2021 Asset Management Plan Update

Andrea Clemencio - Project Manager
Andrea.Clemencio@gmblueplan.ca
1266 South Service Rd, Unit C31
Stoney Creek, ON L8E 5R9
Phone: 905.643.6688

City of Welland

GMBP Project Number: 620025

June 8, 2022

Version Log

Version #	Date	Revised By	Revision Description
Version 1	June 8 2022	-	Initial Release

In accordance with O.Reg. 588/17, on June 7 2022, this City of Welland Asset Management Plan Update was endorsed by the Executive Lead (CAO) and approved by a resolution passed by Welland Council.

EXECUTIVE SUMMARY

This report is the City of Welland Asset Management Plan which provides insights on City-owned assets. The AMP establishes a new line of sight from levels of service and costs to strategic drivers, whether those drivers be legislation, strategic initiatives, or current areas of Council focus.

This AMP addresses the following questions:

- What do we own and why?
- What is it worth and what condition is it in?
- What are the current service levels?
- What activities do we employ to manage the assets and maintain those levels?
- What does all of that cost?

Ultimately, this plan and future plans will work to address this very important question - what does the community want in service levels through these assets?

The AMP provides insight into starting conversations about preferred levels of service (LOS). As such this document will be more technical and rely on a significant amount of data collected, rationalized and reviewed in order to build the platform for future AMP work. This plan is a result of a provincial regulation (Ontario Regulation 588/17) aimed at addressing infrastructure and the related activities to own and operate municipal assets. In 2019, Council approved a Strategic Asset Management Policy which is the foundation of the work done to create this, and future plans.

State of Assets

The assets in this plan represent approximately $1.524 Billion, and these assets provide services to Welland citizens. The asset summary is provided in Table E-1.

Table E- 1: Asset Inventory Summary

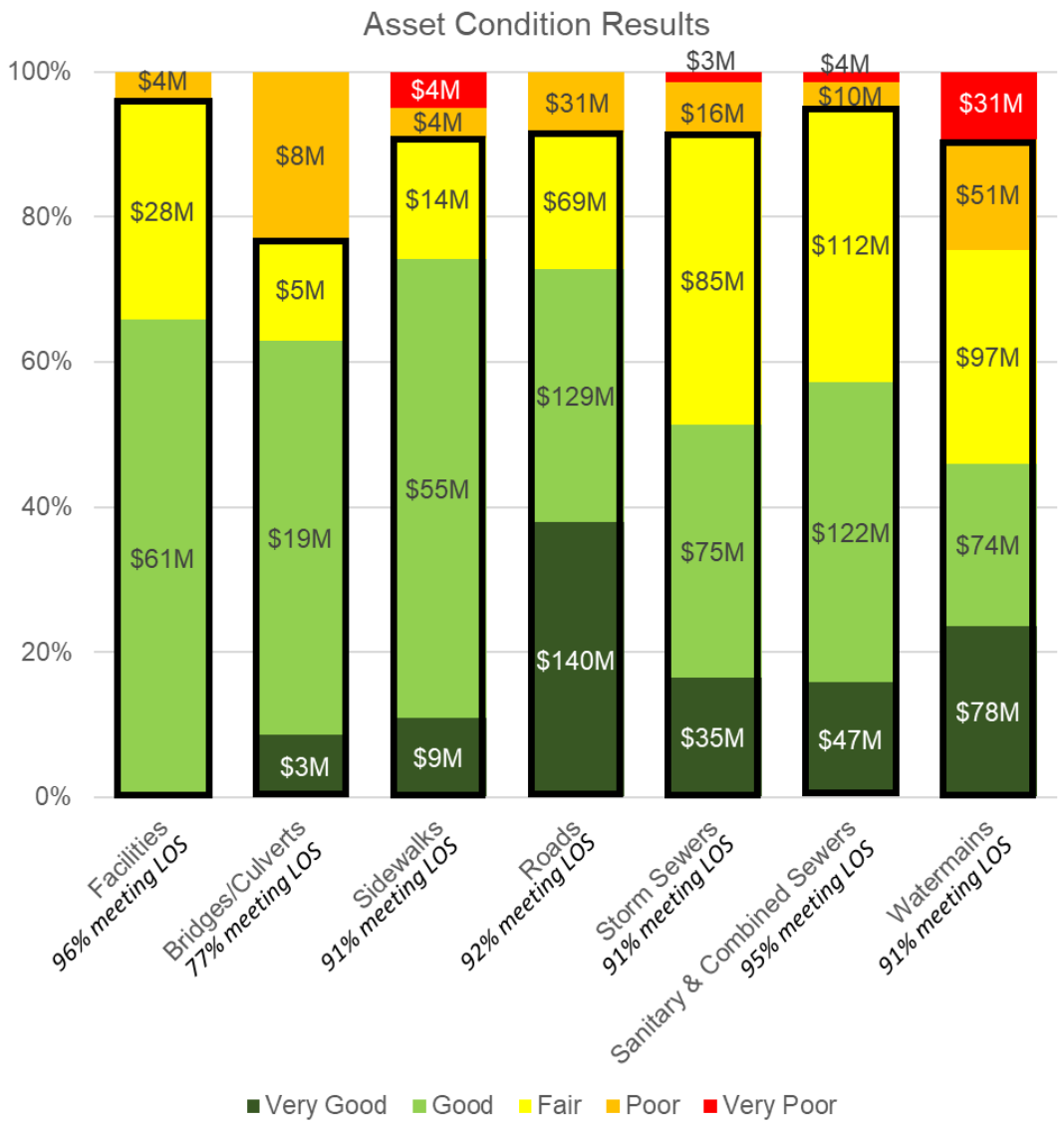
Asset Category	Inventory	Replacement Value ($millions)	Average Age
Watermains	271 km	$340	42
Wastewater and Combined Sewers	238.5 km	$298	47
Storm Sewers	173.5 km	$223	38
Roads	299 km	$372	46
Sidewalks	342 km	$87	36
Traffic	6818 Street Lights, 1561 Traffic Signs, 3 Parking Meters	$11	Information not available at this time
Bridges/ Culverts	13 bridges & culverts	$35	No information
Facilities	52 Facilities	$93	21*
Parks	171 components	$22	

Asset Category	Inventory	Replacement Value ($millions)	Average Age
Cemeteries	2 Cemeteries	$0.9	Information not available at this time
Fleet	34 Transit, 13 Fire, 109 miscellaneous vehicles	$25	
Forestry	10,834 Street Trees	$5.4	
General Equipment	Various bundles	$12	

*Average age of facility components

The current condition of assets is provided in Figure E-1.

Figure E- 1: Asset Condition Summary



Levels of Service

Current levels of service describing the extent and quality of services that the municipality provides through its assets to users are listed in Section 3 of this AMP, based on legislated asset management requirements. Levels of service are described from a community experiential perspective and include indicators that are qualitative and/or technical. The main LOS metric that was used to determine the infrastructure expenditure need is the percentage of assets that are maintained in conformance with their defined lifecycle strategies – this is demonstrated through the black outline in Figure E-1.

Asset Management Strategy

The lifecycle strategies applied to each Asset Category are summarized in Table E- 2 and discussed in detail in Section 4 of the AMP.

Table E- 2: Asset Lifecycle Strategies

Asset Group	Lifecycle Strategy
Watermains	Replace when watermain exceeds its expected useful life, when number of breaks exceeds target threshold, or when desired fire flow cannot be achieved.
Wastewater Sewers	Replace or rehabilitate when condition state reaches poor or very poor
Combined Sewers	Replace and separate all combined sewers
Storm Sewers	Replace or rehabilitate when condition state reaches poor or very poor
Roads	Rehabilitate or reconstruct roads at the optimal time to maintain an acceptable condition state
Sidewalks	Replace when condition state reaches poor
Bridges/Culverts	Maintain bridges in a safe state of repair through completing rehabilitation or replacement activities as recommended through biannual inspections
Facilities	Replace or rehabilitate as per the recommendations in the BCA reports
All other assets	Replace or rehabilitate as appropriate when asset reaches the end of its useful life

Financial Strategy

Overall funding discussions presented in the AMP:

- The cost to maintain current levels of service suggests the planned average expenditures are generally suitable for rate supported assets (water and wastewater – see Figure E-2), and $18.9M short each year for tax supported assets (assets not including water and wastewater – see Figure E-3).

Figure E-2: Expenditure Need vs. Planned for Rate Supported Assets, 2021-2030

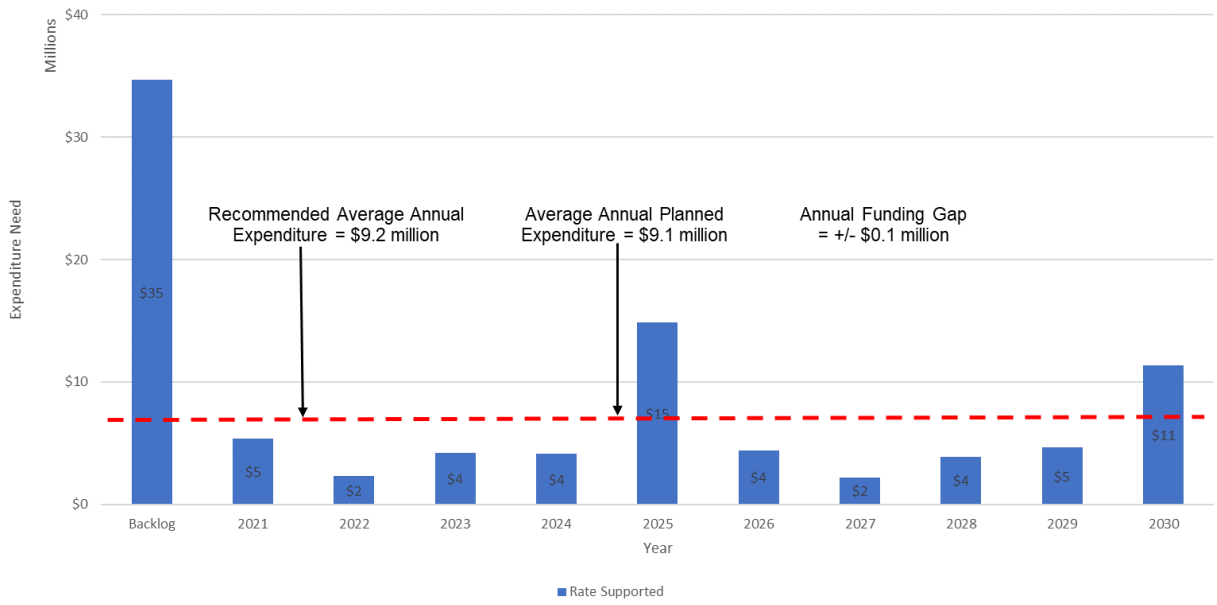
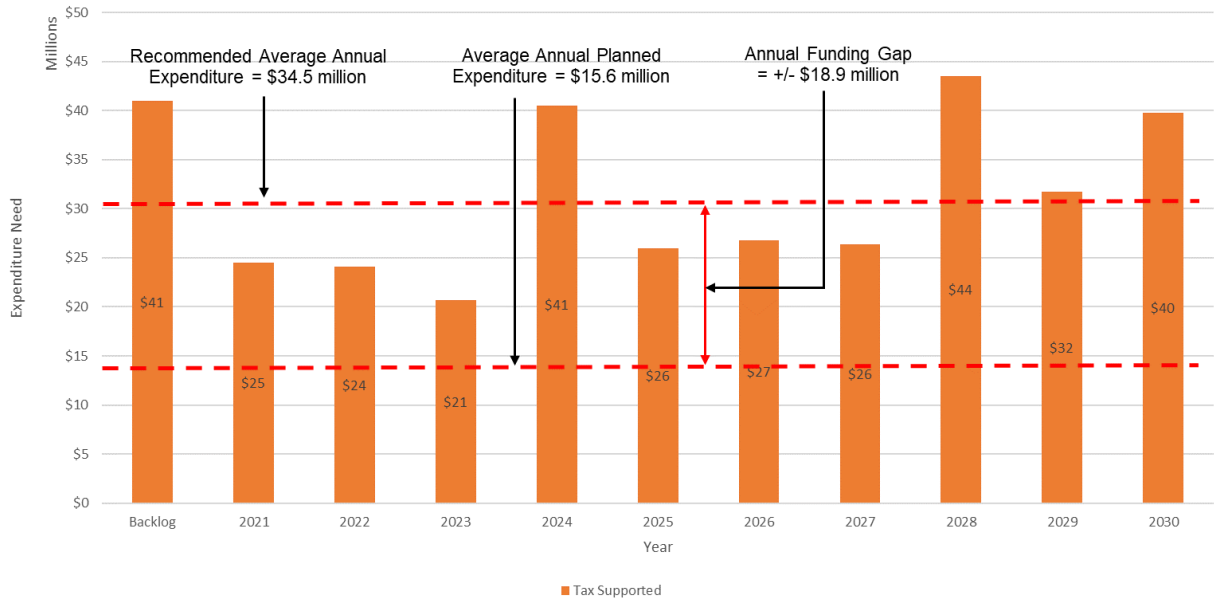


Figure E-3: Expenditure Need vs. Planned for Tax Supported Assets, 2021-2030



- In addition, if the City decides that current levels of service do not meet the community's expectations, then an increased investment would be required.
- The underfunding for tax assets may be addressed by some degree with tax increases. However, there are several strategies the City can use to address the capital infrastructure

backlog (what is already overdue for lifecycle intervention) and annual funding shortfall, these include:

1. Adjust asset performance expectations. The funding shortfall may be reduced by revisiting stakeholder objectives against affordability/willingness to pay.
2. Consider modest above-baseline revenue increases to fund the infrastructure funding shortfall. This could be through water/wastewater rate and/or levy increases.
3. Examine the trade-offs between the allocation of current funds between and within asset groups. For example, through the levy-funded assets, transitioning of funding envelopes from one asset group to another without increasing the net capital requirements, such as decreasing roads budget to increasing the bridges budget.
4. Continue to seek funding from the Provincial or Federal government to fund infrastructure.
5. Draw from available reserves. The use of reserves is appropriate to fund large projects where spending is increased for a short time period, after which spending will return to baseline levels.

Recommendations

In the next steps of this AMP, the City will be asking “Is this asset providing the community the service it expects and is willing to pay for?” Assets may be in excellent condition but may not be providing service at a level that is satisfactory to the community. This assessment and forecasting process will evolve to establish proposed levels of service accompanied by a corresponding cost and financing strategy.

