



MUNICIPALITY OF
PORT HOPE
WORKS & ENGINEERING

STORM WATER

**Asset Management
Plan • May 2022**

Version 1.1

Contents

Introduction.....	1
Background	1
Asset Categories and Types	2
State of Local Infrastructure	4
Inventory and Valuation	4
Age and Condition.....	7
Condition Collection.....	8
Stormwater Condition Indices	9
Levels of Service.....	11
Community Qualitative Descriptions	12
Technical Metrics	13
Asset Management Strategy	14
Practices, Procedures and Tools	14
Future Demand and Service Enhancement	15
Lifecycle Management and Risk.....	15
Stormwater Mains	16
Stormwater Management Facilities.....	17
Annual Reinvestment required based on Lifecycle Management Strategy costs	18
Improvement and Monitoring Plan.....	19
More Information	20
Appendix 1 – Stormwater System Map.....	21

Introduction

Background

Ontario Regulation 588/17: Asset Management Planning for Municipal Infrastructure requires all municipalities to prepare baseline asset management plans for their core municipal infrastructure assets supporting the delivery of drinking water, wastewater, stormwater, and transportation. The Municipality of Port Hope has a developing Asset Management program that is advancing and refining a clear picture of its infrastructure assets and maintaining them responsibly, balancing affordability, risk, and service levels. The Provincial regulation requires the Municipality shift its reporting slightly to present the cost of maintaining all core assets in their present state, with no changes to the service level, for the next 10 years.

To meet the Provincial requirements, the Municipality of Port Hope has created this first version of its **Stormwater Asset Management Plan (Stormwater AMP)**. It reports the current state of the assets, levels of service provided, strategies, and activities applied by the Municipality, historical and forecasted financial details, and potential improvement actions. It is a strategic document that provides a snapshot of current conditions and establishes a basis for future asset management planning and decision making.



Asset Categories and Types

The Stormwater AMP satisfies the Provincial requirements for stormwater management assets that relate to the collection, transmission, treatment, retention, infiltration, control or disposal of stormwater. These assets enable and support the collection and conveyance of water to watercourses in all parts of the Municipality whether in the urban or rural area. Snow melt and runoff are contained or controlled to protect properties, roads and local waterways from flooding and erosion and also to mitigate water quality impacts to the natural environment.

Stormwater Asset Categories and Types

Stormwater Main



Storm mains are designed to convey flows during the most frequent rainfall events and are designed for a certain magnitude of storm events and thus make up what is called the “minor” drainage system

Overland Drainage System



Flows that exceed the capacity of the storm sewers are conveyed along the ground surface (i.e. “overland”). The overland system makes up what is called the “major” **drainage system** since it conveys flows in excess of the minor system during larger magnitude, infrequent storm events. This system is made of swales and ditches with minor culverts.

Maintenance Holes



The purpose of a **storm Maintenance Hole** is to allow for a human access point at certain intervals of a storm drainage system for inspection and maintenance purposes.

