growth	2021	2021-2026	A+	WDM	250 mm	1380 m	Open Cut	$958	$1,323,000	$204,000	$1,526,000	$382,000	$153,000	$34,000	$2,095,000	$0	$2,095,000	$0	Project is triggered by growth to 2029. 250 mm watermain will strengthen transmission capacity to future development in the south. Project is not required for existing service area.
W02	Design and Construction	Elm St Watermain 2 (Looping)	270 m - 200 mm watermain on Elm St from existing 200 mm connecting to future McNaughton St Extension Watermain 3	Growth	2016	2016-2021	A+	WDM	150 mm	90 m	Open Cut	$776	$70,000	$25,000	$95,000	$24,000	$10,000	$2,000	$131,000	$0	$131,000	$0	Looping of watermains is triggered by intensification and greenfield growth to 2029. Project is intended to improve future level of service but is not required for existing service area.
W03	Design and Construction	McNaughton St & Future Extension Watermain 3 (Looping)	333 m - 200 mm watermain on future McNaughton St Extension from Elm St Watermain 2 to Mary St Extension Watermain 4	Growth	2016	2016-2021	A+	WDM	150 mm	333 m	Open Cut	$776	$258,000	$53,000	$312,000	$78,000	$31,000	$7,000	$428,000	$0	$428,000	$0	Looping of watermains is triggered by intensification and greenfield growth to 2029. Project is intended to improve future level of service but is not required for existing service area.
W04	Design and Construction	Mary St Extension Watermain 4 (Looping)	190 m - 200mm watermain on future Mary St Extension from McNaughton St Watermain 3 to existing 200 mm on Dawson St	Growth	2016	2016-2021	A+	WDM	150 mm	190 m	Open Cut	$776	$147,000	$51,000	$198,000	$50,000	$20,000	$4,000	$272,000	$0	$272,000	$0	Looping of watermains is triggered by intensification and greenfield growth to 2029. Project is intended to improve future level of service but is not required for existing service area.
W05	Design and Construction	Frank St Extension Watermain 5 (Looping)	333 m - 200 mm watermain on future Frank St Extension from Dawson St to Watson St	Growh	2016	2016-2021	A+	WDM	150 mm	244 m	Open Cut	$776	$189,000	$52,000	$241,000	$60,000	$24,000	$5,000	$330,000	$0	$330,000	$0	Looping of watermains is triggered by intensification and greenfield growth to 2029. Project is intended to improve future level of service but is not required for existing service area.
W06	Design and Construction	Dawson St Extension Watermain 6	297 m - 150 mm watermain on Dawson St Extension from Mary St to Elm St	Growh	2016	2016-2021	A+	WDM	150 mm	297 m	Open Cut	$776	$231,000	$52,000	$283,000	$71,000	$28,000	$6,000	$388,000	$0	$388,000	$0	Extension of water distribution network is intended to improve security of supply to South Lands development and is intended to align with works proposed under the preferred wastewater servicing strategy.
W07	Design and Construction	Elm St Watermain 7	542 m - 200 mm watermain on Elm St from west of Gould St to west limit of South Lands development	Growh	2016	2016-2021	A+	WDM	200 mm	542 m	Open Cut	$863	$467,000	$89,000	$557,000	$139,000	$56,000	$12,000	$764,000	$0	$764,000	$0	Extension of water distribution network is intended to improve security of supply to South Lands development and is intended to align with works proposed under the preferred wastewater servicing strategy.
TOTAL														**$526,000**	**$3,212,000**	**$804,000**	**$322,000**	**$70,000**	**$4,408,000**	**$0**	**$4,408,000**	**$0**	

Note: Water Tower is approaching capacity at full buildout and will require monitoring as development occurs.

Wastewater Master Servicing Plan

Existing Wastewater System

Wiarton generally employs a gravity-based wastewater collection and treatment system that conveys wastewater flows from the Wiarton area to a series of sewage pumping stations, which due topographic constraints, are in place to direct the flows from the shoreline of the Georgian Bay to the treatment facility on top of the Niagara Escarpment. Treated flow is then conveyed to its final destination in Georgian Bay.

Design Criteria

Table 4 summarizes the wastewater design criteria utilized as part of this MSP for both new development areas and existing service areas.

Table 4. Wastewater Design Criteria for New Growth Areas

Scenario	Average Day Flow	Peaking Factor	Wet Weather Infiltration Rate
Existing	450 L/person/day	Harmon (min 2.0, max 4.0)	0.69 L/s/ha
Future	450 L/person/day	Harmon (min 2.0, max 4.0)	0.23 L/s/ha

This criteria is considered generally in agreement with other municipalities in Southern Ontario.

Preferred Wastewater Servicing Strategy

Several separate wastewater servicing components are recommended throughout Wiarton that collectively make up the overall Preferred Wastewater Servicing Strategy. **Wastewater Servicing Strategy – Alternative 2b** was selected as the preferred Servicing Strategy based on the 5-point evaluation to satisfy growth to 2029.

Greenfield growth within 2029 extends south of Elm St, west of Gould St. The preferred wastewater servicing strategy focuses on infrastructure improvements within this area, including a new sewage pumping station near the corner of Elm St and Dawson St, a sanitary forcemain, and a gravity sewer on Elm St. In addition, a local network of gravity sewers along future road alignments south of Elm St will be required to drain the future growth flows north to the trunk sewer.

As an interim solution to addressing the condition of the existing sanitary sewer between Gould Street and Berford Street north of Frank Street, the preferred strategy includes a sanitary sewer to re-direct flows from Gould Street north of Frank Street to Frank Street and Berford Street. This will address the restriction at the Gould Street location but maintains the transfer of flow to SPS#1. This sanitary sewer would be constructed in the short term, in advance of all other servicing components.

The components that make up the preferred wastewater servicing strategy are summarized as follows:

- New Gravity Sewer on Gould St and Frank St, as interim solution to re-direct flows from Gould Street north of Frank St to Frank Street and Berford Street, abandoning the existing sanitary sewer on the easement between Gould Street and Berford Street north of Frank Street (flow would continue be conveyed to SPS#1)
- New Gravity Sewer on Frank St and Dawson St, as long term solution to divert west area flows away from SPS#1
- New sewage pumping station SPS#3 and forcemain to Berford Street to service the South Lands and to convey west area flows

- New Gravity Sewers on Elm Street to convey South Lands flow to SPS#3 and to convey flows from SPS#3 to SPS#2
- Extraneous flow abatement through long term I&I reduction program (assuming 10 disconnections per year)

As part of the Preferred Strategy, several benefits of diverting flow to the new SPS#3 and reducing inflow and infiltration flow should be noted including:

- Avoids upgrading existing SPS#1 and forcemain on Taylor St
- Reduces CSOs to Colpoy's Bay
- Reduces likelihood of basement flooding to shoreline areas
- Avoids twinning sewer sections within the downtown area

Inflow and Infiltration reduction initiatives are recommended throughout Wiarton as part of the Preferred Wastewater Servicing Strategy. As such, capacity upgrades were not flagged at SPS#2 due to the anticipated abatement of I/I ingressing the sanitary sewer system and the potential ability for the station's peak wet weather flows to remain within its firm capacity.

The Preferred Wastewater Servicing Strategy is shown in Figure 2.

Capital Program for the Preferred Wastewater Servicing Strategy

The Preferred Wastewater Servicing Strategy has been developed to satisfy the existing and growth areas within Wiarton to 2029. The capital projects are listed according to their project number and are shown in Table 5. The Capital Program Table also contains the project description, proposed timing, size and estimated total project cost.

Implementation & Class EA Requirements

The Preferred Wastewater Servicing Strategy will support the servicing needs of Wiarton's Greenfield and urban growth to 2029. This Strategy will be implemented in accordance with each projects Class EA schedule. The Class EA requirements for each project have been identified in the Capital Program. Schedule A and A+ projects may move forward to design and construction, with A+ projects requiring public notification prior to implementation.

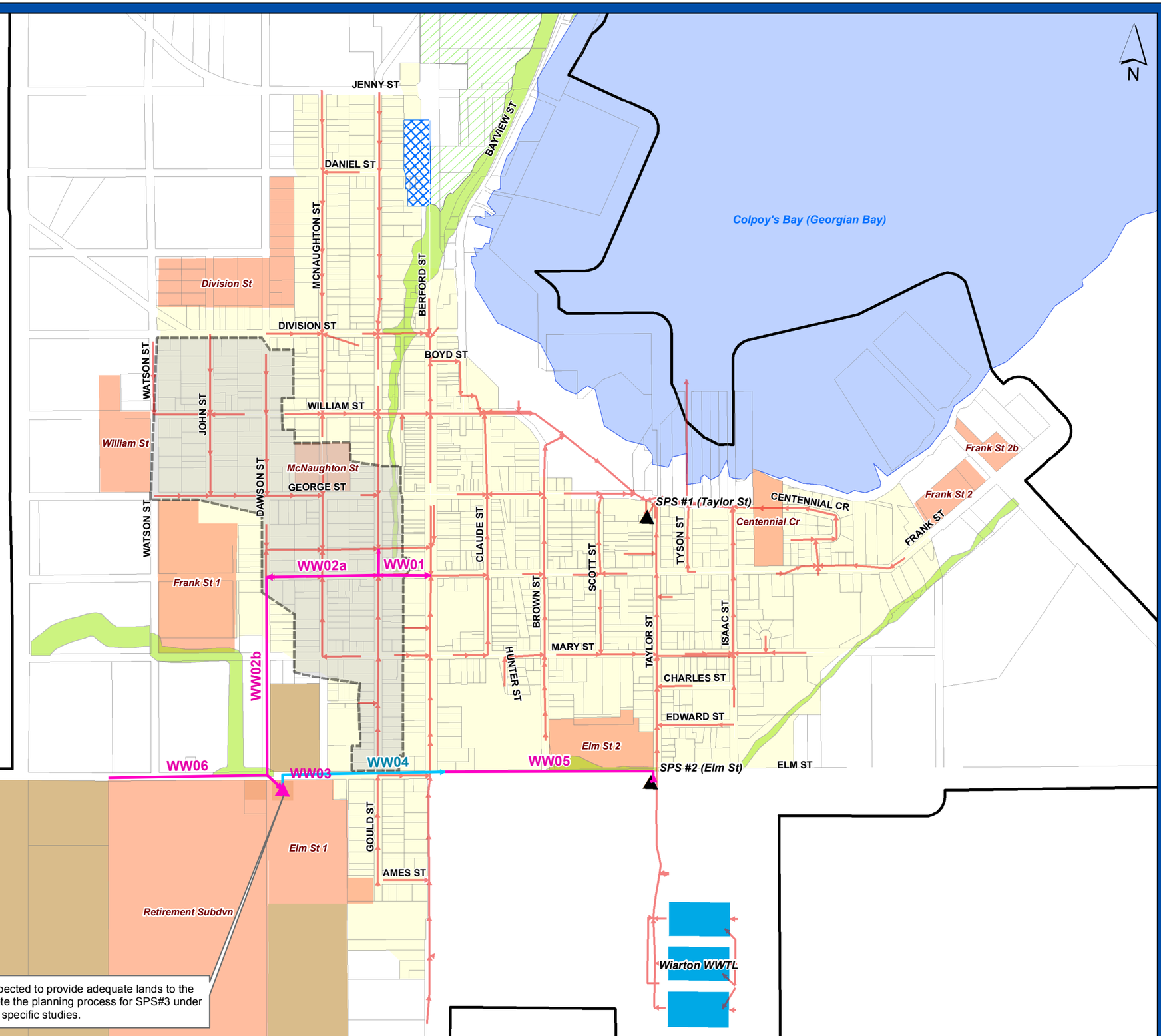
The MSP identifies one project which would qualify as a Schedule B Class EA project, if the project was to be initiated by the municipality – the South Lands Sewage Pumping Station. The schedule for this project is considered appropriate given that it "extends the wastewater collection system and all works necessary to connect the system to an existing sewage outlet where such facilities are not in an existing road allowance or an existing utility corridor".

The project can be developer-led through a Plan of Subdivision Application under the Planning Act, through a process similar to the Class EA process under the EA Act.

The Preferred Wastewater Strategy does not identify any Schedule C projects.

Approvals

All proposed projects are planned to be within the existing and future road rights of way and are subject to the road planning and approvals being met, including required investigations. It is recommended that all key projects undertake a pre-design consultation with the applicable review agencies. This early consultation prior to the detailed design will ensure sufficient technical and environmental information is available to support the preferred design and that the project scope is well understood. Ultimately this process will facilitate project approvals moving forward.



* South Lands Developer is expected to provide adequate lands to the Town for SPS#3 and to complete the planning process for SPS#3 under the Planning Act, including site specific studies.

Town of SOUTH BRUCE PENINSULA

Wiarton Water, Wastewater and Stormwater Master Servicing Plan and Gould Street Sanitary Sewer Upgrade Class Environmental Assessment

Preferred Wastewater Capital Program

Legend

- Proposed Sewage Pumping Station
- Proposed Sanitary Sewer
- Proposed Sanitary Forcemain
- Existing Sewage Pumping Station
- Existing Sanitary Sewer
- Existing Catchment Area
- Phase I Growth Area
- Phase II Growth Area
- West Drainage Area
- Property Parcel
- Master Servicing Plan Study Area
- Escarpment Natural Area
- Environmental Protection
- Special Policy Area

BluePlan ENGINEERING

214128-14-WW
November 2015
Data Source: Town of South Bruce Peninsula
Scale: 1:10,000 | NAD 1983 UTM Zone 17N

WASTEWATER CAPITAL & IMPLEMENTATION PROGRAM

Project Number	Project Name	Project Description	Project Trigger	Start Year	Year in Service	Class EA Schedule	Project Type	Size/ Capacity	Length (m) / Size (L/s)	Construction Assumption	Unit Cost (2014$)	Base Cost (2014$)	*Crossing & Tunnelling (2014$)*	*Permiting, Enviromental, Geotechnical, & Other (2014$)*	*Total Construction Cost (2014$)*	Total Engineering & Design (2014$)	Contingency (2014$)	Non Refundable HST (2014$)	Total Project Cost (2015$)	Grants and Subsidies (2014$)	Growth Split (%)	Existing Split (%)	Direct Developer Cost (2014$)	Benefit to Existing (2014$)	DC Comment
WW01	Gould St Diversion Sewer 1	200 m - 375 mm sanitary sewer on Gould Street, from easement to Frank Street, and on Frank Street, from Gould Street to Berford Street (Short Term Diversion).	Existing Condition / Capacity Requirements.	2016	2016-2021	A+	SAN	375 mm	200 m	5m	$692	$138,000	$0	$10,000	$148,000	$36,000	$15,000	$3,000	$202,000	$0	12.6%	87.4%	$25,496	$176,504	Project required to address existing deficient sewer on easement north of Frank St, from Gould St to Berford St. New sanitary sewer will convey flows from existing west area to Berford St. Recommend splitting based on proportion of future growth flows tributary to west area to existing flows in west area.
WW02a	Gould St Diversion Sewer 2a	351 m - 375 mm sanitary sewer on Frank Street, from Gould Street to Dawson Street (Long Term Diversion).	Project is required to support existing service area as well as growth. Trigger for long term diversion will be development of South Lands.	2021	2021-2026	A+	SAN	375 mm	283 m	10m	$2,339	$662,000	$0	$13,000	$675,000	$166,000	$68,000	$15,000	$924,000	$0	44.4%	55.6%	$409,796	$514,204	Intent of the Gould Street Diversion Sewer is to divert flows from the west area away from SPS#1 to the future South Lands SPS#3. The project benefits existing service area and intensification growth in the west area to 2029. Recommend splitting based on proportion of total future growth flows in Wiarton to total existing flows in Wiarton.
WW02b	Gould St Diversion Sewer 2b	845 m - 375 mm sanitary sewer on Dawson Street, from Frank Street to future SPS #3 on Elm Street (Long Term Diversion).	Project is required to support existing service area as well as growth. Trigger for long term diversion will be development of South Lands.	2021	2021-2026	A+	SAN	375 mm	495 m	5m	$692	$343,000	$0	$7,000	$349,000	$86,000	$35,000	$8,000	$478,000	$0	44.4%	55.6%	$211,994	$266,006	Intent of the Gould Street Diversion Sewer is to divert flows from the west area away from SPS#1 to the future South Lands SPS#3. The project benefits existing service area and intensification growth in the west area to 2029. Recommend splitting based on proportion of total future growth flows in Wiarton to total existing flows in Wiarton.
WW03	South Lands Pump Station #3	134 L/s Sewage Pumping Station at the corner of Elm Street and the future Dawson Street extension, servicing the future South Lands development and the existing west area. Location may vary depending on layout of development.	Project is required to support growth in southwest Wiarton, and will also improve existing system performance by diverting flows away from SPS #1.	2021	2021-2026	B	SAN		134 L/s	-	$16,736	$2,243,000	$0	$45,000	$2,332,000	$381,000	$224,000	$118,000	$3,055,000	$1,000,000	44.4%	55.6%	$1,354,900	$1,700,100	Intent of SPS#3 is to convey existing flows from the west area and future flows from the South Lands development to SPS#2. The project benefits the entire existing service area and supports Greenfield and intensification growth to 2029. Recommend splitting based on proportion of total future growth flows in Wiarton to total existing flows in Wiarton.
WW04	Elm St Forcemain	452 m - 400 mm sanitary forcemain on Elm Street, from SPS#3 to east of Berford Street.	Project is required to support growth in southwest Wiarton, and will also improve existing system performance by diverting flows away from SPS #1.	2021	2021-2026	A+	SAN	400 mm	452 m	Forcemain	$1,072	$485,000	$0	$10,000	$494,000	$122,000	$49,000	$11,000	$676,000	$0	44.4%	55.6%	$299,808	$376,192	Intent of Elm Street sanitary forcemain is to convey existing flows from the west area and future flows from the South Lands development to SPS#2. The project benefits the entire existing service area and supports Greenfield and intensification growth to 2029. Recommend splitting based on proportion of total future growth flows in Wiarton to total existing flows in Wiarton.
WW05	Elm St Gravity Sewer to SPS #2	557 m - 450 mm sanitary sewer on Elm Street, from east of Berford Street to SPS #2 at Taylor Street.	Project is required to support growth in southwest Wiarton, and will also improve existing system performance by diverting flows away from SPS #1.	2021	2021-2026	A+	SAN	450 mm	557 m	5m	$735	$409,000	$153,000	$11,000	$574,000	$141,000	$57,000	$13,000	$785,000	$0	44.4%	55.6%	$348,149	$436,851	Intent of Elm Street sanitary sewer is to convey existing flows from the west area and future flows from the South Lands development to SPS#2. The project benefits the entire existing service area and supports Greenfield and intensification growth to 2029. Recommend splitting based on proportion of total future growth flows in Wiarton to total existing flows in Wiarton.
WW06	South Lands Elm St Sanitary Sewer to SPS #3	662 m - 375 mm sanitary sewer on Elm Street, from west limit of Phase I South Lands development to SPS #3 at Dawson Street.	Growth in South Lands.	2021	2021-2026	A+	SAN	375 mm	468 m	5m	$692	$324,000	$0	$6,000	$337,000	$83,000	$34,000	$7,000	$461,000	$0	100.0%	0.0%	$461,000	$0	Intent of South Lands sanitary sewer on Elm Street is to convey future flows from the South Lands development to SPS#3. The project supports Greenfield to 2029. All costs to be assumed by developer.
WW07	Long Term Inflow & Infiltration Reduction Program	Removal of extraneous flow connections to the sanitary sewer system (downspouts, weeping tiles / foundation drains, sump pump, catchbasin connections, etc.) identified through previous surveys. Approximately 100 candidate properties are identified for disconnection works estimated at a cost of $10,000 per property. Program is recommended to be implemented from 2016 to 2026 at approximately $100,000 per year.	Program is required to support existing service area as well as growth. Removal of extraneous flows is expected to reduce peak flows at SPS#1 and SPS#2, eliminating the need to upgrade existing SPS facilities.	2016	2016-2029		SAN		N/A	N/A									$1,000,000	$0	44.4%	55.6%	$443,503	$556,497	Project is required to support existing service area as well as growth. Removal of extraneous flows is expected to further reduce peak flows at SPS#1 and SPS#2, eliminating the need to upgrade existing SPS facilities. I&I Reduction was also recommended as part of the 2015 Wiarton WWTP Class EA.
TOTAL												**$4,604,000**	**$153,000**	**$102,000**	**$4,909,000**	**$1,015,000**	**$482,000**	**$175,000**	**$7,581,000**	**$1,000,000**	**-**	**-**	**$3,554,647**	**$3,026,353**	

Stormwater Master Servicing Plan

Watershed Overview

Wiarton is located within two watersheds where flow drains to Colpoy's Bay (Georgian Bay) and to several tributary branches of Clavering Creek terminating at Boat Lake. Clavering Creek is part of the Sauble River watershed and the Rankin River subwatershed and its headwaters originate in Wiarton. Flow from Boat Lake then continues to the Rankin River, Sauble River and terminates at Lake Huron. [1]

For the purposes of this Master Servicing Plan, the Town is subdivided into the following watersheds:

- Colpoy's Bay (Georgian Bay)
- Clavering Creek (Lake Huron)

Existing Stormwater Collection System

The majority of the Wiarton stormwater conveyance system consists of a traditional sewer system, where surface water runoff is directed to and collected by the storm sewer system. Within Wiarton, all runoff flows are conveyed directly to the system outlets without peak flow attenuation. Also forming part of storm conveyance system are localized areas serviced by ditches and culverts. A stormwater management pond regulates flows from south east of Wiarton before discharging to the Taylor Street storm sewer.

Preferred Stormwater Management Strategy

The preferred servicing strategy was developed and evaluated to both existing Level of Service objectives and to satisfy growth. Different strategies for the Georgian Bay and Clavering Creek catchments were developed and evaluated individually based on the detailed five-point evaluation criteria, which included considerations for environmental, technical, socio-cultural, financial and legal-jurisdictional impacts.

The primary servicing needs for each catchment differ but general consist of:

- Managing infill growth through on site controls
- Managing greenfield growth through end of pipe control
- Implementing policies and encouraging the use of LID measures to improve runoff water quality and reduce total peak flows to the existing stormwater system.

It is recognized that the preferred servicing strategies have the opportunity for further enhancement and optimization as further details regarding the development areas present themselves. As further discussed under the Implementation Section, it is recommended that the preferred strategies be further reviewed under independent sub-watershed studies.

Georgian Bay Catchment

Increased runoff from intensification growth areas will be managed using onsite Low Impact Development (LID) measures to ensure post-development peak flow matches pre-development peak flow. General water quality improvements will be achieved through a voluntary onsite management incentive program. For existing properties, onsite management measures include roof leader disconnection, the use of rain barrels and the use of rain gardens. Under the preferred management strategy, no new facilities or conveyance upgrades are being proposed, as the downstream system in the Georgian Bay catchment has sufficient capacity to accommodate growth.

[1] *LGL Limited environmental research associates. Wiarton Wastewater Treatment Plant - Environmental Study Report – Natural Sciences Report – Desktop Review. April 2015.*

Clavering Creek Catchment

Increased runoff from growth areas in the Clavering Creek catchment will be managed via a combination of end of pipe detention facilities. Water quality control for new development areas will be achieved via a combination of onsite management incentive program and end of pipe detention facilities. As part of the preferred management strategy, no new stormwater outlets are proposed and existing flow profiles to Clavering Creek with be maintained mitigating any potential impact.

Capital Program for the Preferred Stormwater Management Strategy

Given the complexity and unique challenges of the Town's stormwater system, it was determined that further refinement of the Preferred Stormwater Strategy would be required through more area specific and detailed Sub-Watershed Studies. Further, all new stormwater works are likely to be completed internal to new developments. As such, a capital program has not been prepared.

Class EA and Follow-On Requirements

The stormwater management strategies presented in this Master Servicing Plan are intended to provide an overall framework providing overall guidance of the Town's Stormwater Management Objectives and Criteria and area specific strategies to address the management of Wiarton's stormwater infrastructure. These area specific management strategies are to be further refined, and technical details will need to be confirmed as part of follow-on Sub-Watershed Studies.

Approvals

All projects are planned to be within the existing and future road rights of way and are subject to the road planning and approvals being met, including required investigations.

Although no stormwater projects have been identified in the capital program because they will largely be driven by private developers as development occurs, it is recommended that stormwater projects undertake a pre-design consultation with the Niagara Escarpment Commission, Grey Sauble Conservation Authority, the Ministry of Tourism, Culture and Sport, and any other applicable review agencies. This early consultation prior to the detailed design will ensure sufficient technical and environmental information is available to support the preferred design and that the project scope is well understood. Ultimately this process will facilitate project approvals moving forward.

Town of SOUTH BRUCE PENINSULA

Wiarton Water, Wastewater and Stormwater Master Servicing Plan and Gould Street Sanitary Sewer Upgrade Class Environmental Assessment

Figure 35 - Existing Stormwater System

City-wide voluntary onsite SM incentive program: roof leader disconnection, rain barrels, rain gardens, etc.

On-site water quality treatment facilities for all new development within the Georgian Bay subwatershed.

Potential conveyance system upgrades upstream of centralized detention facilities.

Subwatershed study for Clavering Creek subwatershed recommended to develop optimal detention conveyance strategy.

Utilize detention facilities to manage development runoff within the Clavering Creek sub-watershed. Post-development peak flows to match pre-development rates. Opportunity to optimize and combine detention locations to service multiple sites.

N

Colpoy's Bay (Georgian Bay)

JENNY ST
DANIEL ST
BAYVIEW ST
MCNAUGHTON ST
Division St
DIVISION ST
BOYD ST
WATSON ST
JOHN ST
DAWSON ST
WILLIAM ST
William St
McNaughton St
GEORGE ST
BERFORD ST
CLAUDE ST
SCOTT ST
TYSON ST
CENTENNIAL CR
Centennial Cr
Frank St 2b
Frank St 2
FRANK ST
Frank St 1
GOULD ST
BROWN ST
HUNTER ST
MARY ST
TAYLOR ST
ISAAC ST
CHARLES ST
EDWARD ST
Elm St 2
ELM ST
Elm St 1
AMES ST
Retirement Subdvn

Legend

- Proposed Localized Low Impact Development
- Proposed SWM Detention Pond
- Existing Storm Sewer
- Existing Storm Outfall
- Existing Stormwater Detention Pond
- Phase I Growth Area
- Phase II Growth Area
- Property Parcel
- Master Servicing Plan Study Area
- Escarpment Natural Area
- Environmental Protection
- Special Policy Area

BluePlan ENGINEERING

214128-13-WW
October 2015
Data Source: Town of South Bruce Peninsula
Scale: 1:10,000 | NAD 1983 UTM Zone 17N

Summary

Through this Master Servicing Plan (MSP) Study, long term servicing plans and capital programs are identified for the Town's water, wastewater and stormwater systems to support growth to 2029. The anticipated timing of each project within the Preferred Strategy is established based on the projected population in Wiarton. The Gould Street Sanitary Sewer Upgrade Class Environmental Assessment, which was undertaken in conjunction with the MSP, informed the decision-making process for the selection of the preferred wastewater servicing strategy.

This report has been prepared to document the planning and decision making process undertaken for the 2015 MSP. The study defined existing problems and opportunities, considered and evaluated solutions, and identified preferred water, wastewater, and stormwater servicing strategies. The MSP followed Approach #2 which will fulfill the requirements for Schedule A, A+, and B projects. Two public information centres were held in October 2014 and July 2015 as part of the process.

No Schedule B projects were identified for the water and stormwater preferred strategies. The preferred wastewater servicing strategy has identified one Schedule B project whose requirements are being satisfied under this study:

- A 134 L/s Sewage Pumping Station to service future South Lands development and existing west area at Elm Street and Dawson Street.

As an immediate solution to address the poor condition of the existing sanitary sewer between Gould Street and Berford Street north of Frank Street, the preferred strategy includes a sanitary sewer to re-direct flows from Gould Street north of Frank Street to Frank Street and Berford Street. This will address the restriction at the Gould Street location but maintains the transfer of flow to SPS#1.

It should be noted that the following facilities are approaching capacity at full buildout and will require monitoring as development occurs:

- Water Tower
- Sewage Pumping Station #2

A key outcome of this study is the support for the tactical abatement of extraneous flows through a long term inflow and infiltration reduction program. With this, it is recommended that flow monitoring be undertaken to assist in determining the areas of Wiarton where targeted I&I separation would best benefit the system. Comments received during the process suggest that the Town's splash pad, the downtown core area, and the area around the hospital may be initial target areas.

During the next steps of the implementation program, primarily during detailed design of the projects, the following requirements will be considered:

- Finalization of property requirements
- Refinement of infrastructure alignment
- Identification of preferred construction methodologies
- Completion of additional supporting investigations as required
- Review and mitigation of potential construction related impacts
- Satisfying of all provincial, municipal and conservation authority approval requirements

With respect to the Town's planning and budgeting, this program will be utilized as high level baseline estimates for the Town capital budgets. These costs will be further developed and refined during the implementation phases as more detailed information becomes available.

Given the growth-related nature of the servicing strategies, the capital programs will support the water, wastewater and stormwater components of the Town's Development Charges (DC) By-Law.

Wiarton Master Servicing Plan for Water, Wastewater and Stormwater Services and Gould St Sanitary Sewer Upgrade Class Environmental Assessment Study

Prepared By
GM BluePlan for:

Town of South Bruce Peninsula

November 6, 2015

GMBP File: 214128

Town of SOUTH BRUCE PENINSULA

GUELPH | OWEN SOUND | LISTOWEL | KITCHENER | EXETER | HAMILTON | GTA
1260-2ND AVE. E., UNIT 1, OWEN SOUND ON N4K 2J3 P: 519-376-1805 WWW.GMBLUEPLAN.CA

Table of Contents

Executive Summary

List of Figures

List of Tables

APPENDICES

1 Introduction

1.1 Background

Wiarton is a small community located in the Town of South Bruce Peninsula on the west shores of Colpoy's Bay, an inlet off Georgian Bay. The existing population in Wiarton is currently approximately 2,291 (2011 Census). There is a significant amount of growth planned for Wiarton within the 2029 timeframe which largely consists of residential units in Greenfield areas with some intensification areas. The largest planned growth area is the South Lands which has a retirement subdivision development application.

This Master Servicing Plan (MSP) for water, wastewater and stormwater services is being undertaken to identify a preferred strategy to support existing servicing needs and projected growth in Wiarton. This MSP sets out to develop, evaluate, and select a preferred water, wastewater and stormwater servicing strategy to support existing needs and projected development within the community of Wiarton to the year 2029.

The Town of South Bruce Peninsula owns and operates its own water system, which draws water from Colpoy's Bay, located on Georgian Bay. The maintenance of the Water and Sanitary Sewers is completed under contract by the Ontario Clean Water Agency (OCWA).

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

To ensure viable development, establish existing water and wastewater services, and upgrade existing services in Wiarton, the Town of South Bruce Peninsula initiated the preparation of a Master Servicing Plan encompassing water servicing, wastewater servicing, and stormwater management.

1.2 Objectives

1.2.1 Master Servicing Plan

The Master Servicing Plan for water, wastewater and stormwater services comprehensively documents the development, evaluation and selection of the preferred servicing strategies to meet the servicing needs of the community.

The key objectives of the Wiarton Master Servicing Plan (MSP) are to:

- Define how developments are to be serviced and identify what components are to be provided by the Town and by the Developer
- Provide the preferred servicing strategy for the remaining vacant land south of the Town and for infilling within the existing developed areas
- Provide infrastructure planning tools (hydraulic models) for use in analyzing future development proposals
- Provide a capital works program for the upgrade of existing services
- Complete the MEA Class EA process for all Schedule A, A+ and B projects
- Define any Schedule C projects required to meet development goals and identify the timing for these projects
- Provide a capital cost estimate for all servicing components

The study takes into consideration all potential future developments when recommending upgrades to existing systems. Priority has been given to upgrades that support development. The MSP is based on existing and available system information.

1.2.2 Gould Street Sanitary Sewer Upgrade Class EA

The Gould Street Sanitary Sewer Upgrade Class EA is being carried out in conjunction with this MSP and is intended to inform the process of identifying, evaluating and selecting the preferred wastewater servicing strategy to meet the servicing needs of Wiarton.

Specifically, the Gould Street Sanitary Sewer Upgrade Class EA will

- Document the process undertaken to identify, evaluate and select a preferred solution to address the existing Gould Street Sanitary Sewer while ensuring that it aligns with the long term wastewater servicing strategy
- Complete a transparent and comprehensive EA process with effective public and agency consultation, engagement and input; and,
- Provide Project File (s) as supporting documentation for any Schedule A, A+ and B projects identified

1.3 Problem/Opportunity Statement

1.3.1 Master Servicing Plan

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

- *There is significant development being considered in the Wiarton area. To define how developments are to be serviced, a comprehensive Master Servicing Plan for stormwater, wastewater, and water systems is being undertaken;*
- *The current capacity of the system is uncertain; thus, there is a need to identify the current capacity of existing water, wastewater, and stormwater services; and,*
- *Upgrades of the existing systems are required and the master plan will ensure that services are implemented in a timely manner.*

1.3.2 Gould Street Sanitary Sewer Upgrade Class EA

The problem/opportunity statement for the Gould Street Sanitary Sewer Upgrade Class EA expands on the problem/opportunity statement for the MSP as follows:

- *There is an existing sanitary sewer that is in very poor condition located on private property that conveys flows from the west area to SPS#1 and needs to be addressed;*
- *Analysis of the wastewater system has confirmed that existing peak flows exceed the pumping and forcemain capacity out of SPS#1. There is opportunity through the long term wastewater servicing strategy to reduce extraneous flows in the system; and,*
- *There is opportunity to optimize use of the existing wastewater system, leverage planned infrastructure capacity, and minimize the need for infrastructure upgrades.*

1.4 Study Area

The community of Wiarton is located in Southern Ontario, 30 kilometres from the City of Owen Sound and 210 kilometres from the City of Toronto. Wiarton is situated on the tip of Colpoy's Bay, an inlet off Georgian Bay. The Master Servicing Plan study area covers the urban area of Wiarton as shown in Figure 3.

1.5 Documentation Layout

The Wiarton Master Servicing Plan and Gould Street Sanitary Sewer Upgrade Class EA Report is the documentation placed on public record for public review. The documentation describes all required phases of the planning process.

The Master Servicing Plan Report is organized into six chapters:

1. Introduction
2. Background and Planning Context
3. Water Master Servicing Plan
4. Wastewater Master Servicing Plan
5. Stormwater Master Servicing Plan

Chapter 1 – Introduction

Chapter 1 provides a brief overview of the Wiarton Master Servicing Plan. It summarizes the information contained in Chapters 2, 3, 4, 5, and 6, including problem statement, purpose of the study, significant planning, environmental and technical considerations, description of the analysis performed and final solutions and recommendations.

Chapter 2 – Background and Planning Context

Chapter 2 details the master planning process including related studies, legislative and policy planning context, and water, wastewater and stormwater servicing principles and policies. This chapter also introduces the existing infrastructure conditions for the water, wastewater and stormwater systems.

Chapter 3 – Water Master Servicing Plan

Chapter 3 focuses on the water system and provides the approach, methodologies, technical analyses, evaluation and selection of the preferred water servicing strategy. This chapter outlines the water policies, design criteria and level of service needed to be achieved by the water distribution system. Further in Chapter 3 is the detailed evaluation and decision-making as well as the preferred water servicing strategy and associated capital program.

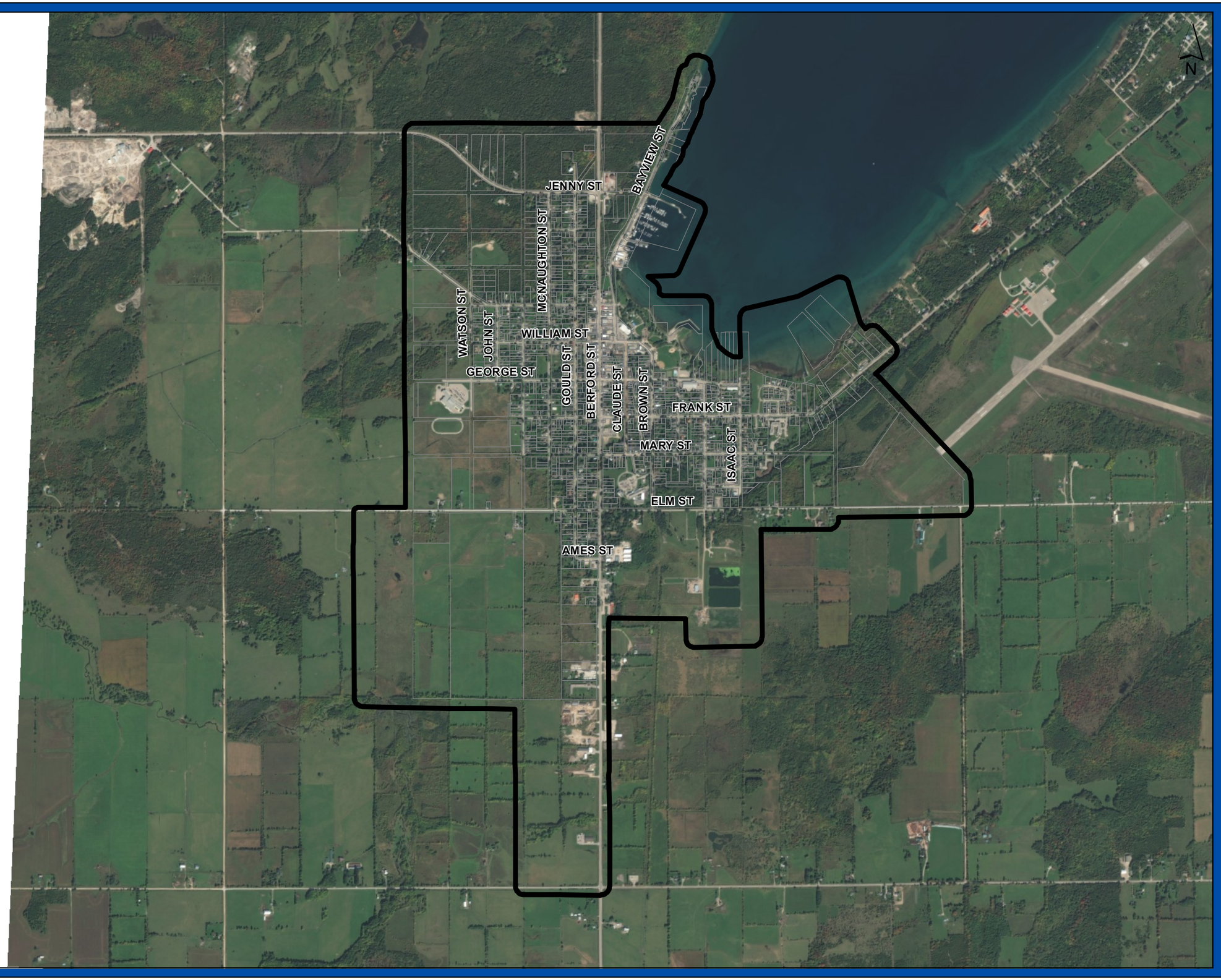
Chapter 4 – Wastewater Master Servicing Plan

Chapter 4 focuses on the wastewater system and provides the approach, methodologies, technical analyses, evaluation and selection of the preferred wastewater servicing strategy. This chapter outlines the wastewater policies, design criteria and level of service relevant to the wastewater collection system. Further in Chapter 4 is the detailed evaluation and decision-making as well as the preferred wastewater servicing strategy and associated capital program.