Further recommendations related to asset management improvements and preparation for upcoming regulatory deadlines are provided in Section 6 of the AMP.

TABLE OF CONTENTS

FIGURES

TABLES

APPENDIX

1 INTRODUCTION

City of Welland assets provide the foundation upon which the City delivers services essential to the livelihood of its citizens and businesses. The City currently owns and operates over $1.524B in assets which contributes to community health, citizen satisfaction and enables the City's future growth.

The City's well-established Asset Management (AM) practices are a set of integrated strategies to plan investments regarding the building, operating, maintaining, renewing, replacing and disposing of these assets while being as efficient as possible with the resources entrusted to City.

This 2021 Asset Management Plan (AMP) update represents the City's Plan to responsibly maintain its assets so that it may continue to deliver services sustainably into the future. It provides a rational framework enabling the City to create a line of sight between high-level corporate drivers and the assets required to deliver services.

This document was a collaborative effort among the asset owners and programming teams. It describes the rationale used to deliver programs to design, construct, maintain, operate, and renew the City assets to strike a balance between:

- Performance / levels of service,
- Costs associated with asset ownership, and
- The risks inherent in owning large critical networks of infrastructure.

The objectives of this AMP were two-fold. First and foremost, it was developed to add applicable requirements from Ontario Regulation 588/17 Asset Management Planning for Municipal Infrastructure and the City's 2019 AM Policy; and secondly it is being used to reset the conversation around AM at the City. Emphasis will be placed on alignment with the legislation, exploring AM concepts where applicable, and defining and consistently using AM terminology.

A glossary of terms can be found in Appendix A.

This AMP is a formal document that links organizational objectives and the current levels of service needed to achieve the objectives, the work required on assets to sustain current levels of service, and the cost of doing that work.

The Asset Management Plan describes the rationale used to deliver programs to design, construct, maintain, operate, and renew the City assets to strike a balance between:

- Performance / levels of service,
- Costs associated with asset ownership, and
- The risks inherent in owning large critical networks of infrastructure.

1.1 About this Asset Management Plan

1.1.1 Purpose

The purpose of this plan is to:

- Enable the City to respond to current AM Plan regulatory requirements.
- Provide recommendations regarding future AM Plan regulatory requirements and enhanced AM practices.

- Establish an AMP Framework that can be expanded or modified as Enterprise Asset Management at the City gets underway.
- Describe current levels of service.
- Identify the ways in which assets can fail and describe the lifecycle management options applied to mitigate the failure.
- Forecast expenditures required to sustain current levels of service for the next 10 years.
- Support the line of sight between Council approved plans and initiatives and asset investment needs.
- Provide increased transparency related to the City's AM practices, challenges and opportunities.

1.1.2 Scope

This AMP covers a period of 10 years with some outlook over the 50-year and reports on the majority of the assets owned by the City, including:

Core Assets:

- Watermains and water distribution system appurtenances,
- Wastewater sewers, combined sewers and collection system appurtenances,
- Stormwater management infrastructure,
- Roads and traffic,
- Bridges and large culverts

Non-Core Assets:

- Buildings,
- Parks,
- Cemeteries,
- Fleet,
- Forestry, and
- Some aspects of General Equipment.

It should be noted that the assets required to support Fire and Emergency Services, Transit and the Welland Recreational Canal Corporation (WRCC) are included in the asset groups listed above (i.e. fleet, parks, buildings, forestry). It should also be noted that the City of Welland does not own or operate social housing infrastructure.

Based on available information, data/records assets and General Equipment assets including equipment, Information Technology, and furniture, are not included in this AMP.

1.1.3 Alignment with City Strategic Plan

This AMP sits among the City's other significant planning documents. This AMP aligns with the 5 pillars of culture outlined in the City Strategic Priorities[1] as it is a tool to communicate and share information about the City's core assets. The AMP functions to provide transparency, build trust, and demonstrate the good work done by the City's Council and staff. It shares information with infrastructure reports, master plans, Capital and Operating budgets, and Tangible Capital Asset Reporting.

[1] https://www.welland.ca/Council/

An important point of clarification is the role the AMP plays in the City's capital and operating budget development process – which is to identify the cost associated with completing all the work required on assets to deliver a defined level of service. While AM practices are rooted in financial efficiency and achieving the lowest cost of asset ownership, the AMP (unlike the capital and operating budget process) is not constrained in its financial analysis. It identifies all asset costs associated with all asset needs, not just those the City can afford to address. The purpose of this type of analysis is to demonstrate that the City is aware of the gap between what is needed in terms of asset investment and what is currently budgeted.

City Asset Managers provide their expertise on asset and service requirements, and in collaboration with staff in Finance and Council, are committed to finding solutions that will enable the City to continue to sustainably provide valuable services to the community.

1.1.4 Alignment with Strategic Asset Management Policy

This AMP was developed in accordance with the City's Strategic AM Policy (2019). As part of its asset management planning for municipal infrastructure, the City is committed to considering the following as outlined by the Policy:

- Opportunities for input from municipal residents and other interested parties.
- Coordinating asset management planning for assets that are interrelated with neighbouring municipalities and other agencies such as Welland Hydro, Enbridge Gas, Bell, and the Region of Niagara.
- Considering climate change.

1.1.5 Ontario Regulation 588/17

On January 1, 2018, Ontario Regulation 588/17: Asset Management Planning for Municipal Infrastructure came into effect. The regulation sets out requirements for municipal asset management planning to help municipalities better understand their infrastructure needs and inform infrastructure planning and investment decisions. The regulation is being phased in over six years and in 2025 will culminate in the development of an Asset Management Plan that addresses the future investment needs for all infrastructure assets owned by the City. Key legislative deadlines for all Ontario municipalities are shown in Table 1.

Table 1 – Legislative Milestones

Date	Milestone	Status
July 1, 2019	Prepare and publish a strategic asset management policy.	Complete – June 2019
July 1, 2022	Develop enhanced AMP that includes the cost to maintain current service levels covering core infrastructure assets.	Pending endorsement
July 1, 2024	Expand enhanced AMP that includes the cost to maintain current service levels covering all infrastructure assets.	Partially complete, requires refinement
July 1, 2025	Expand AMP to provide further details on all infrastructure assets, including proposed service levels and the revenue and expenditure plan to achieve the proposed service levels (if greater than current service levels).	Under development

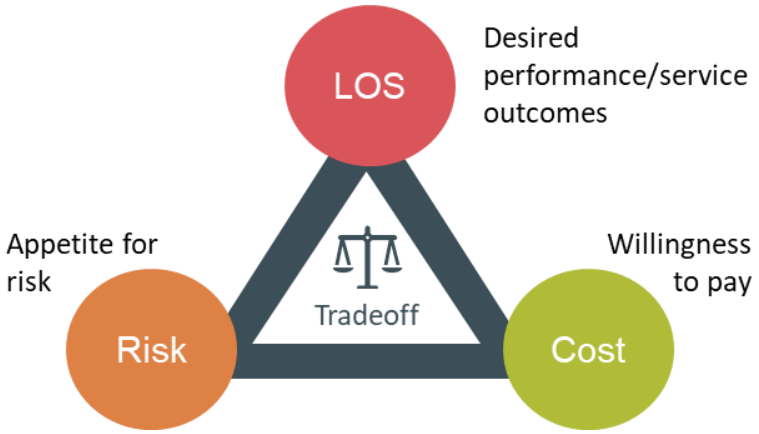
This AMP is focused on compliance to the July 1, 2022 requirements, and also builds a foundation towards partial compliance to the July 1, 2024 requirements. Next steps for compliance to 2024 requirements are discussed in the Recommendations.

1.1.6 Impacts of COVID-19 Pandemic

This AMP does not fully reflect the impacts of the COVID 19 pandemic. The City acknowledges that there may be economic impacts that will have to be fully assessed at a later date.

1.2 Key Asset Management Concepts

The City is challenged by fiscal constraints, revenue shortages and limited resources. At the same time, deteriorating and failing infrastructure requires proper investment, management and response. To address infrastructure challenges and meet legislated requirements, service objectives and financial targets, the City's Asset Managers strive to balance three intrinsically connected elements: levels of service, cost and risk.



The tension between these elements typically result in impacts and trade-offs. For example, by allowing one element to decline or conversely by enhancing another, an organization can be pushed off balance and away from the optimum center point.

Understanding the connections, impacts and tradeoffs Asset Managers are required to balance provides insight into AM decision-making and a line of sight between initiatives and directives and their potential impacts. A brief discussion of these three AM concepts is provided as they are fundamental to the City's AM practice and this AMP.

1.2.1 Levels of Service

Levels of service are the cornerstone of asset management; they build the connection between the strategic initiatives and service objectives of the City with the means (the assets) that deliver the service. A level of service provides what the City needs that asset to do, as such levels of service provide the platform for all lifecycle decision-making.

The Levels of Service described in this 2021 AMP have been prepared in response to the requirements of O.Reg. 588/17. In the future, the City may consider additional Levels of Service that demonstrate alignment between organizational objectives and assets.

The City also tracks many performance measures, which can also indicate performance or services being provided to the community. Examples are energy consumption and AODA compliance. These measures are not established as levels of service at this time, as more monitoring and related data would be required, but these may be rolled up into levels of service in future AMPs with increased data or connection to costing.

1.2.2 Cost

Providing sustainable levels of service is only achievable if the community is willing to pay the associated cost of maintaining assets into the future. Asset Managers continually seek to optimize asset decisions to achieve a level of service at the lowest cost of asset ownership. This involves the analysis of different scenarios of lifecycle activities throughout an asset's life.

Understanding the costs associated with maintaining assets throughout their life cycle to sustain levels of service is a critical component of this AMP. For the purposes of this AMP, costs are defined as the capital and operating expenditures required to conduct the lifecycle activities on the assets.

1.2.3 Risk

Risk often drives AM decisions, often without awareness or documentation that risk management is being exercised. The City's Asset Managers continually strive to reduce risks to the community. Risk can be expressed in terms of financial, legislative compliance, public safety or health, environmental, City reputation, private property, or service to the customer considerations. Risks to the community can be as minor as traffic delays and as severe as harm to public health. The role of the Asset Manager is to identify and mitigate the risks of asset failure.

An asset is considered to have failed when one of the following failure modes has occurred:

1. **Capacity:** demand on the asset exceeds asset capabilities.
2. **Performance:** requirements (legislative, industry standard or internal requirement) exceed asset capabilities.
3. **Financial Efficiency:** the cost of maintaining and operating the asset exceeds the cost of the replacement or alternative option to deliver the same capability.
4. **Physical Failure:** the asset fails structurally, stops working or is otherwise non-operational.

Asset Managers monitor all asset failure modes but focus on the failure modes most likely to occur. In the case of core assets, physical and performance failure modes are modelled and monitored and mitigation techniques (lifecycle activities) are prescribed to offset failure and extend the life of the asset. Risks related to City's current assets and failure modes are further described in this AMP.

1.3 Since the Last Asset Management Plan

The status of recommendations from the previous AMP and update are provided in Tables 2 and 3.

Table 2 - Status of 2015 Recommendations

2015 AMP Recommendation	Status	Notes
Improving the City's Understanding of Infrastructure Investment Needs		
Complete a Building Needs Study ($200,000 every 5 years)	**Completed**	City-wide building condition assessments were completed in 2016
Complete a Needs Study for the Wastewater Sewer Collection System ($300,000 every 5 years)	**Ongoing**	Wastewater and Pollution Control Plan ongoing and nearing completion
Complete a Parks and Canal Lands Asset Inventory and Needs Study ($100,000 every 5 years)	**Completed**	Parks, Recreation and Culture Master Plan completed 2019
Continue with the Road Needs Study ($100,000 every 5 years)	**Completed**	Road Needs Study Completed 2019
Continue with the Bridge Needs Study ($50,000 every other year)	**Completed**	Bridge Needs Study Completed 2020
Long Term Activities to Advance the City's Asset Management Strategy		
Develop a Strategy to Optimize Investments between Operating, Maintenance and Capital	**Not Initiated**	
Public Engagement	**Not Initiated**	
Develop a reporting process to communicate the state of infrastructure in the City Revise the TCA register	**Not Initiated**	The City is beginning to use ESRI's ArcGIS dashboards to make asset inventories available online
Develop Annual Infrastructure Scorecard	**Not Initiated**	
Complete a Needs Study for the Water Distribution System ($100,000 every 5 years)	**Not initiated**	Planned for 2023

Table 3 - Status of 2016 Recommendations

2016 AMP Recommendation	Status	Notes
Combined sewer separation and cast iron watermain integrated with road needs and right-of-way replacement	**Ongoing**	11.2km of Cast Iron watermain replaced between 2017-2020, 1km of combined sewer, 2.6km of Wastewater sewer
Replacement of subsurface infrastructure in areas with high leakage watermains or high infiltration Wastewater sewers	**Ongoing**	The City has undergone various sewer lining projects. The City's Asset Management team is continuously exploring new data capture technologies and management systems
Rehabilitation or Replacement of Bridges in Poor Condition Bridges represent a critical asset in Welland and therefore it is important to ensure that they are in a state of repair that does not impact their safe use.	**Ongoing**	Forks Road bridge removed in 2018. Replacement bridge is under design. Construction planned for 2022-2024.

1.4 Sources of Information

The City of Welland maintains several asset inventories at varying levels of detail, summarized as follows:

GIS / Database inventories

The City maintains Geographic Information System (GIS) inventories of several asset types. The inventories are an excellent source of information to support asset management decision making processes. They contain condition information of some asset groups and other relevant information that can be used for infrastructure planning purposes.

Tangible Capital Asset (TCA) Register

The asset register was developed to achieve the requirements of the Public Sector Accounting Board (PSAB) 3150 regarding full accrual accounting of assets in municipalities. While this Asset Register is comprehensive, there is not enough information on the assets to make informed investment decisions other than replacing an asset when it reaches the end of its amortization period (i.e. construction dates and theoretical useful lives).

Expert Systems

The City currently owns and operates several specialized systems for the assessment and planning of capacity, capture of customer service requests and the documentation of the frequency, cost and extent of maintenance of infrastructure assets.

Stand-Alone Spreadsheets

The City also maintains several stand-alone spreadsheets that are used to collect and store information on some assets. Some of these spreadsheets are useful for asset management decision making processes.