Catch Basins



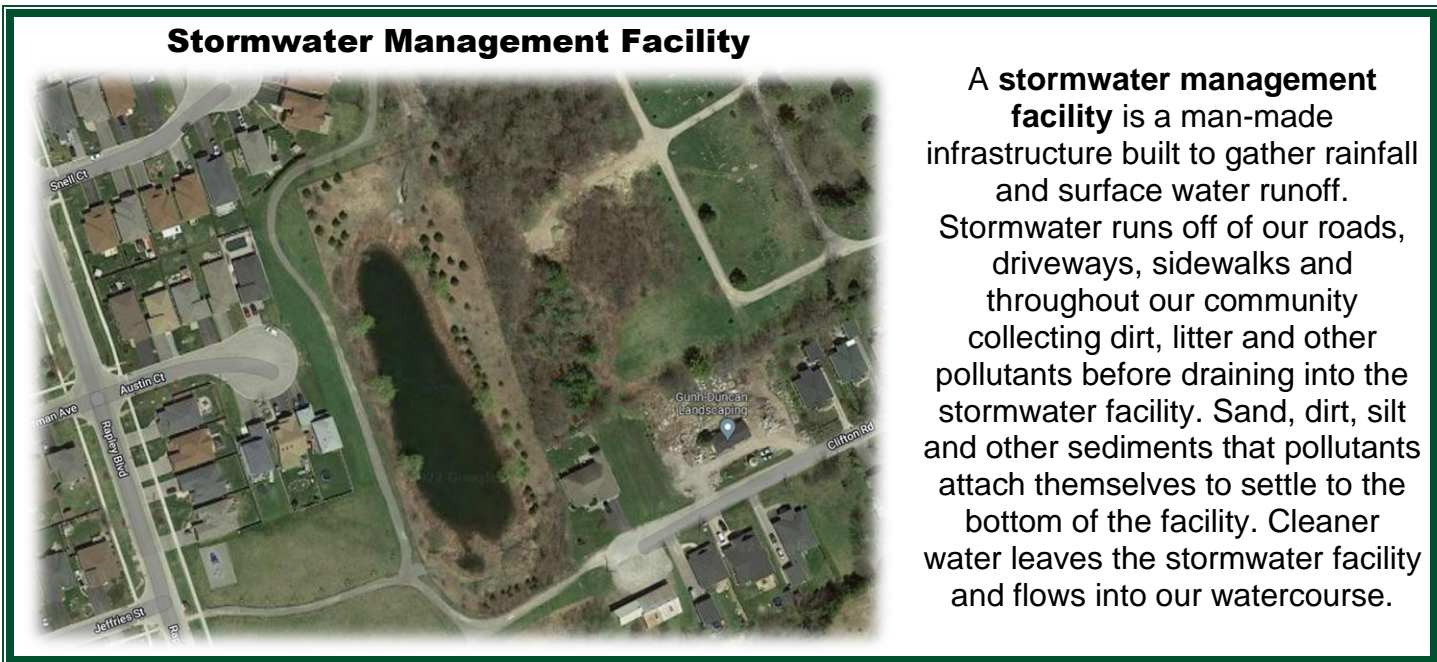
A **catch basin** is, in other words, a storm drain. They are used to redirect water to prevent flooding and are common on public streets. Catch basins collect rainwater or melted snow and transport it to an outfall reservoir.

Oil / Grit Separators



An **oil / grit separator** is designed to protect waterways from hazardous material spills and stormwater pollution, including suspended sediment, free oils, and other pollutants that attach to particles.

Stormwater Management Facility



A **stormwater management facility** is a man-made infrastructure built to gather rainfall and surface water runoff. Stormwater runs off of our roads, driveways, sidewalks and throughout our community collecting dirt, litter and other pollutants before draining into the stormwater facility. Sand, dirt, silt and other sediments that pollutants attach themselves to settle to the bottom of the facility. Cleaner water leaves the stormwater facility and flows into our watercourse.

State of Local Infrastructure

Inventory and Valuation

The assets covered in the Stormwater AMP have a replacement value of approximately **\$95.93 million**. This includes an inventory of over 66 kilometers of stormwater mains, 639 maintenance holes, 1,820 catch basins, 5 oil/grit separators and 6 stormwater management facilities. The length and condition data contain assumptions based on area infrastructure and will be a focus for data improvement in the coming years. The length of road-side ditches is being collected and will be reported in the 2025 update.

	Stormwater Collection	Stormwater Management Facility
Inventory	<ul style="list-style-type: none"> • 66 kilometers of stormwater main • 639 maintenance holes • 1,820 catch basins • 5 Oil/Grit Separators • Road-side ditches (TDB) 	<ul style="list-style-type: none"> • 6 Stormwater Management Facility (5 permanent/1 temporary)
Replacement Costs	\$92,824,390	\$3,108,000

Replacement costs for stormwater collection are based on benchmark project pricing from tenders received for 2022 capital works and are inclusive of administrative costs, removal, materials and labour. These costs are very similar to the wastewater unit costs used in the 2019 Wastewater Rate Study. In correlation to the other asset classes the Stormwater AMP replacement costs can be related to the table below.