Chapter 4 also includes the documentation supporting the Gould Street Sanitary Sewer Upgrade Class EA, and rationale within the context of this MSP. Detailed documentation supporting the Schedule 'B' project identified through the Master Plan and Class EA process is provided in the Project File provided in Appendix J.

Chapter 5 – Stormwater Master Servicing Plan

Chapter 5 focuses on the stormwater system and provides the approach, methodologies, technical analyses, evaluation and selection of the preferred stormwater management strategy. This chapter outlines the stormwater policies, design criteria and level of service needed to be achieved by the stormwater system. Further in Chapter 5 is the detailed evaluation and decision-making as well as the preferred stormwater management strategy and associated capital program.



Town of SOUTH BRUCE PENINSULA

Town of South Bruce Peninsula
Gould Street Sanitary Sewer Upgrade
Class Environmental Assessment

Figure 1 - Study Area

Legend

- Parcel
- Master Servicing Plan Study Area

BluePlan ENGINEERING

214128-1-G
June 2015
Data Source: Town of South Bruce Peninsula
Scale: 1:20,000 | NAD 1983 UTM Zone 17N

2 Background and Planning Context

2.1 Master Planning Process

The Municipal Engineer's Association (MEA) Municipal Class Environmental Assessment (EA) process defines approaches for completing master plans within the context of the Class EA process. This Master Servicing Plan (MSP) is based on Approach 2, which involves preparing a master plan document at the conclusion of Phases 1 and 2 of the Class EA process. This approach allows for all Schedule A, A+ and specific Schedule B projects identified in the Master Servicing Plan to move forward to implementation.

The MSP provides systematic evaluation and documentation to support any identified Schedule B Class EA requirements with applicable review agency commitments prior to their respective implementation. As well, the MSP will identify required Schedule B and C projects that will proceed with separate studies to fully meet the Class EA requirements and allow for greater detail in the evaluation of alternatives and design concepts. Schedule C projects will continue to Phases 3 and 4 of the Class EA process with an Environmental Study Report (ESR) filed for public review.

2.1.1 Class Environmental Assessment Process

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

2.1.1.1 Environmental Assessment Act

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

The *Act* defines the environment broadly as:

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

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

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

- A description of the purpose of the undertaking
- The undertaking
- The alternative methods of carrying out the undertaking
- Alternatives to the undertaking

The EA document must also include a description of:

- The environment that will be affected or that might reasonably be expected to be affected, directly or indirectly, by the undertaking or alternatives to the undertaking;

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

2.1.1.2 Principles of Environmental Planning

The *EA Act* sets a framework for a systematic, rational and replicable environmental planning process that is based on five (5) key principles, as follows:

1. **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.
2. **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.
3. **Identification and consideration of the effects of each alternative on all aspects of the environment.** These aspects include the natural, social, cultural, technical, and economic environments.
4. **Systematic evaluation of alternatives in terms of their advantages and disadvantages, to determine their net environmental effects.** The evaluation shall increase in the level of detail as the study moves from the evaluation of "alternatives to" to the evaluation of "alternative methods".
5. **Provision of clean and complete documentation of the planning process followed to allow "traceability" of decision-making with respect to the project.** The planning process must be documented in such a way that it may be repeated with similar results.

2.1.1.3 Class Environmental Assessment

"Class" Environmental Assessments (Class EAs) were approved by the Minister of the Environment in 1987 for municipal projects having predictable and mitigable impacts. The Municipal Class EA process was revised and updated in 1993, 2000, 2007 and 2010. The Class EA approach streamlines the planning and approvals process for municipal projects that are:

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

The Municipal Class Environmental Assessment, prepared by the Municipal Engineers Association (October 2000, as amended in 2007 and 2010), outlines the procedures to be followed to satisfy Class EA requirements for water, wastewater, stormwater management and road projects. The Class EA process includes five phases:

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

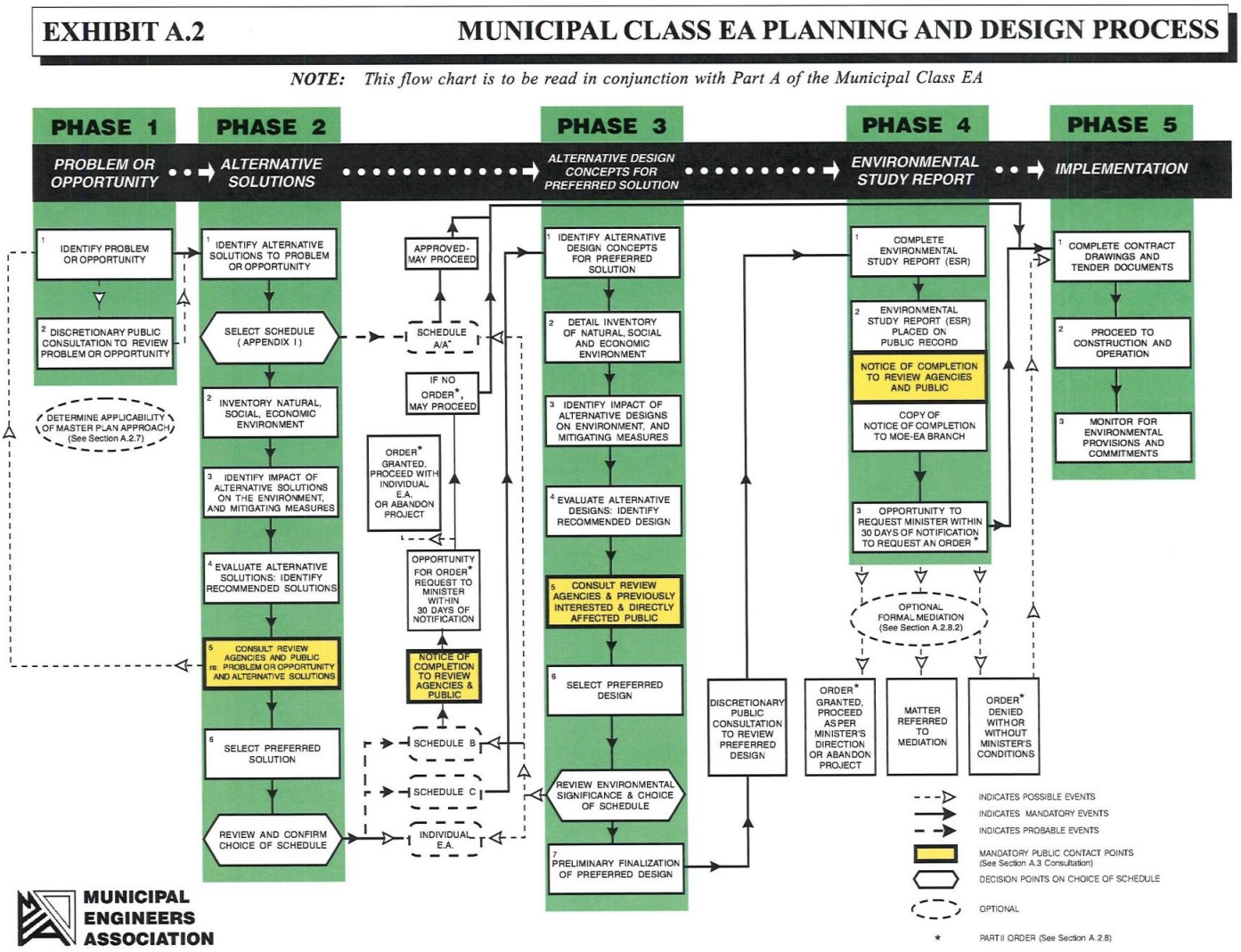
Public and agency consultation are integral to the Class EA planning process.

Projects subject to the Class EA process are classified into four “schedules” depending on the degree of expected impacts. Schedule A projects are minor operational and maintenance activities and are approved without the need for further assessment. Schedule A+ projects are also pre-approved; however, the public is to be advised prior to project implementation. Schedule B projects require a screening of alternatives for their environmental impacts and Phases 1 and 2 of the planning process must be completed. Schedule C projects have the potential for significant environmental effects and must proceed under the full planning and documentation procedures specified in this Class EA document.

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

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

Figure 2. Municipal Class EA Planning and Design Process



2.1.1.4 Master Planning Process

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

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

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

- Master plans are broad in scope and focus on the analysis of a system for the purpose of outlining a framework for the provision of future works and developments;
- Specific projects recommended in a master plan are part of a larger management system and are distributed geographically throughout the study area. The implementation of specific projects may occur over an extended time frame; and,
- Unlike an individual project, a Master Servicing Plan itself cannot be subject to a Part II Order or a "bump-up" request, as it is not a "Scheduled" activity. The MSP follows the EA process, but is not intended to build a project at the outcome.

According to the Class EA document, a master plan must at least satisfy the requirements of Phases 1 and 2 of the Class EA process and incorporate the five key principles of environmental planning, as identified in Section 2.1.1.2. A master plan must document public and agency consultation at each phase of the process. A reasonable range of alternative solutions must be identified and systematically evaluated.

This Master Servicing Plan is the first of its kind in Wiarton and has incorporated information gathered through previous studies to present a long term municipal servicing strategy for the study area. The approach of this Master Servicing Plan is to:

- Establish a baseline understanding of the study area and its water, wastewater and stormwater systems
- Identify opportunities and constraints in the existing water, wastewater and stormwater systems
- Assess infrastructure capacity to service future growth using planning projections provided by the Town
- Identify and evaluate alternative servicing strategies to select a preferred servicing strategy for the water, wastewater and stormwater systems

This approach was scrutinized through a public and agency consultation process and is fully documented.

2.1.2 Public Consultation

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

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

- To present clear and concise information to stakeholders at key stages of the study process;

- To solicit community, regulatory and Town staff input; and,
- To meet Municipal Class EA consultation requirements.

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

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

Full documentation of the Consultation and Communication Program is contained in Appendix G – Public and Agency Consultation.

2.1.2.1 Study Communication and Public Communication

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

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

2.1.2.1.1 Notice of Study Commencement

The Notice of Commencement was published and distributed on October 24th, 2014 with a joint Notice of Public Information Centre (PIC) No. 1. The Notice of Commencement informed the public of the initiation of the study, the overall goals of the Master Servicing Plan, the Class EA process and provided the details for the date, time and location for PIC No. 1.

2.1.2.1.2 Public Information Centre No. 1

The first round of Master Servicing Plan Public Information Centres (PIC) was held during Phase 1 of the Class EA study process to introduce the project and receive feedback regarding the Problem and Opportunity Statement, Study Background and Class EA Process.

PIC No. 1 was held as follows:

- **Thursday, October 30th 2014 from 4:30 pm to 6:30 pm at the Wiarton Arena (Upstairs) – 526 Taylor Street, Wiarton**

2.1.2.1.3 Public Information Centre No. 2

The second round of Public Information Centres was held during Phase 2 of the Class EA study process and was held as a Joint PIC in conjunction with the first PIC for the Gould Street Sanitary Sewer Upgrade Class EA Study. The Joint PIC focused on the alternative water, wastewater and stormwater servicing concepts and strategies developed and evaluated as part of the Class EA process. It also presented the preliminary recommended servicing strategy for the water, wastewater and stormwater systems.

PIC No. 2 was held as follows:

- **Wednesday, July 29th 2015 from 4:30 pm to 6:30 pm at the Wiarton Arena (Upstairs) – 526 Taylor Street, Wiarton**

2.2 Related Studies and Background Information

The 2014 Wiarton Master Servicing Plan is the most recent in a line of long-term planning reports for the Community of Wiarton. These previous reports were considered and the findings integrated as part of this Master Servicing Plan.

2.2.1 Official Plan of the Town of South Bruce Peninsula

The Official Plan is a statement of goals, objectives and policies intended to guide future land use, growth and future development within the Town of South Bruce Peninsula. Council is currently reviewing the Official Plan and will be making updates as required to guide future development in the Town.

Some of the goals of the current Official Plan include:

- Provide for agricultural uses and a range of non-farm uses while monitoring the agricultural/rural character and natural heritage features.
- Enhance the quality of the natural environment through the establishment of development guidelines and policies to protect the Natural Heritage features of the Town, and minimize land use conflicts within or adjacent to environmentally-sensitive areas.
- Protect the health and safety of area residents by preventing loss of life and minimizing property damage due to flooding and erosion.
- Maintain the aesthetically pleasing characteristics of the municipality and general quality of life to preserve natural/cultural heritage and archaeological resources.
- Encourage development in a manner consistent with and compatible with the demographic structure and social needs of the Town's residents.
- Provide adequate and safe systems of water supply, sanitary sewage disposal and storm drainage to all areas of development.
- Facilitate the establishment of a transportation network which enables the efficient and safe movement of people and goods throughout the Town.
- Optimize the recreational potential of the Town by ensuring sufficient lands are preserved for recreational purposes and by optimizing existing recreational resources.

The County of Bruce provides professional planning advice, assistance, and land use planning functions to The Town of South Bruce Peninsula on local development processes including applications.

The Wiarton South area needs a more detailed approach as part of the planning update. Bruce County Planning has identified the affected stakeholders and have engaged them directly to discuss how the Official Plan affects their area.

2.2.1.1 Land Use Policies and Designations

Land uses within the Town of South Bruce Peninsula shall be developed in accordance with the following land use designations:

1. Environmental Protection
2. Open space
3. Agricultural
4. Rural
5. Estate residential
6. Residential

7. Shoreline development
8. Future residential
9. Institutional
10. Commercial
11. Recreational commercial
12. Industrial
13. Extractive industrial
14. Potential extractive industrial
15. Waste disposal industrial

These land use and environmental designations have been categorized and are shown in Figure 3.

2.2.2 Wiarton Community Plan

The Wiarton Community Plan was developed through extensive public consultation and provides specific goals, action and policies to guide future developments within Wiarton.

Some of the goals of the community plan relevant to the Master Plan includes:

- Protect, enhance, and where warranted, restore Wiarton's healthy environment by minimizing air, water and land pollution and by the wise use of the area's natural resources.
- Improve community facilities and infrastructure that address the social, environmental and economic needs of the Community.
- Provide a full range of affordable, municipal services to meet the social, environmental and economic needs of the Community.

2.2.3 Wiarton Wastewater Treatment Plant Municipal Class EA (2015)

The Wiarton Wastewater Treatment Plant Class EA Study was undertaken as a Schedule C Class EA. The final report was completed in April 2015 and provided the following recommendations:

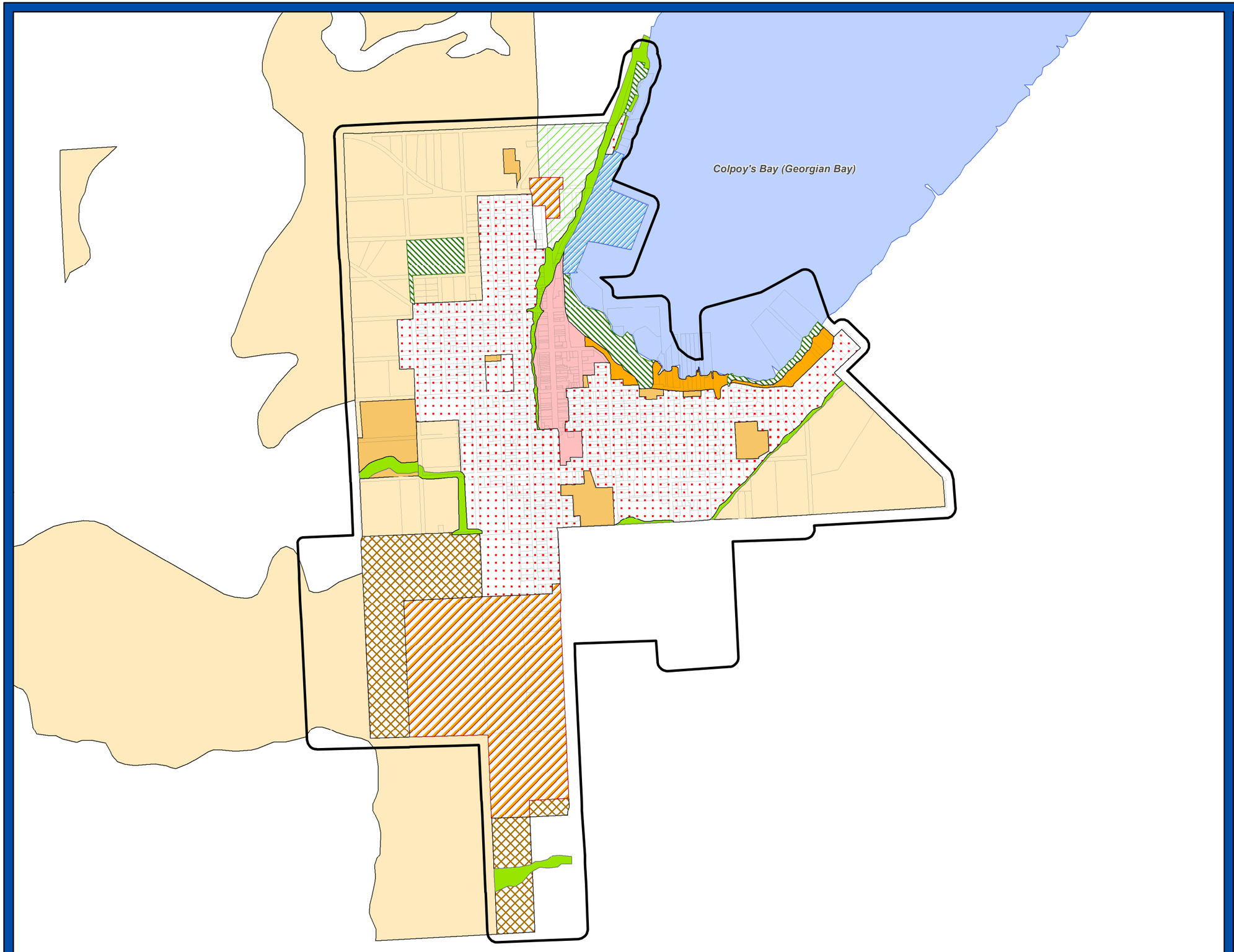
- Upgrade the plant to 4400 m^3/day capacity using an IFS system with nitrification;
- Locate the proposed pre-treatment building and IFS tanks by the UV/Filtration Building and maintain the same flow orientation; and,
- Consider implementation of inflow and infiltration controls as a supportive measure.

2.2.4 Asset Management Plan (AMP) for the Town of South Bruce Peninsula (2014)

The Asset Management Plan is intended to serve as a strategic and financial reference for the management of municipal infrastructure. The AMP follows best practices and principles while ensuring a desired level of service and optimization of resources. The plan provides asset management information and recommendations for the road network, gravel roads, bridge & culverts, water network, sanitary sewer network, and storm sewer networks. The AMP answers key questions such as: What do we need to do? When do we need to do it? And how much will that cost?

2.2.5 Town of South Bruce Peninsula Community-Based Strategic Plan (2012)

The community-based strategic plan was developed through a public process with the purpose of establishing the vision and actions for the next 10 years. The plan looks to maximize resources and keep inform citizen about priorities. It also includes an implementation strategy for municipal services and operations across the Town of South Bruce Peninsula.



N

Town of SOUTH BRUCE PENINSULA

Wiarton Water, Wastewater, and Stormwater Master Servicing Plan and Gould Street Sanitary Sewer Upgrade Class Environmental Assessment

Figure 3 - Existing Land Use and Environmental Conditions

- Study Area
- Community Facility
- Downtown Commercial
- Escarpment Natural Area
- Environmental Protection
- Highway Commercial & Industrial
- Industrial
- Marine Commercial
- Recreation & Open Space
- Residential
- Rural
- Shoreline Constraint Area

BluePlan ENGINEERING

October 2015
214128-12-G
1:<enter scale> | NAD 1983 UTM Zone 17N

The goals of the community-based strategic plan includes:

- Supportive and accountable municipal operations and governance
- Healthy and vibrant communities
- Sustainable infrastructure and built environment
- Stable economy supported by skilled labour force and employment opportunities
- Protection, promotion and preservation of natural environment and agricultural lands

2.2.6 Growth Management Report Wiarton South Settlement Area (2011)

A comprehensive review of land use policies and land use designations within the Wiarton primary urban area was undertaken to provide estimations of the demand and supply of residential and employments lands required to accommodate future growth. The report provides recommendations on the extent and arrangement of future development designation with a focus on the south-western settlement area. The report also provides assistance in the allocation of future infrastructure and employment opportunities for a self-sustaining and strong community.

2.2.7 Town of South Bruce Peninsula Community Improvement Plan for the Urban Areas of Alleford, Hepworth, Sauble Beach and Wiarton (2010)

The community improvement plan is intended to provide a framework for the improvement of facilities and infrastructure in the Town's four urban areas that contribute to community health, social, environmental and economic priorities. The plan recognizes the limited water and sewer services with only Wiarton having full services, and recommends that revitalization efforts should consider the provision of full water and sewer services to support future developments.

2.2.8 Town of South Bruce Peninsula Action Plan (2007)

The Strategic Planning Process and the Action Plan reports provide a summary of the:

- Community consultation process or methodology used to garner public input
- Identified priorities to affect positive social and economic change in the community
- Specific actions to be taken, including time frames, lead parties and potential partners
- Expected outcomes as a consequence of implementing priority action items

The strategic planning process and action report identified the need to secure adequate water and sanitary sewer infrastructure to attract future developments, investments and expand tourism in the area.

2.2.9 Town of South Bruce Peninsula Economic Development Plan (2005)

The Economic Development Plan is an initiative of the Town of South Bruce Peninsula to guide the decision making towards a prosperous economic future for the Town. The efforts have been focused on industrial development, downtown revitalization, additional residential development, waterfront development and tourism. The plan was development through extensive public consultation. From the public consultation process it is recognized the finite amount of water and limited sewage capacity of the town of South Bruce Peninsula, making only planned and sustainable developments acceptable for the future of the town.

2.3 Planning Context

2.3.1 Provincial and Federal Legislation and Policy

The Town of South Bruce Peninsula, as all cities and municipalities in Ontario, must operate within the administrative, legislative and financial framework established by senior levels of government. The key

provincial and federal initiatives that provide directives, and are considered within the master planning process, are summarized below.

2.3.1.1 Provincial Policy Statement

The Provincial Policy Statement (PPS)[1] provides policy direction on matters of provincial interest related to land use planning and development. As a key element of Ontario's policy-led planning system, the Provincial Policy Statement sets the policy foundation for regulating the development and use of land. It provides for appropriate development while protecting resources of Provincial interest, public health and safety and the quality of the natural environment. Key policies relevant to water, wastewater and stormwater servicing are as follows:

- Infrastructure, electricity generation facilities and transmission and distribution systems, and public service facilities shall be provided in a coordinated, efficient and cost-effective manner that considers impacts from climate change while accommodating projected needs.

  Planning for infrastructure, electricity generation facilities and transmission and distribution systems, and public service facilities shall be coordinated and integrated with land use planning so that they are:
    - financially viable over their life cycle, which may be demonstrated through asset management planning; and available to meet current and projected needs. (Policy 1.6.1);
- Before consideration is given to developing new infrastructure and public service facilities :
    - the use of existing infrastructure and public service facilities should be optimized; and
    - opportunities for adaptive re-use should be considered, wherever feasible. (Policy 1.6.3);
- Planning for sewage and water services shall:
    - Direct and accommodate expected growth or development in a manner that promotes the efficient use and optimization of existing :
        - municipal sewage services and municipal water services; and
        - private communal sewage services and private communal water services, where municipal sewage services and municipal water services are not available;
    - Ensure that these systems are provided in a manner that:
        - can be sustained by the water resources upon which such services rely
        - is feasible, financially viable and complies with all regulatory requirements; and
        - protects human health and the natural environment;
    - Promote water conservation and water use efficiency;
    - Integrate servicing and land use considerations at all stages of the planning process; and
    - Be in accordance with the servicing hierarchy outlined through policies 1.6.6.2, 1.6.6.3, 1.6.6.4 and 1.6.6.5 (Policy 1.6.6.1); and
- Planning for stormwater management shall:
    - Minimize, or, where possible, prevent increases in contaminant loads;

[1] Provincial Policy Statement. Ontario Ministry of Municipal Affairs and Housing, 2014.

- Minimize changes in water balance and erosion;
- Not increase risks to human health and safety and property damage;
- Maximize the extent and function of vegetative and pervious surfaces; and Promote stormwater management best practices, including stormwater attenuation and re-use, and low impact development. (Policy 1.6.6.7);

2.3.1.2 Places to Grow

2.3.1.3 Planning Reform Act

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

- Municipalities must now update their Official Plan every five years, followed by an update of the accompanying zoning by-law within three years after the new Official Plan is in effect;
- There are more opportunities for public input before local decisions are made;
- Municipalities have enhanced ability to plan for a range and mix of housing types and densities; and
- Municipalities have additional ability to have the final say on whether designated employment lands can be changed to other uses.

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

This Bill enacts the *Sustainable Water and Wastewater Systems Improvement and Maintenance Act*, *2010*[2] and repeals the *Sustainable Water and Sewage Systems Act, 2002*. The Bill had it first reading on March 23rd. Key points of the Bill are as follows:

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

2.3.1.5 Water Opportunities and Conservation Act

The Ontario Government passed the *Water Opportunities and Conservation Act* in 2010. The purposes of the *Act* are as follows[3]:

- To foster innovative water, wastewater and stormwater technologies, services and practices;
- To create opportunities for economic development and clean-technology jobs in Ontario; and

---

[2] *Bill 13 Sustainable Water and Wastewater Systems Improvement and Maintenance Act, 2010. An Act to sustain and encourage improvement in Ontario's water and waste water services and to establish the Ontario Water Board. http://www.ontla.on.ca/web/bills/bills_detail.do?locale=en&BillID=2288. Accessed September 14, 2015.*

[3] *Bill 72 (Chapter 19, Statutes of Ontario, 2010) An Act to Enact the Water Opportunities Act, 2010 and to amend other Acts in respect of water conservation and other matters. http://www.ontla.on.ca/bills/bills-files/39_Parliament/Session2/b072ra.pdf. Accessed September 14, 2015.*

- To conserve and sustain water resources for present and future generations.

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

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

2.3.1.6 Safe Drinking Water Act

The *Safe Drinking Water Act* was adopted in 2002. The *Act* provides for the protection of human health and the prevention of drinking water hazards through the control and regulation of drinking water systems and drinking water testing[4]. Key features of the *Act* include the following:

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

2.3.1.7 Clean Water Act

The Clean Water Act was adopted in 2006. The purpose of the *Act* is to protect existing and future sources of drinking water[5]. The *Act* requires the following:

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

2.3.1.8 CCME Setting Strategic Directions for Water

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

- Aquatic ecosystems are protected on a sustainable watershed basis;

[4] Safe Drinking Water Act, 2002, S.O. 2002, c. 32. http://www.ontario.ca/laws/statute/02s32. Accessed September 14, 2015.
[5] Clean Water Act, 2006. O. Reg. 287/07. https://www.ontario.ca/laws/regulation/07028. Accessed September 14, 2015.

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

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

2.3.1.9 Canada-wide Strategy for the Management of Municipal Wastewater Effluent

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

2.3.1.10 CCME Wastewater Systems Effluent Regulations

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

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

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

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

2.3.1.11 Ministry of the Environment Procedure F-5-1

Procedure F-5-1 outlines the treatment requirements for municipal and private sewage treatment works discharging to surface waters. Effluent requirements are established on a case-by-case basis considering the characteristics of the receiving water body. All sewage treatment works shall provide secondary treatment or equivalent as the "normal" level of treatment, unless individual receiving water assessment studies indicate the need for higher levels of treatment. Existing works not complying with the guideline are required to upgrade as soon as possible.

The Procedure stipulates effluent design objectives for biochemical oxygen demand (BOD), suspended solids, total phosphorus and ammonia and provides guidelines for BOD and suspended solids. Sewage treatment works designed according to the guidelines should be able to meet the objectives on an average annual basis and not exceed the guidelines.

2.3.2 Town of South Bruce Peninsula and Wiarton Plans, Legislation and Policy

2.3.2.1 Official Plan

The Official Plan is the main tool for the implementation of Provincial, County and Municipal land use policies. The policies of the Plan provide a framework designed to maintain a good quality of life for the citizens, to direct growth in a logical and orderly manner, and to provide a basis for land use controls while preserving the Town's environmental and economic well-being.

Key policies relevant to this Master Servicing Plan Include:

Servicing Overview

It is a primary goal of the Official Plan to preserve the environmental integrity of all lands within the Town, and to protect the health and safety of municipal residents by preventing illness and the loss of life and minimizing property damage due to flooding and erosion. To this end, it is the broad intent of the municipality that:

- New development be serviced by water supply and sanitary sewage disposal systems which comply with the standards and regulations of the Ministry of Environment and the Town. The servicing of all future growth areas shall occur in accordance with the criteria in the following sections, with the preferred water supply and sanitary sewage disposal servicing approach being determined on the basis of a hierarchical review favouring the use of full municipal services, and, where this is not possible, full communal services or private servicing systems on the basis of appropriate justification studies;
- The potential for surface water run-off, groundwater contamination and thermal impact on cold water streams from new development be minimized through hydrogeological investigation and careful site design; and,
- Development only be permitted upon the completion of, or entering into of agreements for the construction of, necessary public utilities/facilities, (e.g. water / wastewater / stormwater management).

Water Supply and Sanitary Sewage Disposal

It is a primary objective of the Official Plan to ensure that existing and newly-proposed development has an adequate supply of potable water and is serviced by proven sanitary sewage disposal systems.

Where full municipal or full site-specific communal services are not viable, consideration may be given to the use of private (individual) water and sewer systems or a partial (water or sewer only) servicing approach, on the basis of studies, completed to the satisfaction of the Town and/or other responsible approval authority(s), demonstrating their technical and environmental adequacy to support the level of growth proposed.

New development on private (individual) or partial services shall only be possible on the basis of a Servicing Feasibility Study and Settlement Capability Study, completed to the satisfaction of the Town and/or other responsible approval authority(s), demonstrating, among other things, that there will be no negative impact on ground and surface water quality or on other natural heritage features and functions.

Stormwater Management

All applications for major development, which includes plans of subdivision and condominium, the creation of more than five new lots, industrial, commercial, or institutional development, and major public works, shall be accompanied by a Stormwater Management (SWM) Report. The SWM Report shall be prepared by a qualified professional to the satisfaction of the Town and the Grey Sauble Conservation Authority, and shall be developed in a manner which ensures:

- A stormwater management system that adheres to the stormwater practices deemed appropriate by the Town and the Grey Sauble Conservation Authority;
- A stormwater quality system that meets the levels of protection established by the Town, Ministry of Environment and/or Grey Sauble Conservation Authority;
- A stormwater quantity system that ensures post-development runoff rates are no greater than pre-development runoff rates;
- A stormwater management system that identifies and minimizes the impacts of development on watershed flow regimes including the relationship between groundwater, infiltration, discharge and inflow;
- A stormwater management system that promotes the use of centralized facilities, wherever practical;
- A stormwater management system that locates facilities, such as detention ponds, outside defined flood plains;
- A stormwater management system which, although encouraging the use of storm sewers, may enable other methods of directing stormwater flows in those circumstance where the provision of storm sewers is not physically viable or is prohibitively expensive; and,
- A stormwater management system that maximizes the retention of existing tree cover or natural vegetation, and encourages the provision of significant grassed and natural areas to facilitate the absorption of surface water into the ground.

2.3.2.2 Wiarton Community Plan

As part of the Official Plan, the Wiarton Community Plan was developed through public consultation to provide specific goals, actions and policies to guide the decision-making process to meet the social, environmental and economic needs of the Community of Wiarton.

Key policies relevant to this Master Servicing Plan Include:

Water Quality and Quantity (Policy 11.4.4.5)

- The Town shall consider the potential impact a development may have on the quality and quantity of the Town's water resources. Such an assessment should not only involve the individual development but should also take into account the cumulative effects over time that such development may result in.
- Development shall be assessed based on its:
    - Protection, maintenance and enhancement of water resources;
    - Impact on the quality and quantity of surface and groundwater resources; and,
    - Promotion of water conservation and the efficient use of water resources.

Water Supply & Sewage Disposal Policies (Policy 11.4.6.3)

- It shall be a policy of the Town that all new development and redevelopment shall proceed only where full municipal water supply and municipal sewage disposal services, to such standards as may be required;
- The Town shall initiate a program to extend its water/sewage works to areas within the Town which are on private services, except where physical conditions would make costs prohibitive. Municipal services shall be extended in accordance with the Phasing Plan set forth in Section 11.5.22;
- The Town shall prepare a municipal serving plan which strives to provide water supply and sewage disposal services which support the environmental, urban intensification and growth management policies of this Plan in a manner which is efficient and cost effective;
- Adequate reserve capacity in the Town's water/sewage works must be demonstrated to be available to accommodate proposed development. Limitations in the capacity or operating performance of the water/sewage works shall be recognized as a constraint to the timing of new development;
- The Town shall require development and redevelopment projects which demonstrate that surface water originating from the site is not entering the sanitary sewer system; and,
- The Town shall only provide sewer and water services to lands outside of the Town's Corporate Limits, when the service capacity is clearly surplus and when it is assured that the long term commitment to Town residents can be met.

Stormwater Management Policies (Policy 11.4.6.4)

- It is a policy of the Town to require "at-source best management practices and techniques" to maintain stormwater quality and quantity. This shall assist in controlling flooding, ponding, erosion and sedimentation and enhance the water quality and fishery habitat of Colpoy's Bay;
- It shall be a policy of the Town to undertake the development of a Municipal Master Drainage Plan, in cooperation with the Grey Sauble Conservation Authority, the Ministry of Energy and Environment and the Ministry of Natural Resources, in order to control the quantity and quality of surface water;
- It is a policy of the Town that once a Master Drainage Plan is approved, development proposals shall be required to include a drainage plan which manages drainage in accordance with the Master Drainage Plan;
- It is a policy of the Town that if drainage is planned through an adjacent municipality, then the adjacent municipality shall be consulted with respect to the Master Drainage Plan;
- Development shall incorporate stormwater management practices to control runoff up to the Regulatory Flood level;
- Until such time as a Master Drainage Plan is approved, development proposals shall be required to submit a drainage management report which meets the quality and quantity requirements of the Town, Grey Sauble Conservation Authority, the Ministry of Energy and the Environment, the Ministry of Natural Resources and/or the Ministry of Transportation;
- Where appropriate, all new development shall incorporate the "Major-Minor" system concept, as required by the Grey Sauble Conservation Authority, and:
    - The stormwater management system shall be designed to control runoff from the site to pre-development levels, and where necessary shall require detention or temporary storage facilities to control discharge rates. Where feasible detention must be provided on site; and,
    - The Minor system shall accommodate runoff from more frequent storms up to the design capacity of an existing receiving system and, where necessary, shall require retention or

storage facilities. New collection systems shall be designed in accordance with the Town's Municipal Servicing Standards.

- It is a policy of the Town that natural drainage systems used in the design of new subdivisions and major watercourses be left, as much as possible, in their natural state, including existing vegetative buffers. Channelization shall be discouraged. Detention and retention facilities may be permitted in open space areas to ensure controlled runoff into receiving streams;
- Any modification to an existing natural watercourse shall preserve floodplain storage capacity and shall require approval from the Grey Sauble Conservation Authority; and,
- The Town shall assume ownership and/or maintenance responsibilities for new stormwater management facilities/structures.

2.4 Existing Conditions

The following section describes the existing conditions within the Town of South Bruce Peninsula and Wiarton specifically with respect to the natural environment and the existing water, wastewater and stormwater infrastructure. This is to ensure that the preservation and management of natural and cultural heritage resources play an important role in the evolution of the community.

2.4.1 Natural Heritage

The Official Plan of the Town of South Bruce Peninsula includes a set of policies to protect and enhance the natural heritage resources. Within the Town, there exists a system of natural areas of varying significance. Development is carefully controlled in these areas to ensure that the various significant features are protected.

Significant natural features in the Town include Areas of Natural and Scientific Interest (ANSI) and Provincially-Significant wetlands, agricultural areas, aggregate reserves, and fisheries and wildlife habitat. Future development must take into consideration these environmental features in order to minimize the disruption of the resource and the unique aspect of the Town.

Land use development must be in accordance with land use designations. The Environmental designation is divided into three sub-classifications, Environmental-Wetland Areas, Environmental-Significant Areas, and Environmental-Hazard Land Areas.

2.4.1.1 Environmental-Wetland Areas

The Environmental-Wetland Areas classification identifies provincially and locally significant wetlands. Development is prohibited, except for a few exceptions, in these areas due to its ecological importance. The exceptions are if the development is for public works for flood and erosion control, conservation, and passive recreation.

2.4.1.2 Environmental-Significant Areas

The Environmental-Significant Areas classification identifies all lands, except for wetland areas, with a specific protection designation. The level of protection depends on the ecological function and importance as valleyland, woodland, and fish or wildlife habitat.

Development is generally directed away from Environmental-Significant Areas. If development is to take place, it shall only be permitted on this area, or adjacent lands located within 50 metres of an Environmentally-Significant Area, if it is completed in accordance with prescribed guidelines.

2.4.1.3 Environmental-Hazard Land Areas

Environmental-Hazard Land Areas describe land that is unsuitable for development. This could be due to inherent natural hazards such as the land being susceptible to flooding or erosion, having poor drainage, organic soils, or steep slopes. Development on these lands are governed by specific policies.

2.4.2 Cultural Heritage

The Town of South Bruce Peninsula recognizes the importance of cultural heritage resources. The Town recognizes that heritage conservation is a wise investment for the future as it is a means of maintaining contact with the past, provides a unique living environment and facilitates economic/tourism opportunities. The Town has therefore established additional policies to conserve its cultural heritage. It has established a method of planning control to identify and protect heritage resources, including individual buildings, structures, monuments and unique districts.

2.4.3 Existing Systems

The scope of this study includes all three municipal servicing systems: water, wastewater and stormwater. There have not been any major changes to the systems in recent years with only the typical maintenance and renewal featuring as the primary activities.

2.4.3.1 Existing Water System

Wiarton draws all of its municipal water supply from Georgian Bay and treats it at the Wiarton Water Treatment Plant (WTP) located at the north end of Bayview St at Colpoy's Bay. The water distribution system in Wiarton is based on two (2) pressure zones: the lower zone servicing the major portion of Wiarton, and the upper zone servicing a small area to the north between Division St and Jenny St. There is one standpipe that provides storage for the lower zone and a local booster pumping station that services the upper zone. The majority of watermains in Wiarton range in size between 100 mm and 350 mm.

The water distribution system is further detailed in Section 3.2 of this MSP document.

2.4.3.2 Existing Wastewater System

Wiarton generally employs a gravity-based wastewater collection and treatment system that collects wastewater flow from the Wiarton area to a series of sewage pumping stations, which due to topographic constraints, are in place to direct flow from the shoreline of Georgian Bay to the treatment facility atop the Niagara Escarpment. Treated flow is then conveyed to its final destination to Georgian Bay.

The wastewater collection system is further detailed in Section 4.2 of this MSP document.

2.4.3.3 Existing Stormwater System

Wiarton is located within two watersheds where flow drains to Colpoy's Bay (Georgian Bay) and to several tributary branches of Clavering Creek terminating at Boat Lake. Clavering Creek is part of the Sauble River watershed and the Rankin River subwatershed and its headwaters originate in Wiarton. Flow continues from Boat Lake to the Rankin River and Sauble River and terminates at Lake Huron. [6]

For the purposes of this MSP, the Town has been subdivided into the following watersheds:

- Colpoy's Bay (Georgian Bay)
- Clavering Creek (Lake Huron)

The stormwater system is further detailed in Section 5.3 of this MSP document.