The City is striving to have their asset inventories in one location, referred to as asset centric data management, to allow asset management related information to be analyzed in a more timely and effective manner. The sources of information for each asset group are provided in Table 4.

Table 4 – Summary of Information Sources

Asset Category	Information Sources
Watermains	GIS / Database inventories
Wastewater and Combined Sewers	GIS / Database inventories, CCTV condition assessments
Storm Sewers	GIS / Database inventories, CCTV condition assessments
Roads	GIS / Database inventories, roads condition assessments
Sidewalks	GIS / Database inventories, inspection condition assessments
Bridges/Culverts	Bridge condition assessment report
Facilities	Condition assessment reports
Parks	TCA Inventory
Cemeteries	GIS/ Data base (only has quantity and location, TCA Inventory for replacement values
Fleet	TCA Inventory
Forestry	Quantity and replacement costs
Traffic	TCA Inventory
General Equipment	TCA Inventory

2 STATE OF ASSETS

2.1 Asset Inventory

The summary of asset information as of January 2021 is provided in Table 5. The total value of the assets owned by the City is approximately $1.524 billion (rounded).

Table 5 – Asset Inventory Summary

Asset Category	Includes items like…	Inventory	Replacement Value ($millions)	Average Age
Watermains	Watermains, hydrants, valves and other water distribution system appurtenances	271 km	$340	42
Wastewater and Combined Sewers	Wastewater and combined sewers, manholes and other related appurtenances	238.5 km	$298	47
Storm Sewers	Stormwater management infrastructure, manholes and other related appurtenances. Ditches are not assessed at this time.	173.5 km	$223	38
Roads	Road Network	299 km	$372	46
Sidewalks	Sidewalks	342 km	$87	36
Traffic	Streetlights, Traffic Signs, Parking Meters, traffic signals	6818 Street Lights, 1561 Traffic Signs, 3 Parking Meters	$11	Information not available at this time
Bridges/ Culverts	Bridge decks, structures and culverts	13 bridges & culverts	$35	No information
Facilities	All City buildings, water & wastewater vertical facilities including pumping stations	52 Facilities	$93	21*
Parks	Playgrounds, ball diamonds, landscaping, paved surfaces	171 components	$22	Information not available at this time
Cemeteries	Cemeteries	2 Cemeteries	$0.9	
Fleet	All City vehicles and motorized equipment	34 Transit, 13 Fire, 109 miscellaneous vehicles	$25	
Forestry	Trees	10,834 Street Trees	$5.4	
General Equipment	Includes all City Equipment and software	Various bundles	$12	

*Average age of facility components

2.2 Asset Performance

Understanding the performance of the City's assets is an essential component to an AMP. Ideally the performance information is based on assessment activities that provide first-hand knowledge. This information must be standardized to allow for the comparison of infrastructure needs and furthermore the analysis of trade-offs in capital investments. The City currently uses condition as its means to quantify asset performance. The City's current maturity of asset data with respect to actual condition information is summarized in Table 6.

Table 6 – Data Maturity Assessment

Asset Group	Maturity Assessment
Watermains	Break history and a full inventory of assets is available for asset management planning purposes
Wastewater and Combined Sewers	95% of Wastewater/combined sewers have an industry-standard condition score
Storm Sewers	80% of storm sewers have an industry-standard condition score
Roads	99% of roads have a Pavement Condition Index (PCI) value
Sidewalks	92% of sidewalks have condition information based on inspections
Bridges/Culverts	100% of bridges are subjected to biannual inspections in accordance with Provincial regulations
Facilities	All City facilities have a UNIFORMAT Level 4 Building Condition Assessment (BCA)
Parks	Limited information is available for asset management planning purposes
Cemeteries	Limited information is available for asset management planning purposes
Fleet	A full inventory is available for asset management planning purposes
Forestry	A full inventory is available for asset management planning purposes
Traffic	A full inventory is available for asset management planning purposes
General Equipment	A full inventory is available for asset management planning purposes

Table 7 summarizes how the condition information for the asset groups listed was used to establish a Condition State for the infrastructure.

Table 7 – Mapping Condition Information to a Condition State

Condition State	Watermains	Wastewater, Storm or Combined Sewers	Roads	Sidewalks	Bridges/Culverts	Facilities
Very Good	100-76% service life remaining	PACP/WRC Score of 1	Pavement Condition Index (PCI) >= 76	10-9	Bridge Condition Index (BCI) >=80	UNIFORMAT Level 4 Building Condition Assessment (BCA) that align with the 5 possible condition states
Good	75-51% service life remaining	PACP/WRC Score of 2	PCI between 61 and 75	8-7	BCI between 70 and 79	
Fair	50-26% service life remaining	PACP/WRC Score of 3	PCI between 51 and 60	6-5	BCI between 60 and 69	
Poor	25-1% service life remaining	PACP/WRC Score of 4	PCI between 0 and 50	4-3	BCI less than 60	
Very Poor	Past estimated service life	PACP/WRC Score of 5	The typical process used to assess Roads in Welland does not distinguish between poor and very poor	2-1	The typical process used to assess bridges in Welland does not distinguish between poor or very poor condition	

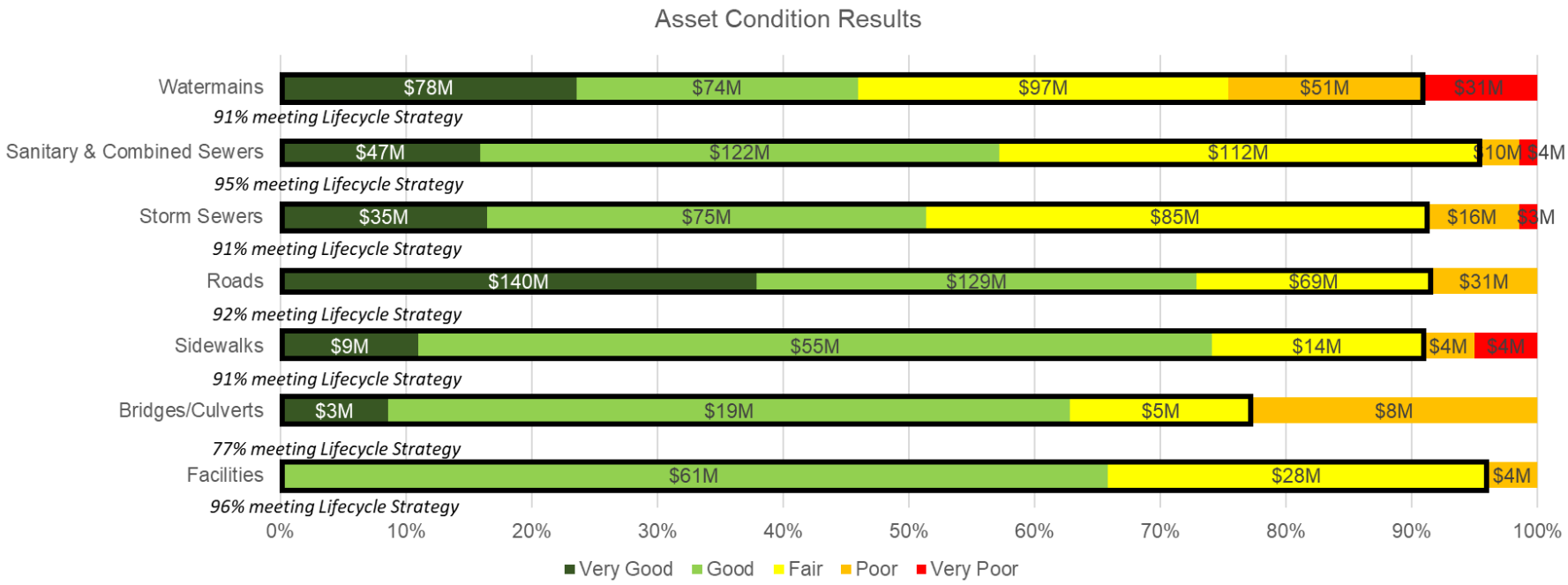
For watermains, age is used as a proxy for performance, however, work is typically prioritized based on a review of material and break history before the age of the pipe.

For wastewater, storm and combined sewers, PACP/WRC scores are determined based on the collection of CCTV footage of the interior of the pipe.

For sidewalks, a sidewalk condition rating is assigned by the inspector using inspection guidelines, and conditions ratings are averaged for all segments.

The 2020 condition performance results for each asset group with performance data available is provided in Figure 1. For each asset group, the colour bands represent the portion of the group, by replacement value, within each condition state. The black outlines for each bar represent the percentage of assets that are in conformance with planned lifecycle strategies, which are further discussed in Section 4.

Figure 1 – 2020 Condition Performance Results



It is apparent that there is $124M and $42M worth of assets in poor and very poor condition respectively, with a large portion related to Wastewater, Combined and Storm Sewers.

The analysis could not be completed for Parks, Cemeteries, Fleet, Forestry, Traffic and Other Equipment because performance assessment or age information is not currently available.

2.3 Performance Beyond Condition

Performance measures are required to be reported from the requirements in O.Reg.588/17. By default, asset performance has been measured by asset physical condition for most assets. This is effective for assets with functions directly related to physical integrity, such as a sewer main, but as more assets are added to the scope of asset management, this metric will require expansion.

Performance indicators for assets should be tied to levels of service – the expectation or value that is required from the assets. Capacity and financial efficiency are examples of additional parameters that may indicate asset performance.

For example, asset capacity can be an integral component of asset management planning. An asset can be well within its estimated service life and exhibit “like new” condition however may not meet the capacity requirements that are necessary to achieve the desired levels of service. Capacity can be described as the ability of an asset to meet the current demands put upon it both now and in the future by customers (i.e. sewer or water system capacity). Capacity levels of service are often established in master planning exercises and can also be set in Council initiatives.

Similarly, an asset can be well within its estimated service life and exhibit “like new” condition however may not meet financial requirements that are necessary to achieve the desired levels of service. The conversion of streetlights to LEDs is an excellent example of assets that may be replaced due to financial efficiency, even though condition and consumption of age is well within acceptable range. Energy operating costs of LED streetlights is significantly lower than traditional, high intensity discharge or high pressure sodium street lights, making conversion of these lighting fixtures a strong candidate for replacement due to financial efficiency.

Other assets, such as active parks, cemeteries, IT assets, and records may require more consideration of levels of service and performance indicators beyond ‘condition’ because of the unique nature of the assets. IT assets for example may remain in good physical condition but become obsolete due to advances in technology.

3 LEVELS OF SERVICE

3.1 Drivers

The City services and the level at which these services are provided are shaped by internal drivers such as council approved strategies and plans, and external forces such as citizen expectations, and legislative requirements.

Asset management guidance is required to prioritize the work required on assets to support the delivery of these commitments, especially when that work is weighed against state of good repair projects in the highly competitive capital programming process. Many of the asset groups are currently evaluated based on condition, while newer initiatives, such as multi-modal streetscaping and enhanced service levels bring the need for new metrics to prioritize work and show success, especially related to project costs and funding. The following identifies the City's drivers and objectives.

For the City of Welland, strategic drivers and commitments may originate from:

- Council Strategic Priorities - City Infrastructure
- Strategic Asset Management Policy 2019
- Legislation (e.g. Minimum Maintenance Standards for Municipal Highways O.Reg. 239/02)
- Official Plan 2019 - Welland will encourage the efficient movement of people and goods.
- Master Plans (e.g. Parks, Recreation and Culture Master Plan 2019, Wastewater Pollution Prevention Control Plan)

Proposed or targeted levels of service are required to be defined by July 2025, along with a financial strategy to achieve the targets.

Proposed or targeted levels of service are required to be defined by July 2025, along with a financial strategy to achieve the targets.

3.2 Current Levels of Service

Current levels of service describing the extent and quality of services that the municipality provides through its assets to users are listed below, based on legislated asset management requirements. Levels of service are described from a community experiential perspective and include indicators that are qualitative and/or technical.

Levels of service are based on mandatory legislative metrics.

3.2.1 Water

Level of Service Statement	Metric	Current
My City maintains what it owns	% Watermains maintained in conformance with defined lifecycle strategies	91%
I can use water as I like when I want	Connection-days[2] per year due to watermain breaks, relative to properties connected to the municipal water system	218:19,048
	Description of disruptions	The City is proactive in preventing unplanned service disruptions during watermain replacement projects by ensuring contractors obtain accurate locates of existing infrastructure before construction, and by requiring through the contract that contractors resolve any service disruptions ASAP using DWQMS guidelines.
I have fire protection	% Properties with fire flow available[3]	96.7%
	Areas of the municipality that have fire flow are shown in a map	Attached (Appendix B)
I have quality drinking water	Connection-days per year where a boil water advisory notice is in place, relative to 19,048 properties connected to the municipal water system	0
	% Properties are connected to the municipal water system	99.2%
	Boil water advisories issued in 2019 or 2020	0
	Areas of the municipality that are connected to the water system are shown in a map	Attached (Appendix B)

[2] Assume 10 properties affected for 6 hours per watermain break
[3] Properties within 75m of fire hydrant

3.2.2 Wastewater

Level of Service Statement	Metric	Current
My City maintains what it owns	% Sewer mains maintained in conformance with defined lifecycle strategies	95%
I have sewer services	% Properties connected to the municipal wastewater system	99.2%
	Areas of the municipality connected to the wastewater system are shown in a map	Attached (Appendix B)
My City is considerate of the environment[4]	Effluent violations due to wastewater discharge, relative to 19,048 properties connected to the municipal wastewater system	None
	Description of overflows	The majority of overflows are triggered annually and discharge into the Welland River, and are reported through the City's website
My property is protected from flooding	Events per year[5] where combined sewer flow in the municipal wastewater system exceeds system capacity compared to number of properties connected to the municipal wastewater system	7:19,048
	Km of combined sewers	2.5
	Description of flow into wastewater sewers	Infiltration and inflow into Wastewater sewers may be from groundwater and surface runoff, both of which are not intended to be in Wastewater system. Infiltration can enter through a variety of sources (cracks in pipes and maintenance holes), and inflow may enter through direct connections of storm outlets into the system, such as weeping tile connections or cross connections with storm outlets or downspouts. This excess and unplanned flow can overwhelm the Wastewater system.