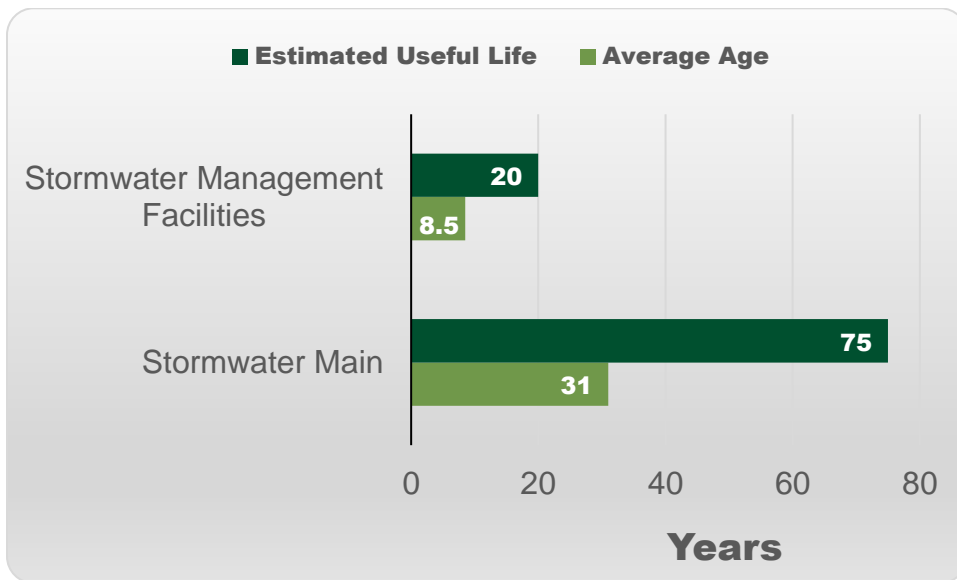


Asset Class	Quantity	Unit	Historical Cost	Replacement Value	Historical (3 year) average of actual annual replacement	Required Annual Lifecycle Cost	Average annual Lifecycle Cost as % of Replacement Cost
Bridges & Culverts	20	Each	\$7.23 million	\$55.68 million	0	\$1.13 million	2%
Water Facilities	5	each	\$24.40 million	\$48.27 million	\$0.41 million	\$1.61 million	3%
Wastewater Facilities	6	each	\$40.22 million	\$65.14 million	\$0.13 million	\$1.87 million	3%
Other Facilities	35	each	\$29.62 million	\$58.98 million	TBD in next AMP update	TBD in next AMP update	TBD in next AMP update
Water Linear	96	km	\$30.56 million	\$139.16 million	\$1.79 million	\$1.86 million	2%
Wastewater Linear	83	km	\$17.86 million	\$123.60 million	\$1.36 million	\$2.36 million	2%
Transportation Services	690	km	\$49.27 million	\$321.73 million	\$1.14 million	\$8.04 million	2%
Storm Sewer Linear	66	km	\$17.53 million	\$92.32 million	\$0.34 million	\$1.89 million	2.7% for SWMF & 2.0% for linear
Equipment	140	each	\$2.59 million	\$3.19 million	TBD in next AMP update	TBD in next AMP update	TBD in next AMP update
Land Improvements	208	each	\$9.21 million	\$14.90 million	TBD in next AMP update	TBD in next AMP update	TBD in next AMP update
Technology	29	each	\$2.52 million	\$2.93 million	TBD in next AMP update	TBD in next AMP update	TBD in next AMP update
Vehicles	158	each	\$11.68 million	\$14.26 million	TBD in next AMP update	TBD in next AMP update	TBD in next AMP update
Totals			\$242.68 million	\$940.17 million	\$5.18 million	\$18.74 million	

Age and Condition

The age of an asset gives a sense of how close it is to the end of its service life and what renewal interventions may be appropriate. The average age and condition ratings for stormwater management facilities are being calculated from the last major maintenance activity. Where construction dates were unavailable in our inventories and GIS mapping, construction dates have been assumed to correspond with other proximate buried linear infrastructure.

Average Age of Stormwater Management Facilities & Storm Main



Condition Collection

The Municipality has recently begun assessing the condition of its stormwater collection assets on a regular basis using a variety of techniques, as summarized in the table below.