[6] *LGL Limited environmental research associates. Wiarton Wastewater Treatment Plant - Environmental Study Report – Natural Sciences Report – Desktop Review. April 2015.*

2.5 Future Growth Planning Projections

Growth population for Wiarton to 2029 were supplied by the Town either in the form of population or 'units' and spatial area. No employment populations were provided. The planning data is summarized in Table 1 and the growth areas are shown in Figure 4.

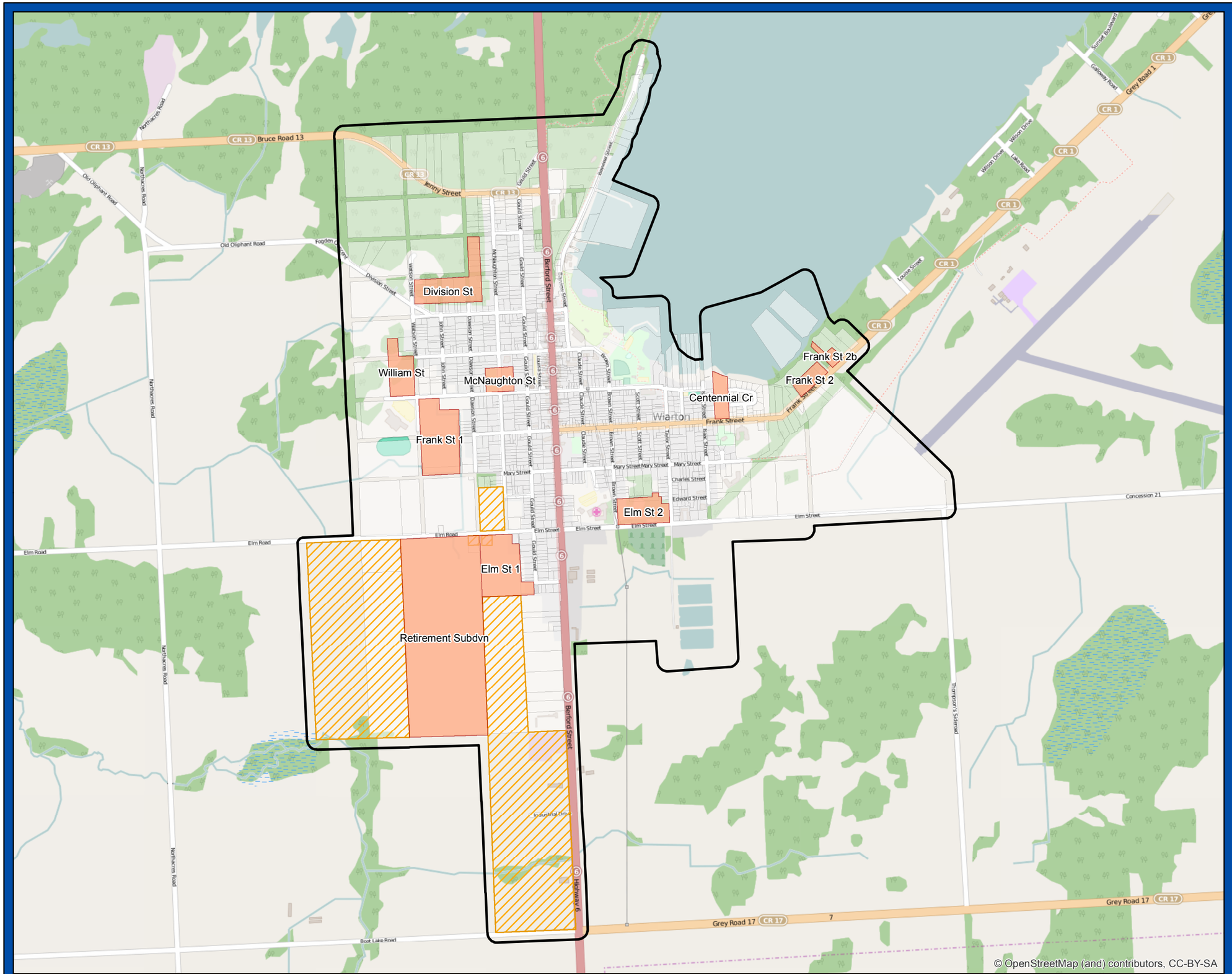
Table 1. Projected Population Growth in Wiarton

Growth Area Description	Population Growth (units)	Population Growth (persons)[1]	Employment Growth (employees)	Area (ha)	New Contributing Area (ha)	Comment
Division St	24	60	0	5.48	5.48	
McNaughton St	50	125	0	1.73	0.00	intensification
Frank St 1	34	85	0	7.03	0.88	
Elm St 1	28	70	0	6.44	6.01	
William St	20	50	0	3.07	3.07	
Elm St 2	16	40	0	3.48	0.00	intensification
Frank St 2	20	50	0	2.11	2.11	
Centennial Cr	43	108	0	1.68	0.00	
Retirement Subdivision	1,500	2,850[2]	0	40.67	40.67	
TOTALS	**1,735**	**3,438**	**0**	**72**	**58**	

[1] Growth estimates (except for Retirement Subdivision / South Lands) based on 2.5 persons per unit (ppu).

[2] Retirement Subdivision / South Lands residential growth units multiplied by 1.9 ppu.

The analysis and recommendations provided as part of this Master Servicing Plan are based on the planning data provided above.



N

Town of SOUTH BRUCE PENINSULA

Town of South Bruce Peninsula
Wiarton Master Servicing Plan

Figure 4 - Future Growth Areas

- Study Area
- Phase I Growth Area
- Phase II Growth Area

BluePlan ENGINEERING

October 2015
<enter GMBP figure #>
1:<enter scale> | NAD 1983 UTM Zone 17N

3 Water Master Servicing Plan

3.1 Water System Policy and Criteria

3.1.1 Design Criteria

A guiding principle for the design criteria is to ensure that demand projections are accurately predicted with an appropriate level of safety and risk management. This overall principle also ensures that infrastructure has sufficient capacity to meet the growing needs of the Town and does not impede the approved/planned growth.

The design criteria was reviewed as part of this Master Servicing Plan to ensure water demands are accurate and will support sizing and timing of future infrastructure such as pipes and facilities.

The development of design criteria utilized historical billing data in combination with Ontario Ministry of Environment and Climate Change (MOECC) Design Standards and Guidelines. Level of service and water policies were discussed and established at the outset of the project.

Table 2 summarizes the Town of South Bruce Peninsula water design criteria used at a Master Servicing Planning level.

Table 2. Water Design Criteria

Scenario	Average Day Demand	Maximum Day Factor[1]	Peak Hour Factor[1]
Existing Residential / Employment	450 L/employee/day	2.25 (for communities of size 2,001-3000)	3.38 (for communities of size 2,001-3000)
Future Residential / Employment	450 L/person/day	2.0 (for communities of size 3,001 – 10,000)	3.0 (for communities of size 3,001 – 10,000)

[1] *Based on MOECC peaking criteria.*

System fire flow requirements were based on MOECC criteria as follows:

- Existing Conditions: 110 L/s fire flow for 2 hours for a population of 2,291 (used 3,000)
- Future Conditions: 159 L/s fire flow for 3 hours for a population of 5,729 (used 6,000)

3.1.1.1 Water Treatment Plant

Treatment plant capacity needs were based on maximum day demands. The capacity of the high lift pumps (at the WTP) were also based on maximum day demands.

3.1.1.2 Watermains

The Wiarton full pipe hydraulic model was used to assess the ability of the water distribution to deliver adequate flows and pressures throughout the Town as well as to further refine watermain capacities. Additional criteria considered typical of best practices were also referenced to establish existing and future watermain capacities. These criteria are as follows:

- Watermains that are part of the local distribution system are sized for the greater of maximum day demand plus fire or peak hour demand;
- Watermain sizing is based on flow and pressure requirements which include maintaining pressures in the distribution system between 40 psi (275 kPa) and 100 psi (700 kPa); and,
- Trunk watermain capacity expansions are based on service level (e.g. pressure, velocity, head loss). Oversizing shall be considered in areas where potential growth and build out is expected to occur.

As such, two hydraulic modelling scenarios were evaluated to confirm watermain requirements:

- Maximum Day
- Maximum Day plus Fire

Results of these scenarios under baseline, future and future with local looping improvements are provided in Appendix D1.

3.1.1.3 Water Pumping Stations

Upper zone booster pumping station capacity needs were based on the greater of peak hour demands or maximum day demands plus fire flow.

3.1.1.4 Water Storage Facilities

Water storage capacity needs were based on the Ministry of Environment and Climate Change (MOECC) storage requirement criteria. System fire flow requirements were developed based on a review of industry standards and Fire Underwriters Survey (FUS) criteria for the purpose of this Master Servicing Plan, as follows:

- Single Family Homes: 37 L/s
- Multi-Family Homes: 75 L/s
- Town Centre / Institutional: 120 L/s

3.1.2 Costing Methodology

3.1.2.1 Unit Rates

Unit cost rates were used as a baseline approach in determining estimated linear project costs. The linear unit rates used for this Master Servicing Plan are based in 2014 dollars and take into consideration southern Ontario prices of labour and availability of materials. The unit rates are the result of preparing multiple Master Planning Studies and have undergone independent peer reviews in order to further refine and ensure overall accuracy of the cost estimates. Estimates were favourably compared to costs of recent capital projects within the GTA and southern Ontario to support validation of the unit rates. A summary of the linear unit water costs for the Master Servicing Plan is provided in Appendix F.

3.1.2.2 Operation and Maintenance Costs

Operation and Maintenance Costs (O & M) have been qualitatively considered during the evaluation of servicing alternatives. The development of alternatives has strived to reduce O & M costs wherever possible. For example, the ongoing operation and maintenance costs of a pumping station or storage facility will have a larger financial impact than one that does not include one.

3.1.2.3 Final Project Costs

This Master Servicing Plan includes the calculation of capital costs for all proposed projects. These costs were calculated using a combination of methods. For the majority of the water projects, a base construction cost was obtained using either unit rate construction cost based on pipe diameter or unique project analysis. The base construction cost considers several factors unique to each project such as approximate depth of installation, creek, railway and highway crossings, tunneling requirements, Greenfield versus urban construction and various other construction challenges. Design, administration, contingency and non-recoverable HST costs were added to arrive at a final project cost. Detailed costing sheets were developed to support the financial evaluation for each linear and facility projects. The final project costs are shown in the Capital Program within Section 3.5.1.

3.2 Existing Water System

Wiarton draws all of its municipal water supply from Georgian Bay and treats it at the Wiarton Water Treatment Plant (WTP) located at the north end of Bayview St at Colpoy's Bay. The plant is operated by the Ontario Clean Water Agency (OCWA). The Wiarton WTP also provides treated water to Oxenden (via the Wiarton system) and Oliphant (via truck transportation). Oxenden consists of seasonal and permanent homes with 171 connections and 23 vacant lots. Oliphant consists of approximately 225 residents.

The water distribution system in Wiarton is based on two (2) pressure zones: the lower zone servicing the major portion of Wiarton, and the upper zone servicing a small area to the north between Division St and Jenny St. There is one standpipe that provides storage for the lower zone and a local booster pumping station that services the upper zone.

The existing water system and its pressure zones are shown in Figure 5.

3.2.1 Existing Water Infrastructure

3.2.1.1 Water Treatment Plant

The Wiarton WTP has a design capacity of 5,400 m^3/day. The final treated water is discharged to the distribution system via a high lift pump with a capacity of 5,140 m^3/day (62.3 L/s); a standby pump is also available[7].

There are two raw water intakes: a main intake and a back-up intake. The main raw water intake pipe is a 450 mm diameter pipe extending 180 m into Colpoy's Bay (Georgian Bay) east of the plant. The backup raw water intake is also a 450 mmm diameter pipe extending approximately 45 m into Colpoy's Bay east of the plant.

A raw pumping station equipped with four (4) pumps rated at 31.3 L/s and 9.8 m total dynamic head (TDH) are used to draw water from a two-cell raw water well. Three pumps are usually in operation at any given time.

The high lift pumping station is equipped with two (2) pumps (one duty, one standby) rated at 59.5 L/s and 77.7 m TDH.

The WTP building is approximately 26.7 m x 18.2 m and contains the low lift and high lift pumping stations, two (2) flocculation tanks, filters, chemical storage and pumping equipment, standby diesel generator, office, laboratory and control and instrumentation equipment.

Two direct filtration, dual-media (anthracite and sand), gravity filters each rated at 2,700 m^3/d are used to filter the floc. Each filter is equipped with a filter backwash pump, an agitator and an underdrain system. The filtrate is chlorinated again prior to the water entering the clearwell.

There is one un-baffled clearwell divided into two compartments with a total useable storage volume of approximately 751 m^3.

A sodium hypochlorite disinfection system provides both primary and secondary disinfection. The free chlorine residual in the treated water leaving the plant provides a method for secondary disinfection.

An activated carbon feed system for taste and odour is installed but has not been used to date.

Two ultraviolet (UV) disinfection reactors are also used to provide primary disinfection at the plant. They are located on the high lift discharger header.

[7] *OCWA. 2014. Wiarton Water Treatment Plant – Large Municipal Residential Drinking Water System – Schedule 22 Summary Report for the period of January 1, 2014 to December 31, 2014.*

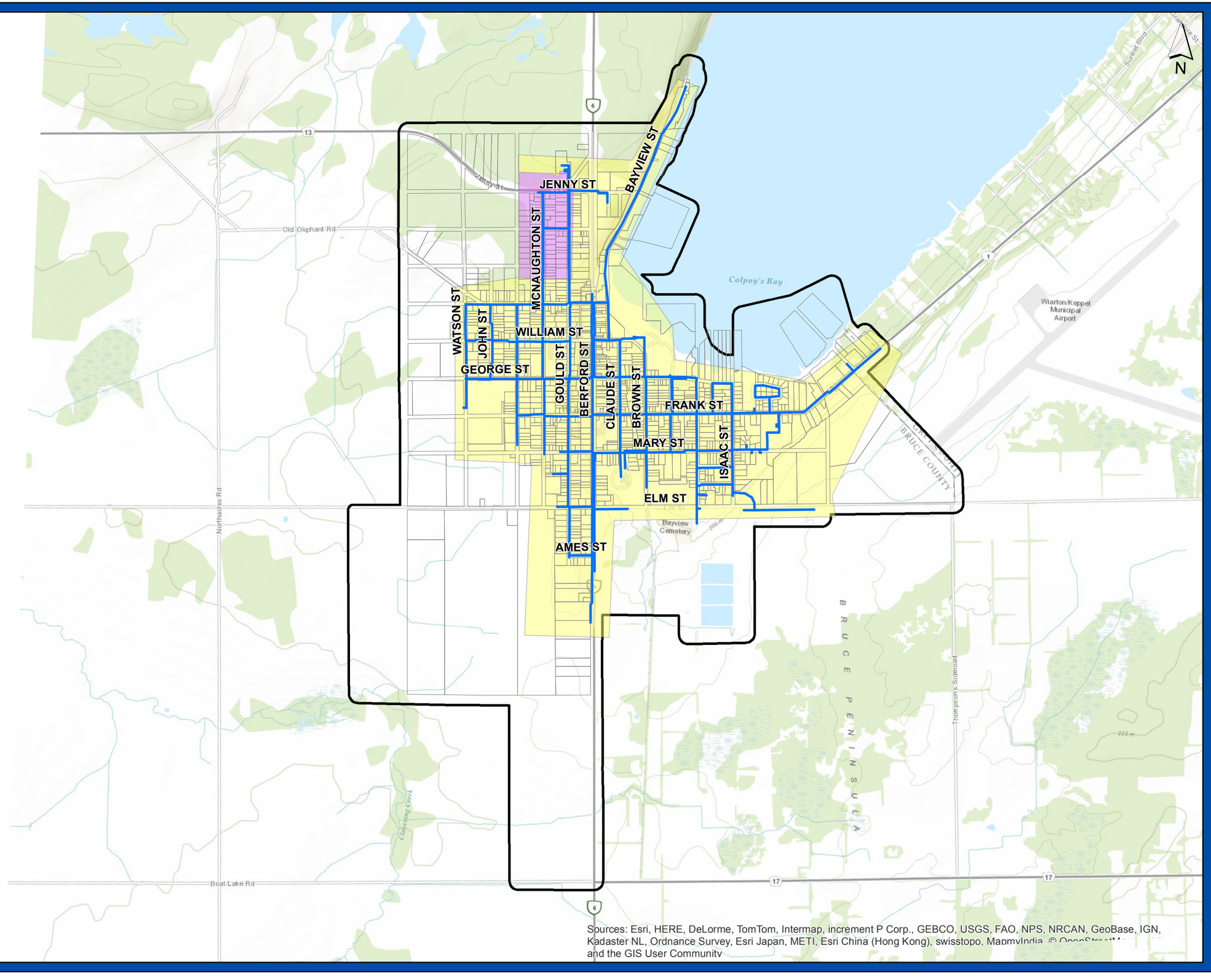
Town of SOUTH BRUCE PENINSULA

Wiarton Master Servicing Plan
for Water, Wastewater and Stormwater Services
and Gould Street Sanitary Sewer Upgrade
Class Environmental Assessment

Figure 5 - Existing Water System

Legend

- Existing Watermain
- Upper Pressure Zone
- Lower Pressure Zone
- Property Parcel
- Master Servicing Plan Study Area



Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap and the GIS User Community

BluePlan ENGINEERING

214128-4-W
September 2015
Data Source: Town of South Bruce Peninsula
Scale: 1:20,000 | NAD 1983 UTM Zone 17N

3.2.1.2 Water Distribution System

The Wiarton distribution system has approximately 1,062 service connections and services an estimated population of 2,300 residents. There are approximately 23.5 km of watermains and approximately 87 fire hydrants. Approximately 54% of the piping is comprised of PVC and the remaining 46% is cast iron and ductile iron. Watermain sizes range between 100 mm and 350 mm diameter, with almost half being 150 mm.

A Booster Pumping Station (BPS) located at the north limit of Gould St (Upper Zone) services approximately 80 homes on Gould St, Daniel St, and Jenny St. This BPS is equipped with one duty pump and three fire pumps for a total rated capacity of 3,920 m^3/day. The pumps boost pressure to approximately 52 psi to service these homes that are above 212 m in elevation.

The Water Standpipe is located on Gould St, adjacent to the Booster Pumping Station, and has a capacity of 2,895 m^3. The bottom elevation of the standpipe is 232 m and the approximate top water level is 246.8 m.

3.2.2 Hydraulic Water Model

Analysis of the current and future water distribution system was undertaken using a hydraulic simulation model developed as part of this MSP. This model was built using GIS data provided by the Town and was further enhanced by referencing information such as pipe inverts in construction/as-built drawings. The existing model includes approximately:

- 179 pipes
- 135 nodes
- 1 storage facility
- 1 pumping station
- 1 water treatment plant

3.3 Assessment of the Existing and Future Water Infrastructure

The first step in the detailed analysis of the Master Servicing Plan is the assessment of the existing infrastructure capacity and conditions. Establishing accurate existing conditions will ensure further accuracy of the future recommendations. It should be noted however, that no flow analysis was done to verify C-factors or fire flow pressures. Once the existing system conditions were established, the impacts of future growth demands on the water distribution system were analyzed to develop and evaluate servicing alternatives.

The following sections describe the current infrastructure constraints, as well as opportunities for developing and expanding the water system to meet growing demands to the 2029 planning horizon.

3.3.1 Opportunities and Constraints

A review of the latest 2014 Annual Summary Report provides a comparison of average and monthly maximum daily flows of the approved capacity in the System Approval. The report shows that the WTP consistently operated within the limits of its rated capacity in 2014, reaching 35% of rated capacity in the peak month of July.

Water Distribution System

In general, the water distribution has adequate capacity to deliver water at acceptable service levels, though there are some areas at the higher or lower end of the acceptable pressure range. The hydraulic water model was used to identify these areas. The following Opportunities and Constraints for the Wiarton water distribution system were identified:

General

- Future buildout of the South Lands may require additional storage. Storage requirements are based on design criteria numbers rather than actual flow data.
- Opportunities for intensification development will need to be incorporated into the infrastructure analysis
- Based on the existing maximum day demand (2,183 m^3/d), the Wiarton WTP is within capacity
- Based on the future maximum day demand (4,958 m^3/d), the Wiarton WTP has sufficient capacity to support growth
- There is sufficient pumping capacity in the Upper Zone BPS to support future growth
- There is sufficient storage capacity (2,890 m^3) within the Standpipe to support existing (1,599 m^3) requirements but there is a deficit (765 m^3) in storage with the 2029 buildout requirements (3,655 m^3); however, given the uncertainty of the development details for the proposed retirement community anticipated for the South Lands development area, it is recommended that the Town continue to monitor water demands over time to assess need for additional storage.
- Proposed development must consider environmentally protected features

Operation

- Opportunity to optimize the use of existing storage, pumping and treatment capacity
- There are some localized dead ends within the system that are experiencing either low pressures and/or limited fire flows. These restrictions can be addressed through localized looping of the system.
- There are some high pressures areas (greater than 90 psi) along the Colpoy's Bay shoreline
- There is surplus booster pumping capacity to the Upper Zone

3.3.2 Hydraulic Analysis

Analysis and water demand from existing and future population and employment growth is based on the Town's growth projections. Population growth including intensification, in the form of population or 'units' and spatial area, was supplied by the Town. There were no employment projections provided. Existing and future demand projections consider the Communities of Oxenden and Oliphant. However, there were no growth projections provided for Oxenden and future demands in Oliphant are assumed to be zero after an upgrade to their water system.

Existing demands are also provided based on the following

- Average Day Demand based on total water consumption
- Max Day Demand peaking factor based on the MOECC peaking criteria of 2.25 (for communities size of 2,001-3,000)
- Peak Hour Demand peaking factor based on the MOECC peaking criteria of 3.38 (for communities size of 2,001-3,000)

Average Day Demands, Maximum Day Demands, and Peak Hour Demands calculated for the existing system are provided below by water pressure zone.

Table 3. Existing Demands by Pressure Zone

Zone	ADD (m^3/d)	MDD (m^3/d)	PHD (m^3/d)
Upper	42	95	142
Lower	928	2,088	3,137
Total	**970**	**2,183**	**3,279**

Using the Town's design criteria and the planning projections provided in Table 1, the following demands were determined for the existing and future growth conditions.

Table 4. Existing and Future Water Demand Summary

Demand Condition	Population	Demand (m^3)	
		ADD	MDD[1]
Existing System	2,291	970	2,183
Growth Only Contribution[2]	3,438	1,547	3,094
Future System Total	**5,729**	**2,479**	**4,958**

[1]Existing MDD peaking factor is 2.25, however once population increases with growth it becomes 2.00 based on MOECC peaking criteria (population 3,001-10,000).
[2]Oliphant future demands assumed to be zero.

3.3.2.1 Water Treatment Plant

This Master Servicing Plan analyzed the projected average day growth demand within the Wiarton WTP service area to ensure that the facility had adequate capacity within the 2029 growth horizon. The capacity assessment is summarized as follows:

Existing WTP Capacity	= 5,400 m^3/day	
Existing Population	= 2,886	*includes Oxenden and Oliphant
Existing ADD	= 970 m^3/d	
Existing Per capita ADD	= 336 L/cap/d	*includes Billed and Non-Revenue Water
Future Population	= 6,099	*includes Oxenden but excludes Oliphant
Future MDD	= 4,958 m^3/d	
Capacity Surplus at WTP	**= 442 m^3/d**	**(8% of rated capacity)**

Based on the future MDD (4,958 m^3/d), the existing Wiarton WTP is operating within its rated capacity (5,400 m^3/d) and can support growth to 2029, with no further capacity expansion required.

3.3.2.2 Trunk Watermains

3.3.2.3 Water Pumping Stations

This Master Servicing Plan analyzed the projected maximum day growth demands at the High Lift Pumping Station at the WTP and at the Booster Pumping Station to ensure that the facilities had adequate capacity within the 2029 growth horizon. The capacity assessment is summarized as follows:

<u>High Lift Pumps (at WTP)</u>

Existing HLPS Capacity	= 5,140 m^3/d	
Future MDD	= 4,958 m^3/d	
Capacity Surplus at High Lift	**= 182 m^3/d**	**(3.5% of rated capacity)**

<u>Upper Zone Booster Pumps</u>

Existing Capacity	= 3,920 m^3/d	
Future MDD + fire flow	*= 3,404 m^3/d*	
Future peak hour demand	*= 161 m^3/d*	
Capacity Surplus at BPS	**= 516 m^3/d**	**(13% of rated capacity)**

Based on the future MDD (4,958 m^3/d), the existing high lift pumps at the Wiarton WTP are operating within their rated capacity (5,140 m^3/d) and can support growth to 2029, with no further capacity expansion required. Based on the future maximum day plus fire demand in the Upper Zone (3,404 m^3/d), the existing Upper Zone BPS is operating within its rated capacity (3,920 m^3/d) and can also support growth to 2029, with no further capacity expansion required.

3.3.2.4 Water Storage

This Master Servicing Plan analyzed the projected storage requirements at the Standpipe to ensure that the facility had adequate storage capacity within the 2029 growth horizon. The capacity assessment using MOECC storage requirements is summarized as follows:

Water Storage Standpipe

Existing Capacity	= 2,895 m^3	
Future Fire Flow Requirement	*= 1,717 m^3*	
Future Emergency Requirement	*= 731 m^3*	
Future Equalization Requirement	*= 1,207 m^3*	
Future Total Storage Requirement	= 3,655 m^3	
Capacity (Deficit) at Standpipe	**= (760 m^3)[8]**	**(26% of rated capacity)**

3.4 Evaluation of Strategies

The identification and evaluation of servicing options is a critical component of the Master Servicing Planning process because it enables a comprehensive review of a reasonable range of alternatives while documenting the process in a transparent manner. The evaluation process that has been undertaken is described in the following sections.

3.4.1 Objectives

The Town intends the 2015 Master Servicing Plan to meet the Approach 2 requirements under the Municipal Engineers Association (MEA) Class EA process. Under Approach 2, a Master Servicing Plan Report is prepared at the conclusion of Phases 1 and 2 of the Class EA process. This approach allows for all Schedule A, A+ and select Schedule B projects identified in the Master Servicing Plan to move forward to implementation. To achieve this objective, systematic evaluation and documentation is required to support the Schedule B Class EA requirements along with any applicable review agency commitments prior to implementation. Any Schedule C projects identified will also require supporting information and decision making to proceed onto separate studies and continue to Phases 3 and 4 of the Class EA process.

The proposed evaluation approach described herein has been designed to ensure a logical and transparent process that can document the evaluation and decision making that will ultimately develop a capital program that is defensible. Sustainability principles will also be considered in the development of the 2015 Master Servicing Plan, and will be integrated within the five-point evaluation, such as:

- Making best use of existing infrastructure;
- Minimizing the cost of new infrastructure;
- Considering operation and maintenance costs to ensure financial sustainability and;
- Ensuring the long term reliability and security of the water, wastewater and stormwater systems.

[8] Based on design criteria flows. Actual flows may be less. Monitoring is recommended.

3.4.2 Description of the Evaluation Process

The evaluation process undertaken for the development and selection of a preferred servicing strategy is described in this section and is graphically depicted in Figure 6.

A broad range of water serving concepts were established based on high level feasibility to meet the servicing requirements for the growth within Wiarton. These high level concepts included but were not limited to:

- Do Nothing
- Limit Community Growth
- Watermain Upgrades
- Additional Storage
- Pressure Zone Optimization
- Water Conservation / Water Loss

To evaluate the Servicing Concepts, the advantages and disadvantages for each were established based on several evaluation criteria. This preliminary evaluation examined the concepts from an ability to meet the servicing needs as well as a high level examination based on the 5-point criteria. Each concept was given a Low, Medium or High rating with concepts receiving a Low rating being screened out and not carried further to detailed evaluation.

The Servicing Concepts that were carried forward were then combined in order to build overall Servicing Strategies that would alleviate any existing constraints and satisfy the projected growth within Wiarton to 2029. The complete Servicing Strategies were also evaluated using a detailed 5-point strategy evaluation. The result of this evaluation was the selection of the Preferred Servicing Strategy.

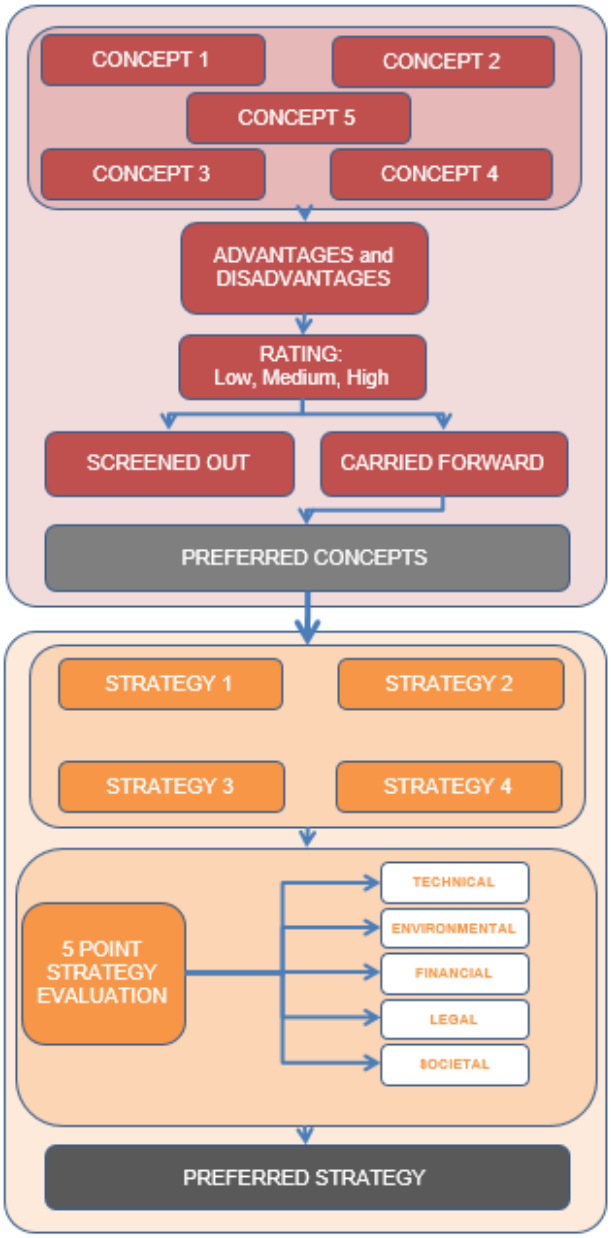


Figure 6. Servicing Option Evaluation Flow Diagram

3.4.3 Evaluation Criteria

Detailed evaluation tables supporting the evaluation of alternative servicing concepts, strategies, and alignments or sites are provided in Appendix E. Maps to accompany alternative servicing concepts, strategies, and alignments or sites are included in this section.

As described in Section 3.4.2, servicing strategies and appropriate alignments and sites are subject to a five-point evaluation, which includes five major areas of impact: environmental, technical, socio/cultural, financial, and legal/jurisdictional. The five-point evaluation criteria and their associated impacts are described in Table 5.

Table 5. Water Evaluation Criteria

CRITERIA	DESCRIPTION

Technical Impact	• Describes any overall technical advantage/disadvantage to an option related to:
	  ○ capacity requirements and level of service
	  ○ performance under power outage conditions
	  ○ alignments that can maximize a service area
	  ○ utilization of existing infrastructure
	• Describes difficulty of construction (construction in limited areas, crossings, protection of utilities, trees or structures)
	• Assesses whether existing infrastructure upgrades are required
	• Describes risk considerations:
	  ○ Level of security of water supply/transmission or wastewater treatment/conveyance
	• Describes the ability for phasing:
	  ○ staged growth and maximizing the use of existing or planned infrastructure
	  ○ incremental extensions of infrastructure as growth progresses
	  ○ balanced infrastructure costs with staged level of growth (high-level comment)
	• Describes impact on the sizing of planned and existing infrastructure
	• Highlights trunk infrastructure that potentially should be oversized to benefit future growth
	• Comments on whether growth areas will need to be serviced by existing or new infrastructure
	• Compares relative sizing differences between alternatives
	• Describes the technical consideration required for construction:
	  • Highlights need for deep pipe construction, creek/highway/railway crossings, alignment changes, and potential challenges during construction
	  • Where applicable, comments on construction of projects that can be coordinated with road improvements or construction
	  • Describes potential opportunities/constraints to servicing build out

Environmental Impact	• Describes the potential impacts of the option on the natural environment, proximity to existing natural features and designations including but not limited to: ESAs, ANSIs, conservation authority regulation limits, vegetation, woodlands, wildlife, aquatic resources and fisheries • Highlights requirements for major environmental crossings, development through environmental designated areas, and requirements for mitigative action
Financial Impact	• Describes the capital cost relative to other options • Considers construction costs for new infrastructure and for upgrades to existing system • Highlights major projects that differ from other options that significantly contribute to the capital costs

CRITERIA	DESCRIPTION
	• Describes large up-front costs required for phasing of growth • Comments on post-construction impacts such as operation and maintenance costs and requirements, and compares to other options
Legal/Jurisdictional Impact	• Notes any land requirement issues and agency concerns that may arise related to project alignments, land acquisition, planning permits, crossings etc. • Comments on compliance with Regional Guidelines and Policies • Describes the potential impacts related to opportunity or requirements for integrated planning, design, construction with other servicing such as bridge, road construction etc. • Notes if coordination with involved parties is required
Socio-Cultural Impact	• Describes the potential impacts to residents, archaeological/heritage resources, and visual aesthetics • Describes any potential noise, dust, vibrations, traffic disruptions to residents and businesses during and following construction

3.4.4 Servicing Concepts

The water network, along with the previously identified Opportunities and Constraints, were examined and a long list of high level Servicing Concepts were introduced early in the analysis and were investigated. The Concepts are listed below and were evaluated to determine which are feasible to carry forward to make up the Servicing Strategies. The Concept evaluation table is provided in Appendix E1.

Concept 1 – Do Nothing – *Screened Out*

The Do Nothing alternative is required for evaluation under the Class EA process. It essentially identifies the existing conditions, and helps to define the extent of the problem. In this case the "Do Nothing" alternative does not address the problem and needs of the study. The Do Nothing concept does not meet the servicing needs of future population projected by the Town. For this reason, the Do Nothing concept is not considered a viable one and has been screened out.

Concept 2 – Limit Community Growth – *Screened Out*

Similarly, the Limit Community Growth concept does not meet Official Plan policies and as such, it has also been screened out as a viable concept.

Concept 3 – Increase System Capacity

- Concept 3a – Provide Additional Storage – *Carried Forward*
- Concept 3b – Watermain Upgrades – *Carried Forward*

Concept 4 – Improve System Efficiency

- Concept 4a – Pressure Optimization – *Carried Forward*
- Concept 4b – Increase Water Conservation / Reduce Water Loss – *Carried Forward*

While each of these concepts on its own may not satisfy all growth and capacity constraints within the system, these have been combined to generate the Servicing Strategies.

3.4.5 Servicing Strategies

Six (6) alternative water servicing strategies were developed and evaluated. The descriptions for the strategies are provided below and are depicted in Figure 7 to Figure 12.

Strategy 1 –Trunk Watermain Upgrade to South Lands

- Trunk watermain upgrade to South Lands (on Gould St)
- Loop dead end watermains in the southwest
- Increase water conservation / reduce water loss

Strategy 2a – New Storage at Existing Site and Trunk Watermain Upgrade to South Lands

- New storage facility at existing standpipe
- Trunk watermain upgrade to South Lands (on Gould St)
- Loop dead end watermains in the southwest
- Increase water conservation / reduce water loss

Strategy 2b – Decommission Existing Storage, New South Lands Storage and Trunk Watermain Upgrade

- New storage facility at South Lands site
- Decommission existing standpipe
- Trunk watermain upgrade to South Lands (on Gould St)
- Loop dead end watermains in the southwest
- Increase water conservation / reduce water loss

Strategy 3 – New South Lands Storage and Trunk Watermain Upgrade

- New storage facility at South Lands site
- Trunk watermain upgrade to South Lands (on Gould St)
- Loop dead end watermains in the southwest
- Increase water conservation / reduce water loss

Strategy 4 – New South Lands Storage and Expand Upper Pressure Zone

- Expand Upper Pressure Zone
    - Upgrade existing booster pumping station
    - New floating storage for upper zone
    - Maintain existing storage for lower zone

    - Twin trunk watermain from Division St to booster pumping station
- New storage facility at South Lands site
- Loop dead end watermains in the southwest
- Increase water conservation / reduce water loss

Strategy 5 – Expand Upper Pressure Zone

- Expand Upper Pressure Zone
    - Pump upgrades at Wiarton WTP
    - Decommission existing booster pumping station and storage facility
    - New storage in upper zone
    - PRV connection to lower zone
- Loop dead end watermains in the southwest
- Increase water conservation / reduce water loss

Common Elements:

Common to all Servicing Strategies is the requirement for the increase of water conservation through implementation of a demand reduction program and the reduction of water loss through maintenance of system infrastructure. In addition, the requirement to loop watermain dead ends in the southwest applies to all the strategies as this will support future growth while maintaining existing levels of service.

The six water servicing strategies were evaluated using the five-point evaluation criteria, resulting in the selection of a preferred water servicing strategy. The evaluation of the alternative water servicing strategies is provided in Appendix E1.