[4] Effluent that is discharged from sewage treatment plants is the responsibility of the Region of Niagara, including monitoring, reporting and response.
[5] Average events from 2019 and 2020

Level of Service Statement	Metric	Current
	Description of combined sewers	The City no longer constructs combined sewers. To avoid basement flooding and backups into homes, existing combined sewers have a sewer system overflow to provide system relief. Sewer overflows exist to prevent Wastewater sewer backup into basements by instead relieving overloaded Wastewater sewers into an adjacent storm sewer or receiving water body. Sewer overflows exist on both combined sewer locations and on otherwise separated sewer locations. Many have been retroactively installed after basement flooding experiences. The design varies greatly among the many overflow locations. The frequency varies from site to site but are largely triggered by wet weather (rainfall) events or snow melt. Welland has a Pollution Prevention and Control Plan (PPCP) which details all the overflow locations, along with characterizing each overflow site and setting priorities/strategies for remediation.
	Description of design resilience	To minimize sewage overflow into streets or backup into homes, the City has established design standards to convey flows under ultimate conditions, design sheets for capacity needs that include infiltration inflow.
	Connection-days per year due to wastewater backups compared to the 19,048 properties connected to the municipal wastewater system	Data is currently not available

3.2.3 Storm

Level of Service Statement	Metric	Current
My City maintains what it owns	% Storm mains maintained in conformance with defined lifecycle strategies	91%
My property is protected from flooding	% Properties in municipality resilient to a 100-year storm (This includes all properties on streets that are connected to a stormwater management pond, minus any properties that intersect with the 100-year floodplain)	11.7%
	% Municipal stormwater management system resilient to a 5-year storm (length of storm sewer main installed since 2017)	14%
	Areas of the municipality protected from flooding are shown in a map (map shows storm sewer network)	Attached (Appendix B)

3.2.4 Roads

Level of Service Statement	Metric	Current
My City maintains what it owns	% Roads maintained in conformance with defined lifecycle strategies	92%
The roads help me connect around the City	Lane-kilometres of arterial roads, collector roads and local roads as a proportion of square kilometres of land area	3.46
	Road network is shown in a map	Attached (Appendix B)
My roads are comfortable to drive on	Km of roads have PCI <50	24.6
	Average OCI of roads	69.5
	Average unpaved surface condition	72.0
	Pavement condition by road class (Service level calculated using Classification of Highways Table)	Class 3 – 77.4 Class 4 – 72.4 Class 5 – 70.2 Class 6 - 64.9
	Description of the different levels of road class pavement condition	The City has outlined different levels of road class pavement condition and seeks to maintain the condition of the road pavement. The City aims to provide a balanced approach to service delivery with inspection

		focusing on those assets that are in very poor condition by leveraging a risk based approach to prioritize renewal or rehabilitation of roads. The City strives to maintain full compliance with Ontario Minimum Maintenance Standards.

3.2.5 Sidewalks

Level of Service Statement	Metric	Current
My City maintains what it owns	% Sidewalks maintained in conformance with defined lifecycle strategies	91%
	Average condition	7.2

3.2.6 Bridges & Culverts

Level of Service Statement	Metric	Current
My City maintains what it owns	% Bridges and culverts maintained in conformance with defined lifecycle strategies	77%
I can get around the city without restrictions	% Bridges with loading or dimensional restrictions	0%
My bridges are safe to drive on	Average BCI of Bridges	63
	Average BCI for Structural Culverts	81
	Description of structural culverts condition related to use	The City's structural culverts are used for road crossings over water, and can be crossed by all types of vehicles on the road, including heavy transport vehicles, motor vehicles, emergency vehicles, and cyclists. Regular legislated inspections ensure water flow and structural integrity is closely monitored.
	Description of bridges condition related to use	The City's municipal bridges are used by all types of vehicles on the road, including heavy transport vehicles, motor vehicles, emergency

Level of Service Statement	Metric	Current
		vehicles, and cyclists. Regular legislated inspections ensure water flow and structural integrity is closely monitored.

3.2.7 Facilities

Level of Service Statement	Metric	Current
My City maintains what it owns	% Facilities in conformance with defined lifecycle strategies	96%
	Buildings below "good" FCI condition	22

3.2.8 Cemeteries, Forestry, Parks, Fleet, Traffic, Other Equipment

Level of service is defined as current reinvestment rate, based on valuation and estimated service life (metric data for a level of service is not available at this time).

3.3 Performance Measures

As required to be reported in O.Reg. 588/17, other important performance measures are used for operation, maintenance, compliance, reporting and capital planning purposes. In the future, these may be rolled up as levels of service. The City completes regular "checks and balances" of its operations through various reporting including the multi-year business plans, budgets, and measurement tools, which also employ performance measures.

Sidewalks

- 17.4% of sidewalks are at least 1.5m wide

Bridges & Culverts

- All but 1 City-owned bridge support vehicle, bicycle and pedestrian traffic

Facilities

- 100% facilities are AODA compliant
- 5,030,647 kWh annual energy consumption

Parks

- 5.4 hectares of parks per thousand residents
- 61 parks are provided to citizens

Cemeteries

- 847 traditional plots available, 165 cremation plots available

Traffic

- 1,473,255 kWh annual energy consumption for streetlights
- 21 locations with adequate traffic signals

Transit

- 40% bus stops are AODA compliant
- 100% buses are AODA compliant
- $10,364 spent on annual reactive maintenance per bus

4 ASSET MANAGEMENT STRATEGY

The asset management strategy component of the AMP represents the set of planned activities to ensure that the infrastructure is able to achieve the level of service goals. The strategy is generally related to optimizing decisions with respect to:

- The replacement or rehabilitation of assets.
- The optimal level of maintenance investment required to optimize the long-term costs of the assets (i.e. does more maintenance result in a longer useful life).
- Disposing of assets that are not required to meet service levels. (i.e., obsolete fleet retired after use).
- Addressing policies that impact the strategy for how to renew the asset (i.e., does the asset size/design need to change to meet a certain policy).

The items summarized above are the goals for an AMP (and the associated systems that support the plan) to achieve through an analysis of readily available information. In this iteration of the City's AMP, achieving a process that optimizes these goals is difficult due to a lack of readily available information and established processes to support the decisions.

For example, the decision to rehabilitate a Wastewater sewer is dependent on knowing if the size is sufficient or should be increased to provide adequate service to accommodate future growth. If the pipe is too small, then rehabilitation is not an option. Therefore, the City needs to have the data in place (i.e. functioning hydraulic model of their Wastewater sewer collection system with growth projections and spatial records of basement flooding complaints) in order to determine if the Wastewater sewer is too small to support the decision making process of rehabilitation versus replacement.

4.1 Lifecycle Strategies

The performance objectives that are used by the City to determine priority projects and determine the infrastructure needs in the subsequent portions of this AMP is provided in Table 8. These strategies have been established to ensure that the infrastructure systems provide reliable services to residents in Welland.

Table 8 – Key Lifecycle Strategy

Asset Group	Lifecycle Strategy
Watermains	Replace when watermain exceeds its expected useful life, when number of breaks exceeds target threshold, or when desired fire flow cannot be achieved.
Wastewater Sewers	Replace or rehabilitate when condition state reaches poor or very poor
Combined Sewers	Replace and separate all combined sewers
Storm Sewers	Replace or rehabilitate when condition state reaches poor or very poor
Roads	Rehabilitate or reconstruct roads at the optimal time to maintain an acceptable condition state
Sidewalks	Replace when condition state reaches poor
Bridges/Culverts	Maintain bridges in a safe state of repair through completing rehabilitation or replacement activities as recommended through biannual inspections
Facilities	Replace or rehabilitate as per the recommendations in the BCA reports
All other assets	Replace or rehabilitate as appropriate when asset reaches the end of its useful life

The City strives to coordinate rehabilitation and replacement projects across asset groups where opportunities exist. This may result in asset strategies being delayed or advanced to accommodate the overall benefit of coordinated work.

More than just replacement and rehabilitation occur on assets. Examples and further descriptions of key lifecycle activities carried out within asset categories, is described with examples for core assets below.

4.1.1 Planning

Planning activities are considered ‘non-infrastructure’ - activities that can affect the assets required to deliver a service to the community, but not directly ‘touching’ the assets. Planning activities take growth into account. These activities apply to most asset categories and may include initiatives such as the Water Master Plan, Wastewater Master Plan and Pollution Control Plan, DWQMS risk assessment, Development Charge Study, Storm Subwatershed Studies, Transportation Master Plan, Roads Needs Study, Walkway Master Plan, and Recreation Master Plan.

4.1.2 Design

This lifecycle activity allows the City to explore cost or risk saving options of an asset while maintaining a level of service, such as new technologies or materials. The City uses established Engineering Design Criteria in the Development Engineering Guidelines and municipal standards to ensure the design criteria and process is consistent, including design for trees, parks, sidewalks and all City assets.

Value engineering is a design activity used by staff to improve the value of assets wherever possible by reducing costs while maintaining level of service. Example – selecting materials or construction methods that may reduce lifecycle cost while not affecting the level of service to the community.

4.1.3 Procurement

Procurement is always performed in conformance with the City's Procurement Policy. Opportunities may arise to procure innovatively through the quotation, proposal or tendering process, to allow for economies of scale or efficiencies that may result in cost or risk improvements while maintaining level of service. Example – Allowing flexibility in construction scheduling so that the contractor may offer savings. Procurement is a non-infrastructure lifecycle activity.

4.1.4 Construction

Construction or reconstruction of assets with modified design (i.e. replacing an asset but not 'like for like') is always performed in conformance with the City's Construction and Materials Specifications Manual. Opportunities may arise to construct innovatively while maintaining compliance, to allow for economies of scale or efficiencies that may result in cost or risk improvements while maintaining level of service. Industry changes in construction methods, technologies and materials may allow for cost savings.

4.1.5 Operation

The City operates its assets in a mode to balance cost and risk, related to providing a level of service to the community. Seeking cost savings in operation while maintaining level of service is a continual process at the City, especially carried out during budget preparations.

4.1.6 Demand Management

The City administers programs and practices to control the use of certain assets, which can reduce wear and tear or accommodate peak capacity constraints. This is considered a 'non-infrastructure' lifecycle activity.

For watermains, demand management activities may include water conservation.

For wastewater collection, demand management activities include:

- Disconnecting Downspouts
- Working with largest industries to assist them in moving toward full compliance with the City's Sewer Use By-law – working with the Region (quality)
- SWAP program – weeping tile disconnection
- Sewer use bylaw – FOG, storm connections
- New engineering design guidelines
- Use of CSOs

For stormwater, demand management activities include:

- SWAP program – weeping tile disconnection
- Protective Plumbing Program
- Disconnecting Downspouts
- Pump scheduling in facilities

- Policies that prioritize the sustainability of natural watersheds, especially stormwater management functions and climate change considerations, can reduce the need for additional stormwater services and assets

For roads, bridges and culverts, demand management activities include:

- Overweight/load permit process
- Half load season – rural roads
- Encouragement to use public transportation, active transportation, and other modes of transportation

For other assets, demand management activities may include open/close times, seasonal closures, and conservation programs for living assets and natural areas.

4.1.7 Monitoring

The City monitors its assets to check in on performance, usage, condition and other metrics.

For watermains, monitoring activities include:

- Leak Detection Program and District Metering Program
- Hydrant flow tests are regularly performed for fire flow prevention purposes. The readings from these tests can help signal if there is a potential problem with watermains that feed the hydrant.
- See DWQMS Infrastructure Maintenance Procedure, Repair Procedure and Infrastructure Review Procedure

For wastewater collection, monitoring activities include:

- Annual inspections of sanitary networks using both movable and stationary (zoom) televised inspection.
- Flow and level monitoring
- LIDAR used for visual monitoring
- GIS used for record management
- Inflow and Infiltration monitoring activities

For stormwater, monitoring activities include:

- Annual inspections using both movable and stationary (zoom) televised (CCTV) inspection. Zoom inspection results used to identify sewers that need more detailed inspection with movable CCTV.
- Flow monitoring programs for assessing flows in relation to storms
- Storm pond sediment surveys and inspections
- Ditch and culvert data collection
- Oil/grit separator inspections

For roads, monitoring activities include:

- Pavement condition assessments, ratings using visual assessment and automated data collection
- Ditch inspection
- Scheduled inspections and patrols for Minimum Maintenance Standards

For bridges and culverts, monitoring activities include:

- LIDAR used for visual monitoring

- The City conducts biannual OSIM inspections of all bridges in accordance with Provincial regulations. The biannual bridge inspections provide recommendations for the rehabilitation or replacement need of each bridge in Welland to ensure that they are safe to use. The implementation of the recommendations from these biannual inspections are considered a high priority in Welland.

For Sidewalks, monitoring activities include:

- The City conducts annual inspections of sidewalks. As part of this program, the inspectors travel all sidewalks in the City on foot or by patrol vehicle to visually determined the physical condition of sidewalks using an evaluation and rating system. The rating is based on physical defects that include cracking, weathering, uneven panels, and the presence of previous maintenance such as grinding or patching. Generally, the strategy for intervention of these assets is based on this rating and is described in Table 6.

For other assets, monitoring activities may include inspections and assessments.

4.1.8 Maintenance

The City performs planned and unplanned maintenance activities to keep the assets in a state of good repair.

For watermains, maintenance activities include:

- Preventive tasks and repairs for breaks and breakdowns
- Valve exercising program
- Hydrant flow and code program
- Dead end flushing program
- Maintenance hole adjustments for chambers
- DWQMS Infrastructure Maintenance Procedure, Repair Procedure and Infrastructure Review Procedure describes more detailed maintenance procedures for watermains.

For wastewater collection, maintenance activities include:

- Regularly scheduled maintenance and inspection programs including cleaning and flushing, minor maintenance hole repairs and minor repairs. May include replacing components such as motors or pumps, and similar unscheduled or unplanned emergency activities.
- Maintenance hole adjustments and minor sewer repairs

For stormwater, maintenance activities include:

- Oil/grit separator and catch basin flushing/cleaning
- Storm system flushing
- Ditch cleaning
- Storm pond dredging / cleaning
- Maintenance to address erosion
- Maintenance hole adjustments
- Erosion control activities and ditch maintenance to maintain road drainage

For roads, bridges and culverts, maintenance activities include:

- Pothole repair
- Street sweeping

- Salting and snow removal
- Pavement marking
- Planned routine maintenance includes crack seal, slurry seal or micro-surface activities which increase the condition of the road segment and may extend its useful service life.

For sidewalks, maintenance activities include:

- Sidewalk grinding and minor cold patch repairs.

For other assets, maintenance activities may include routine and unplanned maintenance and repair activities.