Asset Category	Condition Data Collection Techniques	Frequency
Stormwater Main	Closed Circuit TV inspection (1 st in 2022)	The system is broken into four quadrants. One quadrant is inspected annually. Additional inspections occur dependent on level of risk.
Maintenance Holes	Visual inspection and condition assessment of structural components	The system is broken into four quadrants. One quadrant is inspected annually. Additional inspections occur dependent on level of risk.
Catch basins	Visual inspection and condition assessment of structural components	The system is broken into four quadrants. One quadrant is inspected annually. Additional inspections occur dependent on level of risk.
Oil/Grit Separators	Visual inspection and sediment depth measurement	Once per year
Road-side ditches	Inspection is carried out when reactive ditch cleaning work is requested	Varies (typically reactive)
Stormwater Management Facilities	Environmental Compliance Approval compliant major and minor inspections, ongoing infiltration monitoring	Once per year

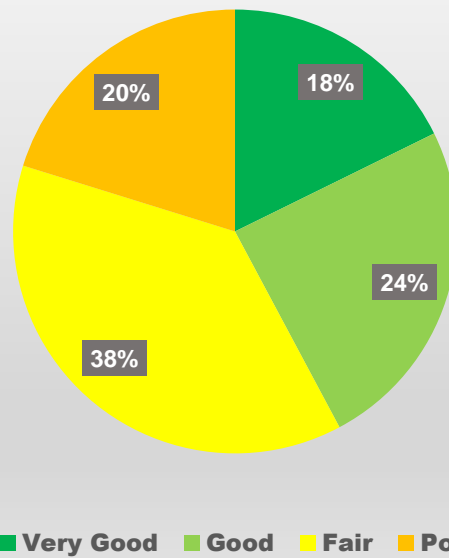
Based on condition data, supplemented by subject matter expert knowledge and professional judgment, the condition of assets is rated on a scale from “Very Good” to “Very Poor” as shown in the table below.

Stormwater Condition Indices

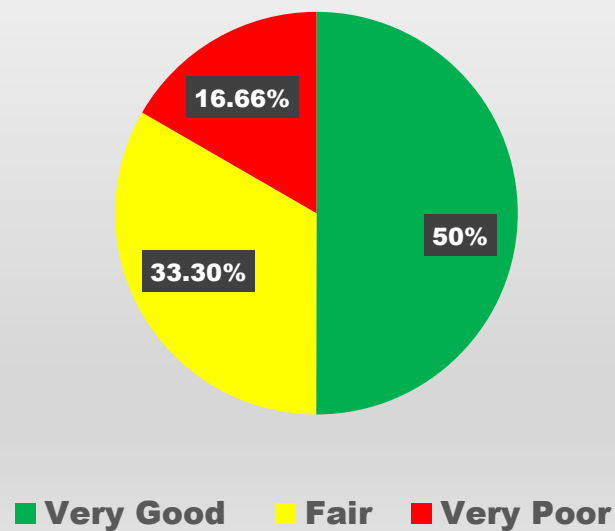
Rating	Rating Description	Remaining Useful Life	Condition Index for Linear (probability of failure)
Very Good	Very Good – Fit for Future Well maintained, good condition, new or recently rehabilitated	80-100%	5
Good	Good – Adequate for Now Acceptable, generally in mid stage of expected service life	60-79%	4
Fair	Fair – Requires Attention Signs of deterioration, requires attention, some elements exhibit deficiencies	40-59%	3
Poor	Poor – Increasing potential of affecting service Approaching end of service life, condition below standard, large portion of system exhibits significant deterioration	20-39%	2
Very Poor	Very Poor – Unfit for Sustained Service Near or beyond expected service life, widespread signs of advanced deterioration, some assets may be unusable.	0 to 19%	1

The overall condition of stormwater assets is Good and a breakdown for the various asset types is shown in the figures below.

Stormwater Main Condition by Percentage of Overall Length based on Age



Stormwater Management Facility Condition by Percentage of Total Replacement Cost



Levels of Service

The State of the Infrastructure section of the asset management plan provides an overview of the capital assets that support provision of the Municipality's services. The information presented in that section includes asset quantities, replacement cost valuation, age, and condition.