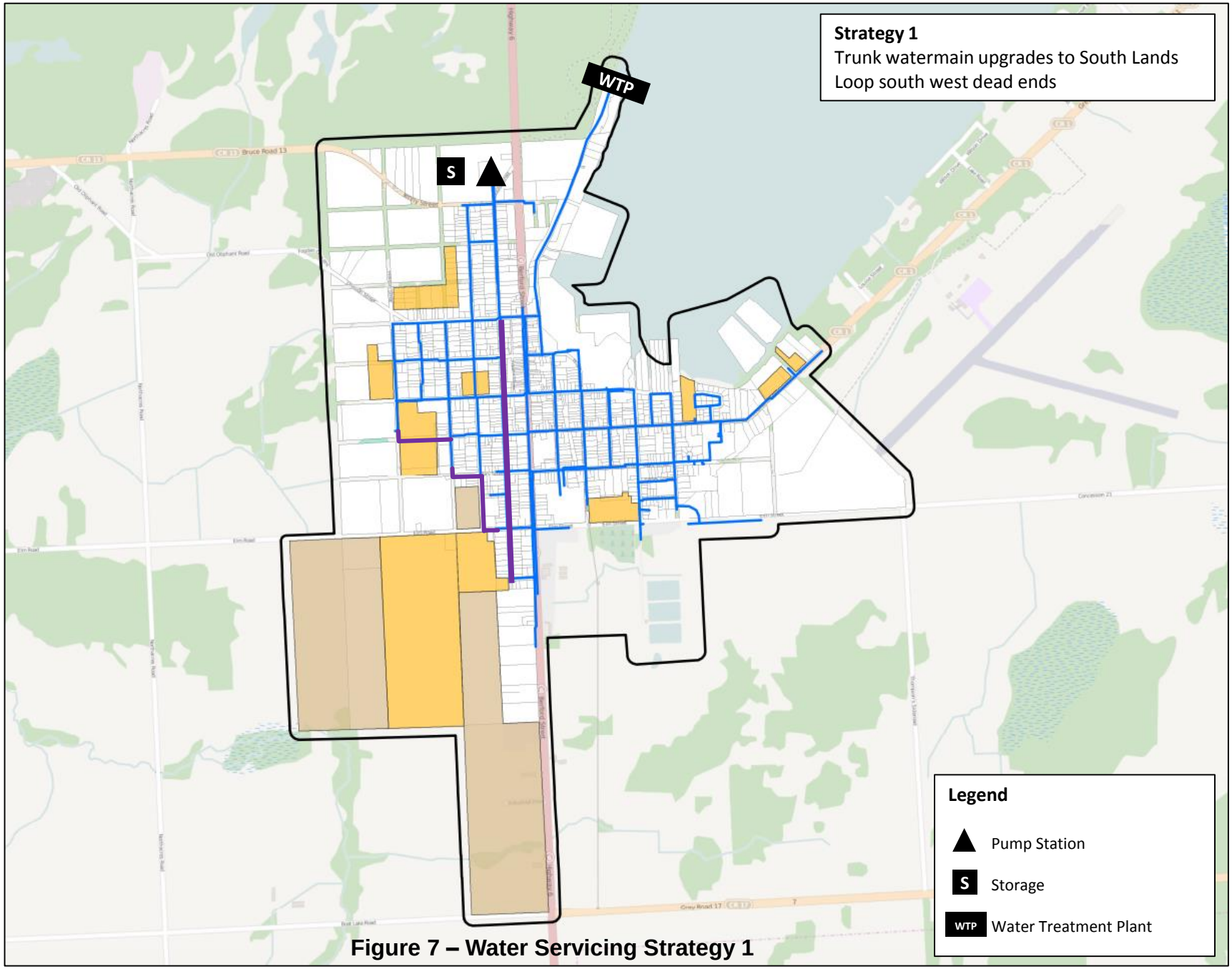


Figure 7 – Water Servicing Strategy 1

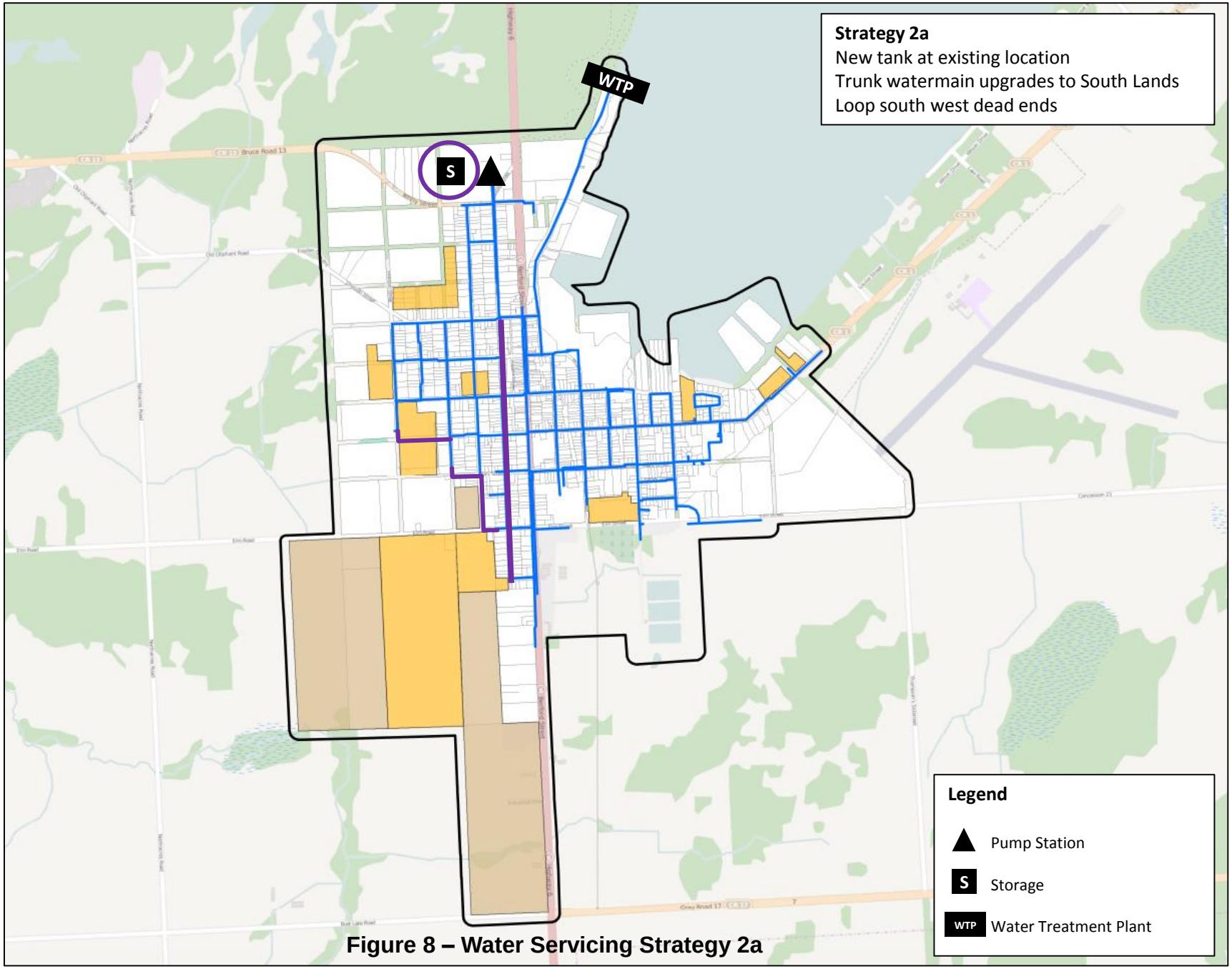


Figure 8 – Water Servicing Strategy 2a

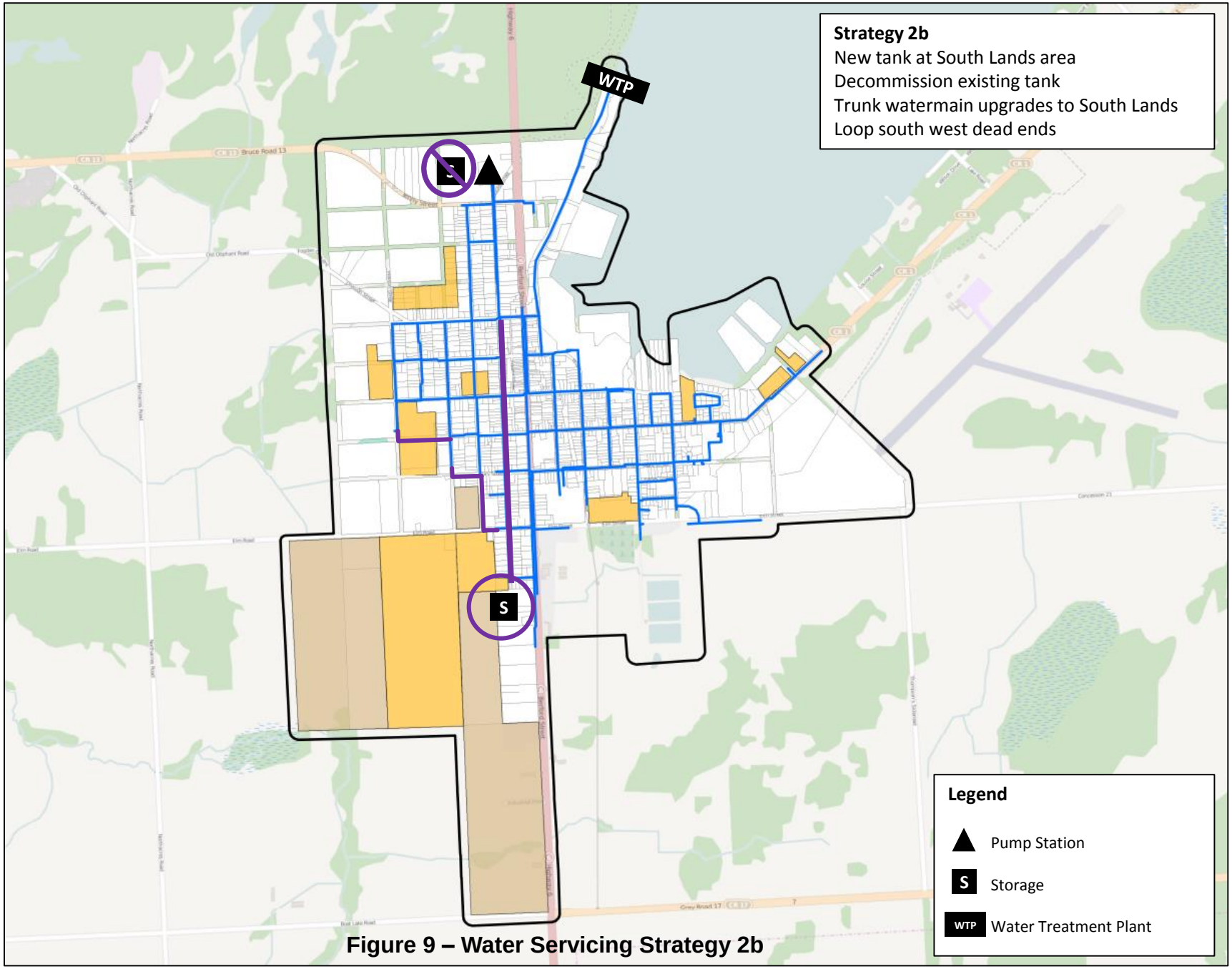


Figure 9 – Water Servicing Strategy 2b

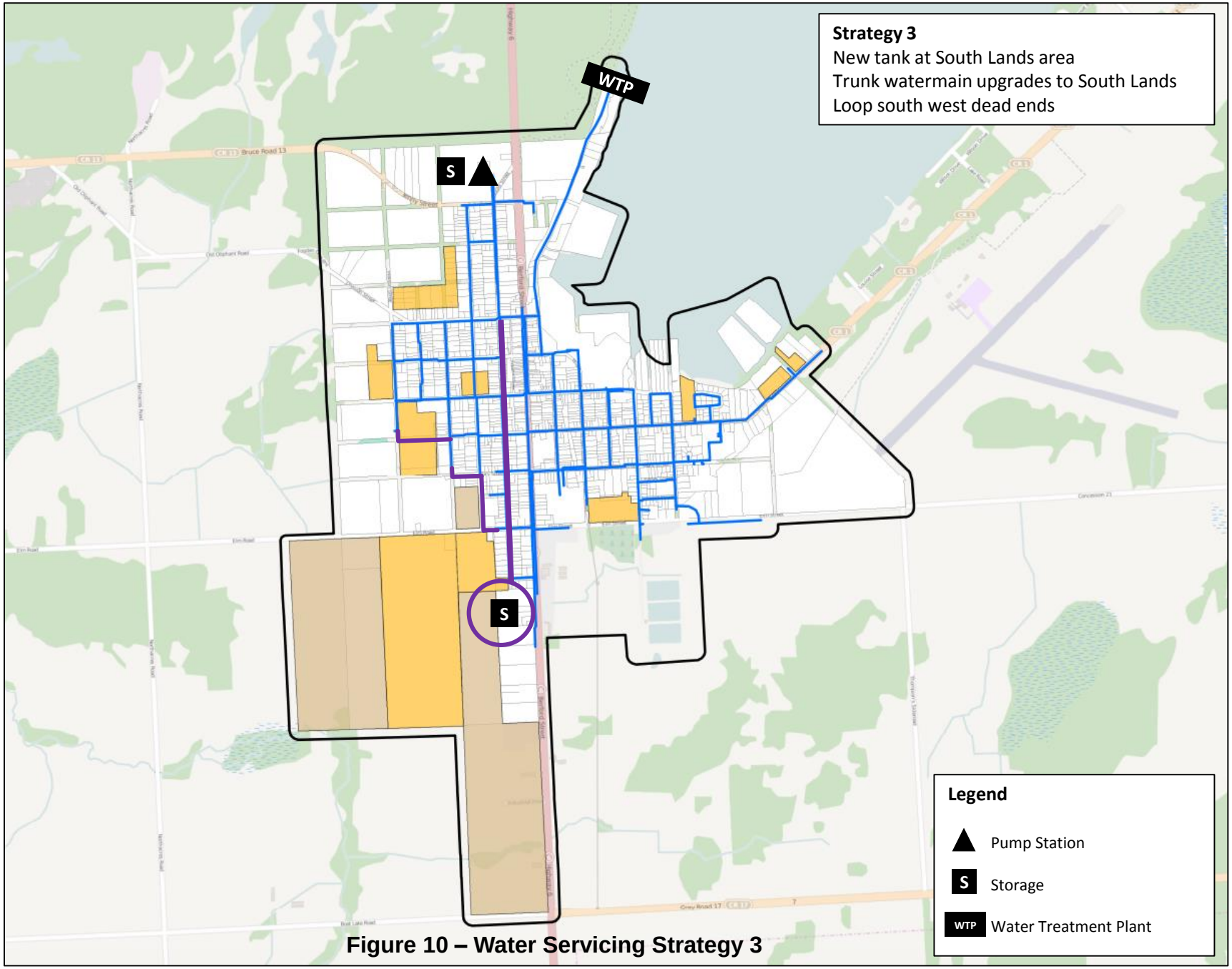


Figure 10 – Water Servicing Strategy 3

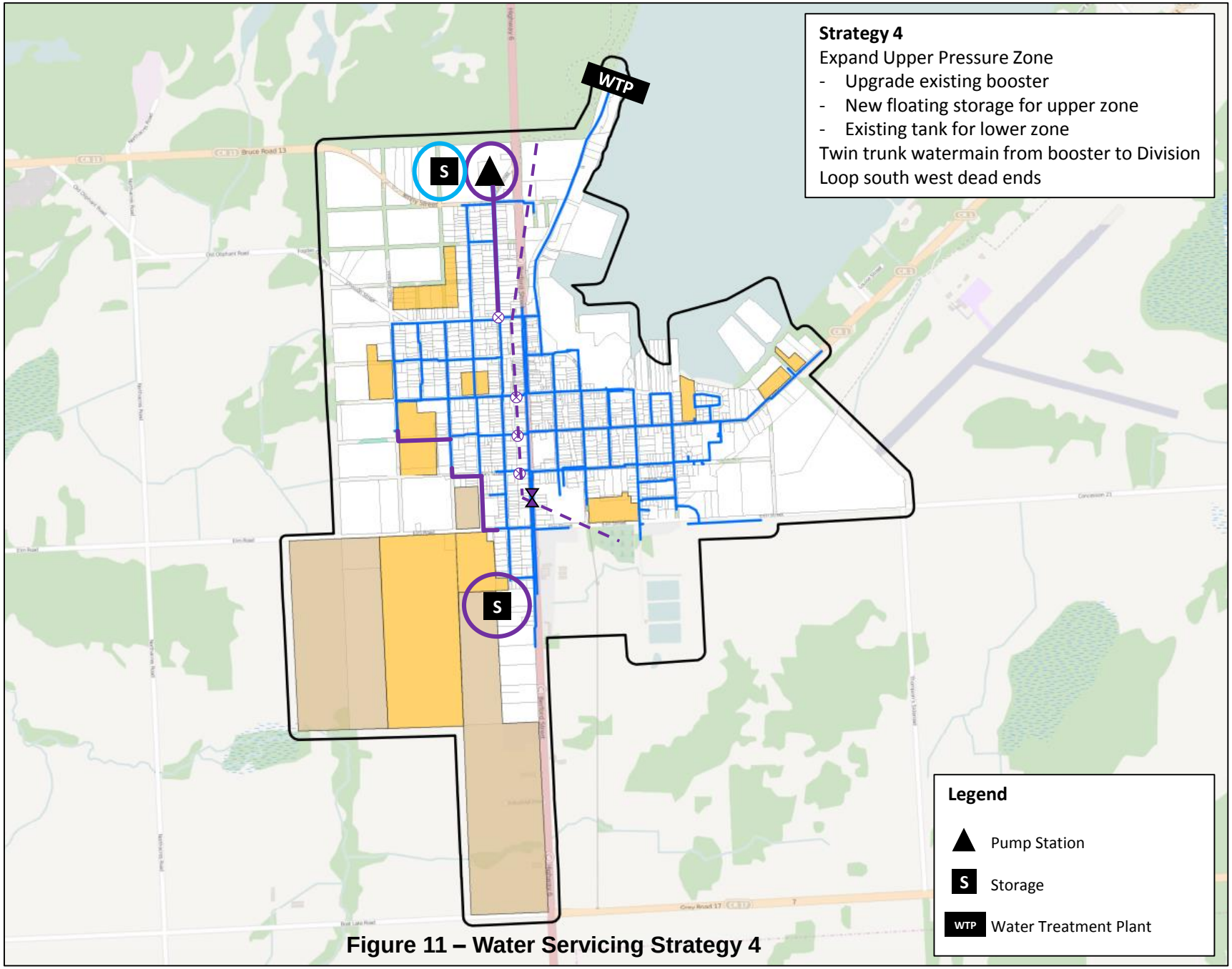


Figure 11 – Water Servicing Strategy 4

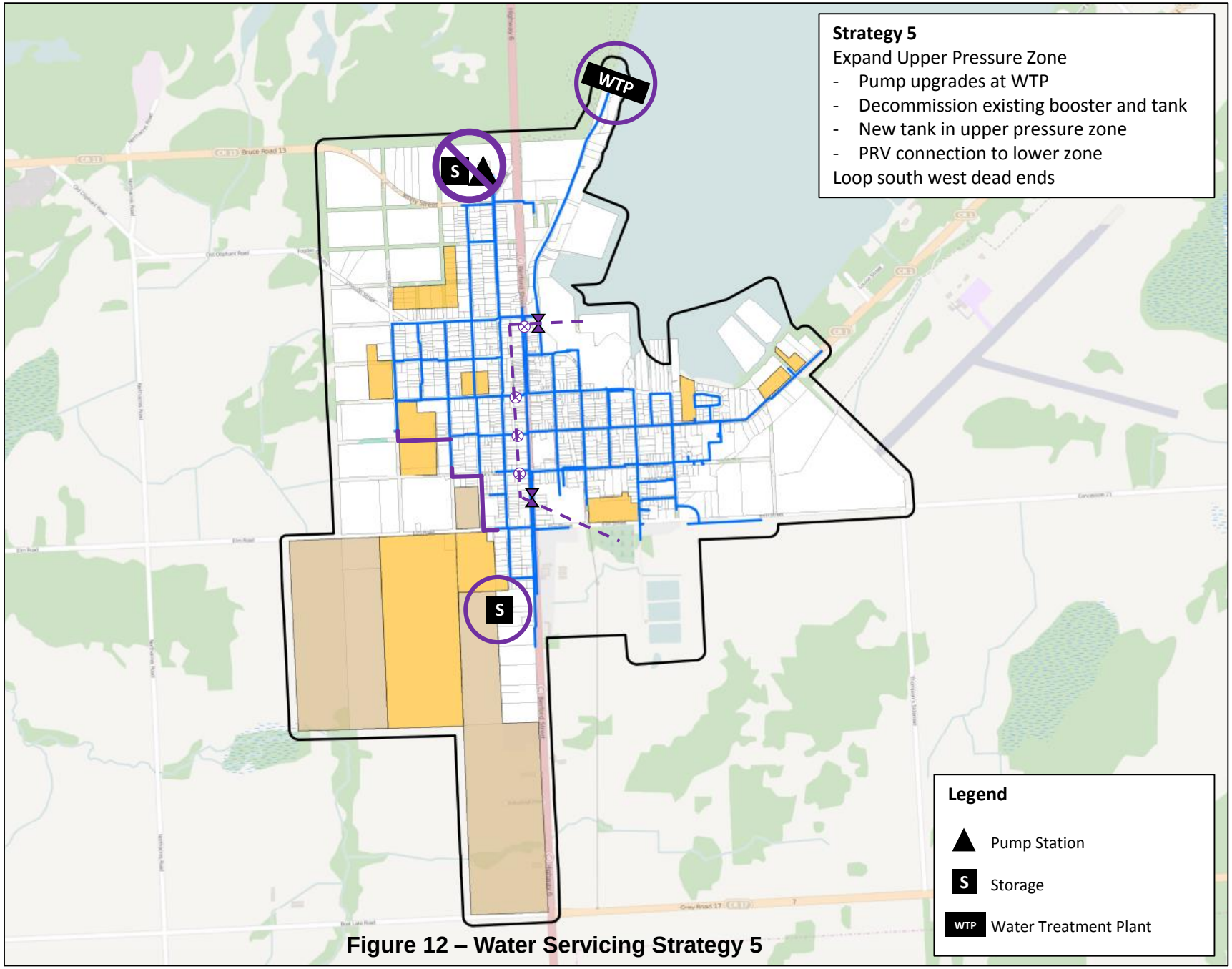


Figure 12 – Water Servicing Strategy 5

3.5 Preferred Water Servicing Strategy

Strategy 1 was determined to be the Preferred Water Servicing Strategy based on the 5-point evaluation to satisfy growth to 2029, as outlined in Section 3.4.

The main servicing needs for growth consists of upgrading conveyance infrastructure (on Gould St) to support growth in the South Lands area. The remainder of the proposed infrastructure is looping of watermains to improve level of service in the southwest end of the distribution system.

The main components that make up the Preferred Water Servicing Strategy consist of:

- New lower zone trunk watermain on Gould St to service South Lands and support future growth
- Looping of local watermains in the southwest area

Key benefits of the preferred Water Servicing Strategy include:

- Maximizing use of existing storage
- Reinforcing feed on Gould St, which will support future South Lands servicing needs
- Adding robustness to the existing water distribution system through looping of the network

The preferred Water Servicing Strategy can be seen in Figure 13. Each individual project is listed with its respective estimated capital cost in Table 6.

3.5.1 Capital Program for the Preferred Water Servicing Strategy

The capital costs for each project within the Preferred Water Servicing Strategy were developed according to the costing methodology presented in Section 3.1.2. These projects are listed according to their project number and are shown in Table 6. Included in the Water Capital Program, is the project description, proposed timing, sizing, and estimated total project cost.

3.5.2 Implementation & Class EA Requirements

As mentioned in Section 2.1, this Water, Wastewater and Stormwater Master Servicing Plan sets out to satisfy the EA Approach II requirements according to the MEA Class EA document.

The Preferred Water Servicing Strategy will support the servicing needs of Wiarton to 2029. This Strategy will be implemented in accordance with each project's Class EA schedule. The Class EA requirements for each project have been identified in the Capital Program Table 6. Schedule A and A+ projects may move forward to design and construction, with A+ projects requiring public notification prior to implementation. The Preferred Water Strategy does not identify any Schedule B or Schedule C projects.

During the next steps of the implementation program, primarily during detailed design of the projects, the following requirements will be considered:

- Finalization of property requirements
- Refinement of infrastructure alignment
- Identification of preferred construction methodologies
- Completion of additional supporting investigations as required (geotechnical, hydrogeological, etc)
- Review and mitigation of potential construction related impacts
- Satisfying of all provincial, municipal and conservation authority approval requirements

With respect to the Town's planning and budgeting, this program will be utilized as high level baseline estimates for the Town capital budgets. These costs will be further developed and refined during the implementation phases as more detailed information becomes available.

Given the growth-related nature of the servicing strategies, the capital programs will support the water, wastewater and stormwater components of the Town's Development Charges (DC) By-Law.

The anticipated timing of each project within the Preferred Strategy has been established based on the projected population growth in Wiarton.

3.5.3 Approvals

All proposed projects are planned to be within the existing and future road rights of way and are subject to the road planning and approvals being met, including required investigations. It is recommended that all key projects undertake a pre-design consultation with the applicable review agencies. This early consultation prior to the detailed design will ensure sufficient technical and environmental information is available to support the preferred design and that the project scope is well understood. Ultimately this process will facilitate project approvals moving forward.

Niagara Escarpment Commission

There are no water improvement projects that are anticipated to require development permits from the Niagara Escarpment Commission, as all projects lie within the urban area and outside designated Escarpment Natural, Protection, Rural, and Recreation Areas.

Grey Sauble Conservation Authority

Sections of proposed infrastructure cross portions of lands regulated under Ontario Regulation 151/06 Regulation of Development, Interference with Wetlands and Alteration to Shorelines and Watercourses. As such, a permit from Grey Sauble Conservation Authority will be required for the construction of certain water infrastructure, particularly works along unopened road allowances such as the Frank Street Extension, west of Dawson Street. It is anticipated that permits, approvals and construction of these water works will be coordinated with road construction projects.

Ministry of Tourism, Culture and Sport

The Ministry of Tourism, Culture and Sport (MTCS) was consulted as part of this Class EA and provided comments regarding the protection, conservation and preservation of Ontario's cultural heritage, as it relates to:

- Archaeological resources;
- Built heritage resources; and,
- Cultural heritage landscapes.

While an archaeological assessment was not completed as part of the MSP, a desktop review was undertaken along with the completion of the 'Criteria for Evaluating Archaeological Potential' checklist that considered all recommended projects. This process did not identify any areas of concern for the proposed water works.

A detailed cultural heritage evaluation was not completed as part of the MSP; however, a desktop review and completion of the 'Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes' checklist was undertaken. This process identified that there could be water/sewer pipes over forty years old within the road right of way that coincides with the location of the proposed pipe upgrades or new pipe installations.

Town of SOUTH BRUCE PENINSULA

Wiarton Water, Wastewater and Stormwater Master Servicing Plan and Gould Street Sanitary Sewer Upgrade Class Environmental Assessment

Figure 13 - Preferred Water Servicing Strategy and Capital Program

N

JENNY ST
DANIEL ST
BAYVIEW ST
MCNAUGHTON ST
Division St
DIVISION ST
BOYD ST
WATSON ST
JOHN ST
DAWSON ST
WILLIAM ST
William St
McNaughton St
GEORGE ST
BERFORD ST
CLAUDE ST
SCOTT ST
TYSON ST
CENTENNIAL CR
Centennial Cr
FRANK ST
Frank St 2b
Frank St 2
Colpoy's Bay (Georgian Bay)
W05
Frank St 1
W01
BROWN ST
MARY ST
TAYLOR ST
ISAAC ST
CHARLES ST
EDWARD ST
W04
W06
W03
HUNTER ST
Elm St 2
W07
W02
GOULD ST
ELM ST
Elm St 1
AMES ST
Retirement Subdvn

Legend

- Proposed Watermain
- Existing Booster Pumping Station
- Existing Storage Facility
- Existing Watermain
- Pressure Zone 1
- Pressure Zone 2
- Phase I Growth Area
- Phase II Growth Area
- Property Parcel
- Master Servicing Plan Study Area
- Escarpment Natural Area
- Environmental Protection
- Special Policy Area

BluePlan ENGINEERING

214128-15-W
October 2015
Data Source: Town of South Bruce Peninsula
Scale: 1:10,000 | NAD 1983 UTM Zone 17N

WATER CAPITAL & IMPLEMENTATION PROGRAM

Project Number	Components	Project Name	Project Description	Project Trigger	Start Year	Year in Service	Class EA Schedule	Project Type	Size/ Capacity	Length (m)	Construction Assumption	Unit Cost (2014$)	Base Cost (2014$)	*Permitting, Environmental, Geotechnical, & Other (2014$)*	*Total Construction Cost (2014$)*	Total Engineering & Design (2014$)	Contingency (2014$)	Non Refundable HST (2014$)	Total Project Cost (2014$)	Grants and Subsidies (2014$)	Direct Developer Cost (2014$)	Benefit to Existing (2014$)	DC Comment
W01	Design and Construction	Gould St Watermain 1	1380 m - 250 mm watermain on Gould St from Division St to Ames St	Growth	2021	2021-2026	A+	WDM	250 mm	1380 m	Open Cut	$958	$1,323,000	$204,000	$1,526,000	$382,000	$153,000	$34,000	$2,095,000	$0	$2,095,000	$0	Project is triggered by growth to 2029. 250 mm watermain will strengthen transmission capacity to future development in the south. Project is not required for existing service area.
W02	Design and Construction	Elm St Watermain 2 (Looping)	270 m - 200 mm watermain on Elm St from existing 200 mm connecting to future McNaughton St Extension Watermain 3	Growth	2016	2016-2021	A+	WDM	150 mm	90 m	Open Cut	$776	$70,000	$25,000	$95,000	$24,000	$10,000	$2,000	$131,000	$0	$131,000	$0	Looping of watermains is triggered by intensification and greenfield growth to 2029. Project is intended to improve future level of service but is not required for existing service area.
W03	Design and Construction	McNaughton St & Future Extension Watermain 3 (Looping)	333 m - 200 mm watermain on future McNaughton St Extension from Elm St Watermain 2 to Mary St Extension Watermain 4	Growth	2016	2016-2021	A+	WDM	150 mm	333 m	Open Cut	$776	$258,000	$53,000	$312,000	$78,000	$31,000	$7,000	$428,000	$0	$428,000	$0	Looping of watermains is triggered by intensification and greenfield growth to 2029. Project is intended to improve future level of service but is not required for existing service area.
W04	Design and Construction	Mary St Extension Watermain 4 (Looping)	190 m - 200mm watermain on future Mary St Extension from McNaughton St Watermain 3 to existing 200 mm on Dawson St	Growth	2016	2016-2021	A+	WDM	150 mm	190 m	Open Cut	$776	$147,000	$51,000	$198,000	$50,000	$20,000	$4,000	$272,000	$0	$272,000	$0	Looping of watermains is triggered by intensification and greenfield growth to 2029. Project is intended to improve future level of service but is not required for existing service area.
W05	Design and Construction	Frank St Extension Watermain 5 (Looping)	333 m - 200 mm watermain on future Frank St Extension from Dawson St to Watson St	Growh	2016	2016-2021	A+	WDM	150 mm	244 m	Open Cut	$776	$189,000	$52,000	$241,000	$60,000	$24,000	$5,000	$330,000	$0	$330,000	$0	Looping of watermains is triggered by intensification and greenfield growth to 2029. Project is intended to improve future level of service but is not required for existing service area.
W06	Design and Construction	Dawson St Extension Watermain 6	297 m - 150 mm watermain on Dawson St Extension from Mary St to Elm St	Growh	2016	2016-2021	A+	WDM	150 mm	297 m	Open Cut	$776	$231,000	$52,000	$283,000	$71,000	$28,000	$6,000	$388,000	$0	$388,000	$0	Extension of water distribution network is intended to improve security of supply to South Lands development and is intended to align with works proposed under the preferred wastewater servicing strategy.
W07	Design and Construction	Elm St Watermain 7	542 m - 200 mm watermain on Elm St from west of Gould St to west limit of South Lands development	Growh	2016	2016-2021	A+	WDM	200 mm	542 m	Open Cut	$863	$467,000	$89,000	$557,000	$139,000	$56,000	$12,000	$764,000	$0	$764,000	$0	Extension of water distribution network is intended to improve security of supply to South Lands development and is intended to align with works proposed under the preferred wastewater servicing strategy.
TOTAL														**$526,000**	**$3,212,000**	**$804,000**	**$322,000**	**$70,000**	**$4,408,000**	**$0**	**$4,408,000**	**$0**	

Note: Water Tower is approaching capacity at full buildout and will require monitoring as development occurs.

4 Wastewater Master Servicing Plan

4.1 Wastewater System Policy and Criteria

4.1.1 Design Criteria

A guiding principle of design criteria is to ensure that the flow projections are adequately predicted with an appropriate factor of safety and risk management. This overall principle also ensures that infrastructure has sufficient capacity to meet the growing needs of the Town and does not impede the approved/planned growth.

The design criteria was reviewed as part of this Master Servicing Plan to ensure wastewater flows are accurate and will support sizing and timing of future infrastructure such as pipes and facilities.

4.1.1.1 Dry Weather Flow

The Dry Weather Flow (DWF) is the portion of sanitary flow that is generated by residential, industrial, commercial and institutional water consumption. It may also contain a portion of base infiltration. The amount of base infiltration during dry weather flow periods is usually judged to be the minimum night time flow or a certain proportion of it.

For analysis of the wastewater system and for use with the Wiarton wastewater hydraulic model, the Dry Weather Flow (DWF) was estimated based on design flow calculated for the entire system and proportionally allocated to parcels according to billing water meter data received from the Town for the period of November 2011 to June 2014.

This meter data was first adjusted based on a wastewater generation figure of 90 percent of the water consumption figure. Therefore, the individual metered flows were reduced by 10% to establish the base sanitary dry weather flow used for the allocations.

Table 7 summarizes the wastewater design criteria utilized as part of this MSP for both new development areas and existing service areas.

Table 7. Wastewater Design Criteria

Scenario	Average Day Flow	Peaking Factor	Wet Weather Infiltration Rate
Existing Residential / Employment	450 L/person/day	Harmon (min 2.0, max 4.0)	0.69 L/s/ha
Future Residential / Employment	450 L/person/day	Harmon (min 2.0, max 4.0)	0.23 L/s/ha

This criteria is considered generally in agreement with other municipalities in Southern Ontario.

For existing service areas, the average daily flow was also calculated based on the Town's design criteria. However, a higher unit I/I (extraneous flow) rate was applied to the existing areas based on existing system performance. A unit I/I rate of 0.69 L/s/ha was calculated based on the maximum average day flow (11,158 m^3/d in 2013), minus the population derived flow (1,030 m^3/d based on design criteria of 450 L/cap/d), divided by the catchment area (181 ha). It should be noted that the maximum average day flow does not account for any bypassed or flooded volume, just that which was recorded at the treatment lagoons.

4.1.1.2 Wet Weather Flow

Wet Weather Flow is comprised of the aforementioned dry weather flow component and rainfall derived inflow and infiltration (RDII or I/I). The rainfall can either enter the system as runoff or as groundwater infiltration.

The RDII used for the analysis and within the Wastewater Hydraulic Model was applied based on the Town of South Bruce Peninsula design criteria of **0.23 L/s/ha** for new developments, and **0.69 L/s/ha** for existing infrastructure. The infiltration allowance for existing infrastructure was determined from the Maximum Day Flow data from the WWTL and the calculated Wastewater Production from the billing water meter data to determine the total I/I contribution for the entire Wiarton catchment area.

Based on the above Criteria, the total Peak Wet Weather flow is then calculated as follows

Peak Wet Weather Flow = (Dry Weather Flow x Peaking Factor) + RDII Allowance

The capacity of the sewage pumping stations and trunk sewers are assessed based on peak wet weather flow, which is the combination of peak dry weather flow plus infiltration allowance as identified above.

4.1.1.3 Sewage Pumping Station Capacity Assessment

The Town of South Bruce Peninsula design standards require that sewage pumping stations (SPS) shall be designed in accordance with the MOECC guidelines and the satisfaction of the Town Engineer. Two sewage pumping stations lie within the Wiarton Settlement Area, none of which have incoming flow monitoring or Supervisory Control and Data Acquisition (SCADA) systems to monitor station operations.

The level of service standards used for the Wiarton MSP require that the firm capacity of a pumping station be the total installed pumping capacity, discounting the capacity of the largest pump. The station's firm capacity should be sized to handle the peak wet weather flow.

4.1.2 Costing Methodology

4.1.2.1 Unit Rates

Unit cost rates were used as a baseline approach in determining estimated linear project costs. The linear unit rates used for this Master Servicing Plan are based in 2015 dollars and take into consideration southern Ontario prices of labour and availability of materials. The unit rates are the result of preparing multiple Master Planning Studies and have undergone independent peer reviews in order to further refine and ensure overall accuracy of the cost estimates. Estimates were favourably compared to costs of recent capital projects in the GTA and southern Ontario to support validation of the unit rates. A summary of the linear unit water costs for the Master Servicing Plan is provided in Appendix F.

4.1.2.2 Operation and Maintenance Costs

Operation and Maintenance Costs (O & M) have been qualitatively considered during the evaluation of servicing alternatives. The development of alternatives has strived to reduce O & M costs wherever possible. For example, the ongoing operation and maintenance costs of a sewage pumping station will have a larger financial impact on a servicing strategy, therefore the evaluation has shown a preference of a gravity solutions instead of pumping stations, where possible.

4.1.2.3 Final Project Costs

This Master Servicing Plan includes the calculation of capital costs for all proposed projects. These costs were calculated using a combination of methods. For the majority of the wastewater projects, a base construction cost was obtained using either unit rate construction cost based on pipe diameter or unique project analysis. The base construction cost considers several factors unique to each project such as

approximate depth of installation, creek, railway and highway crossings, tunneling requirements, Greenfield versus urban construction and various other construction challenges. Design, administration, contingency and non-recoverable HST costs were added to arrive at a final project cost. Detailed costing sheets were developed to support the financial evaluation for each linear and facility projects. The final project costs are shown in the Capital Program within Section 4.5.

4.2 Existing Wastewater System

4.2.1 Existing Infrastructure

Wiarton generally employs a gravity-based wastewater collection and treatment system that conveys wastewater flows from the Wiarton area to a series of sewage pumping stations, which due topographic constraints, are in place to direct the flows from the shoreline of the Georgian Bay to the treatment facility on top of the Niagara Escarpment. Treated flow is then conveyed to its final destination in Georgian Bay.

The Wiarton wastewater collection system comprises approximately 19.19 km of 50 mm to 700 mm diameter sewer pipes discharging to a pumping station located at the intersection of George St and Taylor St (SPS #1). From there, sewage flows travel through forcemains to a second pumping station located half way up the escarpment at the intersection of Elm St and Taylor St (SPS #2). The forcemains then discharges to the Wiarton treatment plant lagoons where flows area treated and finally conveyed to Georgian Bay via 1.86 km of outfall sewer.

The existing wastewater system is shown in Figure 14 and is further described within this section.

4.2.1.1 Wiarton Wastewater Treatment Lagoons

The Wiarton Wastewater Treatment Lagoons (WWTL) are located south of Taylor St within the former Town of Wiarton. The plant is operated by the Ontario Clean Water Agency (OCWA).

The Wastewater Treatment Lagoons have been in operation since 1999 and treat wastewater flows generated from Wiarton only. The facility consists of a system of three aerated lagoons operated in series and has a currently has a design capacity of 2,500 m^3/day. The final treated effluent is then discharged to Georgian Bay via 1.86 km of outfall sewer.