4.1.9 Insurance

Depending on the mode that assets are expected to fail in, the City may opt for various insurance coverage, in an effort to maintain level of service while balancing cost and risk. Risk Management staff at the City of Welland includes consideration of insurance opportunities. This is considered a 'non-infrastructure' lifecycle activity.

4.1.10 Rehabilitation

The City executes rehabilitation work on certain assets, which is major work done on an asset to allow it to reach or extend its life, without a total replacement.

For watermains, rehabilitation activities include:

- Refurbishment of booster station components, valves and hydrants

For stormwater, rehabilitation activities include:

- Lining and trenchless technologies to renew deteriorated sewer pipes. Less costly and less invasive than traditional construction techniques, lining restores sewer infrastructure to near new condition with limited need for excavation or prolonged street closure.

For roads, rehabilitation activities include:

- Crack sealing, resurfacing i.e. single lift (urban and semi-urban), expanded asphalt (rural), double lift (urban and semi-urban)
- Surface grinding and full depth asphalt removal/repaving
- For bridges and culverts, rehabilitation activities may include:
- Structural reinforcement of structural elements, deck replacement, etc. The City conducts biannual inspections of all bridges and large culvert in accordance with Provincial legislation. As an overall strategy, expert personnel use BCI and inspection data to apply industry best practices with respect to decision making around the rehabilitation versus replacement/reconstruction of the structures. The bridge and large culvert needs documented in this section adopt and reflect the recommendations from the latest inspections from 2020. Generally, the strategy for intervention of bridges and large culverts is based on BCI and is described in Table 6.

For Sidewalks, rehabilitation activities may include:

- Sidewalk grinding and cold patch repairs.

Forestry assets may be rehabilitated through deep root fertigation, propping, cabling.

4.1.11 Replacement

Replacement activities involve the like-for-like replacement of an asset in order to maintain level of service. The cost of replacement typically includes engineering costs related to design, construction and removals of expired assets. Example – replacement of a failed pump in a water booster station.

For watermains, replacement activities include:

- The replacement of old cast iron watermains, as this is also among the highest priority projects in Welland. The cast iron watermains account for a significant portion of the City's expenditure needs in the water distribution system. Areas of water quality issues are also prioritized for capital programming.

For wastewater collection, replacement activities include:

- Clay pipe replacement is a priority for capital programming.

For roads, bridges and culverts, replacement activities may include:

- The complete replacement of road base, curbs, culverts, gutters and surface. The City applies industry best practices with respect to decision making around road rehabilitation versus road replacement/reconstruction. The understanding of current road condition and the subsurface infrastructure condition is also used to decide which roads will be reconstructed and which road will be resurfaced. The renewal needs identified in this section reflect the consideration that some roads will be resurfaced while others will be reconstructed. Generally, the strategy for intervention of roads assets is based on PCI and is described in Table 8.

For sidewalks, replacement may include:

- Panel replacement based on condition.

Facilities are not generally replaced in entirety, but rather major components are replaced or rehabilitated.

Most forestry assets are replaced rather than rehabilitated.

4.1.12 Decommissioning

When an asset is permanently taken offline and not replaced, staff consider options related to decommissioning that considers the environment, liability, other risks and costs. This may include selling, auctioning, salvaging, repurposing, destroying or other actions.

4.2 Other Asset Strategies

The following points summarize the current asset management strategies that are practiced in Welland:

4.2.1 Combined Sewer Separation

The separation of combined sewers is among the highest priority programs in Welland. This priority initiative involves the planning, design and construction of independent sanitary and stormwater sewers. This is often coordinated with other right-of-way work.

4.2.2 General Wastewater, Storm and Combined Sewers Replacement

The City applies industry best practices with respect to decision making around sewer rehabilitation and replacement options and timing. Generally, the strategy for intervention of linear sewer assets is based on PACP/WRC score which is determined from CCTV footage of the pipe interiors, and is described in Table 8.

4.2.3 Integrated Right-of-Way Asset Replacement

To reduce disruption and construction costs, the City strives to optimize when and how assets in the same right-of-way are replaced. This approach provides better value for infrastructure renewal dollars because it is typically more cost effective to replace all the infrastructure in the same right-of-way. Integrated replacement projects are elevated in priority when combined sewer separation and cast iron watermain replacement are completed together.

4.3 Risk Management

The City's Asset Managers continually strive to minimize risks to the community. Types of risk include:

- Financial,
- Legislative compliance,
- Public safety or health,
- Environmental,
- City reputation,
- Private property, and
- Service to the customer.

Risks to the community can be as minor as traffic delays and as severe as harm to public health. The role of the Asset Manager is to identify and mitigate the risks of asset failure. An asset is considered to have failed when one of the following failure modes has occurred:

- Capacity: Demand on the asset exceeds asset capabilities, from growth for example.
- Performance: Requirements (legislative, industry standard or internal requirement) exceed asset capabilities, from climate change for example.
- Financial Efficiency: The cost of maintaining and operating the asset exceeds the cost of the replacement or alternative option to deliver the same capability.
- Physical Failure: The asset fails structurally, stops working or is otherwise non-operational.

Asset Managers monitor all asset failure modes but focus on the failure modes most likely to occur. In the case of core assets, physical and performance failure modes are commonly modelled and monitored and mitigation techniques (lifecycle activities) are prescribed to offset failure and extend the life of the asset.

Table 9 Failure Modes and Risks

Asset Category	Typical Failure Modes	Risks
Watermains	Physical, Performance, Capacity	Public Safety Regulatory Compliance Environmental Private Property Financial Service to the Customer Organizational Reputation
Wastewater and Combined Sewers	Physical, Performance, Capacity	
Storm Sewers	Physical, Performance, Capacity	
Roads	Physical, Performance, Capacity	
Sidewalks	Physical, Performance	
Bridges/Culverts	Physical, Performance, Capacity	
Facilities	Physical, Performance, Capacity, Financial Efficiency	
Parks	Physical, Performance	
Cemeteries	Physical, Performance, Capacity, Financial Efficiency	
Fleet	Physical, Performance, Financial Efficiency	
Forestry	Physical	
Traffic	Physical, Performance, Capacity, Financial Efficiency	
General Equipment	Physical, Performance, Capacity, Financial Efficiency	

Failure modes most closely monitored by the City are shown, along with corresponding risks. The City strives to prevent these failures through its lifecycle activities and strategies in which these are applied.

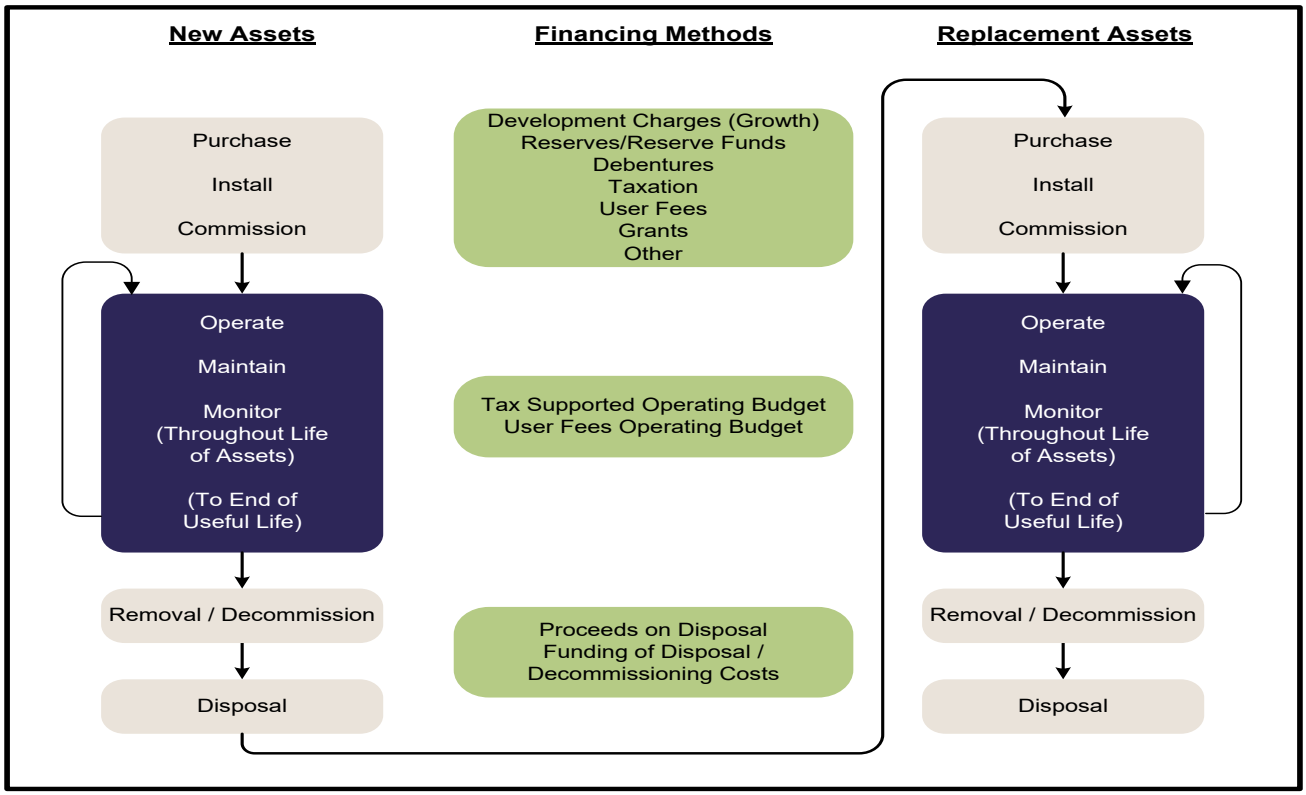
5 FINANCIAL DISCUSSION AND STRATEGY

The financial discussion and strategy of an AMP sets out the approach to ensuring that the appropriate funds are available to support the delivery of infrastructure services. The financing strategy in this AMP is rooted in the 2020 financial state of the City of Welland. The financing strategy is continually reviewed and adjusted to reflect changing pressures and priorities across the community.

This financing strategy starts by providing an overview of the future forecasted financial situation prior to discussing the options for addressing the infrastructure funding gap.

The long-term financing strategy forecast (including both expenditure and revenue sources) was prepared so that it can be used in conjunction with the annual budget process. Various financing options, including taxation, reserves, reserve funds, debt, user fees (i.e. water and wastewater rates) and grants were considered and discussed with City staff during the process. Figure 2 provides a visual representation of how various financing methods can be used for both initial asset purchases, as well as asset replacements.

Figure 2 - Financing Methods of Lifecycle Costs



5.1 Planned Expenditures

The revenue forecast, as described in the 2020 Budget Book for the rate and tax supported assets, is published by the City. The forecasted capital expenditures in the 2020 Budget Book were analyzed to determine the future costs by lifecycle strategy.

Non-infrastructure includes lifecycle activities such as planning, procurement, insurance, and demand management.

Service Changes are categorized as planned expenditures related to a change in level of service, such as the SWAP program.

A summary of the forecasted expenditures for 2020-2029 is provided in Table 10. Based on the review of this forecast, the average annual capital expenditures planned for all lifecycle activities listed for rate and tax supported assets is $9.7M and $17.6M respectively, for 2020-2029.

Table 10 – Infrastructure Expenditure Summary – Average Annual 2020-2029

	Average Annual Asset Related Costs (2020-2029)							
Service Category or Asset Group	**Replacement**	**Rehabilitation**	**Expansion**	**Service Changes**	**Non-Infrastructure**	**Maintenance**	**Disposal**	**Total**
Rate Supported	**$6,455,873**	**$2,665,577**	**$0**	**$416,692**	**$202,135**	**$0**	**$0**	**$9,740,277**
Watermains	$5,423,654	$0	$0	$45,506	$27,167	$0	$0	$5,496,327
Sanitary and Combined S	$1,032,219	$2,665,577	$0	$371,186	$174,968	$0	$0	$4,243,950
Facilities	$0	$0	$0	$0	$0	$0	$0	$0
General Rate Supported*	$0	$0	$0	$0	$0	$0	$0	$0
Tax Supported	**$14,739,552**	**$875,304**	**$1,506,250**	**$0**	**$461,287**	**$22,500**	**$10,000**	**$17,614,893**
Storm Sewers	$1,695,302	$225,561	$0	$0	$45,755	$0	$0	$1,966,618
Roads	$4,250,187	$399,743	$0	$0	$42,832	$0	$0	$4,692,762
Sidewalks	$1,229,036	$76,400	$0	$0	$0	$0	$0	$1,305,436
Bridges/Culverts	$672,700	$0	$0	$0	$11,500	$0	$0	$684,200
Facilities	$3,176,142	$80,000	$1,506,250	$0	$56,000	$22,500	$10,000	$4,850,892
Parks	$1,140,000	$0	$0	$0	$0	$0	$0	$1,140,000
Cemeteries	$0	$0	$0	$0	$0	$0	$0	$0
Fleet	$2,087,751	$93,600	$0	$0	$0	$0	$0	$2,181,351
Forestry	$0	$0	$0	$0	$0	$0	$0	$0
Traffic	$130,600	$0	$0	$0	$0	$0	$0	$130,600
General Equipment	$357,833	$0	$0	$0	$157,700	$0	$0	$515,533
Generall Tax Supported*	$0	$0	$0	$0	$0	$0	$0	$0

*Spending that was not specific to any asset group but benifited the overall tax/rate supported assets. (Ex. Official Plan updated, Community Benefits and By-law Study and other Economic Development projects)

5.2 Infrastructure Expenditure Need

The infrastructure renewal needs were determined by forecasting the condition of assets and factoring in lifecycle interventions by the defined strategies in Section 4. Any assets that met the thresholds of the Lifecycle Strategies in Table 8 were assumed to be replaced in that year and would reset to like-new condition the following year. The forecast of expenditures was calculated from the sum of all replacements or rehabilitations in each year.

It should be noted that the backlog was determined from the replacement cost of assets that were not meeting defined lifecycle strategies in the start year, 2020 for this report.

- The expenditure need used in the financing strategy was calculated by the average cost of the 10-year forecasted expenditures including the backlog. This approach was used for Watermains, Wastewater and Combined Sewers, Storm Sewers, Roads and Sidewalks.
- Bridges/Culverts and Facilities had condition assessment reports that recommended the future forecast of expenditures. The Facilities condition assessments were completed in 2017 and it was assumed that the needs were addressed in each subsequent year, resulting in no backlog.
- The expenditure needs for the remaining assets were calculated using reinvestment rates (replacement cost divided by ESL). This approach was taken due to the lack of performance information as described in this AMP. It was assumed that there was no backlog for these assets.
- The need calculation is prepared solely based on rehabilitation and replacement.