Physical condition of the assets is not sufficient to comprehensively capture the levels of service provided by the Municipality. To cover aspects of services not directly linked to asset condition, a broader levels of service framework has been developed. The levels of service framework presented in this section of the asset management plan contains the following elements:

- Service attributes which identify relevant aspects or characteristics of a service.
- Level of service statements which describe service attributes from a non-technical point of view.
- Performance measures which enable quantitative measurement to support the level-of-service statements.

For each performance measure, the current performance is reported. The Municipality will track and report on the current performance on an annual basis. In the future, targets for each performance measure will be chosen that balance regulatory requirements, the needs/expectations of service users, and various external trends and pressures, with the cost of delivering the service.

Two sets of tables are provided in each of the following subsections. The first table identifies relevant service attributes and defines the community levels of service for each of those attributes. The service attributes are intended to capture all major aspects that are of interest to the users of a service. The community levels of service include qualitative information such as images of assets providing different levels of service and maps, as well as statements describing what the Municipality intends to deliver, generally described from the user's perspective. The second table describes the performance measure(s) connected to each of the service attributes and identifies the current performance for each performance measure.

The Stormwater AMP establishes preliminary level of service measures and the current level of service being provided. The measures align with both Municipal goals and Provincial requirements and recognize that stormwater assets should:

- Protect the public from surface flooding, basement flooding, overland flooding, and river flooding during storm events; and
- Protect receiving body water quality.

A future version of the Stormwater AMP will go a step further and include Municipal Council's target service levels for each measure and may include level of service measures to address other service attributes such as safety, sustainability and reliability.

The Municipality's stormwater management system is utilized in the collection of stormwater from rainfall and snowmelt. The main purposes of the stormwater system is to ensure the safe conveyance of stormwater to avoid the flooding of properties, the safe conveyance of stormwater away from roadways, the mitigation of pollution caused by stormwater runoff, the volume control of stormwater discharge into the environment to lessen the impacts of erosion and sediment deposit, and to mitigate the effects of climate change.

Community Qualitative Descriptions

Service Attribute	Community Levels of Service	Qualitative Description
Scope	Description, which may include maps, of the user groups or areas of the municipality that are protected from flooding, including the extent of the protection provided by the municipal stormwater management system. *	The stormwater management system provides for the collection of stormwater within the Municipality in order to protect properties from flooding. The scope of the Municipality's stormwater system in the urban area is illustrated by the map in Appendix 1. The map (1) shows the geographical distribution of municipal stormwater mains, maintenance holes, catch basins, oil/grit separators, and stormwater management facilities. Road-side ditches will be included in the 2025 update.
Reliability	The Municipality seeks to ensure the reliable operation of its stormwater management system through regular monitoring and maintenance of its stormwater infrastructure.	

* Required by Ontario Regulation 588/17.

(1) See Appendix 1 for the map of the Stormwater Network.

Technical Metrics

Service Attribute	Performance Measure	2020-2021 Performance
Scope	Percentage of properties in the municipality resilient to a 100-year storm. *	0%
Scope	Percentage of the municipal stormwater management system resilient to a 5-year storm. *	32%
Reliability	The number of stormwater facility overflow events.	0
Reliability	Percentage of stormwater facility visually inspected during reporting period.	100%
Reliability	Percentage of stormwater facility inspected comprehensively within the past 5 years.	0% (The last comprehensive inspection was performed in 2016 and reported in 2017)
Reliability	Percentage of stormwater catch basins visually inspected and cleaned within the past 4 years.	100%
Reliability	Percentage of oil/grit separators visually inspected and cleaned annually.	100%
Reliability	Percentage of stormwater mains inspected with CCTV within the past 5 years.	1%

* Required by Ontario Regulation 588/17.

Asset Management Strategy

Practices, Procedures and Tools

The Municipality has well-established overall principles, framework and decision-making approaches for asset management, and these are presented in the 2016 Asset Management Plan. They provide a holistic approach to asset management as demonstrated by the capital investment prioritization process that drives the decision-making towards meeting the desired levels of service at the lowest lifecycle cost.