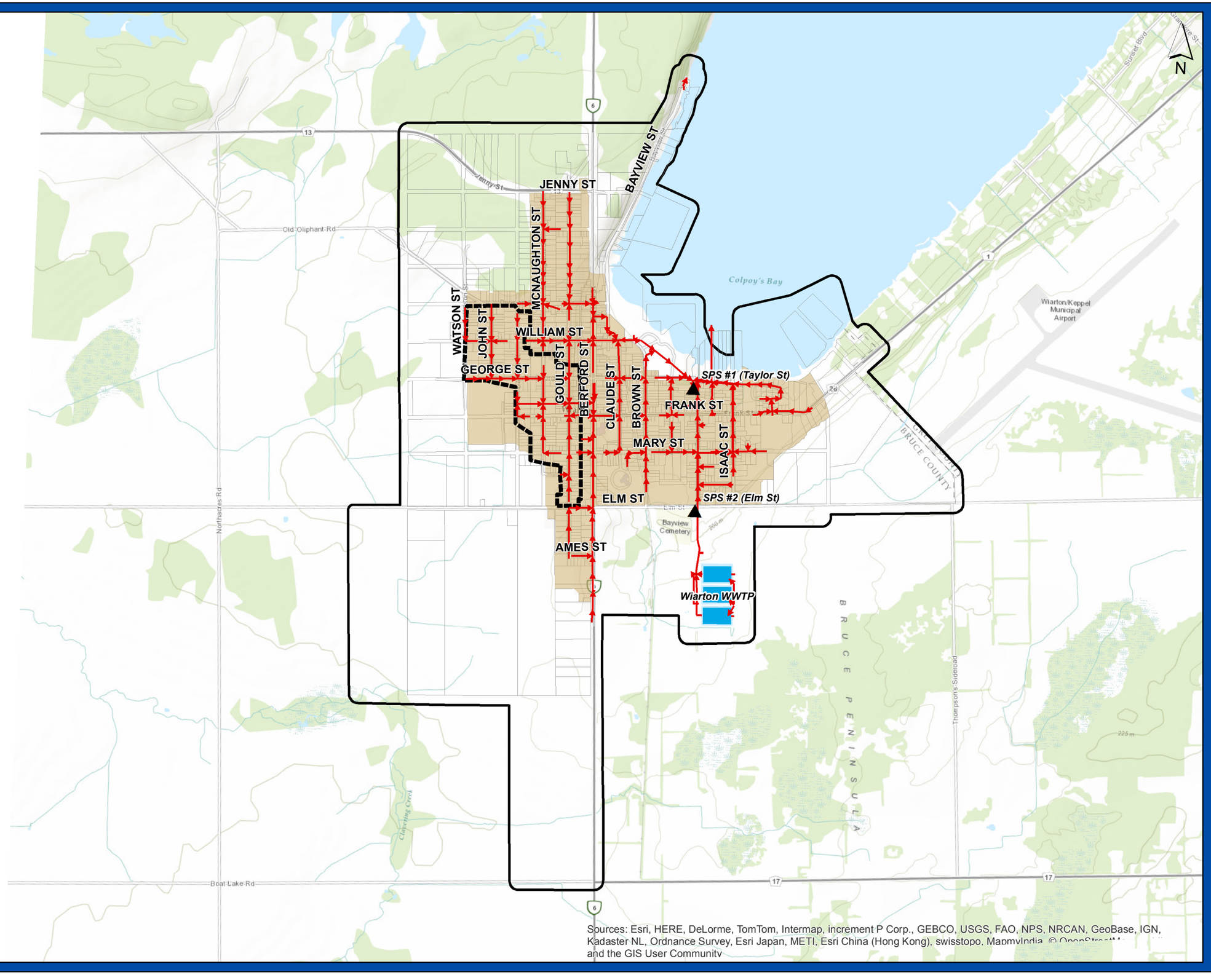
In 2004, the Wiarton Treatment Lagoons were upgraded to include a Dynasand Effluent Filtration System (that removes solids and phosphorus), Coagulation addition in the filter building, a septic receiving facility adjacent to the main building, and an Ultraviolet Disinfection System that operates seasonally between May 15 and September 15.

The Town of South Bruce Peninsula has completed a Schedule C Municipal Class Environmental Assessment (Class EA) to evaluate alternatives to potentially expand the Wiarton Wastewater Treatment Lagoons (WWTL) from its current capacity of 2,500 m^3/day to a future capacity of 4,400 m^3/day. A range of alternatives were considered that included: i) adding a moving bed biofilm reactor with nitrification; ii) deepening the lagoon cell with nitrification; and, iii) conventional activated sludge treatment. The preferred alternative solution that resulted from the Class EA evaluation process was the addition of a moving bed biofilm reactor with nitrification. The construction of the plant upgrades are estimated to be completed by December 2015.

Town of SOUTH BRUCE PENINSULA

Wiarton Water, Wastewater and Stormwater Master Servicing Plan and Gould Street Sanitary Sewer Upgrade Class Environmental Assessment Study

Figure 14 - Existing Wastewater System



Legend

- Wastewater Treatment Lagoons
- Existing Sewage Pumping Station
- Existing Sanitary Sewer
- Existing Catchment Area
- Property Parcel
- Master Servicing Plan Study Area
- West Drainage Area

Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap and the GIS User Community

BluePlan ENGINEERING

214128-2-WW
September 2015
Data Source: Town of South Bruce Peninsula
Scale: 1:20,000 | NAD 1983 UTM Zone 17N

4.2.1.2 *Wastewater Collection System*

The Wiarton wastewater collection system is comprised of gravity mains, forcemains, chlorine mains, low pressure mains and outfall mains; with diameters ranging from 50 mm to 700 mm. This system collects and pumps raw sewage to the lagoons, where it is treated and ultimately discharged to Colpoy's Bay (Georgian Bay). Table 8 provides a breakdown summary of the types of sanitary sewers in Wiarton.

Table 8. Sanitary Sewers Summary

Type	Pipe Diameter (mm)	Length (m)
Gravity Main	100-600	17,025
Forcemain	100-300	4,503
Chlorine Main	50	208
Low Pressure Main	50	96
Outfall Main	300-700	1,864
Total		**19,193**

4.2.1.3 *Sewage Pumping Stations*

There are two sewage pumping stations within the former Town of Wiarton that pump raw wastewater flows to the treatment lagoons facility. The SPS locations are shown in Figure 14.

Sewage Pumping Station (SPS) #1 is referred to as the Taylor St SPS and is located at the southwest corner of the intersection of George St and Taylor St. The pumping station is a wet well/dry well type with two submersible sewage pumps (one duty, one standby) in the dry well. Each of the two pumps have a rated capacity of 103 L/s at a TDH of 29 m, and a combined rated capacity of 130 L/s at a TDH of 39.0 m [9]. It should be noticed that as part of the treatment process, coagulant is injected at the SPS #1 to provide precipitation of phosphorus in the lagoons.

Sewage Pumping Station #2 is referred to as the Elm St SPS and is located approximately half way up to the escarpment between SPS #1 and the lagoon facility on the southwest corner of the intersection of Elm St and Taylor St. The pumps station consists of a divided wet well with three submersible sewage pumps (one duty, two standby). Each of the three pumps have a rated capacity of 116L/s at a TDH of 30.5m, and two pumps in parallel having a rated capacity of 164.81 L/s at a TDH of 36.68 m [10].

4.2.2 Hydraulic Wastewater Model

The Wiarton Wastewater Hydraulic Models were created using InfoSWMM modelling software. The model was built using GIS data provided by the Town and was further enhanced by referencing information such as pipe inverts in construction/as-built drawings. The existing model includes approximately:

- 248 pipes (242 gravity, 6 forcemain)
- 209 manholes
- 2 pumping stations
- 1 wastewater treatment facility (lagoons)

[9] *Wiarton Wastewater Treatment Lagoons Annual Report 2013.*
[10] *Henderson Paddon Design Report, Upgrades to Existing Sanitary Sewage PS #1. Jan 2006.*

Two model scenarios (DWF & WWF) were created for existing and future conditions. Table 9 provides a summary of the final model scenarios developed.

Table 9. Wastewater Model Scenarios

Scenario	Comment
DWF – Existing Condition	Dry Weather Flow for Existing Conditions (2014)
WWF – Existing Conditions	Wet Weather Flow for Existing Conditions (2014)
DWF – Future Conditions 1	Dry Weather flow for existing conditions plus additional growth areas. Alternative alignment 1 at Elm St to support growth on southwest areas
WWF – Future Conditions 1	Wet Weather flow for existing conditions plus additional growth areas. Alternative alignment 1 at Elm St to support growth on southwest areas
DWF – Future Conditions 2	Dry Weather flow for existing conditions plus additional growth areas. Alternative alignment 2 at Elm St to support growth on southwest areas
WWF – Future Conditions 2	Wet Weather flow for existing conditions plus additional growth areas. Alternative alignment 2 at Elm St to support growth on southwest areas

The Wiarton catchment encompasses an area on approximately 181 hectares and approximately 963 properties. Proposed developments include approximately 57.5 hectares of new area to the Wiarton catchment and were considered under the future scenarios.

4.2.2.1 Data Collection

The model has been built based on existing data sources and no new surveys were undertaken. The data sources are summarized as follows:

- GIS – asset database information
- Historic CCTV information
- Historic Infrastructure Assessment Studies
- As-built drawings
- Historic WTP and WWTL Flows
- Billing Water Meter Data
- Pump Curves

Table 10 provides a summary of available information used the development of the wastewater model.

Table 10. Existing Wastewater Information Used for Model Development

Data/Information Set	Description	Use in model build	Comments
GIS	Asset database information	Used to import physical elements of the sanitary network (e.g. pipes, manholes, forcemains). Used parcels to create subcatchments.	Invert elevations and some top ground elevations were missing.
CCTV	CCTV database containing survey information	Manhole depths were used with top ground elevation from GIS to calculate invert elevations.	Limited number of manhole depth data available.
Infrastructure Assessments Studies	Previous reports of Infrastructure assessments and studies.	Manhole depths were used with top ground elevation from GIS to calculate invert elevations.	Limited number of manhole depth data available.

Data/Information Set	Description	Use in model build	Comments
As-built drawings	As-built record drawings of sanitary infrastructure	Primary source of information to build Pumping Stations and Wet Wells.	
Historic WTP and WWTL Flows	Historic recorded flows at the Water Treatment Plant and Wastewater Treatment Lagoons.	Used to compare flows and calculate existing I/I contributions to the sanitary system.	
Billing Water Meter Data	Water Meter Data for parcels within Wiarton from Nov 2011 to June 2014.	Used to proportionally allocate design wastewater flows to parcels	
Pump Curves	Pump curves for SPS #1 and SPS #2.	Used to create pump curves in the model	

Issues with existing GIS asset data

Insufficient information in the existing data, such as manhole invert elevations, top ground elevations, missing manholes, pipes, and forcemains; required interpolation and assumptions to fill the data gaps.

CCTV Survey

No CCTV survey was undertaken as part of this project. Historic CCTV information has been consulted, and where relevant used to enhance the model in terms of network build and connectivity.

Flow Survey

No flow survey was undertaken as part of this project. The model could not be properly calibrated since there is no flow monitoring data available.

Development Data

The Town of South Bruce Peninsula provided a data set of proposed growth/development areas. The data contains each new development ID, area, population and/or units. New growth/development data was linked to the parcel data and all flows and catchment areas were spatially allocated to the nearest manhole that would most likely service the connection.

The flow generated was calculated based on the Town of South Bruce Peninsula design criteria and added to the model as an average flow. New inflow/infiltration flow contributions were calculated for those areas that were not included in the existing catchments.

4.2.2.2 Model Construction

4.2.2.2.1 Model Build and Data Cleansing

The first phase in the development of the model was to import the physical elements of the wastewater system to InfoSWMM.

1. Sanitary Manholes, Pipe network and Forcemains were imported into the model using GIS data available. Fields imported to the model include:

   Manholes: IDs, Top Ground Elevation, Description (Road Name), Location (X, Y)
   Pipes: IDs, Start Node, End Node, Diameter, Description (Road Name)
   Forcemains: IDs, Start Node, End Node, Diameter, Description (Road Name)

2. Pumping stations were built into the model according to available data (mainly as-built drawings). Wet well dimensions, pump curves, and pump controls were taken from supporting exiting information when possible, otherwise these values were assumed.

3. Model network was checked and cleaned for missing data and discrepancies including: missing manholes and pipes, orphan nodes and links, connectivity issues, and wrong pipe direction.

4. Using manhole depths from CCTV Inspection Data and Top Ground Elevations from GIS information, inverts elevations were calculated when possible. In cases where ground elevation information was not available, these values were interpolated from Contours information.

   Additional invert elevation data was extracted from the Town of South Bruce Peninsula Report on Wiarton Public Works Infrastructure Assessment Study. Where invert elevation information was not available, two methodologies were used to calculate and assign invert values: straight interpolation using nearby manholes invert elevation information, or invert calculation to maintain 0.5% pipe slope.

5. Nodes and pipes invert elevations were checked for discrepancies including: outgoing pipes with higher invert elevations than incoming pipes, and negative gradient pipes.

4.2.2.2.2 Subcatchment Delineation

Using parcel information, sub-catchments were delineated based on parcel boundaries that drain to the same pipe. Neighboring parcels that were assigned to the same pipe, were merged into a single-subcatchment in order to create efficiencies in the model calculations.

4.2.2.2.3 Wastewater Flow Allocation

Using billing water meter data and parcel data, wastewater flows were calculated. A design flow value was calculated for the entire system using the total population and 450 liters per capita per day wastewater generation rate. Wastewater flows were proportionally increased according to the total design flow for the system. These values represent Average Dry Weather Flows (ADWF) generated by the population and were allocated to their respective parcel address within the study area.

ADWF were loaded to the upstream node of the pipe assigned to each of the sub-catchments. In the same vein, rainfall derived Inflow/Infiltration (I/I) generated in the sub-catchments were loaded to the upstream node assigned to each of the sub-catchments.

More detailed description of wastewater and I/I flows calculations are provided in sections 4.1.1.1 and 4.1.1.2 of this MSP report.

4.2.2.2.4 Modelling Scenarios

Dry Weather Flow (DWF) and Wet Weather Flow (WWF) simulation scenarios of existing conditions were developed into the model. Diurnal Patterns were applied to the ADWF loadings in both scenarios, and I/I patterns were applied to I/I loadings in the WWF scenario. Model simulations were tested and refined, and EPA SWMM model exports were created for the Town of South Bruce Peninsula to use.

Future scenarios were also developed for both DWF and WWF conditions using new development areas, projected population numbers, and 2 alternative alignments to serve new developments on the southwest area. ADWF and I/I loadings were calculated for the new contributing areas and applied to the upstream manhole of the closest pipe. Model simulations were tested and refined, and EPA SWMM model exports were created for the Town of South Bruce Peninsula to use.

4.2.2.3 Model Limitations

The main limitation relates to the lack of flow monitoring data to verify the models. No flow monitoring program was undertaken as part of this project, and therefore the model could not be verified as not observed data was available.

Pumping stations and forcemain information was limited and in some cases assumed. Modeled pumping stations relied on existing available information, mainly as-built drawings.

The models serve as a good baseline model for the Wiarton area, however detailed design use of the model should be approached with caution. It is recommended that further field investigation, additional monitoring and further verification be conducted prior to use as a detailed design model.

4.3 Assessment of the Existing and Future Wastewater Infrastructure

4.3.1 Opportunities and Constraints

The following summarizes wastewater servicing opportunities and constraints identified through the master planning and Gould Street Class EA process:

- The proposed South Lands development could increase population by up to 3,750 and cannot be serviced completely by gravity
- Opportunities for intensification development will need to be considered in future infrastructure capacity analysis
- Previous flow surveys undertaken throughout the Town have identified private properties with direct connections to the sanitary sewer system, including weeping tile and downspout connections. There is opportunity for the tactical abatement of extraneous flows through a long term inflow and infiltration reduction program.

4.3.1.1 Wastewater Treatment Lagoons

- The Class EA for the Wastewater Treatment Lagoons recently completed identified upgrades to expand the capacity from 2,500 m^3/d to 4,400 m^3/d.

4.3.1.2 Collection System

- There is an existing 300 mm diameter sanitary sewer on private lands between Gould Street and Berford Street, just north of Frank Street that is in very poor condition and needs to be addressed.
- Existing peak flows currently exceed the capacity of the Taylor Street Sewage Pumping Station (SPS#1), resulting in overflows to Colpoy's Bay
- SPS#1 may require expansion for additional capacity and/or there is opportunity for a new storage facility to provide temporary capacity relief to the pumping station during storm events
- There are existing basement flooding issues in the downtown and lakeshore areas (e.g. George St and Isaac St) that need to be addressed
- There is opportunity to divert west area flows from SPS#1, alleviating capacity at SPS#1
- Existing peak flows currently exceed the capacity of the Elm Street Sewage Pumping Station (SPS#2) with bypass occurring during significant storm events

4.3.2 Hydraulic Analysis

The following sections provide a summary of the existing capacity issues based on the analysis of existing and future flows supported through hydraulic modelling.

4.3.2.1 Wastewater Treatment Lagoons

- Based on the flow data provided the existing treatment lagoons are within capacity (2,500 m^3/d), for average daily flow
- The 5-year average (2009 to 2013) was 1,757 m^3/d. 5-year maximum average (2013) was 1,953 m^3/d

Treatment Lagoons

Existing Capacity	= 2500 m^3/day (ADF)
Existing population	= 2291
Existing average m^3/d	= 1757.7 m^3/d
Per capita average/per day (m^3)	= 0.767
Future population	= 5729
Future average m^3/d	= 4395.4 m^3/d
Capacity Deficit at Plant	**= 1895.4 m^3/d**

4.3.2.2 Sewage Pumping Stations

The following summarizes the capacity assessment undertaken for each of the sewage pumping stations under existing and future growth conditions:

- Existing peak flows are known to exceed the capacity of SPS #1 and #2 with bypass and property flooding events occurring. Accurate incoming flow data is not available for the stations.
- Analysis of existing flows estimates a peak flow of 167 L/s, which significantly exceeds SPS#1 firm capacity (103 L/s) and SPS#2 firm capacity (116 L/s).
- The existing inflow and infiltration rate is at least 3 times the normal design criteria, suggesting that sources of I/I should be isolated and disconnected from the sewage collection system. The extraneous flow rate applied to existing areas was 0.69 L/s/ha versus 0.23 L/s/ha for new growth areas.

Pumping Station #1, Taylor Street

Existing Capacity	= 103 L/s
Future PWWF	= 233 L/s
Capacity Deficit at SPS #1	**= 130 L/s**

Pumping Station #2, Elm Street

Existing Capacity	= 116 L/s
Future PWWF	= 233 L/s
Capacity Deficit at SPS #2	**= 117 L/s**

4.3.2.3 Overall System

Table 11 below provides a summary of the existing, growth only and future system average and peak flows for the Community of Wiarton.

Table 11. Existing, Growth and Build Out Wastewater Flow Summary

Scenario	Population	Consumption (l/cap/d)	Inflow (L/s/ha)	ADWF (L/s)	Harmon	PDWF (L/s)	Area (ha)	Inflow (L/s)	PWWF (L/s)
Existing	2291	450	0.69	11.93	3.54	42.2	181.0	124.9	167.1
Growth Only	3438	450	0.23	17.91	3.39	60.7	58.2	13.4	74.1
2029 Build out	5729	450		29.84	3.19	95.2	239.2	138.3	233.5*

* This does not represent the sum of existing and growth because the Harmon peaking factor changes with population

4.4 Evaluation of Strategies

The identification and evaluation of servicing options is a critical component of the master planning process because it enables a comprehensive review of a reasonable range of alternatives while documenting the process in a transparent manner. The evaluation process that has been undertaken is described in the following sections.

4.4.1 Objectives

The identification and evaluation of servicing options is the comprehensive review of a reasonable range of alternatives while documenting the process in a transparent manner.

The 2015 MSP sets out to meet the Approach 2 requirements under the Municipal Engineers Association (MEA) Class EA process. Under Approach 2, a Master Plan document is prepared at the conclusion of Phases 1 and 2 of the Class EA process. This approach allows for all Schedule A, A+ and selected Schedule B projects identified in the Master Plan to move forward to implementation. To achieve this result, systematic evaluation and documentation is required to support selected Schedule B project Class EA requirements along with applicable review agency commitments prior to implementation. Select Schedule B and all identified Schedule C projects will require additional supporting information and decision making to proceed onto separate studies and continue to Phases 3 and 4 of the Class EA process.

The evaluation approach has been designed to ensure a logical and transparent process that can document the evaluation and decision making that will ultimately develop a defensible capital program. Sustainability principles were also considered in the development of the 2015 Master Servicing Plan and have been integrated within the five-point evaluation. Examples of such principles are:

- making best use of existing infrastructure;
- minimizing the cost of new infrastructure;
- considering operation and maintenance costs to ensure financial sustainability and;
- ensuring the long-term reliability and security of the water, wastewater and stormwater systems.

4.4.2 Description of the Evaluation Process

The Evaluation Process undertaken for development and selection of a preferred servicing strategy is described in this section and is graphically depicted in Figure 15.

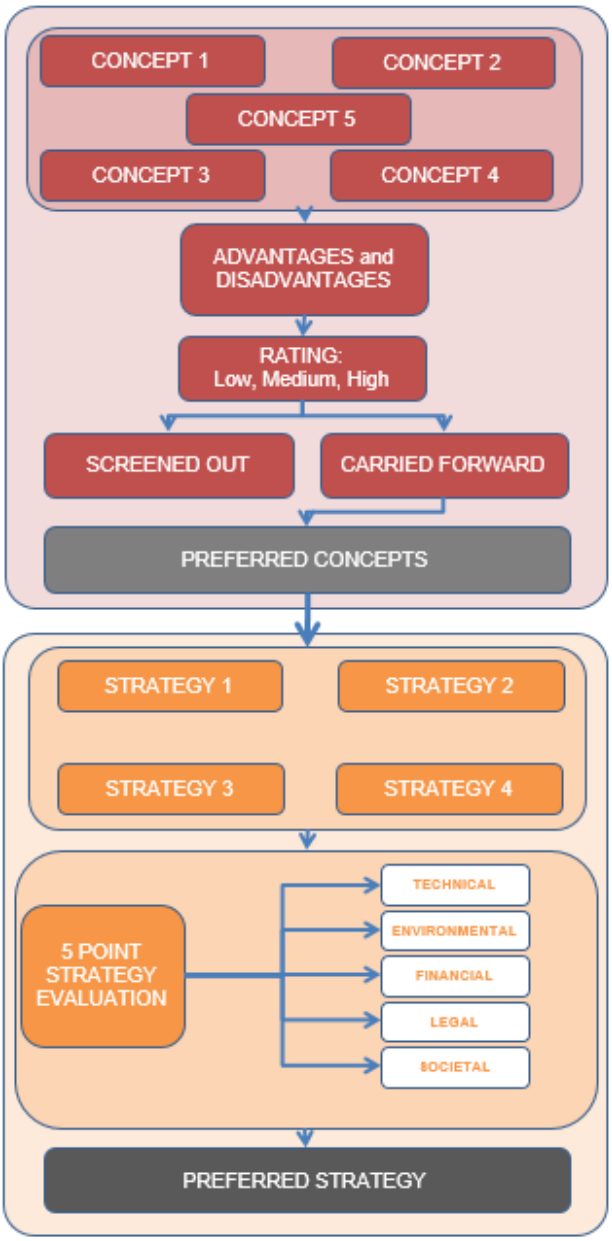


Figure 15. Servicing Option Evaluation Flow Diagram

A broad range of wastewater serving concepts were established based on high level feasibility to meet the servicing requirements for the growth within Wiarton. These high level concepts included but were not limited to Increasing Conveyance Capacity, Diverting Flows Away from Colpoy's Bay Shoreline, Inflow and Infiltration Reduction and Wastewater Storage. These concepts also included Do Nothing and Limit Growth as required for the Class EA Process.

To evaluate the Servicing Concepts, the advantages and disadvantages for each were established based on several evaluation criteria. Each concept was given a Low, Medium or High rating with concepts receiving a Low rating being screened out and not carried further to detailed evaluation.

The Servicing Concepts that were carried forward were then combined in order to build overall Servicing Strategies that would alleviate any existing constraints and satisfy the projected growth within Wiarton to 2029. The Servicing Strategies were evaluated using a detailed 5-point strategy evaluation. The result of this evaluation was the selection of the Preferred Servicing Strategy.

The Preferred Servicing Strategy consists of several Concepts from which two alternative servicing strategies were identified. While an Overall Preferred Strategy was selected, additional details for alternative alignments and sites was required. This gave rise to an additional evaluation of seven alternative diversion alternatives and the subsequent selection of a detailed Preferred Servicing Strategy.

4.4.3 Evaluation Criteria

Detailed evaluation matrices supporting the evaluation of servicing options were developed and used for selection of preferred servicing for the 2015 Master Servicing Plan. The complete evaluation matrices are included in Appendix E2. The servicing strategies were subject to a 5-point evaluation which includes five major areas of impact: Technical, Environmental, Financial, Legal/Jurisdictional, Socio-Cultural. The 5-point criteria and the evaluation considerations are described further in Table 12.

Table 12. Wastewater Evaluation Criteria

CRITERIA	DESCRIPTION

Technical Impact	• Describes overall technical advantages and disadvantages to an option related to:
	  ○ capacity requirements and level of service
	  ○ performance under power outage conditions
	  ○ alignments that can maximize a service area
	  ○ utilization of existing infrastructure
	• Describes difficulty of construction (e.g., construction in limited areas, crossings, protection of utilities, trees or structures)
	• Assesses whether existing infrastructure upgrades are required
	• Describes risk considerations:
	  ○ Level of security of wastewater treatment/conveyance
	  ○ Considers impact of deep sewers versus sewage pumping stations
	• Describes the ability for phasing:
	  ○ staged growth and maximizing the use of existing or planned infrastructure
	  ○ incremental extensions of infrastructure as growth progresses
	  ○ balanced infrastructure costs with staged level of growth (high-level comment)
	• Describes impact on the sizing of planned and existing infrastructure
	• Highlights trunk infrastructure that potentially should be oversized to benefit future growth
	• Comments on whether growth areas will need to be serviced by existing or new infrastructure
	• Compares relative sizing differences between alternatives
	• Describes the technical consideration required for construction:
	  ○ Highlights need for deep pipe construction, creek/highway/railway crossings, alignment changes, and potential challenges during construction
	  ○ Where applicable, comments on construction of projects that can be coordinated with road improvements or construction
	• Describes potential opportunities/constraints to servicing build out

CRITERIA	DESCRIPTION
Environmental Impact	• Describes the potential impacts of the option on the natural environment, proximity to existing natural features and designations including, but not limited to: ESAs, ANSIs, conservation authority regulation limits, vegetation, woodlands, wildlife, aquatic resources and fisheries • Highlights requirements for major environmental crossings, deep sewers, development through environmental designated areas, and requirements for mitigative action
Financial Impact	• Describes the capital cost relative to other options • Considers construction costs for new infrastructure and for upgrades to existing system • Highlights major projects that differ from other options that significantly contribute to the capital costs • Describes large up-front costs required for phasing of growth • Comments on post-construction impacts such as operation and maintenance costs and requirements, and compares to other options
Legal/Jurisdictional Impact	• Notes any land requirement issues and agency concerns that may arise related to project alignments, land acquisition, planning permits, crossings etc. • Comments on compliance with Guidelines and Policies • Describes the potential impacts related to opportunity or requirements for integrated planning, design, construction with other servicing such as bridge, road construction etc. • Notes if coordination with involved parties is required
Socio-Cultural Impact	• Describes the potential impacts to residents, archaeological/heritage resources, and visual aesthetics • Describes any potential noise, dust, vibrations, traffic disruptions to residents and businesses during and following construction

4.4.4 Servicing Concepts

Given the concurrent Class Environmental Assessment (EA) Study for the Gould Street Sanitary Sewer Upgrade, the Wastewater Opportunities and Constraints identified in the Master Servicing Plan were further examined through the Gould St Class EA process.

The Problem / Opportunity Statement under the Master Servicing Plan for the Wastewater System can be summarized as follows:

1. To eliminate CSO and basement flooding, and
2. To support planned development

A long list of high level Servicing Concepts was introduced early in the analysis and was investigated. The Concepts are listed below and were evaluated to determine which concepts are feasible to carry forward to make up Servicing Strategies. The Concept evaluation matrix is shown in Appendix E2.

Concept 1 – Do Nothing – *Screened Out*

The Do Nothing alternative is required for evaluation under the Class EA process. It essentially identifies the existing conditions, and helps to define the extent of the problem. In this case the "Do Nothing" alternative does not address the problem and needs of the study. The Do Nothing concept would not alleviate existing wastewater servicing deficiencies or meet the servicing needs of future population projected by the Town. For this reason, the Do Nothing concept is not considered a viable one and has been screened out.

Concept 2 – Limit Community Growth – *Screened Out*

Similarly, the Limit Community Growth concept does not meet Official Plan policies it has also been screened out as a viable concept.

Concept 3 – Increase Conveyance Capacity

- Concept 3a – Connect SPS#3 to SPS#1 (New Forcemain and Gravity Sewer Upgrades) – *Screened Out*
- Concept 3b – Connect SPS#3 to SPS#2 (New Forcemain and Gravity Sewer) – *Screened Out*
- Concept 3c – Connect SPS#3 to WWTL (Direct Forcemain) – *Screened Out*

Concept 4 – Provide High Flow Storage Capacity within the Existing System

- Concept 4a – Connect SPS#3 to SPS#1 (New forcemain and Gravity Sewer Upgrades) – *Screened Out*
- Concept 4b – Connect SPS#3 to SPS#2 (New Forcemain and Gravity Sewer) – *Carried Forward*
- Concept 4c - Connect SPS#3 to WWTL (New Forcemain and Gravity Sewer) – *Screened Out*

Concept 5 – Divert West Area Flows away from SPS#1

- Concept 5a – Connect SPS#3 to SPS#2 (Divert West Area Flows to SPS#2 via SPS#4) – *Carried Forward*
- Concept 5b – Connect SPS#3 to SPS#2 (Divert West Area Flows to SPS#3 by Gravity Sewer) – *Carried Forward*
- Concept 5c - Connect SPS#3 to WWTL (Divert West Area Flows to WWTL via SPS#3) – *Screened Out*

Concept 6 – Modified Treatment Systems

- Concept 6a – Provide on-site treatment at SPS#1 (septic tank) – *Screened Out*
- Concept 6b – Relocate WWTL to shoreline – *Screened Out*

Concept 7 – Point Source Reduction

- Concept 7a – Inflow and Infiltration Reduction – *Carried Forward*
- Concept 7b – Water Conservation – *Screened Out*

While each of these concepts on its own may not satisfy all growth and capacity constraints within the system, these have been combined to generate the Servicing Strategies. In addition, the concept of Inflow/Infiltration reduction represents good management of wastewater systems and as such, is encouraged to be carried forward in all Servicing Strategies.

4.4.5 Servicing Strategies

At this stage, each Strategy was subjected to a five-point evaluation, which includes environmental, technical, socio/cultural, financial, and legal/jurisdictional impacts. Each Strategy was scored based on

the positive and negative aspects identified for each impact category using a rating system of high, medium and low, where high indicates “more favourable”.

From these Servicing Concepts, two (2) Servicing Strategies were developed and evaluated. The descriptions for the Strategies are provided below.

Strategy 1 – Provide High Flow Storage Capacity within the Existing System and Implement Long Term Inflow and Infiltration Reduction Program – *Screened Out*

- New Storage Facility at SPS#1 to manage peak wet weather flows
- Convey future flow from South Lands via new SPS#3

Strategy 2 – Divert West Area Flows Away from SPS#1 and Implement Long Term Inflow and Infiltration Reduction Program – *Carried Forward*

- Divert West Area Flows away from SPS#1, such that no further upgrades are required at SPS#1 and forcemain
- Convey flows from South Lands via new SPS#3
- Implement Long Term Inflow and Infiltration Reduction Program

Common Elements:

Common to all Servicing Strategies is the requirement for capacity upgrades within the existing system. Several existing sanitary sewers experience surcharging under future peak wet weather flows and have been identified for upgrades in all Strategies. In addition, to service Greenfield growth in the South Lands, extension of the sanitary sewer network is required. This extension is also common to all Strategies. Separate site alternatives for the new SPS#3 required to service the South Lands have been identified. These site alternatives have undergone an additional 5-point Servicing Evaluation, also shown in Appendix E2.