Table 11 – Rate Supported Infrastructure Need

Asset Category	Avg. Annual Expenditure Need
Watermains	$5,909,752
Wastewater and Combined Sewers	$3,263,430
Facilities	$30,682
Total:	**$9,173,182**

Table 12 – Tax Supported Infrastructure Need

Asset Category	Avg. Annual Expenditure Need
Storm Sewers	$2,014,152
Roads	$19,086,115
Sidewalks	$4,501,729
Bridges/Culverts	$1,562,150
Facilities	$2,645,968
Parks	$1,112,133
Cemeteries	$17,532
Fleet	$1,633,127
Forestry	$181,078
Traffic	$559,845
General Equipment	$1,194,046
Total:	**$34,507,875**

Forecasted needs are also shown in Figures 3 and 4.

Figure 3 – 10-year Infrastructure Expenditure Need for Rate Supported Assets

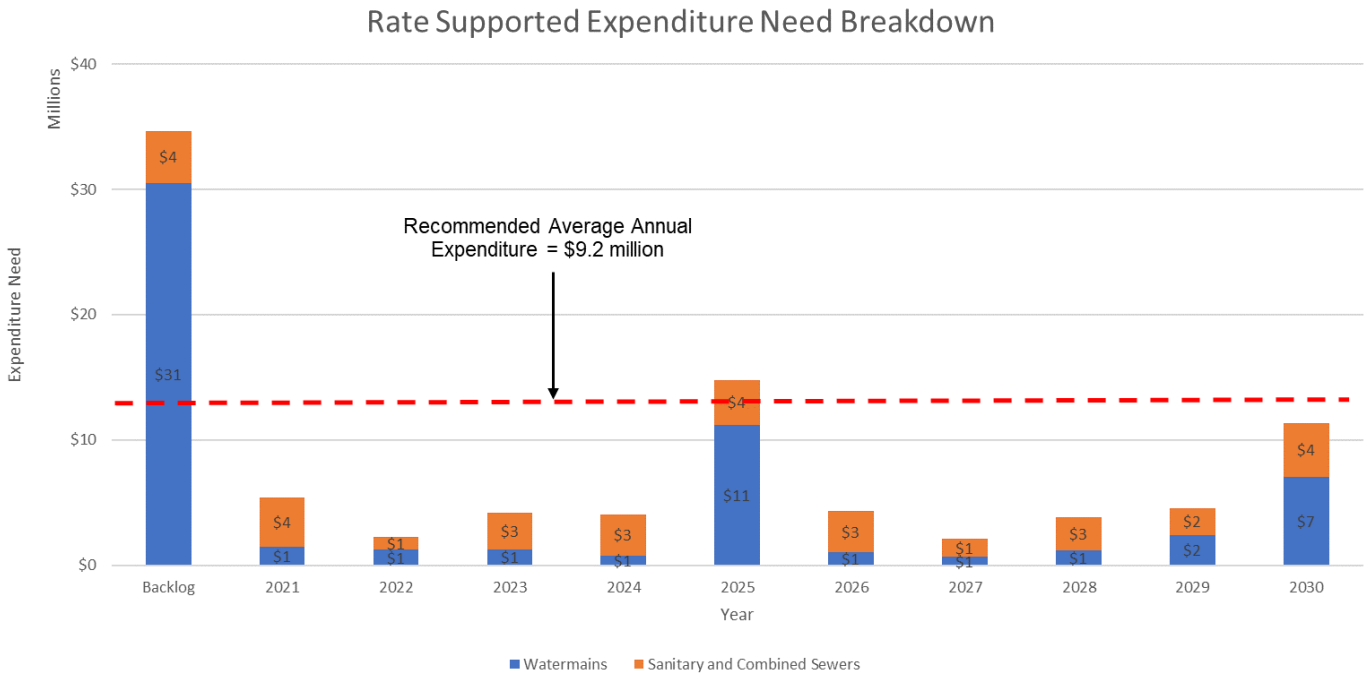
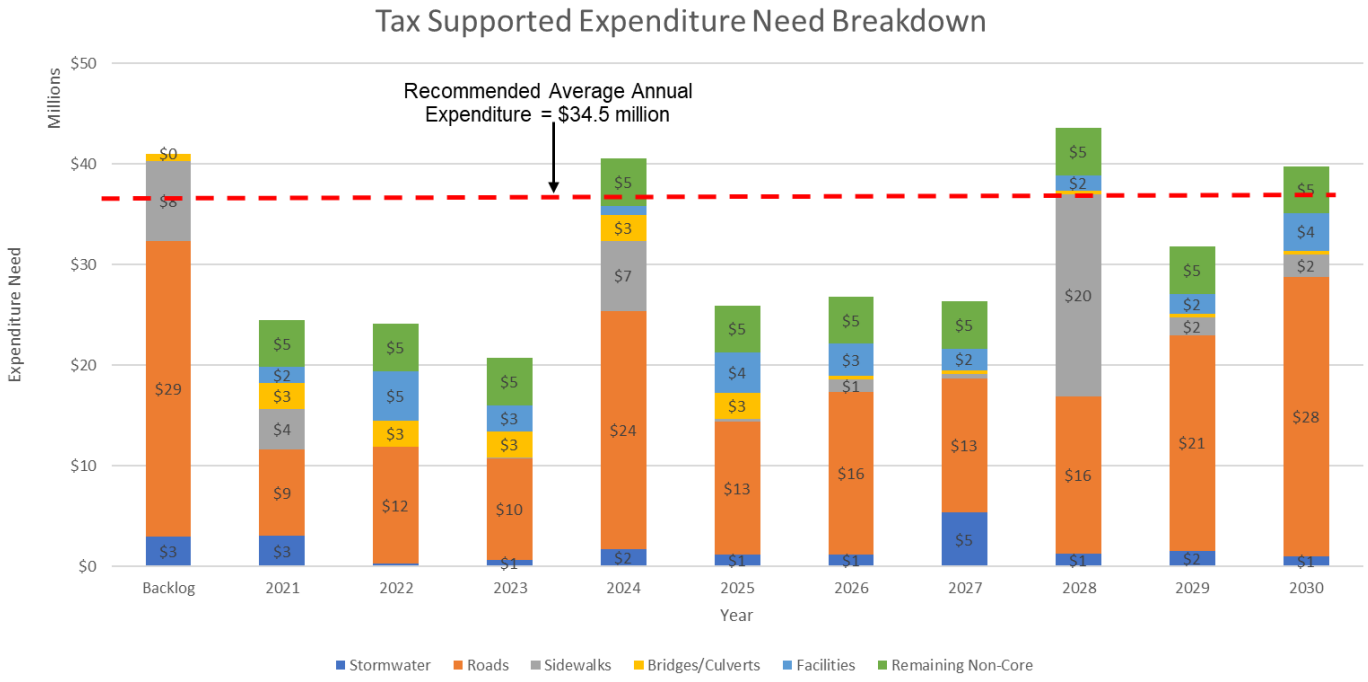
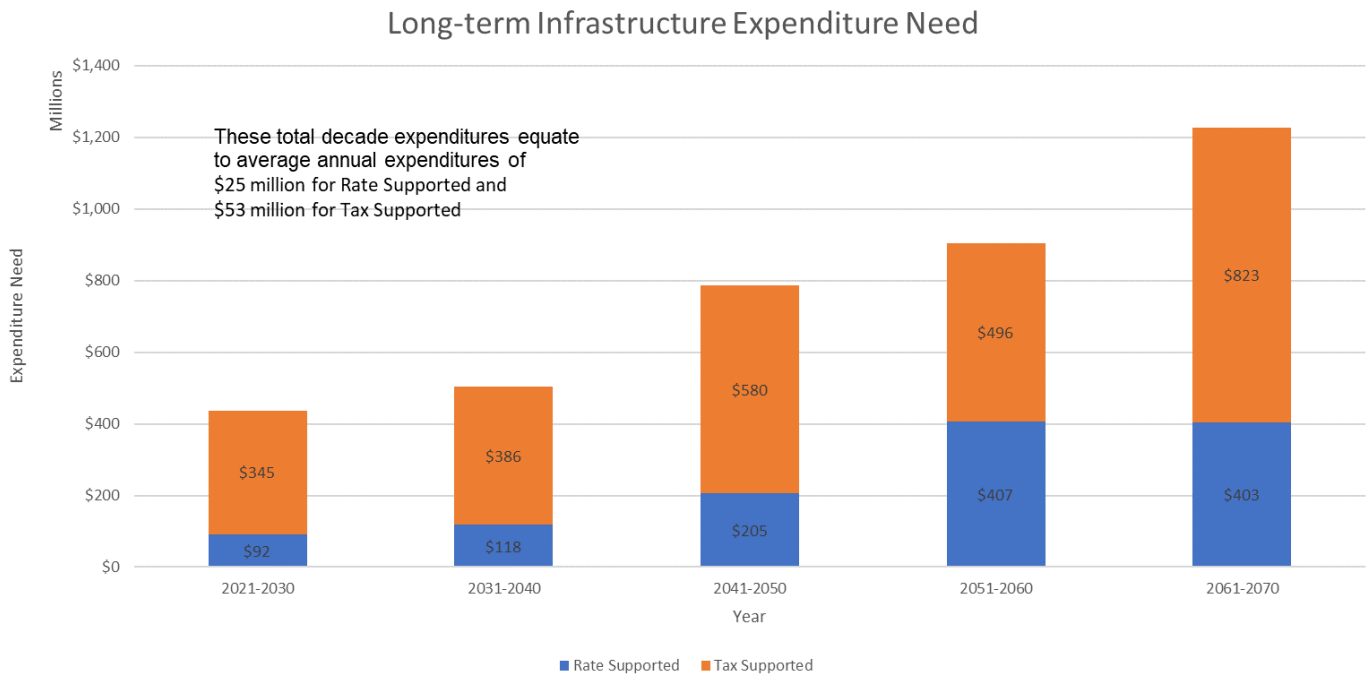


Figure 4 – 10-year Tax Supported Expenditure Needs Breakdown



The long-term renewal needs of the City's infrastructure over the next 50 years were also analyzed. It is apparent from Figure 5 that the investment needs escalate to approximately $1 billion over a ten-year period (or $100 million per year) when 3% annual inflation is factored into the analysis.

Figure 5 – 50-year Infrastructure Expenditure Need for Rate and Tax Supported Assets



5.3 Infrastructure Funding Shortfall

Although the triggers for lifecycle work are based on sound industry practices, due to funding and resource constraints and competing priorities, assets at the City of Welland are not consistently rehabilitated and replaced in accordance with Table 8. This is common across many municipalities. When assets are eligible for lifecycle activities described in Table 8 but the required work is not carried out, this work becomes the 'infrastructure backlog'.

Infrastructure funding shortfall is described as the annual gap between capital need (based on established levels of service) and the capital budget forecast. Depending on definitions, this gap may or may not include allowances to gradually 'pay down' infrastructure backlog – the gap reported in this AMP includes defined allowances for addressing backlog.

Both backlog and infrastructure gap are reported in this AMP, related to the defined levels of service and lifecycle strategies.

The infrastructure funding gap was calculated by subtracting the 10-year forecasted replacement and rehabilitation costs (2020 Budget Book) from the expenditure needs as described above. The summary of the expenditure needs and funding gaps are provided in Tables 13 and 14.

Table 13 – Rate Supported Infrastructure Need and Funding Gap

Asset Category	Avg. Annual Expenditure Need	Avg. Annual Planned 10 year Replacement and Rehabilitation	Avg. Annual Infrastructure Funding Gap	Comment
Watermains	$5,909,752	$5,423,654	$486,098	There is confidence in data to support these results.
Wastewater and Combined Sewers	$3,263,430	$3,697,796	-$434,366	
Facilities	$30,682	$0	$30,682	
Total:	**$9,173,182**	**$9,121,450**	**$51,732**	

Table 14 – Tax Supported Infrastructure Need and Funding Gap

Asset Category	Avg. Annual Expenditure Need	Avg. Annual Planned 10 year Replacement & Rehabilitation	Avg. Annual Infrastructure Funding Gap*	Comment
Storm Sewers	$2,014,152	$1,920,864	$93,288	There is confidence in data to support this result.
Roads	$19,086,115	$4,649,930	$14,436,185	
Sidewalks	$4,501,729	$1,305,436	$3,196,293	
Bridges/ Culverts	$1,562,150	$672,700	$889,450	
Facilities	$2,645,968	$3,256,142	-$610,175	Assumed no backlog because needs were addressed as forecasted. There is confidence in data to support this result.
Parks	$1,112,133	$1,140,000	-$27,867	Expenditure need was calculated by reinvestment rate. Need may be higher if the replacement costs are higher than the TCA inventory (as was the case for core assets).
Cemeteries	$17,532	$0	$17,532	
Fleet	$1,633,127	$2,181,351	-$548,224	
Forestry	$181,078	$0	$181,078	
Traffic	$559,845	$130,600	$429,245	
General Equipment	$1,194,046	$357,833	$836,213	
Total	**$34,507,875**	**$15,614,856**	**$18,893,018**	

*Negative values indicate there may be other needs beyond condition being addressed in the 10-year Budget or replacement values are lower than observed.