Future Demand and Service Enhancement

Port Hope's population is expected to increase to 20,850 people by 2029, an increase of 17.31% over the next 7 years. The Municipality's Official Plan provides the vision for the future growth of the Municipality including areas identified for intensification. Further projections for the urban area are referenced in Northumberland County's Municipal Comprehensive Review – Long-Term Growth Forecast and Urban Land Needs Analysis which projects growth for the urban area up to 2051. The Official Plan is supported by the Development Charges Study. These strategic documents assist the Municipality to ensure that stormwater services will be available to support future growth.

In addition to the growth and enhancement objectives of the Municipality's master plans, asset management planning also needs to consider the Climate Action Plan goals for both resiliencies to changing climate and reduction of greenhouse gas emissions. Existing assets must be maintained, and new assets brought into service, to meet these various growth and service enhancement objectives.

Lifecycle Management and Risk

Lifecycle management activities refer to the set of planned activities and actions undertaken to maintain the current levels of service and achieve good economic life of the assets. The activities undertaken range from operations and maintenance activities, including planned and reactive maintenance, renewal activities (such as condition assessments and rehabilitations), disposal activities and non-infrastructure solutions (such as policies and processes that reduce costs, mitigate risks or maintain/enhance service delivery).

In developing the Stormwater AMP, a preliminary estimate of future costs was generated based on the preliminary forecast to support events occurring throughout the lifespan of the asset, at this time, this provides the best available information for generating this estimate. It was developed through a collaborative effort of Watson & Associates Economists Ltd. combined with staff input that aligns with the Municipality's current decision-making and asset capital expenditure processes. The lifecycle activities that will be required over the 10-year period are based on the asset management strategies that are currently captured in the Annual Capital and Operating Budget processes. For stormwater assets, this includes operational and maintenance strategies, asset management decision making, lifecycle cost and value optimisation, options analysis, ageing assets strategy, non-infrastructure solutions, capital investment planning, condition assessment programs, as well as consideration of mobility impacts and impacts to other services.

The Municipality applies a risk-based approach to prioritizing asset renewals. The risk assessment frameworks and methods vary across the different types of assets but are generally based on the

importance of each asset in terms of service delivery/ continuity and the number of users who could be impacted.

Stormwater Mains

Category	Frequency
Inspection and Condition Assessment	In 2022, the Municipality began using its CCTV equipment to inspect the stormwater collection system (including stormwater mains and maintenance holes) and assign a Quick Score Rating (Q.S.R.) to each asset based on the NASSCO Pipeline Assessment Certification Program. This methodology assigns each segment of sewer a Q.S.R. based on defects, with a Q.S.R. of 1 being the least severe and a Q.S.R. of 5 being the most severe representing sewers with major structural defects and failures. Once the whole system has been assigned a Q.S.R. the mains will be reported using this method.
Major Lifecycle Activities - Operating	Flushing program – In 2021, Municipal staff started performing regular flushing of stormwater mains using a rented vacuum truck (rented for approximately 4 months per year and shared with the Wastewater division The Municipality is aiming to flush the stormwater mains on a 4–5-year cycle, aligned with the CCTV inspection program noted above. All catch basins were flushed, cleaned and inspected in 2019/20. Moving forward, they will be addressed on a rotating 4–5-year rotating schedule, in alignment with the stormwater main flushing and inspection program. Maintenance hole adjustments – Municipal staff perform adjustments on an as-needed basis (i.e., if the maintenance hole cover has significantly raised or sunk).
Major Lifecycle Activities - Capital	Stormwater main replacements are completed as needed and, where possible, are aligned with other asset replacements through a coordinated reconstruction program. Replacements of stormwater mains typically include replacement of related assets such as maintenance holes and catch basins. For long-term capital planning purposes and budgeting, stormwater mains are assumed to have a useful life of 75 years, with a relining taking place part-way through the lifecycle, around age 40-50.
Identification of Short-term Priorities	Generally, stormwater assets are replaced as they fail. However, the coordinated reconstruction program developed as part of the 2020 Water & Wastewater Rate Study includes a plan for reconstructing roads and replacing stormwater infrastructure. The forecast contained in the Water & Wastewater Rate Study is the basis for developing annual capital budgets and is supplemented with priorities that are identified through ongoing operations.
Growth-related Lifecycle Needs	Future population and employment growth in the Municipality may result in incremental service demands that may impact the current level of service for stormwater. The growth-related capital investments related to stormwater mains have not been identified to date, however, stormwater main improvements may be addressed as needed through road reconstruction projects.