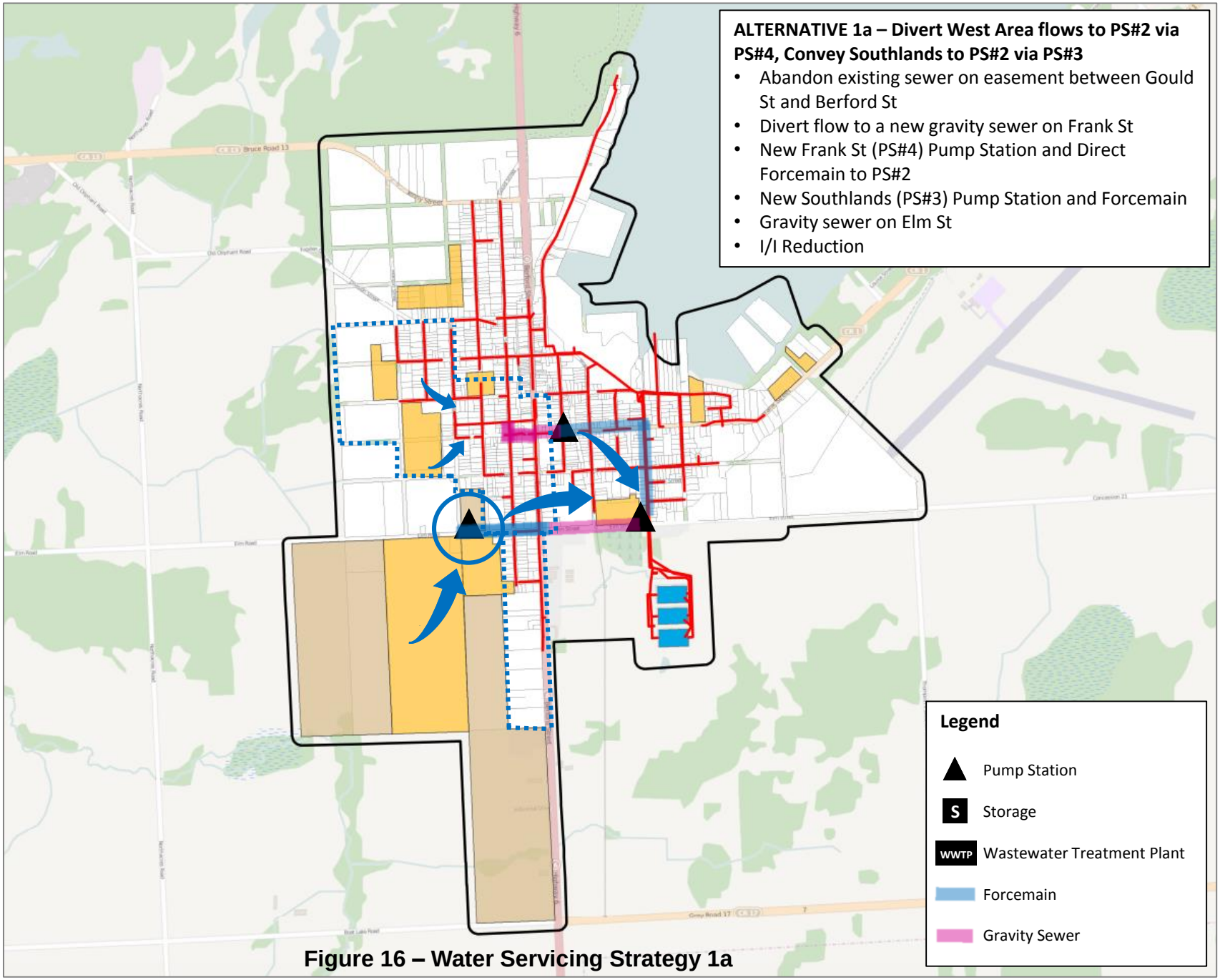


Figure 16 – Water Servicing Strategy 1a

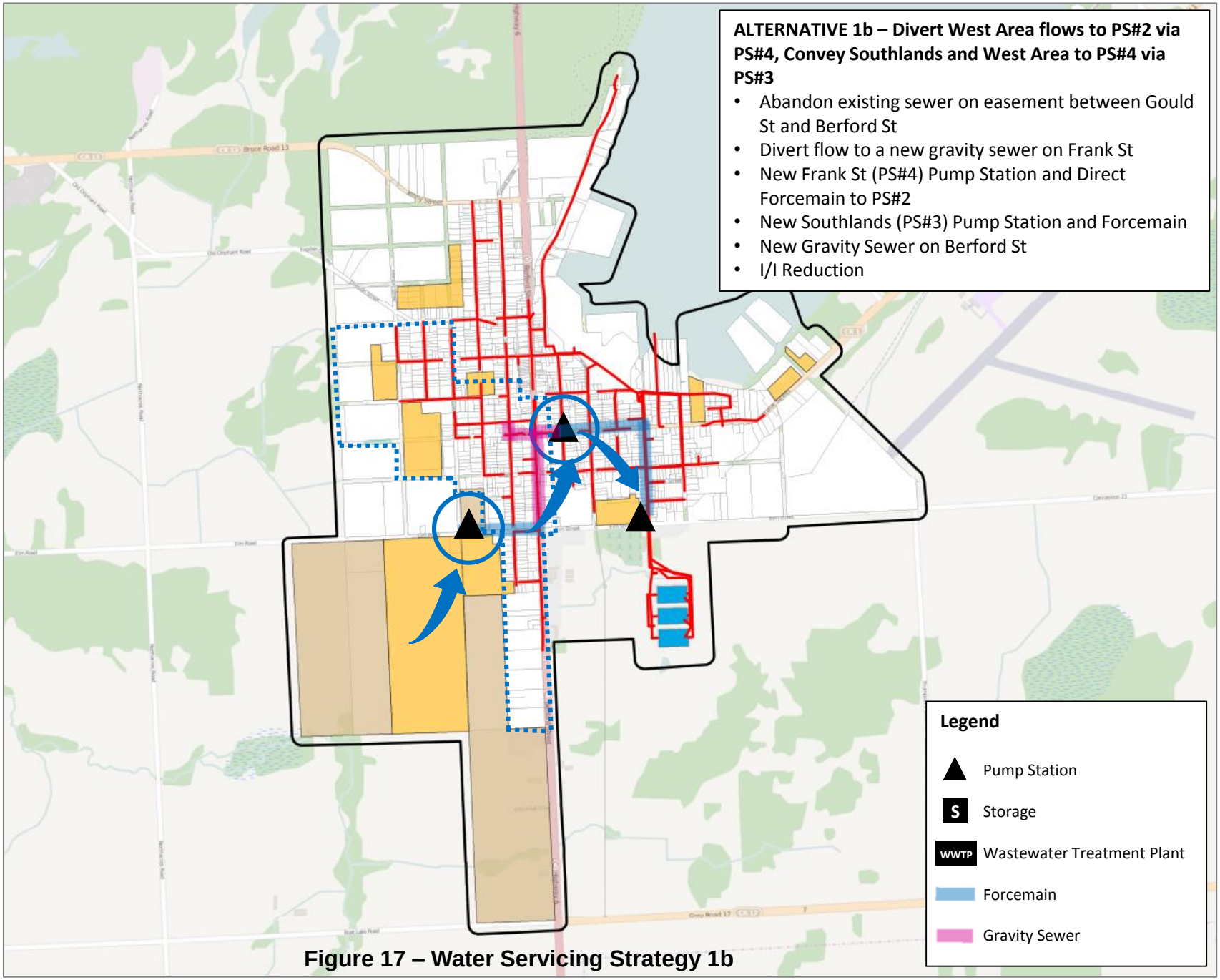


Figure 17 – Water Servicing Strategy 1b

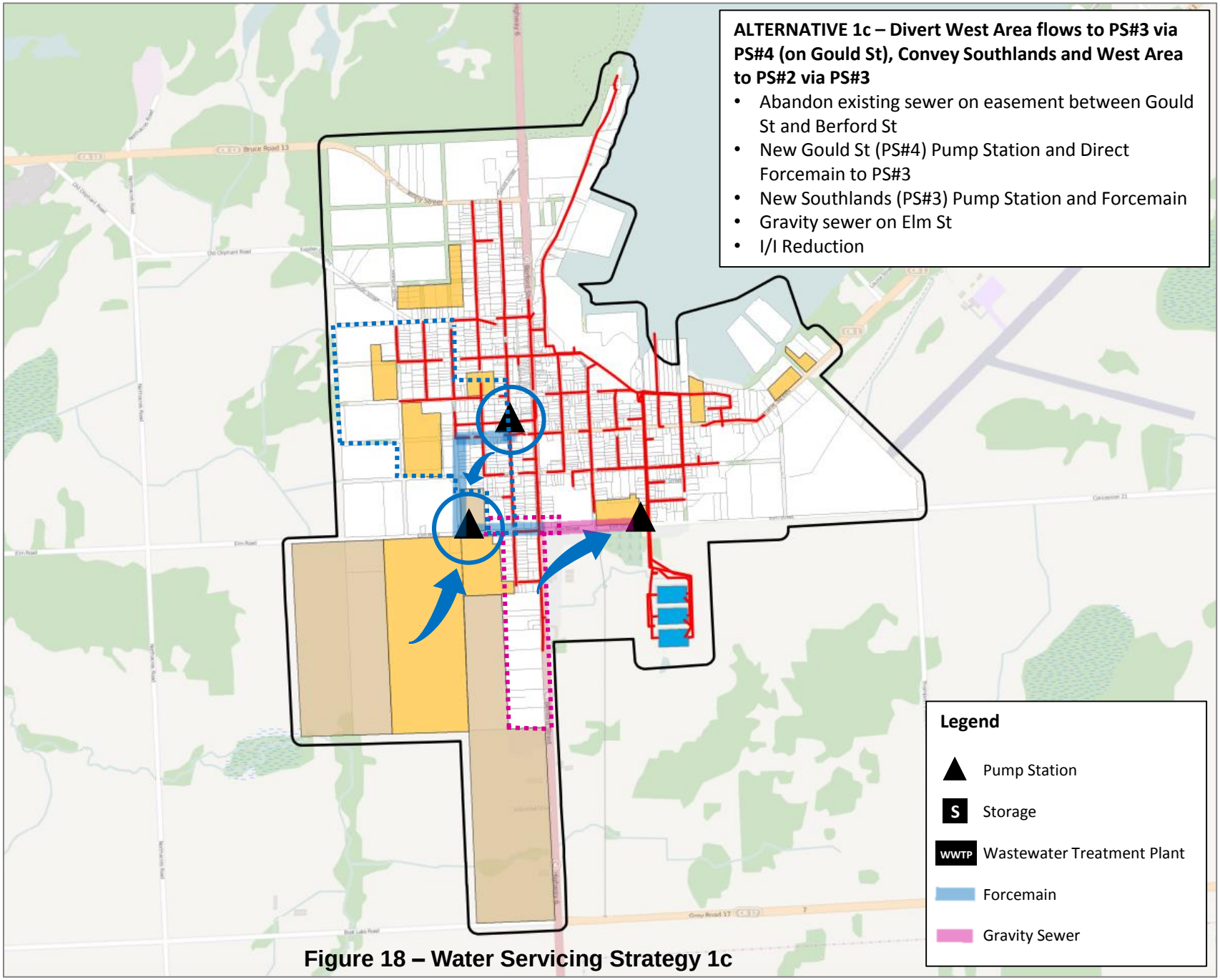


Figure 18 – Water Servicing Strategy 1c

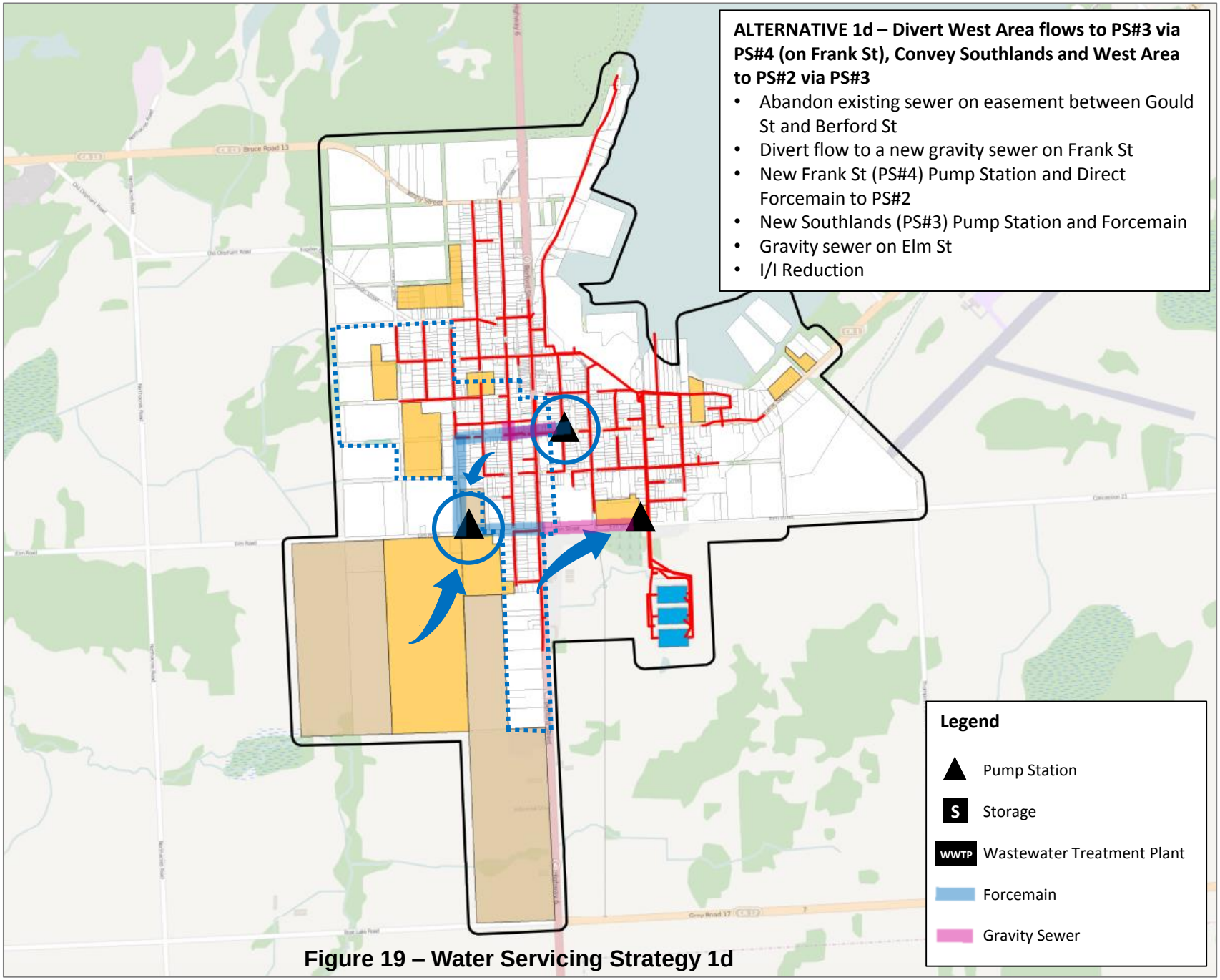


Figure 19 – Water Servicing Strategy 1d

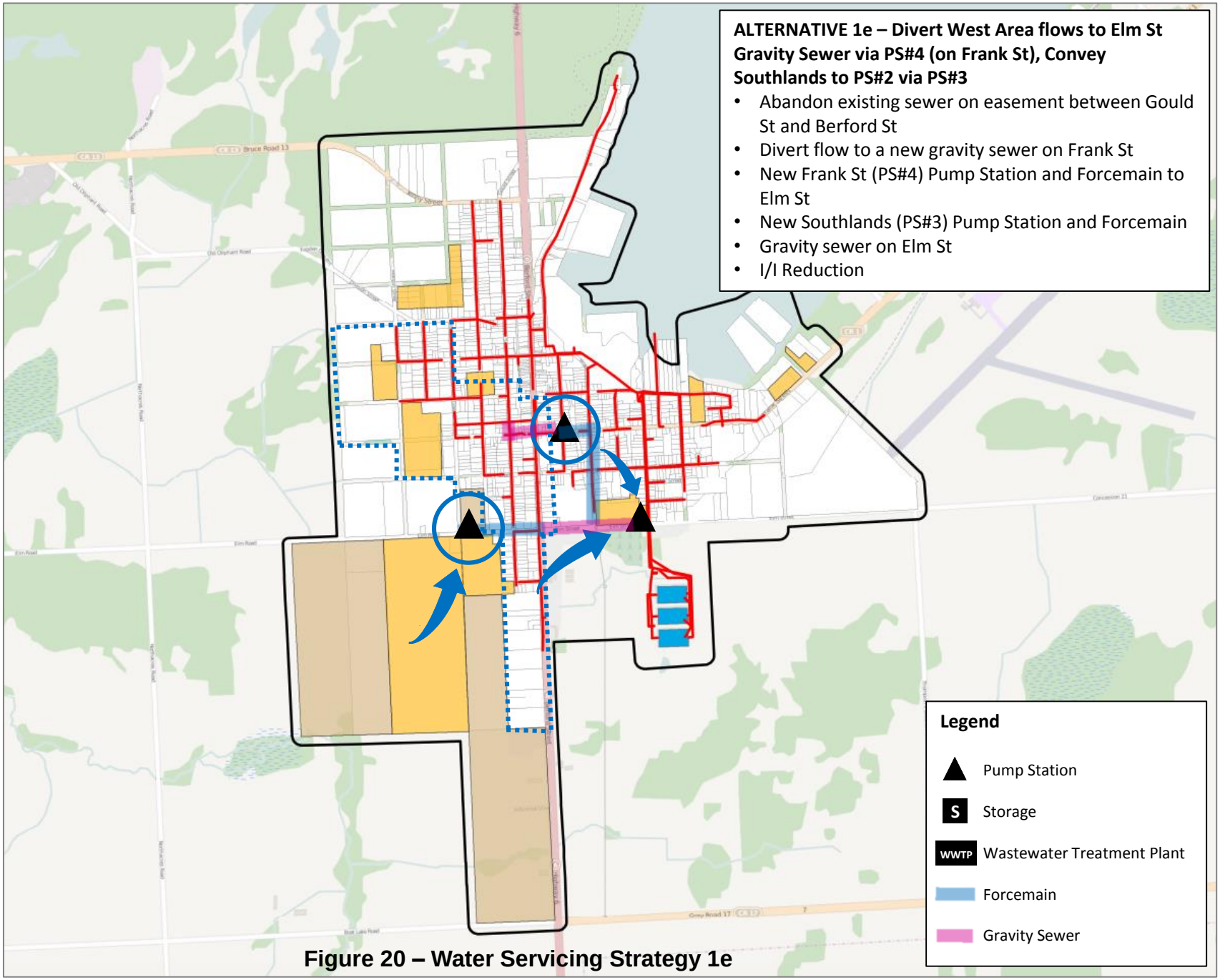


Figure 20 – Water Servicing Strategy 1e

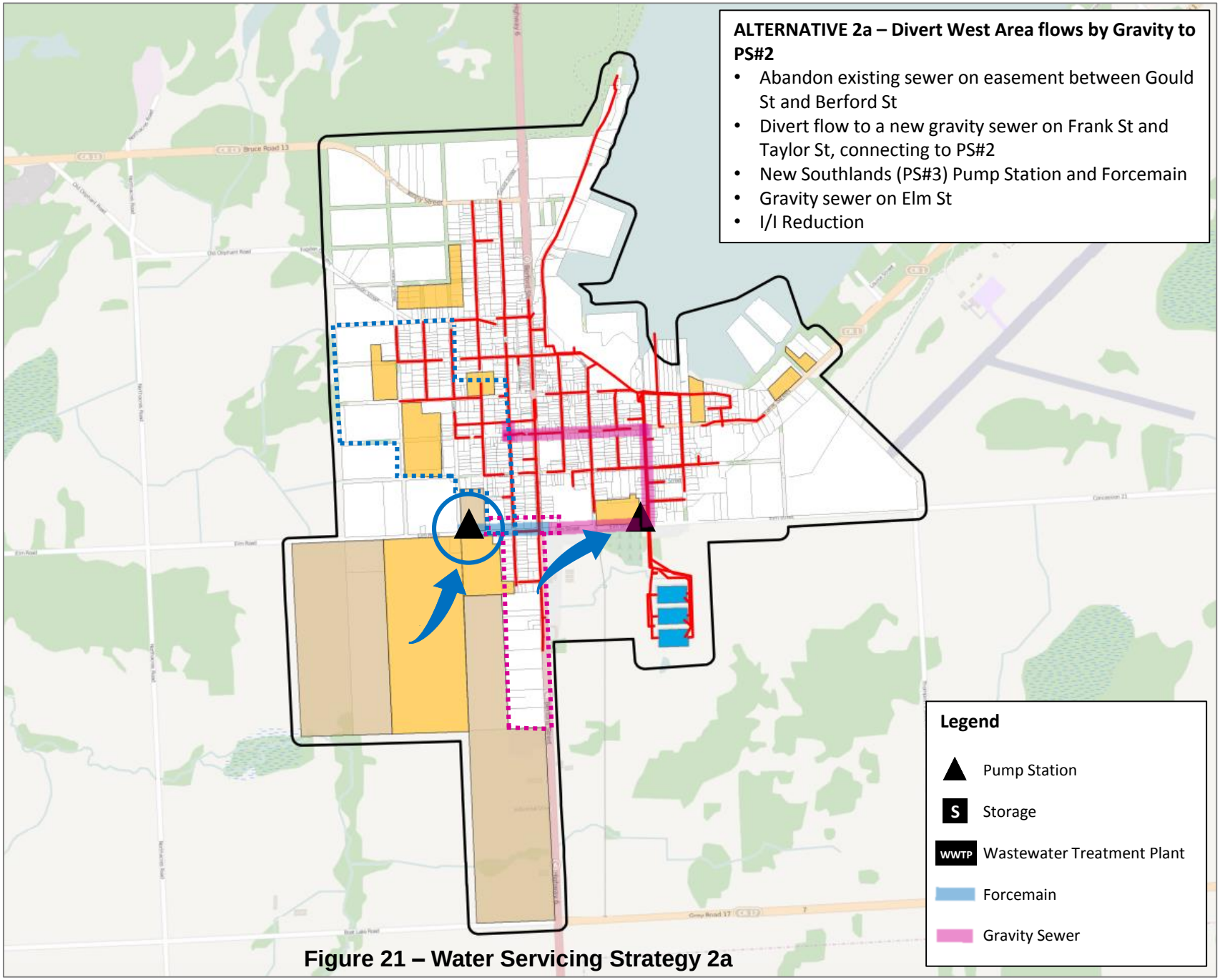


Figure 21 – Water Servicing Strategy 2a

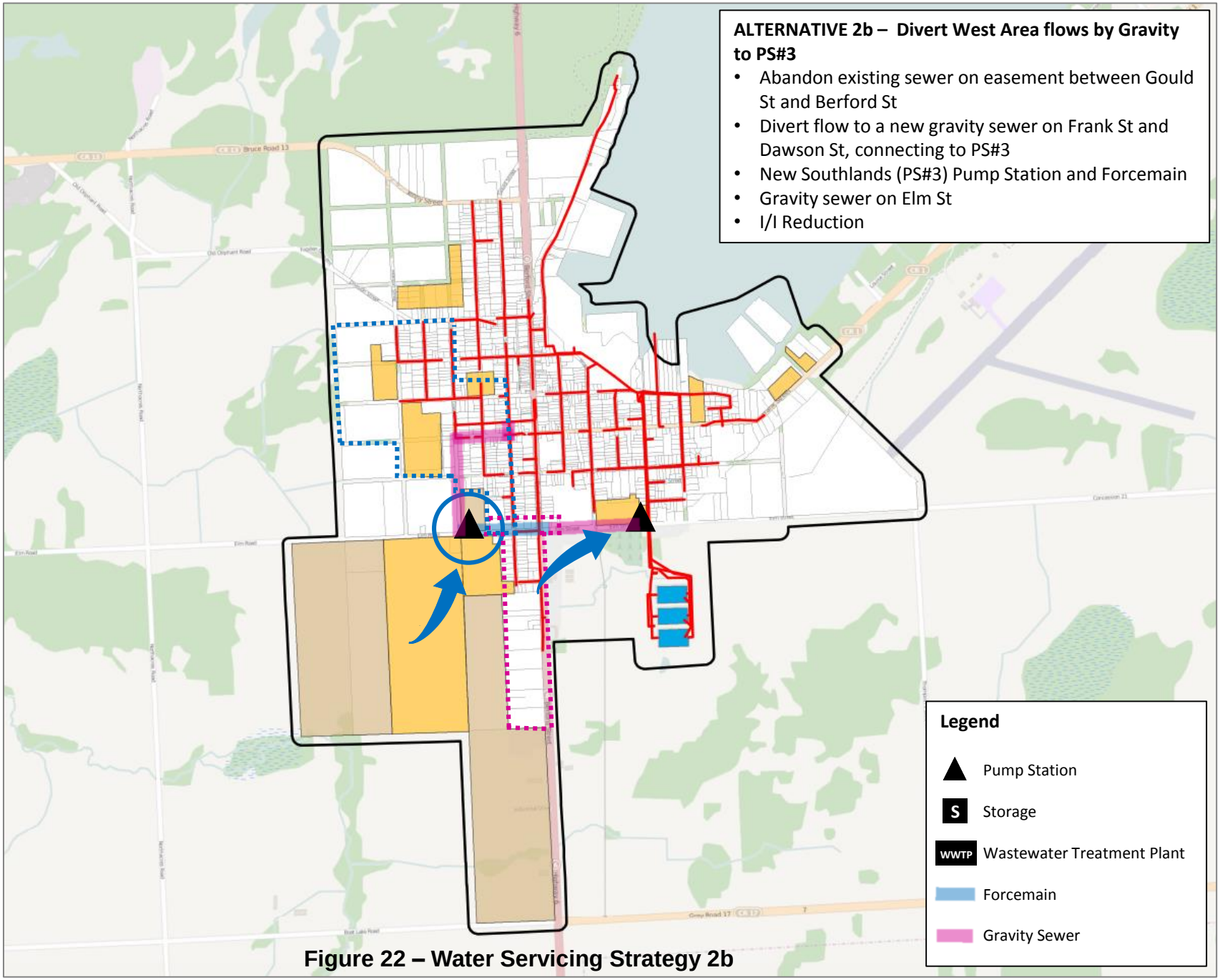


Figure 22 – Water Servicing Strategy 2b

4.5 Preferred Wastewater Servicing Strategy

Several separate wastewater servicing components are recommended throughout Wiarton that collectively make up the overall Preferred Wastewater Servicing Strategy. **Wastewater Servicing Strategy – Alternative 2b** was selected as the preferred Servicing Strategy based on the 5-point evaluation to satisfy growth to 2029, as outlined in Section 4.4.

Greenfield growth within 2029 extends south of Elm St, west of Gould St. The preferred wastewater servicing strategy focuses on infrastructure improvements within this area, including a new sewage pumping station near the corner of Elm St and Dawson St, a sanitary forcemain, and a gravity sewer on Elm St. In addition, a local network of gravity sewers along future road alignments south of Elm St will be required to drain the future growth flows north to the trunk sewer.

As an interim solution to addressing the condition of the existing sanitary sewer between Gould Street and Berford Street north of Frank Street, the preferred strategy includes a sanitary sewer to re-direct flows from Gould Street north of Frank Street to Frank Street and Berford Street. This will address the restriction at the Gould Street location but maintains the transfer of flow to SPS#1. This sanitary sewer would be constructed in the short term, in advance of all other servicing components.

The components that make up the preferred wastewater servicing strategy are summarized as follows:

- New Gravity Sewer on Gould St and Frank St, as interim solution to re-direct flows from Gould Street north of Frank St to Frank Street and Berford Street, abandoning the existing sanitary sewer on the easement between Gould Street and Berford Street north of Frank Street (flow would continue be conveyed to SPS#1)
- New Gravity Sewer on Frank St and Dawson St, as long term solution to divert west area flows away from SPS#1
- New sewage pumping station SPS#3 and forcemain to Berford Street to service the South Lands and to convey west area flows
- New Gravity Sewers on Elm Street to convey South Lands flow to SPS#3 and to convey flows from SPS#3 to SPS#2
- Extraneous flow abatement through long term I&I reduction program (assuming 10 disconnections per year)

As part of the Preferred Wastewater Servicing Strategy, several benefits of diverting flow to the new SPS#3 and reducing inflow and infiltration flow should be noted including:

- Avoids further upgrades at existing SPS#1 and forcemain on Taylor St
- Reduces CSOs to Colpoy's Bay
- Reduces likelihood of basement flooding to shoreline areas
- Avoids twinning sewer sections within the downtown area

Inflow and Infiltration Reduction

Inflow and Infiltration reduction initiatives are recommended throughout Wiarton as part of the Preferred Wastewater Servicing Strategy. In particular, the splash pad / water park located at the shorelines of Colpoy's Bay is believed to discharge a significant portion of flow to the sanitary sewer system. Reportedly, the hospital site also contributes significantly to the sanitary sewer infiltration, and possibly inflows. Wastewater flow monitoring at the outlet from the site should be correlated to water meter flow data to verify the extent of extraneous flows from the property in the wastewater system.

It is recommended that flow monitoring be undertaken to assist in determining the areas of Wiarton where targeted I&I separation would best benefit the system. Comments received during the MSP process suggest that the Town's splash pad, the downtown core area, and the area around the hospital may be initial target areas.

Furthermore, previous flow surveys[11] undertaken throughout the Town have identified private properties with direct connections to the wastewater system, including weeping tile, downspout and sump pump connections. Sources of extraneous flows throughout the existing wastewater system are graphically shown in Appendix I, in a map created based on existing information. Based on this information, there are approximately 191 sources of extraneous flows to the existing wastewater system consisting of:

- Sump pump connections ~ 103
- Roof leader connections ~ 59
- Other connections ~ 25
- Catchbasin connections ~ 4

A key component of the preferred wastewater servicing strategy is the long term inflow and infiltration reduction program that requires approximately 10 disconnections per year to the year 2029. To maximize the efficiency of this program, it is recommended that flow monitoring be undertaken to assist in determining the areas of Wiarton where targeted I&I separation would best benefit the system.

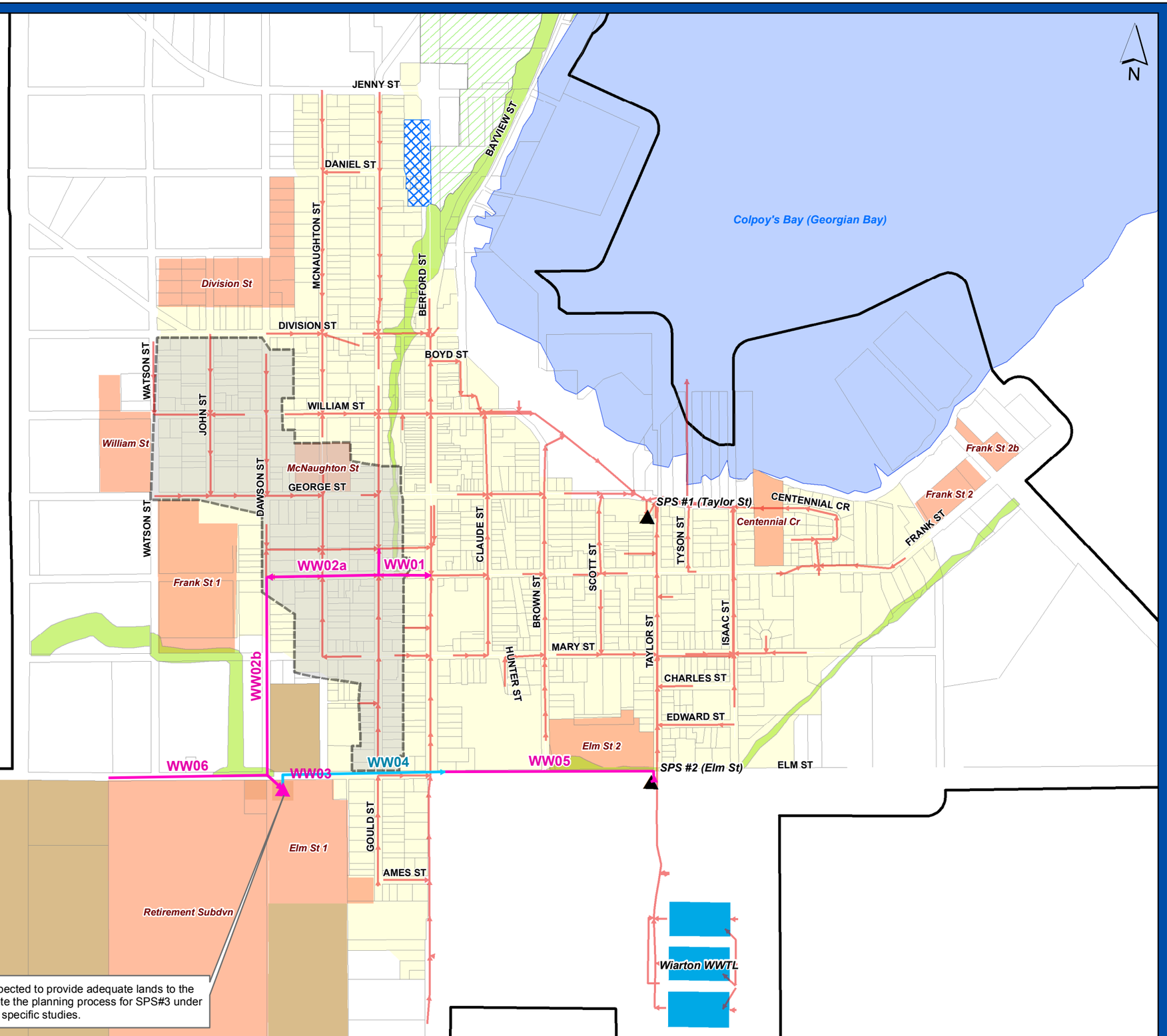
Assuming the Town's commitment to this long term inflow and infiltration reduction program, upgrades have not been flagged at SPS#2 due to the anticipated abatement of extraneous flows and the potential ability for the station's peak wet weather flows to remain within its firm capacity.

The Preferred Wastewater Servicing Strategy is shown in Figure 23.

4.5.1 Capital Program for the Preferred Wastewater Servicing Strategy

As described in the previous sections and depicted in Figure 23, the Preferred Wastewater Servicing Strategy has been developed to satisfy the existing and growth areas within Wiarton to 2029. The capital costs for each project within the Preferred Wastewater Servicing Strategy were developed according to the costing methodology within Section 4.1.2. These projects are listed according to their project number and are shown in Table 13. The Capital Program Table also contains the project description, proposed timing, size and estimated total project cost.

[11] *Henderson, Paddon & Associates Limited. 1992. Wiarton Sewer Needs Study - Sources of Extraneous Flows (Dwg No. 90106-02).*



* South Lands Developer is expected to provide adequate lands to the Town for SPS#3 and to complete the planning process for SPS#3 under the Planning Act, including site specific studies.

Town of SOUTH BRUCE PENINSULA

Wiarton Water, Wastewater and Stormwater Master Servicing Plan and Gould Street Sanitary Sewer Upgrade Class Environmental Assessment

Figure 23 - Preferred Wastewater Capital Program

Legend

- Proposed Sewage Pumping Station
- Proposed Sanitary Sewer
- Proposed Sanitary Forcemain
- Existing Sewage Pumping Station
- Existing Sanitary Sewer
- Existing Catchment Area
- Phase I Growth Area
- Phase II Growth Area
- West Drainage Area
- Property Parcel
- Master Servicing Plan Study Area
- Escarpment Natural Area
- Environmental Protection
- Special Policy Area

BluePlan ENGINEERING

214128-14-WW
November 2015
Data Source: Town of South Bruce Peninsula
Scale: 1:10,000 | NAD 1983 UTM Zone 17N

WASTEWATER CAPITAL & IMPLEMENTATION PROGRAM

Project Number	Project Name	Project Description	Project Trigger	Start Year	Year in Service	Class EA Schedule	Project Type	Size/ Capacity	Length (m) / Size (L/s)	Construction Assumption	Unit Cost (2014$)	Base Cost (2014$)	*Crossing & Tunnelling (2014$)*	*Permiting, Enviromental, Geotechnical, & Other (2014$)*	*Total Construction Cost (2014$)*	Total Engineering & Design (2014$)	Contingency (2014$)	Non Refundable HST (2014$)	Total Project Cost (2015$)	Grants and Subsidies (2014$)	Growth Split (%)	Existing Split (%)	Direct Developer Cost (2014$)	Benefit to Existing (2014$)	DC Comment
WW01	Gould St Diversion Sewer 1	200 m - 375 mm sanitary sewer on Gould Street, from easement to Frank Street, and on Frank Street, from Gould Street to Berford Street (Short Term Diversion).	Existing Condition / Capacity Requirements.	2016	2016-2021	A+	SAN	375 mm	200 m	5m	$692	$138,000	$0	$10,000	$148,000	$36,000	$15,000	$3,000	$202,000	$0	12.6%	87.4%	$25,496	$176,504	Project required to address existing deficient sewer on easement north of Frank St, from Gould St to Berford St. New sanitary sewer will convey flows from existing west area to Berford St. Recommend splitting based on proportion of future growth flows tributary to west area to existing flows in west area.
WW02a	Gould St Diversion Sewer 2a	351 m - 375 mm sanitary sewer on Frank Street, from Gould Street to Dawson Street (Long Term Diversion).	Project is required to support existing service area as well as growth. Trigger for long term diversion will be development of South Lands.	2021	2021-2026	A+	SAN	375 mm	283 m	10m	$2,339	$662,000	$0	$13,000	$675,000	$166,000	$68,000	$15,000	$924,000	$0	44.4%	55.6%	$409,796	$514,204	Intent of the Gould Street Diversion Sewer is to divert flows from the west area away from SPS#1 to the future South Lands SPS#3. The project benefits existing service area and intensification growth in the west area to 2029. Recommend splitting based on proportion of total future growth flows in Wiarton to total existing flows in Wiarton.
WW02b	Gould St Diversion Sewer 2b	845 m - 375 mm sanitary sewer on Dawson Street, from Frank Street to future SPS #3 on Elm Street (Long Term Diversion).	Project is required to support existing service area as well as growth. Trigger for long term diversion will be development of South Lands.	2021	2021-2026	A+	SAN	375 mm	495 m	5m	$692	$343,000	$0	$7,000	$349,000	$86,000	$35,000	$8,000	$478,000	$0	44.4%	55.6%	$211,994	$266,006	Intent of the Gould Street Diversion Sewer is to divert flows from the west area away from SPS#1 to the future South Lands SPS#3. The project benefits existing service area and intensification growth in the west area to 2029. Recommend splitting based on proportion of total future growth flows in Wiarton to total existing flows in Wiarton.
WW03	South Lands Pump Station #3	134 L/s Sewage Pumping Station at the corner of Elm Street and the future Dawson Street extension, servicing the future South Lands development and the existing west area. Location may vary depending on layout of development.	Project is required to support growth in southwest Wiarton, and will also improve existing system performance by diverting flows away from SPS #1.	2021	2021-2026	B	SAN		134 L/s	-	$16,736	$2,243,000	$0	$45,000	$2,332,000	$381,000	$224,000	$118,000	$3,055,000	$1,000,000	44.4%	55.6%	$1,354,900	$1,700,100	Intent of SPS#3 is to convey existing flows from the west area and future flows from the South Lands development to SPS#2. The project benefits the entire existing service area and supports Greenfield and intensification growth to 2029. Recommend splitting based on proportion of total future growth flows in Wiarton to total existing flows in Wiarton.
WW04	Elm St Forcemain	452 m - 400 mm sanitary forcemain on Elm Street, from SPS#3 to east of Berford Street.	Project is required to support growth in southwest Wiarton, and will also improve existing system performance by diverting flows away from SPS #1.	2021	2021-2026	A+	SAN	400 mm	452 m	Forcemain	$1,072	$485,000	$0	$10,000	$494,000	$122,000	$49,000	$11,000	$676,000	$0	44.4%	55.6%	$299,808	$376,192	Intent of Elm Street sanitary forcemain is to convey existing flows from the west area and future flows from the South Lands development to SPS#2. The project benefits the entire existing service area and supports Greenfield and intensification growth to 2029. Recommend splitting based on proportion of total future growth flows in Wiarton to total existing flows in Wiarton.
WW05	Elm St Gravity Sewer to SPS #2	557 m - 450 mm sanitary sewer on Elm Street, from east of Berford Street to SPS #2 at Taylor Street.	Project is required to support growth in southwest Wiarton, and will also improve existing system performance by diverting flows away from SPS #1.	2021	2021-2026	A+	SAN	450 mm	557 m	5m	$735	$409,000	$153,000	$11,000	$574,000	$141,000	$57,000	$13,000	$785,000	$0	44.4%	55.6%	$348,149	$436,851	Intent of Elm Street sanitary sewer is to convey existing flows from the west area and future flows from the South Lands development to SPS#2. The project benefits the entire existing service area and supports Greenfield and intensification growth to 2029. Recommend splitting based on proportion of total future growth flows in Wiarton to total existing flows in Wiarton.
WW06	South Lands Elm St Sanitary Sewer to SPS #3	662 m - 375 mm sanitary sewer on Elm Street, from west limit of Phase I South Lands development to SPS #3 at Dawson Street.	Growth in South Lands.	2021	2021-2026	A+	SAN	375 mm	468 m	5m	$692	$324,000	$0	$6,000	$337,000	$83,000	$34,000	$7,000	$461,000	$0	100.0%	0.0%	$461,000	$0	Intent of South Lands sanitary sewer on Elm Street is to convey future flows from the South Lands development to SPS#3. The project supports Greenfield to 2029. All costs to be assumed by developer.
WW07	Long Term Inflow & Infiltration Reduction Program	Removal of extraneous flow connections to the sanitary sewer system (downspouts, weeping tiles / foundation drains, sump pump, catchbasin connections, etc.) identified through previous surveys. Approximately 100 candidate properties are identified for disconnection works estimated at a cost of $10,000 per property. Program is recommended to be implemented from 2016 to 2026 at approximately $100,000 per year.	Program is required to support existing service area as well as growth. Removal of extraneous flows is expected to reduce peak flows at SPS#1 and SPS#2, eliminating the need to upgrade existing SPS facilities.	2016	2016-2029		SAN		N/A	N/A									$1,000,000	$0	44.4%	55.6%	$443,503	$556,497	Project is required to support existing service area as well as growth. Removal of extraneous flows is expected to further reduce peak flows at SPS#1 and SPS#2, eliminating the need to upgrade existing SPS facilities. I&I Reduction was also recommended as part of the 2015 Wiarton WWTP Class EA.
TOTAL												**$4,604,000**	**$153,000**	**$102,000**	**$4,909,000**	**$1,015,000**	**$482,000**	**$175,000**	**$7,581,000**	**$1,000,000**	**-**	**-**	**$3,554,647**	**$3,026,353**	

4.5.2 Implementation & Class EA Requirements

As outlined in Section 2.1, this Water, Wastewater and Stormwater Master Servicing Plan sets out to satisfy the EA Approach II requirements according to the MEA Class EA document.

The Preferred Wastewater Servicing Strategy will support the servicing needs of Wiarton's Greenfield and urban growth to 2029. This Strategy will be implemented in accordance with each project's Class EA schedule. The Class EA requirements for each project have been identified in the Capital Program Table 13. Schedule A and A+ projects may move forward to design and construction, with A+ projects requiring public notification prior to implementation.

The MSP identifies one project which would qualify as a Schedule B Class EA project, if the project was to be initiated by the municipality – the South Lands Sewage Pumping Station. The schedule for this project is considered appropriate given that it "extends the wastewater collection system and all works necessary to connect the system to an existing sewage outlet where such facilities are not in an existing road allowance or an existing utility corridor".

The project can be developer-led through a Plan of Subdivision Application under the Planning Act, through a process similar to the Class EA process under the EA Act.

The Preferred Wastewater Strategy does not identify any Schedule C projects.

During the next steps of the implementation program, primarily during detailed design of the projects, the following requirements will be considered:

- Finalization of property requirements
- Refinement of infrastructure alignment
- Identification of preferred construction methodologies
- Completion of additional supporting investigations as required (geotechnical, hydrogeological, cultural heritage/archaeological, etc)
- Review and mitigation of potential construction related impacts
- Satisfying of all provincial, municipal and conservation authority approval requirements

With respect to Town planning and budgeting, this program will be utilized as high level baseline estimates for the Town capital budgets. These costs will be further developed and refined during the implementation phases as more detailed information becomes available. For example, effort has been given during the Master Servicing Plan analyses to identify potential impacts related to the natural environment such as environmental features and open or unopened road allowances. Despite these efforts, there is potential that additional project requirements, costs and implementation time may be required to obtain approvals and mitigate the impacts.

Given the growth-related nature of the servicing strategies, the capital program will support the wastewater component of the Town Development Charges (DC) By-Law.

The anticipated timing of each project within the Preferred Strategy has been established based on the projected population growth in Wiarton.

4.5.3 Approvals

All proposed projects are planned to be within the existing and future road rights of way and are subject to the road planning and approvals being met, including required investigations. It is recommended that all key projects undertake a pre-design consultation with the applicable review agencies. This early consultation prior to the detailed design will ensure sufficient technical and environmental information is available to support the preferred design and that the project scope is well understood. Ultimately this process will facilitate project approvals moving forward.

Niagara Escarpment Commission

There are no limited wastewater projects that are anticipated to require development permits from the Niagara Escarpment Commission, as most projects lie within the urban area and outside designated Escarpment Natural, Protection, Rural, and Recreation Areas.

Potential projects that may require permits include the proposed works along Elm Street, including the proposed sanitary sewer and sewage pumping station just west of the Dawson Street Extension and the section of gravity sewer fronting the Bayview Cemetery.

Grey Sauble Conservation Authority

Sections of proposed infrastructure cross portions of lands regulated under Ontario Regulation 151/06 Regulation of Development, Interference with Wetlands and Alteration to Shorelines and Watercourses. As such, a permit from Grey Sauble Conservation Authority will be required for the construction of certain sanitary infrastructure, particularly works along Elm Street. It is anticipated that permits, approvals and construction of these sanitary works will be coordinated with road construction projects.

Ministry of Tourism, Culture and Sport

The Ministry of Tourism, Culture and Sport (MTCS) was consulted as part of this Class EA and provided comments regarding the protection, conservation and preservation of Ontario's cultural heritage, as it relates to:

- Archaeological resources;
- Built heritage resources; and,
- Cultural heritage landscapes.

While an archaeological assessment was not completed as part of the MSP, a desktop review was undertaken along with the completion of the 'Criteria for Evaluating Archaeological Potential' checklist that considered all recommended projects. This process identified that the cemetery located on the southwest corner of Elm Street and Taylor Street is adjacent to Elm Street, which coincides with the proposed alignment for the new sanitary forcemain and gravity sewer.

A detailed cultural heritage evaluation was not completed as part of the MSP; however, a desktop review and completion of the 'Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes' checklist was undertaken. This process identified that there could be water/sewer pipes over forty years old within the road right of way that coincides with the location of the proposed pipe upgrades or new pipe installations.

5 Stormwater Master Servicing Plan

5.1 Watershed Overview

Wiarton is located within two watersheds where flow drains to Colpoy's Bay (Georgian Bay) and to several tributary branches of Clavering Creek terminating at Boat Lake. Clavering Creek is part of the Sauble River watershed and the Rankin River subwatershed and its headwaters originate in Wiarton. Flow from Boat Lake then continues to the Rankin River, Sauble River and terminates at Lake Huron. [12]

For the purposes of this Master Servicing Plan, the Town is subdivided into the following watersheds:

- Colpoy's Bay (Georgian Bay)
- Clavering Creek (Lake Huron)

5.2 Stormwater System Policy and Criteria

5.2.1 Stormwater Management Framework and Policy Review

Watershed planning integrates environmental and land use planning. Criteria for the protection of water quantity, water quality, habitat and biota are established to help achieve the goals set for the watershed. Strategies to mitigate the effects of urbanization on the hydrologic cycle are developed to meet protection criteria.