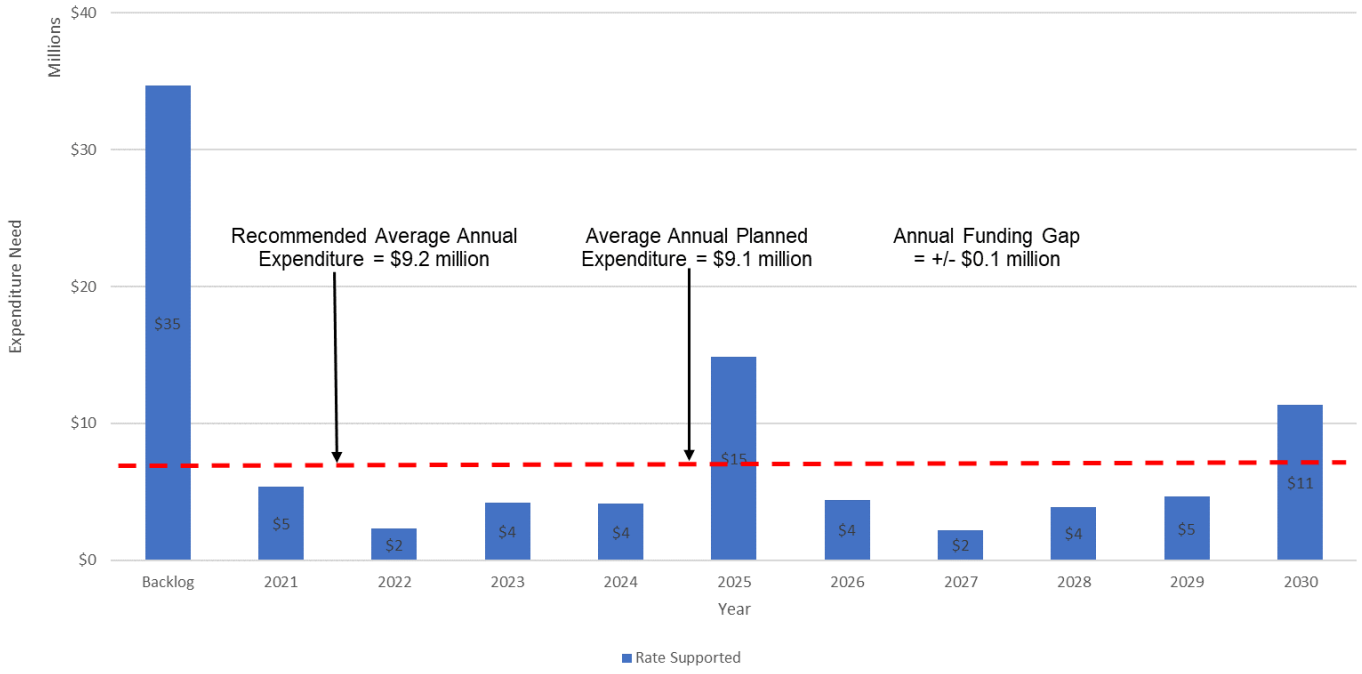
The allocated replacement and rehabilitation expenditures were compared to the capital expenditure need from Section 5.2, to determine the infrastructure spending gap.

O.Reg. 588/17 requires the City to understand the cost to maintain current levels of service. If the current level of service is defined as maintaining the backlog at the same level, then the annual expenditure need for rate and tax supported assets was calculated.

The technical analysis demonstrated that the current planned spending levels would need to increase to meet the lifecycle strategies as outlined.

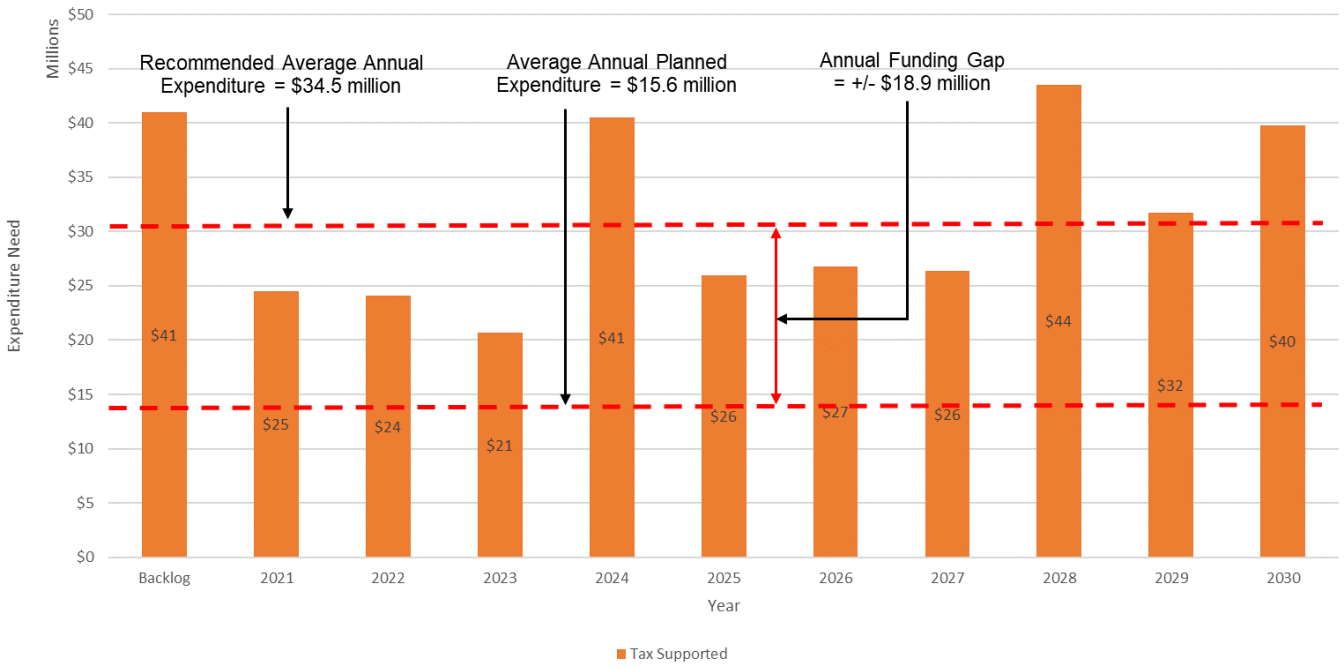
Rate supported assets appear to be generally sufficiently funded based on current levels of service, as shown in Figure 6. The difference between the planned average annual expenditure needed to maintain current levels of service ($9.2M) compared to the planned average annual expenditure of $9.1M is minor, and likely related to data confidence, maturity and rounding. As levels of service are adjusted in coming years to include public consultation, climate change and other coming pressures, it is expected this scenario will change.

Figure 6 – Need vs Planned Expenditure for Rate Supported Assets, 2021-2030



In Figure 7, a funding shortfall $18.9M has been identified for tax supported assets. Figure 7 shows the planned average annual expenditure need to maintain current levels of service ($34.5M) for tax supported assets compared to the planned average annual expenditure of $15.6M. This demonstrates an average annual funding shortfall of $18.9 for tax supported assets.

Figure 7 – Need vs Planned Expenditure for Tax Supported Assets, 2021-2030



5.3.1 Operating Costs

Significant operating costs to maintain current levels of service are assumed to be current total operating expenditures associated with asset groups. Planned operating expenditures from the 2021 Operating budget are:

Asset Category	Annual Operating Budget
Rate Supported Assets - Water - Wastewater - Combined	$29,150,334
Tax Supported Assets	$66,916,207

5.3.2 Growth

The 2019 Development Charge Background Study thoroughly assessed the impact of growth on demand and the resulting capital and significant operating expenditures that are anticipated for core assets to 2028. These forecasts, results and recommendations are used in the asset management discussions for each asset category.

The cumulative growth capital in the 2021-2030 forecast is compared to the DC value below:

Asset Category	Capital from DC Study (2019 2028)	Capital from Planned Expenditures
Rate Supported Assets - Water - Wastewater - Combined	$12,201,870	$0
Tax Supported Assets	$62,832,373	$15,062,500

The cumulative growth operating cost impacts are also shown:

Asset Category	Operating from DC Study (2019 2028)
Rate Supported Assets - Water - Wastewater - Combined	$10,763,881
Tax Supported Assets	$25,348,082

The City's population forecasts are available in the DC Background Study, and is anticipated to reach 63,174 in 2031 and 70,427 in 2041. 2018 population was 53,744 people. Total employment population is anticipated to reach 22,890 in 2031.

The DC Background Study also describes the relationship with the Niagara Region regarding the Greater Golden Horseshoe Growth Plan, and direction for accommodating population and employment growth. Joint projections were established by the Niagara Region and City of Welland.

Growth may correspond to increased demand on transportation assets, increasing 'wear and tear' on the existing portfolio. Also, maintaining connectivity, moving people and goods across the City in a variety of modes poses continuous challenges as intensification occurs and as additional urban and rural development continues. As the asset portfolio increases due to the assumption of new developments, maintenance and renewal of these new assets from the expanded portfolio requires more resources to operate, maintain and respond including workforce, operating and capital.

5.4 Financing Strategies

The cost to maintain current LOS suggests the planned average expenditures are generally sufficient each year for rate assets and $18.9M short each year for tax supported assets. If the City decides that current LOS does meet the community's expectations, then an increased investment would be required.

The City can consider examining the thresholds for backlog and the actual backlog of assets to determine if there is a portion that are actually meeting LOS objectives. This would result in a lower backlog and subsequently a lower 10-year expenditure need, reducing the funding gap that should be addressed.

The underfunding for rate assets is considered minor, and can be largely related to data confidence and maturity.

However, the underfunding for tax assets should be addressed by some degree with tax increases. There are additional steps the City can take to lower the funding gap that should also be explored and are provided in Section 6.

There are several strategies the City can use to address the capital infrastructure backlog and funding shortfall, these include:

1. Adjust asset performance expectations. The funding shortfall may be reduced by revisiting stakeholder objectives against affordability/willingness to pay.
2. Consider modest above-baseline revenue increases to fund the infrastructure funding shortfall. This could be through water/wastewater rate and/or levy increases.
3. Examine the trade-offs between the allocation of current funds between and within asset groups. For example, through the levy-funded assets, transitioning of funding envelopes from one asset group to another without increasing the net capital requirements, such as decreasing roads budget to increasing the bridges budget.
4. Continue to seek funding from the Provincial or Federal government to fund infrastructure.
5. Draw from available reserves. The use of reserves is appropriate to fund large projects where spending is increased for a short time period, after which spending will return to baseline levels.

The tax supported funding gap is significant enough to conclude that tax increases are required to achieve the planned lifecycle strategies. The following excerpt from the financing strategy of the 2015 AMP is relevant to the analysis documented above:

> *"While the annual funding requirement may fluctuate, it is important for the City to implement a consistent yet increasing annual investment in capital so that the excess annual funds can accrue in capital reserve funds. As the financing strategy under each scenario is based on the City funding the plan with own funds, if other funding sources become available (i.e. grant funding or third party contributions) or if maintenance and rehabilitation practices allow for the deferral of capital works, then the impact on the City's water revenue would decrease."*

To provide perspective, a financial analysis has been completed on the revenue increases that would be required should the City choose to address the funding gaps by using option 2 - Revenue increases. The analysis establishes the magnitude of net increases in revenue versus the number of years until the funding shortfall is closed (i.e. larger increase addresses the shortfall sooner; smaller increases will take more time to address shortfall) and is provided in Table 15. Inflationary increases were not included in this analysis.

Table 15 – Magnitude Tax Increase to Close the Funding Gap

Additional Annual Increase to Taxes	Years to Close Annual Infrastructure Funding Gap
1.0%	36
1.5%	24
2.0%	19
3.0%	13
4.5%	9

6 RECOMMENDATIONS

This infrastructure investment needs have been established based on a strategic review of the City's asset inventory. It is important to recognize that the City is striving to reach a position where the infrastructure needs equal the available revenues (i.e. a full cost recovery approach). Over the coming years, the City will continually review the infrastructure needs as better information becomes available and as technological improvements reduce the cost of renewing infrastructure. This will include the adoption of infrastructure rehabilitation techniques such as trenchless technologies in order to provide the desired level of service in a more cost-effective manner.

6.1 General

The City should continue to support the 10-year forecasted water and wastewater expenditures as detailed in the 2021 Budget Book. The backlog should be addressed using Option 1, 3, 4 and 5 of the financing strategies. All financing strategies should be considered for the tax supported assets. Although the magnitude of the funding gap could be refined, the City should consider implementing a tax levy to support their infrastructure because there is enough evidence to support a funding shortfall. Additionally, the City should work on understanding the infrastructure need for non-core assets through performance measurements rather than reinvestment rates. Funding gaps should be reassessed when better performance data is established before committing to tax increases.

6.2 Develop Asset Registers for All Assets

The largest hinderance to establishing a confident infrastructure need is the absence of data to support the claims. The core assets as well as the Facilities and Sidewalks had comprehensive inventories that were able to fully support AM analyses. This resulted in confident outputs that would be the closest to real world scenarios instead of theoretical calculations. There is significant risk in forecasting using proxy TCA information. It is recommended that the City focus on continuing to develop asset inventories for all assets and establishing replacement costs that align with capital project submissions, including consideration of ditches in the stormwater collection system.

6.3 Establish Performance Measurement for All Assets

The non-core asset groups, excluding Sidewalks and Facilities, do not have standardized and comparative condition information that is readily available for asset management planning purposes. At a minimum, the condition of the assets could be estimated based primarily on estimated service life. This is a common practice in municipalities in Ontario and across Canada where no reliable condition information exists. However, caution must be used with this method in that it:

- Assumes replacement of the asset at its service life plus one day;
- Assumes a uniform deterioration rate irrespective of the external influences on that asset and the asset's physical make up; and
- Does not factor in substantial rehabilitation of an asset since it was put into service.

When condition information is required, a good business practice to estimate the condition of an asset, where assessment activities have not been completed, is to evaluate the amount of its useful life that has been consumed. For example, an asset that has a useful life of 10 years would be in excellent condition if it is 1

year old and poor condition if it is 9 years old. Although this approach does not always provide an accurate condition of the asset, particularly in cases of buried linear infrastructure (i.e. watermains and sewers), it is a reasonable starting point where actual condition information is not easily accessible.

The City's inventories that do not have condition assessments also did not contain asset age information. The list of assets includes:

- Parks
- Cemeteries
- Fleet
- Forestry
- Traffic
- Other Equipment

This lack of information prevents the City from understanding the performance of the assets even at a basic level. In the future, performance can be calculated using the estimated service lives and condition mapping provided in Tables 18 and 19.

Table 16 – Estimated Service Lives of Assets

Asset Group	Estimated Service Life (years)
Parks	10 to 20
Cemeteries*	50
Fleet	7 to 15
Forestry*	30
Traffic	20
Other Equipment	10

*ESLs not described within the City of Welland TCA Policy

Table 17 – Translating Estimated Service Life (ESL) to Asset Condition

Condition State	Percent of Estimated Service Life remaining on Asset
Very Good	75-100%
Good	50-74%
Fair	30-49%
Poor	10-29%
Very Poor	<10%

This approach would supersede the reinvestment rate calculations that was used for this AMP. This will result in a better understanding of the backlog and future expenditure requirements.

Furthermore, the City should still strive to establish performance measurements that are not age based since the planning decisions for these assets typically rely more on service performance rather than age/condition.