Stormwater Management Facilities

Category	Frequency
Inspection and Condition Assessment	The Municipality completed an assessment of the six stormwater management facilities in 2016 and is planning to update the formal condition assessment every 10 years.
Major Lifecycle Activities - Operating	<p>Visual inspections – Municipal staff perform visual inspections of the stormwater management facilities annually. The Municipality’s roads team inspects the underground storage reservoir approximately every three months.</p> <p>Vegetation control – Municipal staff complete maintenance activities related to vegetation control at each facility throughout the year.</p>
Major Lifecycle Activities - Capital	Lifecycle rehabilitation of stormwater facilities is performed as needed, guided by the recommendations identified through condition assessments. For long-term capital planning purposes and budgeting, stormwater facilities were assumed to require dredging every 20 years and the underground storage reservoir is assumed to have a useful life of 75 years.
Identification of Short-term Priorities	The Municipality developed a prioritized list of lifecycle activities for the six stormwater facilities as part of the condition assessment completed in 2016. The list of recommendations developed through the 2016 assessment is the basis for developing annual capital budgets, and is supplemented with priorities that are identified through ongoing operations.
Growth-related Lifecycle Needs	Future population and employment growth in the Municipality may result in incremental service demands that may impact the current level of service for stormwater. Stormwater management facilities are typically direct developer responsibility under the Municipality’s local service policy. Therefore, the Municipality does not have any known growth-related capital investments related to stormwater management facilities.

The Municipality continues to invest in maintaining infrastructure and has been increasing its capital investments to align with long-range forecasts available in the 2016 AMP, Development Charges Study and Water & Wastewater Rate Study. The Municipality’s existing funding model incurs an annual shortfall to maintain critical infrastructure in a state of good repair. There are annual contributions to the Asset Management Reserve to increase the current funding model. Changes will again impact the financing strategy when the new service levels are defined in the next version of the asset management plans, which are due in 2025.

Annual Reinvestment required based on Lifecycle Management Strategy costs

Asset Category	Quantity	Unit of Measure	Replacement Cost	Average Annual Lifecycle Cost (Capital)	Average Annual Lifecycle Cost as % of Replacement Cost	2016 Canadian Infrastructure Report Card Reinvestment Rate – Low Target	2016 Canadian Infrastructure Report Card Reinvestment Rate – High Target
Stormwater Mains	66	Km	\$92,324,390	\$1,808,615	2.0%	1.0%	1.3%
Stormwater Maintenance Holes	639	each	incl. with mains	incl. with mains			
Catch Basins	1,820	each	incl. with mains	incl. with mains			
Oil/Grit Separators	5	each	\$500,000	\$6,667	1.3%		
Road-side ditches	Future Update	Future Update	Future Update	Future Update	Future Update	Future Update	Future Update
Stormwater Management Facilities	6	Each	\$3,108,000	\$ 84,305	2.7%	1.7%	2.0%

Improvement and Monitoring Plan

Based on the snapshot of current conditions and existing plans presented in the Stormwater AMP, areas of potential improvement include:

- Asset information, data quality, identify data gaps and record keeping
- Cost estimating
- Level of service measures and targets
- Lifecycle renewal needs forecasting
- Climate change resiliency
- Equity and inclusion

The Stormwater AMP will be reviewed and updated on a regular basis and over time these improvements will be reflected in future versions of the plan.



More Information

For more information about asset management, or to learn more about the Municipality's Asset Management Program, please visit porthope.ca.