A combination of lot level, conveyance and end-of-pipe stormwater management practices are usually required to meet the multiple objectives of stormwater management: maintaining the hydrologic cycle, protection of water quality and preventing increased erosion and flooding.

5.2.1.1 Stormwater Management Framework

Stormwater management, in the province of Ontario, operates within a multi-jurisdictional environment where multiple provincial and federal legislations and accompanying administrative structures and agencies govern and manage Ontario waters. For any given project, there can be over a dozen different (potentially contradictory) federal, provincial and/or municipal legislation, policies and/or bylaws that need to be considered. Further, site specific restrictions and considerations may further influence stormwater management requirements. As such, there is no single framework from which all municipalities can apply to all situation.

Municipalities need to review and weigh the different considerations and establish their own policies in order to best manager their unique systems. Although there is no set framework, stormwater management in Ontario generally follows these general principles:

- Maintain the Natural Hydrologic Cycle
- Prevent an Increase in Risk of Flooding
- Prevent Undesirable Stream Erosion
- Protect Water Quality

The specifics of these management principles are set through the development of an integrated planning process of both Environmental and Municipal Land Use Planning documents that utilizes a multi-layered approach; starting with a board area level study with subsequent, more detailed studies reviewing a more discretized area and establishing more refined objectives. Figure 24 outlines the general planning and approval framework.

[12] *LGL Limited environmental research associates. Wiarton Wastewater Treatment Plant - Environmental Study Report – Natural Sciences Report – Desktop Review. April 2015.*

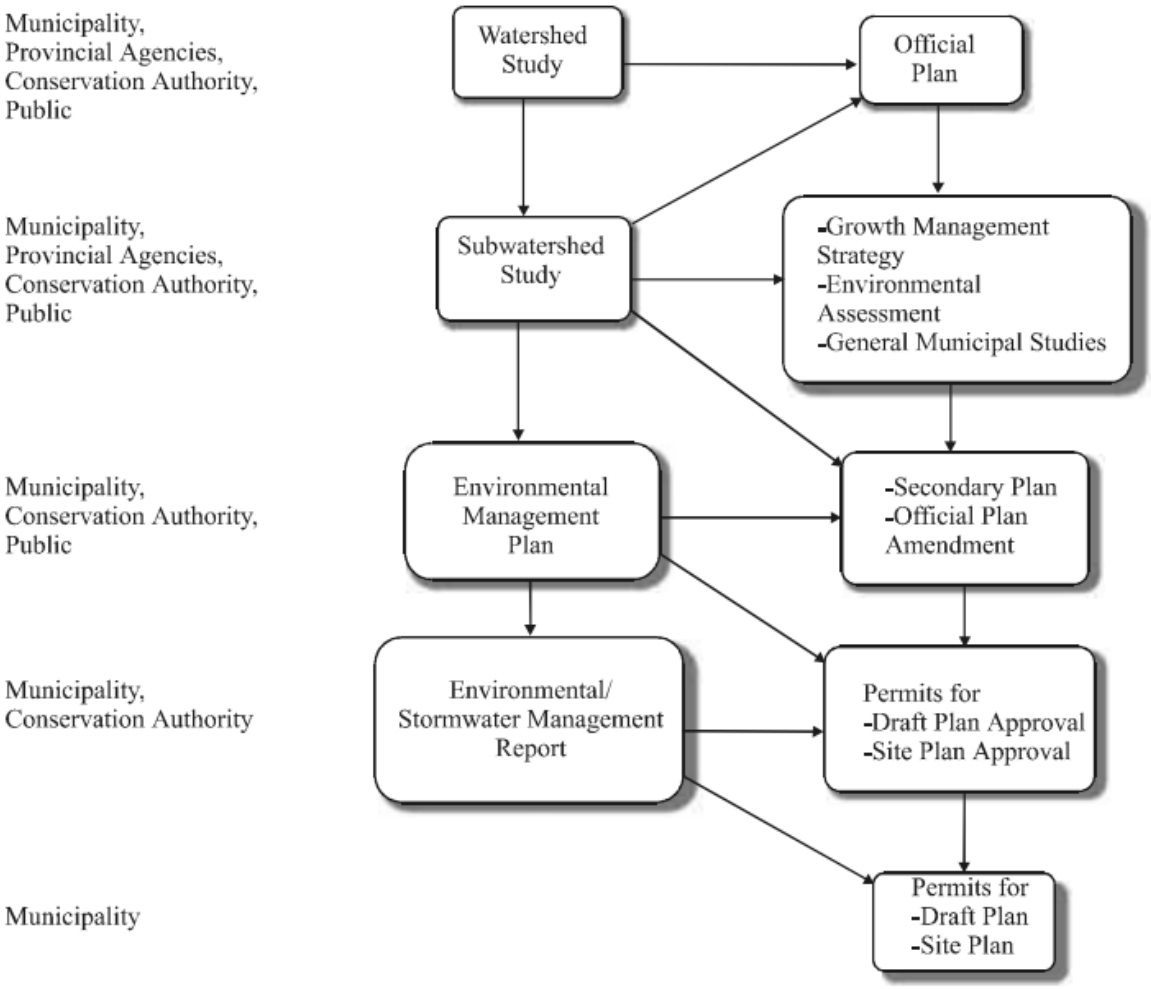


Figure 24. Stormwater Management Framework[13]

[13] *MOE. 2003. Stormwater Management Planning and Design Manual.*

5.2.1.2 Regulatory Environmental Policies

The Town of South Bruce Peninsula has authority to establish its own individual stormwater management policies and guidelines; however, these guidelines will have to generally align with existing provincial and federal legislation. Further, the Town has included the local conservation authority the Grey Sauble Conservation Authority (GSCA), as a key reviewer and stakeholder.

The GSCA operates under the authority of the Conservation Authority Act (CAA) of Ontario that grants the GSCA the authority to fulfill its mandate through multiple measures from; acquiring and managing land, implementation of regulations, review and comment on Class and Individual Environmental Assessments, and through delegated responsibilities from other federal and provincial agencies. Within the CAA its grants the GSCA the authority to make regulations applicable to the following:

a) Prohibiting, regulating or requiring the permission of the authority for straightening, changing, diverting or interfering in any way with the existing channel of a river, creek, stream or watercourse, or for changing or interfering in any way with a wetland;
b) Prohibiting, regulating, or requiring the permission or the authority for development if, in the opinion of the authority, the control of flooding, erosion, dynamic beaches or pollution or the conservation of land may be affected by the development.

5.2.1.3 Existing Management Policies

This section provides a summary of the key regulations and policies governing stormwater management objectives within Wiarton.

5.2.1.3.1 Federal

A portion of the Town of South Bruce Peninsula (TSBP) includes the Provincially-significant Niagara Escarpment and lies in the Niagara Escarpment Planning Area. The Escarpment includes a variety of topographic features and land uses extending 725 km from Queenstown on the Niagara River to the the islands of off Tobermory on the Bruce Peninsula. The Niagara Escarpment Planning and Development Plan was enacted on June 22, 1973 to establish a planning process to ensure that the area would be protected.

In 1990, the United Nations Educational, Scientific and Cultural Organization (UNESCO) names the Niagara Escarpment a World Biosphere Reserve which recognizes the natural features and ecological importance of the Escarpment and endorses the Niagara Escarpment Plan (NEP). The Niagara Escarpment Plan affects a significant part of the easterly boundary of the Town including the lands within the former Town of Wiarton situate to the east of Gould St.

The Official Plan is intended to maintain consistency with the policies of the NEP. The provisions of the Niagara Escarpment Plan continue to prevail over any local Plan or Zoning By-law where there is a conflict.

5.2.1.3.2 Provincial

Provincially, several water-related legislations may in part influence stormwater management and land use planning within the Town. These include:

- Ontario Water Resources Act
- Environmental Assessment Act
- Environmental Protection Act
- Conservation Authorities Act
- Lakes and Rivers Improvement Act
- Beds of Navigable Waters Act

- Aggregate Resources Act
- Clean Water Act
- Planning Act
- Municipal Act
- Public Utilities Act
- Drainage Act
- Nutrient Management Act
- Pesticides Act
- Public Lands Act
- Safe Drinking Water Act
- Water Opportunities Act
- Places to Grow Act

Of particular interest, two provincial policies and guidelines have the greatest influence on the development of the Town's stormwater management Policies.

2005 Provincial Policy Statement

The 2005 provincial Policy Statement (PPS) set policy direction related to land use planning and development. These policies are organized under the general concepts of:

- Building Strong Communities
- Wise Use and Management of Resources, and
- Protecting Public Health and Safety

The policies of the PPS provide important guidance over land and resource use practices and the development of major infrastructure. It is the intent that the PPS be complemented by provincial plans or by locally generated policies regarding matters of municipal interest. In the area of stormwater related protection, the PPS provides direction and standards for:

- Protection of human life, health and property from flooding and other natural and human-made hazards,
- Protection and restoration of water quality,
- Maintenance of the hydrologic system and ecological functions,
- Use of best practices in managing stormwater,
- Protection and restoration for natural environment (vegetation cover), and
- Conservation and sustainable use of water sources (water and groundwater).

Stormwater Management Planning and Design Manual (2003)

The Ontario Ministry of Environment prepared the Stormwater Management and Design Manual in 2003 to provide practical guidance for the planning, design, and review of stormwater management practices. However, the manual is to be utilizes as a tool for understanding the performance requirements of stormwater management projects, and that any final stormwater management policies or management solutions need to consider specific site conditions. The Manual provides general information on:

- Overview of the impacts of urbanization
- Overview of the integrated planning for stormwater management
- Environmental design criteria
- Design considerations for conveyance and end of pipe measures
- Approaches for managing infill development
- Operation, Maintenance and Monitoring considerations
- Capital and operational cost estimates

5.2.1.4 Conservation Authorities

Grey Sauble Conservation Authority (GSCA) is the primary conservation authority with governance in Wiarton. Section 28 of the Conservation Authorities Act empowers GSCA to establish regulations related to natural hazards and environmental protection. The GSCA is a community-based environmental agency which owns and manages 11,734 hectares of land in Grey and Bruce Counties and is responsible for overseeing the healthy and sustainable management of it its watershed environment.

The Environmental Planning Program operates within the framework of the *Development, Interference with Wetlands and Alteration to Shorelines and Watercourses Regulation* (also known as Ontario Regulation 151/06) and the Conservation Authorities Act, R.S.O. 1990, c. C.27.

Regulation 151/06 requires that a permit be obtained from the Authority when undertaking any of the following:

- straightening, changing, diverting or interfering in any way with the existing channel of a river, creek, stream or watercourse or interfering in any way with a wetland.
- development adjacent or close to the shoreline of Lake Huron, Georgian Bay or inland lakes, in river or stream valleys, hazardous lands, wetlands or lands adjacent to wetlands

The intent of the permit process is to ensure that development and interference do not impact the control of flooding, erosion, dynamic beaches, pollution or the conservation of land. More specifically the intent of the regulation is to ensure that these activities do not worsen existing erosion or flooding hazards, that new hazards are not created and that new development is not at risk. In addition the regulation helps to maintain the natural features and ecological functions of river and stream valleys, shorelines, watercourses and wetlands.

Development as defined by the Conservation Act means:

- the construction, reconstruction, erection or placing of a building or structure of any kind
- any change to a building or structure that would have the effect of altering the use or potential use of the building or structure, increasing the size of the building or structure or increasing the number of dwelling units in the building or structure
- site grading
- the temporary or permanent placing, dumping or removal of any material, originating on the site or elsewhere

The lands to which the regulation applies are identified on maps that were produced in accordance with Provincial guidelines and are available for review at the Grey Sauble Conservation office or at local municipal offices.

For any proposed project in or near river or stream valleys, the Lake Huron or Georgian Bay shoreline, the shore of an inland lake, a watercourse or a wetland, Grey Sauble Conservation Authority must be contacted prior to commencing work to determine if a permit is required.

5.2.1.5 Federal Policies

Lake Huron has a Binational Partnership that was formed in 2002 to coordinate actions to help restore and protect the Lake Huron ecosystem. The Binational Partnership is led by Environment Canada and the U.S. Environmental Protection Agency, with participation from federal, provincial, tribal, state and local governments or agencies, and with input from non-government stakeholders and the public.

Under the Great Lakes Water Quality Agreement (GLWQA), the governments of Canada and the United States agreed "to restore and maintain the chemical, physical and biological integrity of the waters of the Great Lakes basin ecosystem." This is accomplished in part through binational Lakewide Management Plans that are developed and implemented in consultation with US state and Ontario provincial governments. In Canada, the Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem supports the development and implementation of Lakewide Management Plans.

The Lake Huron Binational Partnership is an action plan for cooperatively restoring and protecting the ecosystem of Lake Ontario. The latest 2014 Lake Huron Binational Partnership Annual Report 2014 highlights accomplishments and progress towards achieving ecosystem restoration and protection, and outlines planned activities including outreach and monitoring as well as additional protection and restoration actions.

5.2.2 Design Criteria

A guiding principle of stormwater design criteria is to ensure the system is designed with an appropriate factor of safety and risk management. This overall principle also ensures that stormwater infrastructure has sufficient capacity to meet the approved needs of the Town with an appropriate consideration for longer term needs as to not impede approved/planned growth.

The design criteria was reviewed as part of this MSP to ensure stormwater flows are appropriate and will support sizing and timing of future infrastructure such as pipes and facilities.

5.2.2.1 Minor Drainage System

Design criteria and capacity planning for stormwater conveyance infrastructure under this MSP is based on:

- Conveying 5 year flows within the sewer without surcharging
- Providing a safe conveyance route for all runoff up to the 100 year flows
- New development discharging to Clavering Creek Watershed with provision of flow management such that post-development peak flow rates match pre-development peak flow rates for all flow up to and including the 100-year flow

5.2.2.2 Major Drainage System

The major drainage system is responsible for managing flows exceeding the capacity of the minor system. The Wiarton major drainage system is to provide sufficient capacity within public ownership or control to prevent flooding of private property.

5.2.2.3 Stormwater Detention

Stormwater detention facilities shall be designed inline with MOECC design criteria, to meet the following:

- Water quality management targets as outlined in the MOECC design criteria; and,
- Provide peak flow management such that post-development peak flow rates match pre-development peak flow rates for all flow up to and including the 100-year flow for all new development within the Clavering Creek watershed.

5.2.2.4 Water Quality Management

Water quality management targets as outlined in the MOECC design criteria shall be achieved for all new development. These targets can be achieved through the stormwater detention facilities and / or separated water quality facilities.

5.2.2.5 Design Storm & Intensity-Duration-Frequency Curves

The Environment Canada short duration rainfall intensity-duration-frequency (IDF) curve data from the Wiarton weather station was used to generate the design storm data. The system was evaluated using the SCS Type 2 storm hyetograph.

Table 14. IDF Curve Information

Duration	Total Rainfall Amounts (mm)					
	2 year	5 year	10 year	25 year	50 year	100 year
1 hour	21.3	30.1	35.9	43.3	48.8	54.2
2 hour	26.9	39.2	47.4	57.7	65.3	72.9
6 hour	36.2	49.5	58.3	69.5	77.7	85.9
12 hour	40.9	55.2	64.6	76.6	85.4	94.2
24 hour	48.2	61.0	69.4	80.1	88.0	95.9

5.3 Existing Stormwater Collection System

5.3.1 Existing Infrastructure

The majority of the Wiarton stormwater conveyance system consists of a traditional sewer system, where surface water runoff is directed to and collected by the storm sewer system. Within Wiarton, all runoff flows are conveyed directly to the system outlets without peak flow attenuation. Also forming part of storm conveyance system are localized areas serviced by ditches and culverts. A stormwater management pond regulates flows from south east of Wiarton before discharging to the Taylor Street storm sewer.

The Taylor Street Stormwater Management (SWM) Pond is located southwest of the Bayview Cemetery just south of Elm Street and is jointly managed by the Grey Sauble Conservation Authority and the Town. The Taylor Street SWM Pond has a design capacity of 33,080 m^3 (at a depth of 4.7m). Flows out of the pond are controlled by a 750 mm diameter polyethylene pipe that controls peak discharge rates to 3.11 m^3/s. The pond provides peak flow attenuation from a large, mostly rural, upstream catchment areas and was constructed to manage downstream flooding issues within the Wiarton drainage system.

Facility	Storage Capacity	Peak Discharge
Taylor St Pond	33,080 m^3	3.11 m^3/s

There are no naturalized streams within the urban boundary limits.

The existing stormwater system is shown in Figure 25.

5.3.2 Hydraulic Stormwater Model

5.3.2.1 Model Development

As with water and wastewater, the Town of South Bruce Peninsula did not have an existing stormwater system model. To support the stormwater system evaluation, a new SWMM base hydraulic model for the Town's stormwater conveyance system was developed. The final model consists of an "all pipe" model of the Town's conveyance network and includes all existing storm sewers, culverts, and drainage ditches. The model also accounts for all upstream flow areas contributing to the conveyance network.

The conveyance network was developed using the Town's available infrastructure data in GIS, and where required missing network inverts and sewer geometry was estimated using best available information.

The model catchments were developed using available topographic information. Existing drainage features such as curbs, swales, etc were also taken into account when delineating individual storm sewer catchments.

The existing impervious coverages were estimated using existing orthophotography. Under future conditions, it was expected that all new developments are expected to generally maintain existing drainage boundaries. As such, the existing sewer catchments remained unchanged under the future conditions. The proposed development area impervious coverages were estimated based on the proposed land use.

Town of SOUTH BRUCE PENINSULA

Water, Wastewater and Stormwater Master Servicing Plan and Gould Street Sanitary Sewer Upgrade Class Environmental Assessment

Existing Stormwater Infrastructure

Legend

- Existing Storm Sewer
- Existing Storm Outfall
- Existing SWM Detention Pond
- Property Parcel
- Master Servicing Plan Study Area

BluePlan ENGINEERING

214128-6-SW
October 2015
Data Source: Town of South Bruce Peninsula
Scale: 1:20,000 | NAD 1983 UTM Zone 17N

Table 15 summarizes the impervious coefficients used.

Table 15. Impervious Coverage Coefficients

Growth Area Description	Land use	Area (ha)	Impervious Coverage
Division St	Single Family	5.48	0.45
McNaughton St	Single Family	1.73	0.45
Frank St 1	Single Family	7.03	0.45
Elm St 1	Single Family	6.44	0.45
William St	Single Family	3.07	0.45
Elm St 2	Single Family	3.48	0.45
Frank St 2	Single Family	1.35	0.45
Retirement Subdivision	Townhouse	40.67	0.75

A few localized sewers are expected to experience surcharging conditions under a 5-year storm. These areas include Berford Street, at the south end of the Town limits, which confirms noted historic drainage issues in that area. No surface flooding, due to sewer capacity restrictions is expected under the 5-year storm.

5.3.2.2 Model Validation

The model validation was completed by comparing the model predicted performance against the Town's anecdotal performance records. The resulting model results were in general agreement with the Town's performance records.

5.4 Assessment of the Existing and Future Stormwater Infrastructure

Establishing existing infrastructure conditions and capacities is a critical preliminary step in the master planning process. Accurate current conditions provide the basis for future recommendations. Further, assessment of future land use and impact on the stormwater system was analyzed throughout the Master Servicing Plan to develop and recommend servicing strategies.

The following sections describe current constraints within the existing infrastructure, outline the future conditions that are anticipated and assess the capacity deficiencies anticipated in the system within the 2029 planning horizon.

5.4.1 Opportunities and Constraints

Existing opportunities and constraints were identified through preliminary infrastructure review and discussions with Town staff. The opportunities and constraints outlined in the following sections. These Opportunities and Constraints are summarized in Figure 26.

5.4.1.1 Catchment Specific Opportunities and Constraints

Both the Town and GSCA has the desire to utilize Low Impact Development (LID) features to aid in the management of stormwater runoff. In the development of management strategies, the following LID opportunities were explored.

- Where feasible consider using LID, with a particular emphasize on infiltration options for the objective of volume control
- Where feasible on retrofit projects consider including LID
- Where feasible manage infill growth related impacts through LID

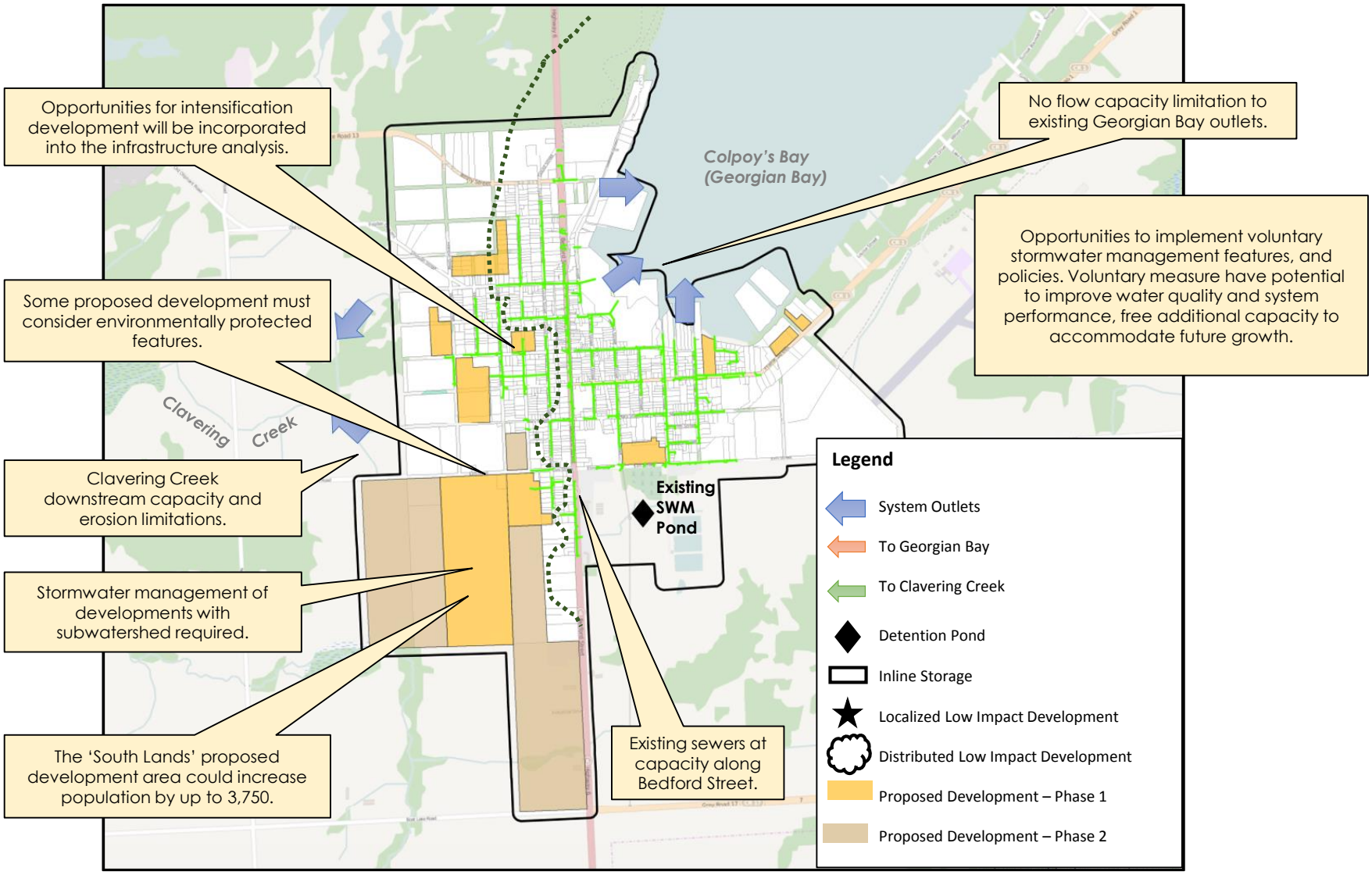


Figure 26 – Stormwater Opportunities and Constraints

5.4.2 Hydraulic Analysis

5.4.2.1 Existing Capacity Issues

- A few localized sewers are expected to experience surcharging conditions under a 5-year storm. These areas include Berford Street, at the Sound end of the Town limits, which confirms noted historic drainage issues in that area.
- No surface flooding, due to sewer capacity restrictions, is expected under the 5-year storm.

5.4.2.2 Future Capacity Issues

- Local storm sewers appear to have sufficient capacity to accommodate projected growth related increases in the peak 5-year flow rates
- New development will require to manage the following:
    - Water quality management from all new development sites
    - Peak flow management is required for all new developments discharging to the Clavering Creek Watershed
    - Management of 100 year overland flow route

5.5 Evaluation of Strategies

The identification and evaluation of servicing options is a critical component of the master planning process because it enables a comprehensive review of a reasonable range of alternatives while documenting the process in a transparent manner. The evaluation process that has been undertaken is described in the following sections.

5.5.1 Objectives

The identification and evaluation of servicing options is the comprehensive review of a reasonable range of alternatives while documenting the process in a transparent manner.

The 2015 Master Servicing Plan sets out to meet the Approach 2 requirements under the Municipal Engineers Association (MEA) Class EA process. Under Approach 2, a Master Plan document is prepared at the conclusion of Phases 1 and 2 of the Class EA process. This approach allows for all Schedule A, A+ and selected Schedule B projects identified in the Master Plan to move forward to implementation. To achieve this result, systematic evaluation and documentation is required to support selected Schedule B project Class EA requirements along with applicable review agency commitments prior to implementation. Select Schedule B and all identified Schedule C projects will require additional supporting information and decision making to proceed onto separate studies and continue to Phases 3 and 4 of the Class EA process.

The evaluation approach has been designed to ensure a logical and transparent process that can document the evaluation and decision making that will ultimately develop a defensible capital program. Sustainability principles were also considered in the development of the 2015 Master Servicing Plan and have been integrated within the five-point evaluation. Examples of such principles are:

- making best use of existing infrastructure;
- minimizing the cost of new infrastructure;
- considering operation and maintenance costs to ensure financial sustainability and;
- ensuring the long-term reliability and security of the water, wastewater and stormwater systems.

5.5.2 Description of the Evaluation Process

The Evaluation Process undertaken for development and selection of a preferred servicing strategy is described in this section and is graphically depicted in Figure 15.

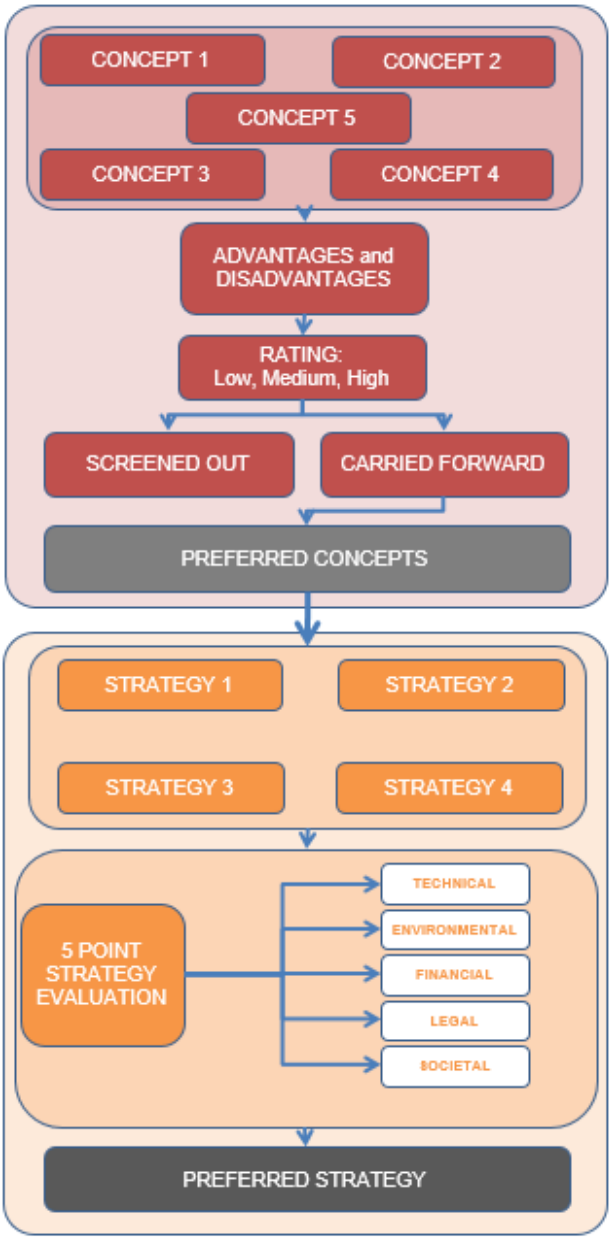


Figure 27. Servicing Option Evaluation Flow Diagram

A broad range of stormwater management concepts were established based on high level feasibility to meet the servicing requirements for the growth within Wiarton. These high level concepts included but were not limited Increased Conveyance, Localized Detention, Increased Conveyance with End of Pipe Detention, Policy and Management and Low Impact Development. These concepts also included Do Nothing and Limit Growth as required for the Class EA Process.

To evaluate the Stormwater Management Concepts, the advantages and disadvantages for each were established based on several evaluation criteria. This preliminary evaluation examined the concepts from an ability to meet the servicing needs as well as a high level examination based on the 5-point criteria.

Each concept was given a Low, Medium or High rating with concepts receiving a Low rating being screened out and not carried further to detailed evaluation.

The Stormwater Management Concepts that were carried forward were then combined in order to build overall Servicing Strategies that would alleviate any existing constraints and satisfy the projected growth within Wiarton to 2029. The Servicing Strategies were evaluated using a detailed 5-point strategy evaluation. The result of this evaluation was the selection of the Preferred Servicing Strategy.

The Preferred Stormwater Servicing Strategy consists of several Concepts from which two (2) alternative servicing strategies were identified for Georgian Bay catchment and seven (7) strategies were identified for the Clavering Creek catchment.

5.5.3 Evaluation Criteria

Detailed evaluation matrices supporting the evaluation of servicing options were developed and used for selection of preferred servicing for the 2015 Master Servicing Plan. The complete evaluation matrices are included in Appendix E2. The servicing strategies were subject to a 5-point evaluation which includes five major areas of impact: Technical, Environmental, Financial, Legal/Jurisdictional, Socio-Cultural. The 5-point criteria and the evaluation considerations are described further in Table 12.

Table 16. Stormwater Evaluation Criteria

CRITERIA	DESCRIPTION

Technical Impact	• Describes overall technical advantages and disadvantages to an option related to:
	  ○ capacity requirements and level of service
	  ○ alignments that can maximize a service area
	  ○ utilization of existing infrastructure
	• Describes difficulty of construction (e.g., construction in limited areas, crossings, protection of utilities, trees or structures)
	• Assesses whether existing infrastructure upgrades are required
	• Describes risk considerations:
	  ○ Level of security of stormwater conveyance
	  ○ Considers in-line versus offsite detention
	• Describes the ability for phasing:
	  ○ staged growth and maximizing the use of existing or planned infrastructure
	  ○ incremental extensions of infrastructure as growth progresses
	  ○ balanced infrastructure costs with staged level of growth (high-level comment)
	• Describes impact on the sizing of planned and existing infrastructure
	• Highlights trunk infrastructure that potentially should be oversized to benefit future growth
	• Comments on whether growth areas will need to be serviced by existing or new infrastructure
	• Compares relative sizing differences between alternatives
	• Describes the technical consideration required for construction:
	  ○ Where applicable, comments on construction of projects that can be coordinated with road improvements or construction
	• Describes potential opportunities/constraints to servicing build out

CRITERIA	DESCRIPTION
Environmental Impact	• Describes the potential impacts of the option on the natural environment, proximity to existing natural features and designations including, but not limited to: ESAs, ANSIs, conservation authority regulation limits, vegetation, woodlands, wildlife, aquatic resources and fisheries • Highlights requirements for major environmental crossings, deep sewers, development through environmental designated areas, and requirements for mitigative action
Financial Impact	• Describes the capital cost relative to other options • Considers construction costs for new infrastructure and for upgrades to existing system • Highlights major projects that differ from other options that significantly contribute to the capital costs • Describes large up-front costs required for phasing of growth • Comments on post-construction impacts such as operation and maintenance costs and requirements, and compares to other options
Legal/Jurisdictional Impact	• Notes any land requirement issues and agency concerns that may arise related to project alignments, land acquisition, planning permits, crossings etc. • Comments on compliance with Guidelines and Policies • Describes the potential impacts related to opportunity or requirements for integrated planning, design, construction with other servicing such as bridge, road construction etc. • Notes if coordination with involved parties is required
Socio-Cultural Impact	• Describes the potential impacts to residents, archaeological/heritage resources, and visual aesthetics • Describes any potential noise, dust, vibrations, traffic disruptions to residents and businesses during and following construction

5.5.4 Stormwater Management Concepts

A long list of high level Stormwater Management Concepts were introduced early in the analysis and were investigated. The Concepts are listed below and were evaluated to determine which concepts are feasible to carry forward to make up Servicing Strategies. The Concept evaluation matrix is shown in Appendix E3.

Concept 1 – Do Nothing – *Carried Forward (Georgian Bay); Screened Out (Clavering Creek)*

The Do Nothing alternative is required for evaluation under the Class EA process. It essentially identifies the existing conditions, and helps to define the extent of the problem. In this case the “Do Nothing” alternative cannot be applied to all proposed developments.

For the Georgian Bay catchment, there are no existing/project capacity issues and as such can be carried forward as viable concept.

For the Clavering Creek catchment, the Do Nothing concept does not meet the management requirements. Moreover, the Do Nothing alternative does not address increased runoff and water quality

issues. As such, the Do Nothing concept is not considered a viable alternative for the Clavering Creek catchment and has been screened out.

Concept 2 – Limit Community Growth – *Screened Out (Both Catchments)*

For both the Georgian Bay and Clavering Creek catchments, the Limit Community Growth concept does not meet Official Plan policies and does not address increased runoff and water quality issues. As such, it has also been screened out as a viable concept for both the Georgian Bay and Clavering Creek catchments.

Concept 3 – Traditional Management

There are not capacity issues in the Georgian Bay catchment, therefore increased conveyance is not needed. For the Clavering Creek, increased conveyance does not address management requirements. As such, it has been screen out as a viable concept for both the Georgian Bay and Clavering Creek catchments.

- Concept 3a – Increased Conveyance – *Screened Out (Both Catchments)*

There are not capacity issues in the Georgian Bay catchment, therefore increased conveyance is not needed. For the Clavering Creek, increased conveyance does not address management requirements. As such, it has been screen out as a viable concept for both the Georgian Bay and Clavering Creek catchments.

- Concept 3b – Localized Detention – *Screened Out (Georgian Bay); Carried Forward (Clavering Creek)*
- Concept 3c – Increased Conveyance with End of Pipe Detention – *Screened Out (Georgian Bay); Carried Forward (Clavering Creek)*

Concept 4 – Low Impact Development

Policy and management measures consist of implementing non-structural requirements on existing and/or new properties with the aim of reducing stormwater runoff and improving runoff water quality. These measures can be both mandatory, voluntary, and/or incentivized. These measures alone are not expected to address all the identified management objectives but form a part of a larger management strategy.

- Concept 4a – Policy and Management – *Carried Forward (Both Catchments)*

Low Impact Development (LID) consists of the use of a decentralized management approach to runoff management. This can include the use of non-structural modifications / retrofits to new and existing sites such as downspout and sump pump disconnections, amended soils, reduced development footprint, or structural features such as green roofs, soak away pits or rain gardens. The use of LID can meet all or part of the identified management objectives.

Further, the Town should consider the installation of oil/grit separators and/or other water quality management facilities at all existing outlets when other capital project occur in these areas.

- Concept 4b – Low Impact Development – – *Carried Forward (Both Catchments)*

While each of these concepts on their own may not satisfy all growth and capacity constraints within the system, they have been combined to generate the Servicing Strategies for the Georgian Bay catchment and the Clavering Creek catchment.

At this stage, each Strategy was subjected to a five-point evaluation, which includes environmental, technical, socio/cultural, financial, and legal/jurisdictional impacts. Each Strategy was scored based on the positive and negative aspects identified for each impact category using a rating system of high, medium and low, where high indicates “more favourable”.

5.5.5 Stormwater Management Strategies

5.5.5.1 Georgian Bay Catchment

Two (2) Servicing Strategies were identified for the Georgian Bay catchment. The descriptions for the Strategies are provided below.

Strategy 1 – Do Nothing or Implement Low Impact Development (LID) Policy and Management

- Voluntary onsite management incentive program including roof leader disconnection, rain barrel and rain garden programs.
- No conveyance upgrades required as downstream system has sufficient capacity to accommodate existing and projected stormwater flows.
- Water quality controls provided by onsite management incentive program.
- Consider the installation of oil/grit separators and/or other water quality management facilities at all existing outlets when other capital project occur in these areas.

Strategy 2 – Development Specific Onsite Impact Development

- Onsite control for new development, where post-development peak flow matches pre-development peak flow
- Voluntary onsite management incentive program including roof leader disconnection, rain barrel and rain garden programs.
- No new facilities required nor conveyance upgrades as downstream system has sufficient capacity to accommodate
- Water quality controls provided by onsite LID facilities.

The alternative stormwater management strategies are shown in Figure 28 to Figure 34.

5.5.5.2 Clavering Creek Catchment

Seven (7) Servicing Strategies were identified for the Clavering Creek catchment. The descriptions for the Strategies are provided below.

Strategy 1a – Individual Detention Facilities

- Voluntary onsite management incentive program including roof leader disconnection, rain barrel and rain garden programs.
- Utilizes onsite detention ponds for peak flow control and water quality management before discharging to existing stormwater system.
- Localized capacity upgrades to address existing capacity issues.
- No new conveyance infrastructure or upgrades required to accommodate growth.
- Water quality controls provided at onsite detention facilities.

Strategy 1b – Localized End of Pipe Detention Facilities

- Voluntary onsite management incentive program including roof leader disconnection, rain barrel and rain garden programs.
- Utilizes multiple small centralized detention ponds and peak flow control and water quality management before discharging to existing creeks.
- Localized capacity upgrades to address existing capacity issues.
- New conveyance infrastructure and/or upgrades to existing infrastructure upstream of detention facilities.
- No new conveyance infrastructure or upgrades downstream of detention facilities.
- Water quality controls provided at centralized detention facilities.

Strategy 1c – End of Pipe Detention and Erosion Enhancements

- Voluntary onsite management incentive program including roof leader disconnection, rain barrel and rain garden programs.
- Utilizes a single centralized detention pond for peak flow control and water quality management before discharging to existing creeks.
- Post-development peak flow matches pre-development peak flow.
- Localized capacity upgrades to address existing capacity issues.
- New conveyance infrastructure and/or upgrades to existing infrastructure upstream of detention facilities.
- Ditch erosion control and enhancements upstream of storage facility.
- Water quality controls provided by end of pipe detention facility.

Strategy 2 – Inline Detention

- Voluntary onsite management incentive program including roof leader disconnection, rain barrel and rain garden programs.
- For new development areas; end of pipe water quality control facility.
- Utilizes localized inline detention facilities (subsurface storage tank) for peak flow control management before discharging to existing stormwater system.
- Post-development peak flow matches pre-development peak flow.
- Localized capacity upgrades to address capacity issues.
- No new conveyance infrastructure or upgrades to accommodate growth.
- Water quality controls provided by end of pipe water quality control facilities.

Strategy 3a – High LID Distributed

- Voluntary onsite management incentive program including roof leader disconnection, rain barrel and rain garden programs.
- On-site control for new development – post-development peak flow matches pre-development peak flow
- No public facilities; control is achieved through onsite LID.
- Localized capacity upgrades to address capacity issues.
- No new conveyance infrastructure or upgrades to accommodate growth.
- Water quality controls provided by onsite LID facilities.
- Onsite control for New Development - Post-Development Peak Flow matches Pre-Development Peak Flow

Strategy 3b – Moderate LID Incorporated within Right of Way

- Voluntary onsite management incentive program including roof leader disconnection, rain barrel and rain garden programs.
- Incorporate distributed LID within rights of way (conveyance system) to provide peak flow control and water quality management before discharging to existing creeks.
- Localized capacity upgrades to address capacity issues.
- Water quality controls provided by the right of way LID facilities.

Strategy 4 – Hybrid Localized End of Pipe and Localized End of Pipe and Inline Storage

- Voluntary onsite management incentive program including roof leader disconnection, rain barrel and rain garden programs.
- For new development areas; end of pipe water quality control facility

- Utilizes localized inline detention facilities (subsurface storage tanks) and a single centralized detention pond for peak flow control and water quality management before discharging to existing creeks.
- Post-development peak flow matches pre-development peak flow.
- Localized capacity upgrades to address existing capacity issues.
- New conveyance infrastructure and/or upgrades to existing infrastructure upstream of detention facilities.
- No new conveyance infrastructure or upgrades downstream of detention facilities.
- Water quality controls provided at centralized detention facilities.

The alternative stormwater management strategies for both catchments have been combined and shown in Figure 28 to Figure 34.

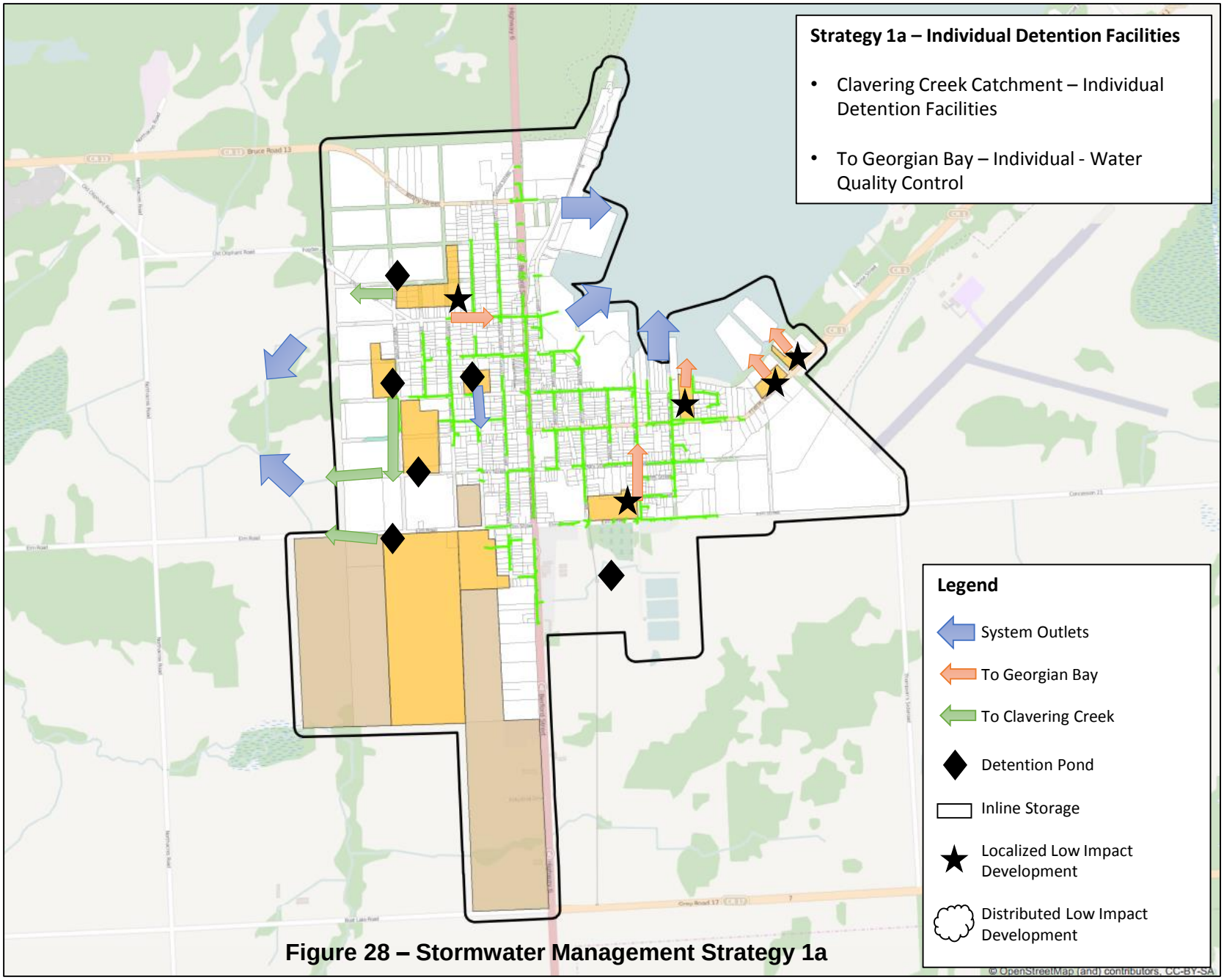


Figure 28 – Stormwater Management Strategy 1a

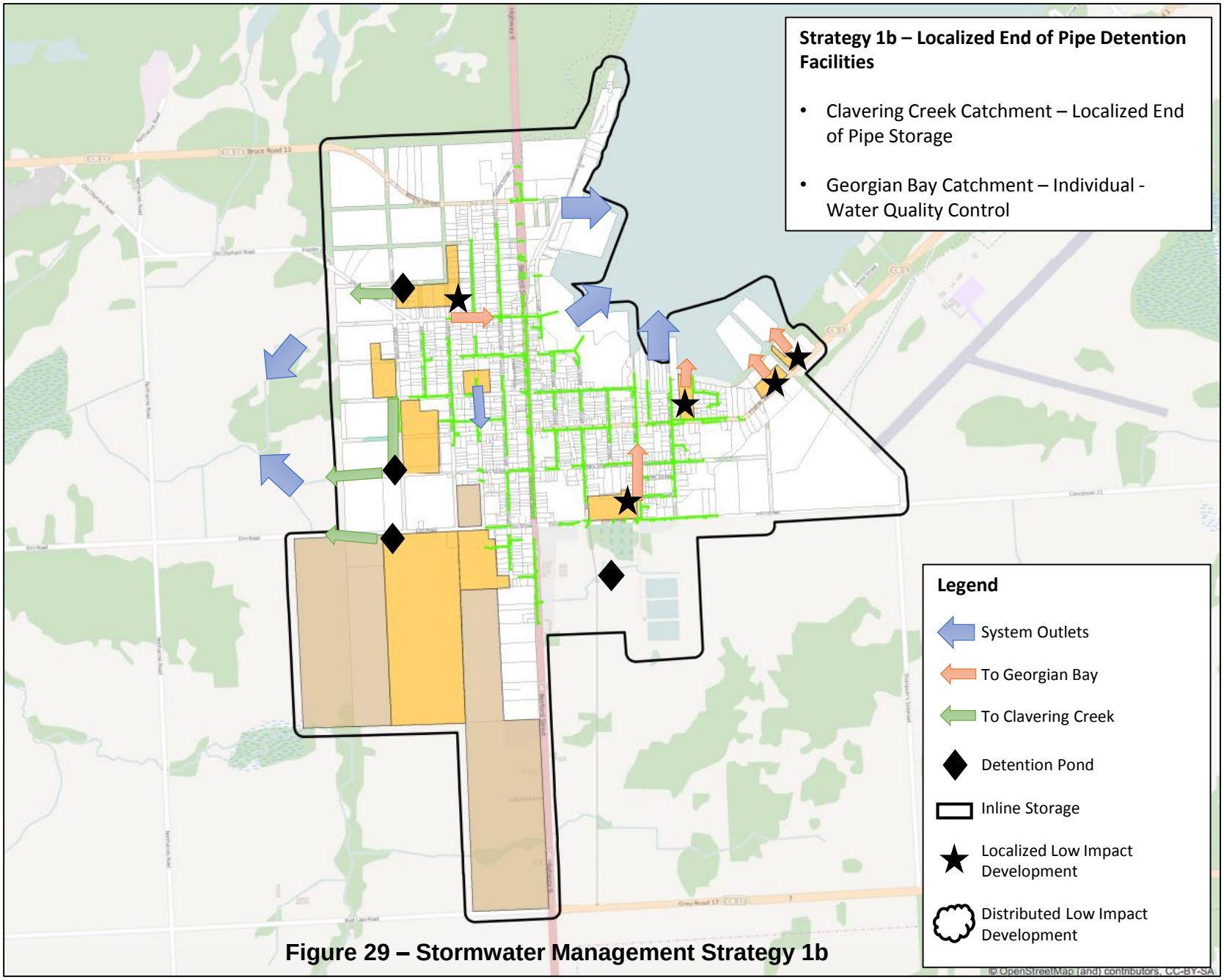


Figure 29 – Stormwater Management Strategy 1b

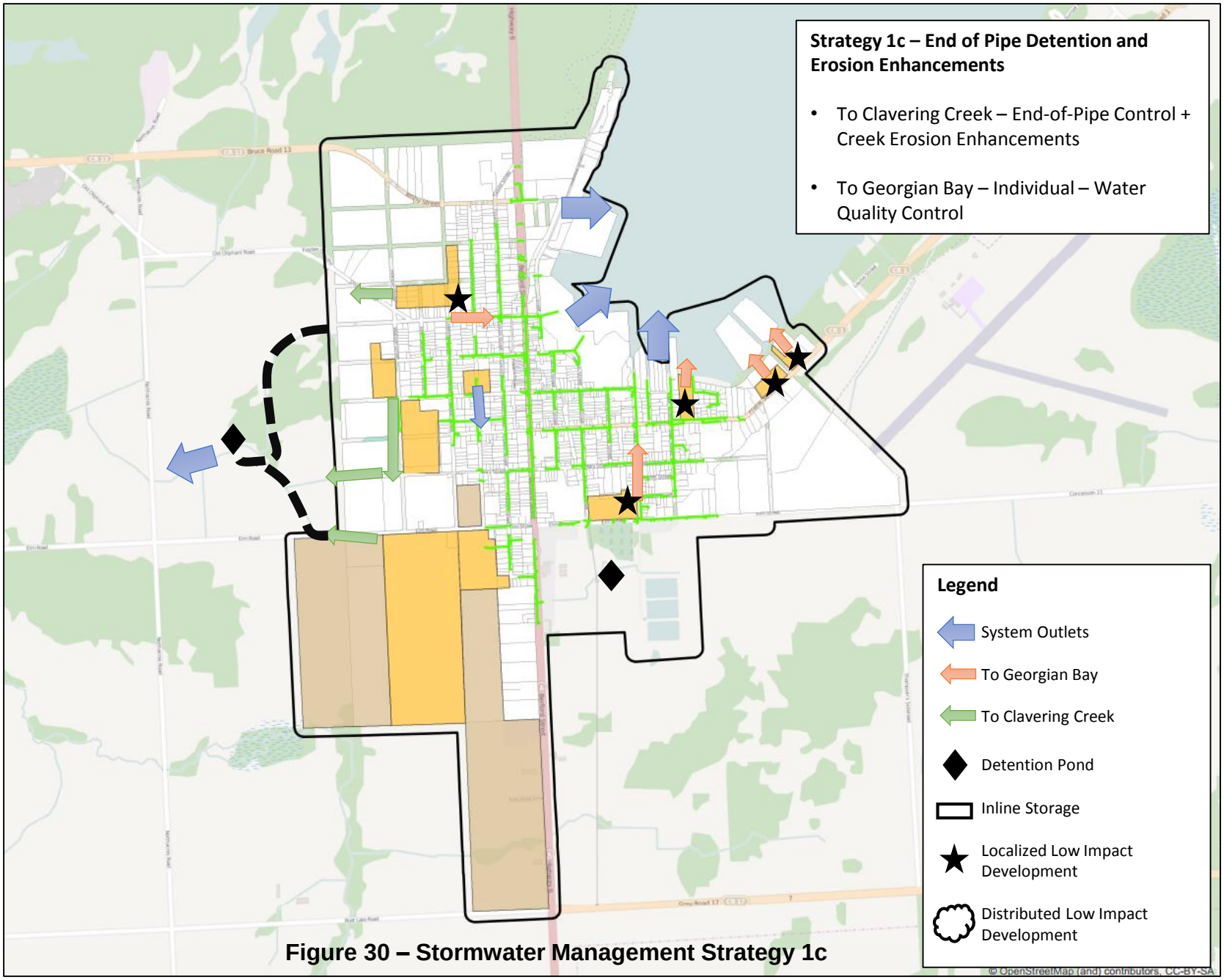


Figure 30 – Stormwater Management Strategy 1c

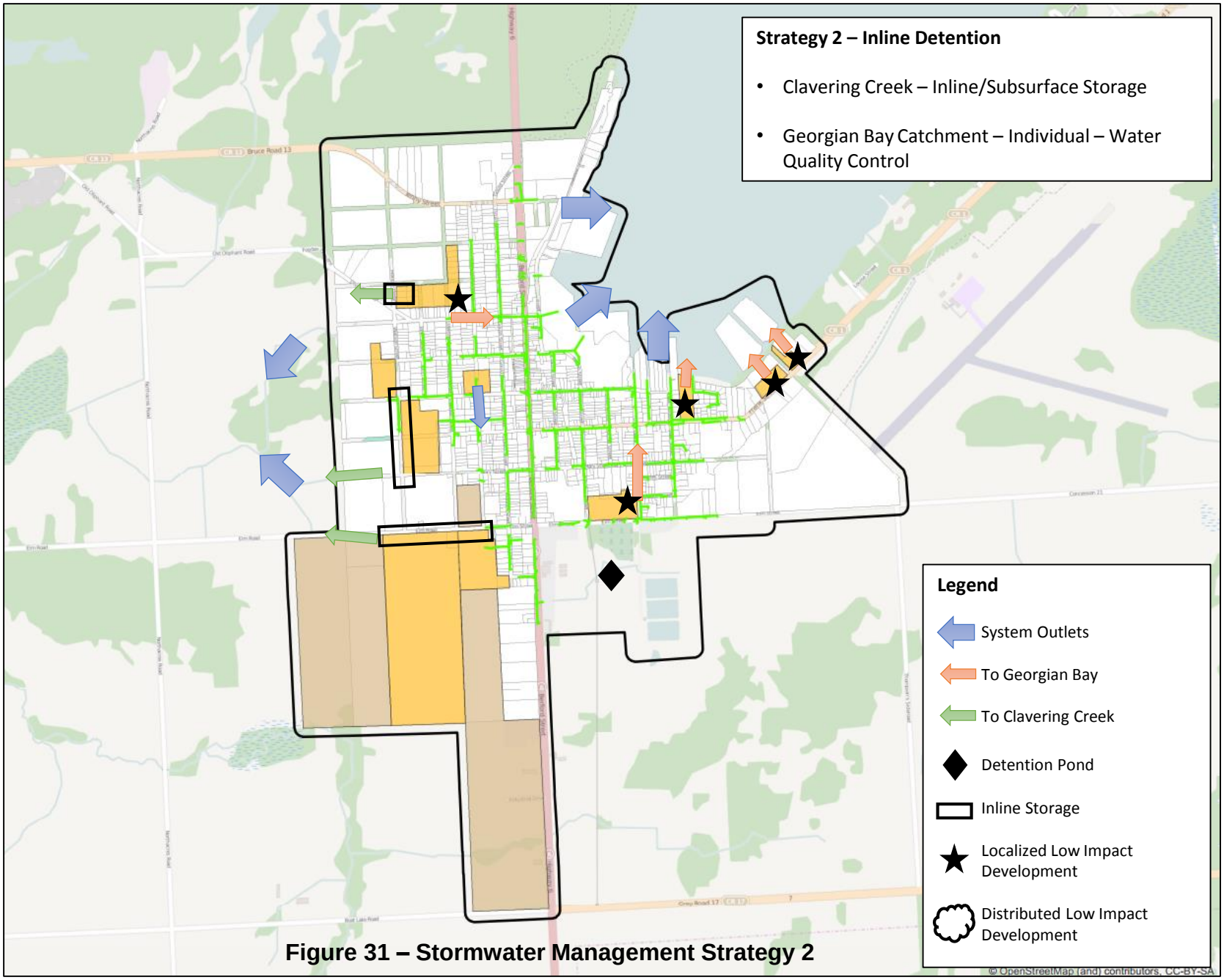


Figure 31 – Stormwater Management Strategy 2

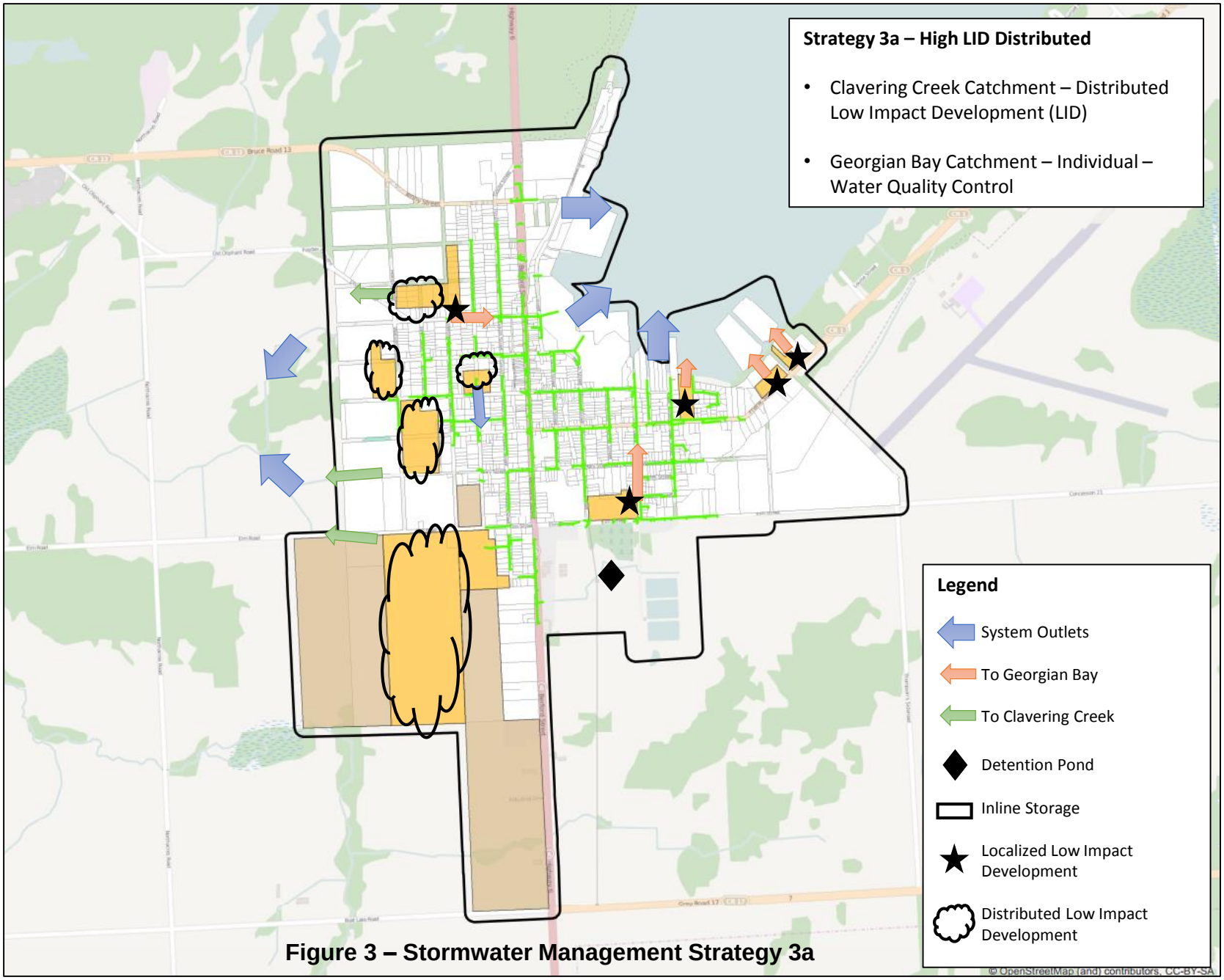


Figure 3 – Stormwater Management Strategy 3a

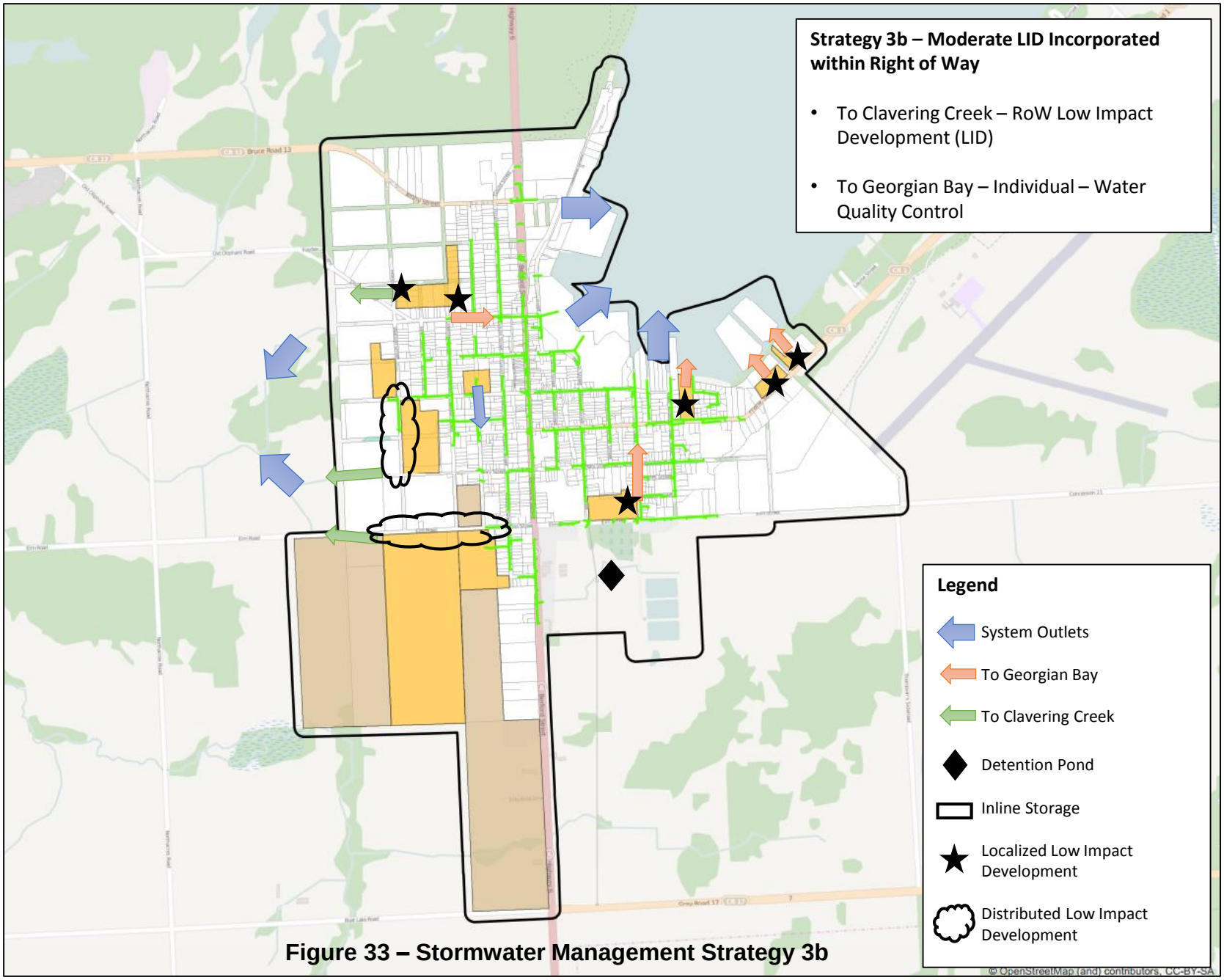


Figure 33 – Stormwater Management Strategy 3b

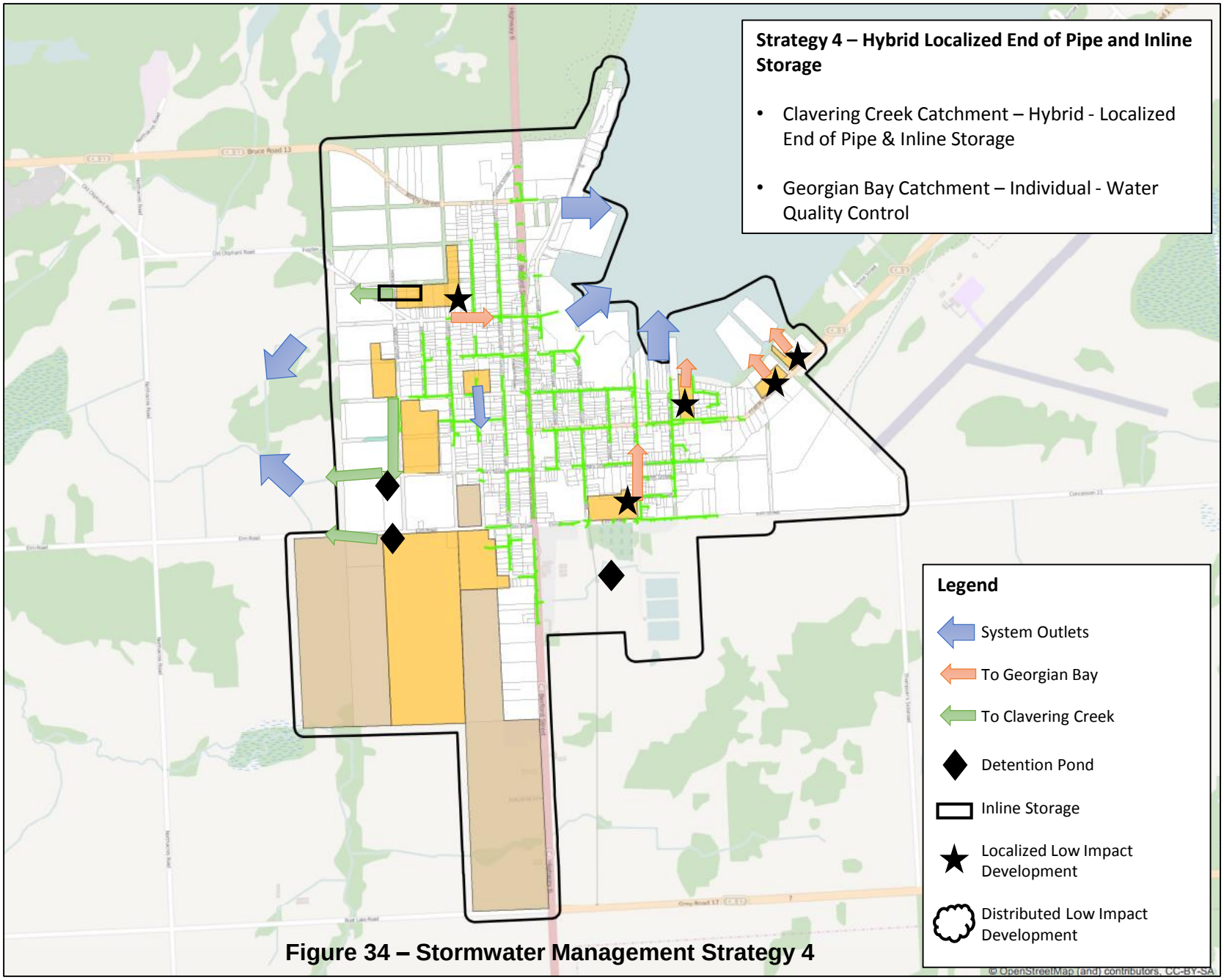


Figure 34 – Stormwater Management Strategy 4

5.6 Preferred Stormwater Management Strategy

The preferred servicing strategy was developed and evaluated to both existing Level of Service objectives and to satisfy growth. Different strategies for the Georgian Bay and Clavering Creek catchments were developed and evaluated individually based on the detailed five-point evaluation criteria, which included considerations for environmental, technical, socio-cultural, financial and legal-jurisdictional impacts.

The highest rated scores from the five-point short list evaluation matrix for each catchment were then brought forward and combined to collectively make up the overall Preferred Stormwater Management Strategy for Wiarton.

The primary servicing needs for each catchment differ but general consist of:

- Managing infill growth through on site controls
- Managing greenfield growth through end of pipe control
- Implementing policies and encouraging the use of LID measures to improve runoff water quality and reduce total peak flows to the existing stormwater system.

It is recognized that the preferred servicing strategies have the opportunity for further enhancement and optimization as further details regarding the development areas present themselves. As further discussed under the Implementation Section, it is recommended that the preferred strategies be further reviewed under independent sub-watershed studies.

The key strategies and benefits for each catchment are summarized below.

5.6.1 Georgian Bay Catchment

Increased runoff from intensification growth areas will be managed using onsite LID measures to ensure post-development peak flow matches pre-development peak flow. General water quality improvements will be achieved through a voluntary onsite management incentive program. For existing properties, onsite management measures include roof leader disconnection, the use of rain barrels and the use of rain gardens. Further, the Town should consider the installation of oil/grit separators and/or other water quality management facilities at all existing outlets when other capital project occur in these areas.

Under the preferred management strategy, no new facilities or conveyance upgrades are being proposed, as the downstream system in the Georgian Bay catchment has sufficient capacity to accommodate growth.

5.6.2 Clavering Creek Catchment

Increased runoff from growth areas in the Clavering Creek catchment will be managed via a combination of end of pipe detention facilities. Water quality control for new development areas will be achieved via a combination of onsite management incentive program and end of pipe detention facilities. As part of the preferred management strategy, no new stormwater outlets are proposed and existing flow profiles to Clavering Creek with be maintained mitigating any potential impact.

5.6.3 Capital Program for the Preferred Stormwater Management Strategy

Given the complexity and unique challenges of the Town's stormwater system, it was determined that further refinement of the Preferred Stormwater Strategy would be required through more area specific and detailed Sub-Watershed Studies. Further, all new stormwater works are likely to be completed internal to new developments. As such, a capital program has not been prepared.

5.6.4 Class EA and Follow-On Requirements

As mentioned in Section 2.1, this Water, Wastewater and Stormwater Master Servicing Plan sets out to satisfy the EA Approach II requirements according to the MEA Class EA document. The Preferred

Stormwater Management Strategy includes the establishment of new Stormwater Management detention/retention facilities. These stormwater management facilities would be Schedule B EA activities if undertaken by the Town. However, as all these required stormwater management facilities are for the direct support of new development, it is anticipated that they will be constructed under the Plan of Subdivision Application and as such would be subject to the Planning Act. Therefore, this MSP does not identify any Town-led Schedule A, A+, B or C projects at this time.

Given the growth-related nature of the servicing strategies, the capital programs will support the water, wastewater and stormwater components of the Town's Development Charges (DC) By-Law. The anticipated timing of each project within the Preferred Strategy will be established based on the projected population growth in Wiarton.

The stormwater management strategies presented in this Master Servicing Plan are intended to provide an overall framework providing overall guidance of the Town's Stormwater Management Objectives and Criteria and area specific strategies to address the management of Wiarton's stormwater infrastructure. These area specific management strategies are to be further refined, and technical details will need to be confirmed as part of follow-on Sub-Watershed Studies.

The sub-watershed studies shall generally address the following:

- the facilities required, including their size, location, and capacity, for controlling storm water runoff quantity and quality, including:
    - storm sewers and/or channels;
    - culverts;
    - detention or retention ponds;
    - upstream storm water diversions;
    - the use of rooftop, parking lot, or parks and open spaces as temporary detention areas; and,
    - Low Impact Development facilities
- the onsite stormwater management measures, controls, and/or restrictions required on private property;
- the major flow system and all significant overland flow paths and outlets;
- the measures necessary to control erosion, sedimentation and stream bank stability during and after construction;
- the storm sewer and outfalls to the receiving watercourses; and
- the environmental and economic impacts of the storm water management facilities.
- Identify suitable LID measures for the local soil, infiltration, and/or thermal considerations
- Explore opportunities to match infiltration to pre-development levels.

During the next steps of the implementation program, primarily during detailed design, the following requirements will need to be considered:

- Confirmation of property requirements
- Refinement of infrastructure alignments
- Identification of preferred construction methodologies
- Completion of additional supporting investigations as required (geotechnical, hydrogeological, etc)
- Review and mitigation of potential construction related impacts
- Satisfying provincial, municipal and conservation authority approval requirements

5.6.5 Approvals

All projects are planned to be within the existing and future road rights of way and are subject to the road planning and approvals being met, including required investigations.

Although no stormwater projects have been identified in the capital program because they will largely be driven by private developers as development occurs, it is recommended that stormwater projects

undertake a pre-design consultation with the Niagara Escarpment Commission, Grey Sauble Conservation Authority, the Ministry of Tourism, Culture and Sport, and any other applicable review agencies. This early consultation prior to the detailed design will ensure sufficient technical and environmental information is available to support the preferred design and that the project scope is well understood. Ultimately this process will facilitate project approvals moving forward.

Town of SOUTH BRUCE PENINSULA

Wiarton Water, Wastewater and Stormwater Master Servicing Plan and Gould Street Sanitary Sewer Upgrade Class Environmental Assessment

Figure 35 - Existing Stormwater System

City-wide voluntary onsite SM incentive program: roof leader disconnection, rain barrels, rain gardens, etc.

On-site water quality treatment facilities for all new development within the Georgian Bay subwatershed.

Potential conveyance system upgrades upstream of centralized detention facilities.

Subwatershed study for Clavering Creek subwatershed recommended to develop optimal detention conveyance strategy.

Utilize detention facilities to manage development runoff within the Clavering Creek sub-watershed. Post-development peak flows to match pre-development rates. Opportunity to optimize and combine detention locations to service multiple sites.

N

Colpoy's Bay (Georgian Bay)

JENNY ST
DANIEL ST
BAYVIEW ST
MCNAUGHTON ST
Division St
DIVISION ST
BOYD ST
WATSON ST
JOHN ST
DAWSON ST
WILLIAM ST
William St
McNaughton St
GEORGE ST
BERFORD ST
CLAUDE ST
SCOTT ST
TYSON ST
CENTENNIAL CR
Centennial Cr
Frank St 2b
Frank St 2
FRANK ST
Frank St 1
GOULD ST
BROWN ST
HUNTER ST
MARY ST
TAYLOR ST
ISAAC ST
CHARLES ST
EDWARD ST
Elm St 2
ELM ST
Elm St 1
AMES ST
Retirement Subdvn

Legend

- Proposed Localized Low Impact Development
- Proposed SWM Detention Pond
- Existing Storm Sewer
- Existing Storm Outfall
- Existing Stormwater Detention Pond
- Phase I Growth Area
- Phase II Growth Area
- Property Parcel
- Master Servicing Plan Study Area
- Escarpment Natural Area
- Environmental Protection
- Special Policy Area

BluePlan ENGINEERING

214128-13-WW
October 2015
Data Source: Town of South Bruce Peninsula
Scale: 1:10,000 | NAD 1983 UTM Zone 17N

6 Summary

Through this Master Servicing Plan (MSP) Study, long term servicing plans and capital programs are identified for the Town's water, wastewater and stormwater systems to support growth to 2029. The anticipated timing of each project within the Preferred Strategy is established based on the projected population in Wiarton. The Gould Street Sanitary Sewer Upgrade Class Environmental Assessment, which was undertaken in conjunction with the MSP, informed the decision-making process for the selection of the preferred wastewater servicing strategy.

This report has been prepared to document the planning and decision making process undertaken for the 2015 MSP. The study defined existing problems and opportunities, considered and evaluated solutions, and identified preferred water, wastewater, and stormwater servicing strategies. The MSP followed Approach #2 which will fulfill the requirements for Schedule A, A+, and B projects. Two public information centres were held in October 2014 and July 2015 as part of the process.

No Schedule B projects were identified for the water and stormwater preferred strategies. The preferred wastewater servicing strategy has identified one Schedule B project whose requirements are being satisfied under this study:

- A 134 L/s Sewage Pumping Station to service future South Lands development and existing west area at Elm Street and Dawson Street.

As an immediate solution to address the poor condition of the existing sanitary sewer between Gould Street and Berford Street north of Frank Street, the preferred strategy includes a sanitary sewer to re-direct flows from Gould Street north of Frank Street to Frank Street and Berford Street. This will address the restriction at the Gould Street location but maintains the transfer of flow to SPS#1.

It should be noted that the following facilities are approaching capacity at full buildout and will require monitoring as development occurs:

- Water Tower
- Sewage Pumping Station #2

A key outcome of this study is the support for the tactical abatement of extraneous flows through a long term inflow and infiltration reduction program. With this, it is recommended that flow monitoring be undertaken to assist in determining the areas of Wiarton where targeted I&I separation would best benefit the system. Comments received during the process suggest that the Town's splash pad, the downtown core area, and the area around the hospital may be initial target areas.

During the next steps of the implementation program, primarily during detailed design of the projects, the following requirements will be considered:

- Finalization of property requirements
- Refinement of infrastructure alignment
- Identification of preferred construction methodologies
- Completion of additional supporting investigations as required
- Review and mitigation of potential construction related impacts
- Satisfying of all provincial, municipal and conservation authority approval requirements

With respect to the Town's planning and budgeting, this program will be utilized as high level baseline estimates for the Town capital budgets. These costs will be further developed and refined during the implementation phases as more detailed information becomes available.

Given the growth-related nature of the servicing strategies, the capital programs will support the water, wastewater and stormwater components of the Town's Development Charges (DC) By-Law.

7 References

Town of South Bruce Peninsula. 2013. Wiarton Public Works Infrastructure Assessment Study. (Prepared by Ainley & Associates Limited).

Town of South Bruce Peninsula. 2006. Upgrades to Existing Sanitary Sewage Pumping Station No. 1 Former Town of Wiarton. (Prepared by Henderson, Paddon & Associates Limited).

Town of South Bruce Peninsula. 2005. Wastewater System Performance Review – Former Town of Wiarton Sewage Lagoon System. (Prepared by Henderson, Paddon & Associates Limited).

Town of South Bruce Peninsula. 2005. Potential Expansion of Water and Sewer Servicing for the Former Town of Wiarton. (Prepared by Henderson, Paddon & Associates Limited).

Town of South Bruce Peninsula. 2002. Evaluation of Septage Acceptance at Former Town of Wiarton Sewage Lagoons. (Prepared by Henderson, Paddon & Associates Limited).

Town of South Bruce Peninsula. 1995. Town of Wiarton Sewer Collection System Optimization Study. (Prepared by Henderson, Paddon & Associates Limited).

Town of South Bruce Peninsula. 1992. Town of Wiarton Sewer Needs Study – Dwg No. 90106-02. (Prepared by Henderson, Paddon & Associates Limited).

Town of South Bruce Peninsula. 1989. Town of Wiarton Environmental Study Report for Water Works System Improvements and Expansion Phases I & II. (Prepared by Henderson, Paddon & Associates Limited).