Structure Type

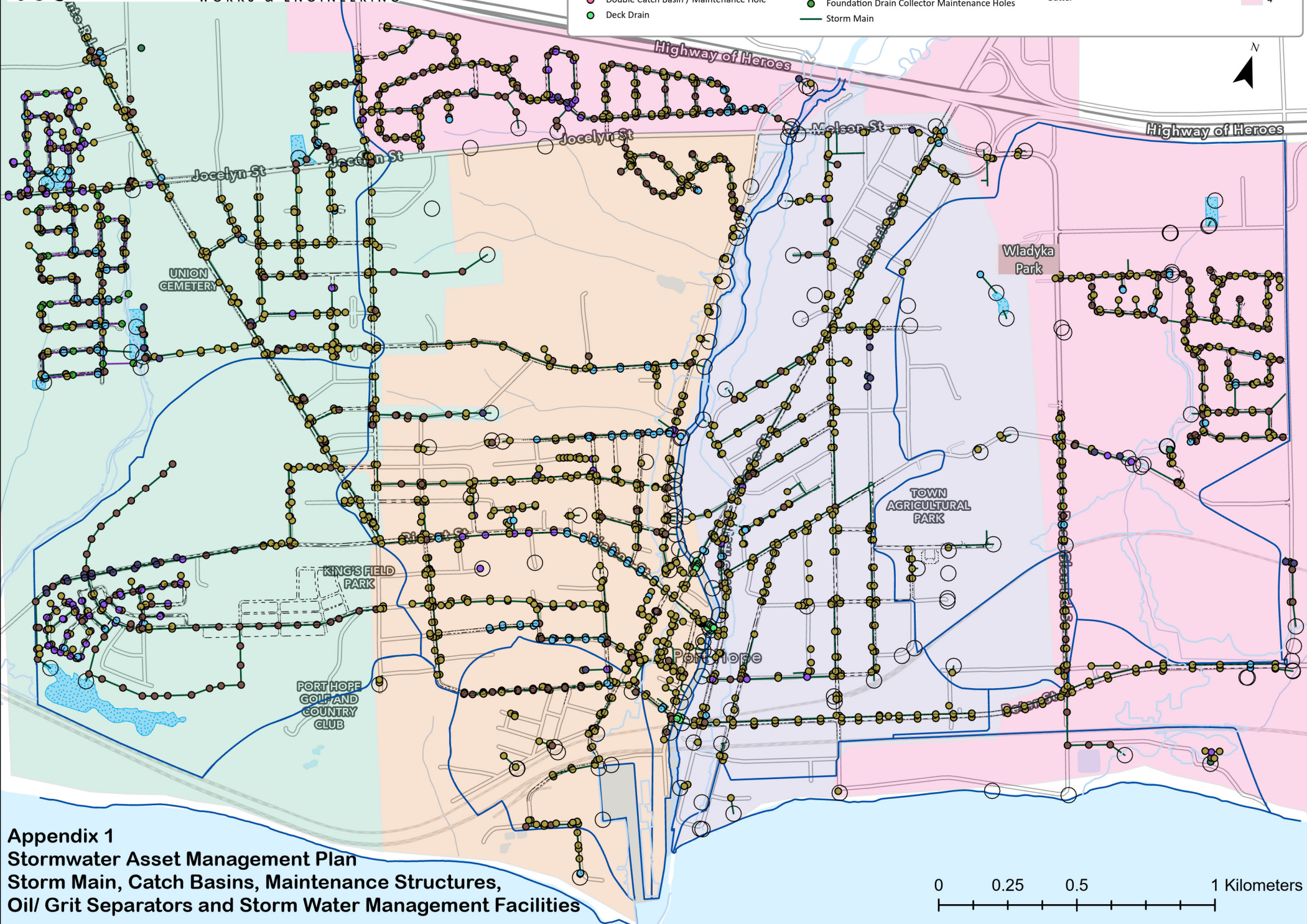
- Catch Basin
- Catch Basin / Maintenance Hole
- Double Catch Basin
- Double Catch Basin / Maintenance Hole
- Deck Drain

- Ditch Inlet
- Oil/Grit Separator
- Storm Maintenance Hole
- Storm_Outlet
- Foundation Drain Collector Maintenance Holes
- Storm Main

- Minor Catchment Area
- Foundation Drain Collector Main
- Storm Water Management Pond
- FloodPlain
- - - Gutter

Quadrant

- 1
- 2
- 3
- 4



Appendix 1
Stormwater Asset Management Plan
Storm Main, Catch Basins, Maintenance Structures,
Oil/ Grit Separators and Storm Water Management Facilities