6.4 Refine Levels of Service

The levels of service within this AMP are based on legislative requirements, and an approach to reset on asset management terminology. For the next AMP update, consider setting levels of service first based on corporate goals and objectives, since these define the City's priorities and guide future spending. Also set levels of service based on citizen needs - the expectations of the general public have a direct impact on the level of service demanded from infrastructure. With this approach, levels of service reflect the Council strategy and owner statements – connecting the work done on the assets with the overall objectives of the City. This is fundamentally important when discussing and negotiating proposed levels of service (due in 2025), since targets should be set in line with corporate direction.

Continue the development of levels of service and performance measures, both through documenting current levels of service with appropriate metrics, and through discussions and financial planning about proposed levels of service. The City is currently tracking a large number of performance indicators for benchmarking and operational performance measurement, including citizen and corporate information. Consideration of this wealth of existing data should be included in the upcoming discussions around proposed levels of service. Levels of service that consider other important indicators of successful service delivery may be considered. With levels of service established, and using the framework of the AMP, the City will be positioned to transition to a more service-oriented approach to asset management planning.

The City may consider more opportunities for citizens to provide input into asset management planning, especially for expected levels of service, willingness to pay and understanding of the services provided. The Strategic AM Policy 2019 requires citizen input and transparency of information that goes into asset decisions.

Develop plans to establish balance over time by recommending the organization lower or find more cost effective methods of delivering levels of service, where suitable. Both recommendations will have a risk reaction and the role of AM is to weigh these options and find the optimum balance.

Alternative lifecycle strategies related to rehabilitation and replacement for the road network may also be considered for 2021-2030. These may include changing levels of service (percent roads in poor condition, percent roads in good condition, average network condition, etc.). If the average network condition is the preferred metric for level of service, higher or lower OCIs may be considered, or spending scenarios, as discussed.

The City may also consider custom levels of service specific to urban vs. rural road class. Since the relative unit cost for rural rehabilitation is lower than urban, there may be opportunity to maintain levels of service in rural roads with a lower investment.

6.5 Align Capital Budget to Lifecycle Activities

The City can use the new Enterprise Asset Management initiative as an opportunity to align the capital budget to the lifecycle activities described in Table 10. The consistent terminology and categorizations will enable comparable reporting.

This will also bring clarity to the values used in the AM analysis. Facilities was a good example of this. The 10-year planned expenditures in the 2021 Budget Book appeared to be higher than the costs forecasted in the condition assessment reports. At first glance it suggests that they are over funded. However, there may be other needs beyond condition that are being addressed. The consistent terminology and categorizations when submitting capital project submission will help during the analysis of allocation of funds.

6.6 Explore Risk and Failure Modes

All decisions about the refurbishment and replacement of an asset and the timing of these activities should be based on a sound determination of the asset's critical failure mode (i.e., the one with the highest consequence of happening). Identification of critical failure modes will ensure that the City focuses on the assets and failures that can have the most impact on its ability to deliver service (current strategy). To improve the confidence of the outputs of future AM Plans, the City should consider additional failure modes. For example, the failure mode for streetlights is often financial efficiency, prompting replacement that is not driven by condition. Although the O.Reg. 588/17 doesn't require Level of Service failure modes to be incorporated into the 2024 plan, it would be a logical next step in the progression of Asset Management Planning.

6.7 Enhance Methods of Forecasting

Forecasting asset performance is a challenging undertaking with methodologies that vary for each asset class and within the industry. Past performance and spending information is a readily available and reliable wealth of data that can be used to predict future performance.

For watermains at the City of Welland, the performance of watermains was determined from age for reporting purposes. However, the City also uses break records during capital planning process to prioritize work. The AM analysis can be refined by developing a watermain break prediction model, which is comprised of a series of Weibull distributions that model the time (in years) between construction and the first failure, and the times between subsequent failures. Fixed condition deterioration curves can be developed through this probability-based model by having the median time between failure calculated for every break interval from their Weibull parameters. These median times until failure can then be stacked to a maximum break limit and evenly distributed between the performance range. An example is provided in Figure 8 and Table 20, where the maximum allowable was 8 breaks. Watermain material and capacity are other attributes that can be considered.

Figure 8 – Watermain Deterioration Curve and Break Intervals

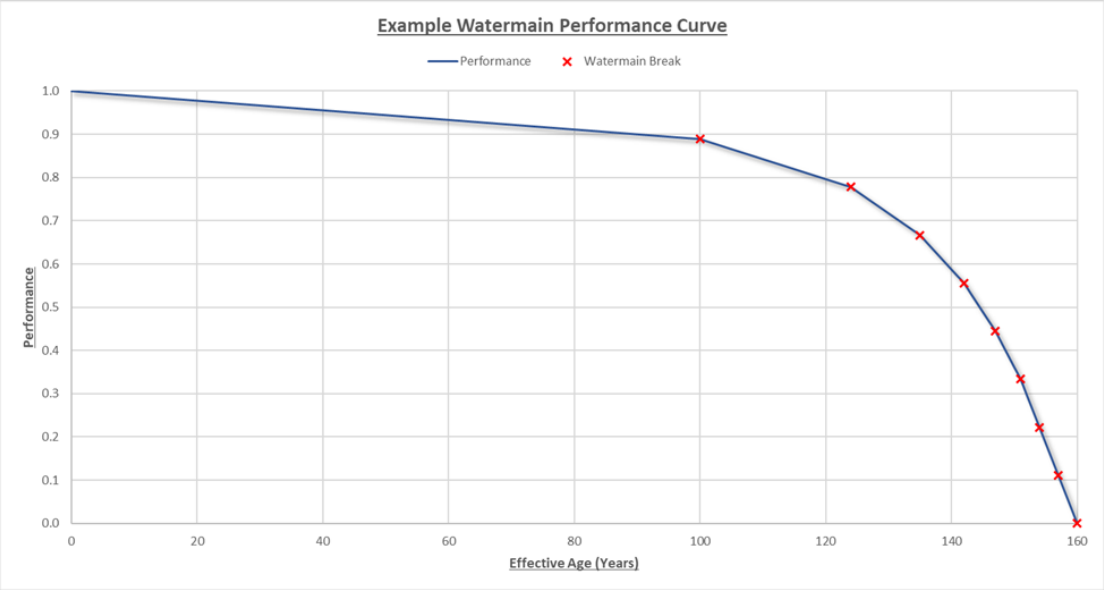


Table 18 - Watermain Breaks and Condition State

Break Interval	Time Until Next Break (Years)	Condition State
0	100	Very Good
1	25	
2	18	Good
3	7	
4	6	Fair
5	5	
6	4	Poor
7	3	
8	2	Very Poor
Total ESL	160	

Generic age-based approaches tend to underestimate the performance of these longer lasting assets. This approach results in a justified ESL that is representative of the City's assets and may result in higher perceived performance which would lower the overall backlog for watermains.

6.8 Future Compliance Requirements

Required and completed for 2022 Deadline:

- ✓ Summary of core assets in each category
- ✓ Replacement cost of core assets in each category
- ✓ Average age of core assets in each category
- ✓ Condition of core assets in each category
- ✓ Description of municipality's approach to assessing condition of core assets in each category
- ✓ Current levels of service for core assets in each category
- ✓ Current performance measures of core assets in each category based on metrics established by the municipality
- ✓ Lifecycle activities needed to maintain current levels of service for core assets in each category for 10 years
- ✓ Costs of providing lifecycle activities needed to maintain current levels of service for core assets in each category for 10 years
- ✓ Growth considerations

2024 Deadline:

Complete:

- ✓ Summary of non-core assets in each category
- ✓ Replacement cost of non-core assets in each category

Partially complete/ Incomplete:

- Average age of non-core assets in each category
- Condition of non-core assets in each category
- Description of municipality's approach to assessing condition of non-core assets in each category
- Current levels of service (qualitative descriptions and technical metrics established by the municipality) for non-core assets, and updated information for core assets, as per Tables 1-5 in regulation, as applicable
- Current performance measures of non-core assets in each category based on metrics established by the municipality (e.g. measures for energy usage, operating efficiency) and updated measures for core assets, as applicable
- Lifecycle activities needed to maintain current levels of service for non-core assets in each category for 10 years
- Costs of providing lifecycle activities needed to maintain current levels of service for non-core assets in each category for 10 years
- Growth considerations (can be taken from 2021 (Fall) Development Charge update study).

2025 Deadline:

Complete:

- ✓ Publicly available webpage containing your municipality's strategic asset management policy
- ✓ Link to the latest version of your municipality's asset management plan

Partially complete/ Incomplete:

- Proposed levels of service for a 10-year period for non-core assets based on qualitative descriptions and technical metrics established by the municipality, and qualitative descriptions and technical metrics based on Tables 1-5 in regulation for core assets.
- Identification of lifecycle activities needed to provide proposed levels of service for a 10-year period.
- An estimate of annual costs for undertaking identified lifecycle activities over a 10-year period.
- Projections for annual funding to be available to undertake identified lifecycle activities over a 10-year period.
- Identification of funding shortfalls for lifecycle activities over a 10-year period and an explanation of how risks associated with not undertaking any of the lifecycle activities will be managed.
- Explanation of why proposed levels of service are appropriate over a 10-year period
- Proposed performance of assets in each category over a 10-year period determined in accordance with performance measures established by the municipality
- Growth considerations and requirements

7 ADMINISTRATION OF THE PLAN

7.1 Roles, Responsibilities and Authorities

Council and Committees of Council are responsible for approving the Asset Management Policy and approving budgetary decisions, and are the overall authority for policy approvals, and budgetary decisions as defined in the Municipal Act. Council has the authority to make asset management decisions related to investment, design, construction, acquisition, operation, maintenance, renewal, replacement and decommissioning of infrastructure assets.

The **Chief Administrative Officer** is responsible for establishing and endorsing the Asset Management Policy and the Asset Management Plan. The CAO has the authority to execute or delegate the duties defined above, and the authority to make asset management decisions related to investment, design, construction, acquisition, operation, maintenance, renewal, replacement and decommissioning of infrastructure assets.

The **Director of Infrastructure Services** is responsible for ensuring the Asset Management Policy and Plan is relevant, suitable, adequate, reviewed and updated as required. This role is responsible for communicating land-use or master plans, forecasts, policies and other planning or financial commitments related to municipal infrastructure assets. This role is also responsible for coordinating with the Directors to align asset management planning with budgets, land-use or master plans, forecasts, policies and other planning or financial commitments. Appropriate authority to carry out these responsibilities is assigned.

The Infrastructure and Asset Manager, Corporate Services is responsible for communicating financial plans, forecasts and other financial commitments related to municipal infrastructure assets to the General Managers.

Asset Leads are responsible for, and assigned the authority for, making asset recommendations related to assigned portfolios, in adherence with the Asset Management Policy and Plan. Asset Leads have the authority to make asset management decisions related to investment, design, construction, acquisition, operation, maintenance, renewal, replacement and decommissioning of infrastructure assets.

7.2 Asset Management Review & Reporting Communication

Council conducts an annual review of its asset management progress on or before July 1 in each year. The annual review must address the City's progress in implementing its asset management plan, any factors impeding the ability to implement its asset management plan, and a strategy to address these factors.

7.3 Public Availability

This asset management plan is available on the City website, and a copy of the plan is provided to any person who requests it. Background information and reports upon which the AMP information is based is available to the public through requests via the Infrastructure and Asset Manager. City residents and other interested parties may provide input into the City's asset management planning via the Infrastructure and Asset Manager or through other established public consultation methods.

This AMP is prepared to facilitate community consultation initially through public display of asset management plans following adoption by Council. Future revisions of the asset management plan will incorporate

community consultation on service levels and costs of providing the service. This will assist Council and the community in matching the level of service needed by the community, service risks and consequences with the community's ability to pay for the service. This will be investigated for future updates of the asset management plan.

The City provides the public opportunity to attend Council or Committee meetings where asset management is discussed and approved. This is achieved through public notices, making agendas public before meetings, and encouraging attendance. The City also makes its AMP available to the public prior to council meetings to promote understanding and preparation. The public is invited to provide feedback on asset management topics through surveys, delegations, and requesting written feedback.

7.4 Review, Endorsement and Approval

The City reviews and updates this AMP at least every five years. The AMP is endorsed by the CAO of the City and approved by a resolution passed by Council.

Once approved, this AMP provides the plan for the effective and efficient management of its assets, and a path forward for future work. This plan will remain current until it is updated. It is intended to be a living document that is relevant and integral to the City's daily asset management activities. For the plan to remain useful and relevant, the following activities will be undertaken:

- Review and formally adopt new or changed levels of service, as these become available.
- Revise the AMP as required to incorporate and document changes to work programs, outcomes of service level reviews, and new knowledge resulting from the asset management improvement program. Some sections may require updating more frequently.

The following indicators can be monitored to measure the effectiveness of this AMP.

- Compliance with legislative requirements
- Quality of Service Delivery

Appendix A: Glossary and Definition of Terms

GLOSSARY AND DEFINITION OF TERMS

Asset

A resource with economic value that a municipality controls with the expectation that it will provide a future benefit. An asset is specifically defined as property, equipment, vehicles, tools or other resources with a purchase value at or above the Capital Asset Threshold.

Asset Management (AM)

The coordinated activity of an organization to realize value from assets.

Asset Management Plan (AMP)

A plan for the management of infrastructure assets that combines multi-disciplinary management techniques (including technical and financial) over the life cycle of the asset in the most cost effective manner to provide a specific level of service. The management of infrastructure assets includes investment, design, construction, acquisition, operation, maintenance, renewal, replacement and decommissioning of these assets.

Asset Category

A category of municipal infrastructure assets that is an aggregate of assets.

Asset Hierarchy

A logical digital index of assets and asset information.

Bridge Condition Index (BCI)

A numerical index generally utilized for the assessment of the condition & structural reliability of bridges and culverts.

Connection Days

The number of properties connected to a municipal system that are affected by a service issue, multiplied by the number of days on which those properties are affected by the service issue.

Core Asset

Includes any municipal infrastructure asset that is a:

- water asset that relates to the collection, production, treatment, storage, supply or distribution of drinking water,
- wastewater asset that relates to the collection, transmission, treatment or disposal of wastewater, including any wastewater asset that from time to time manages stormwater,
- stormwater management asset that relates to the collection, transmission, treatment, retention, infiltration, control or disposal of stormwater,
- road, or
- bridge or culvert.

Enterprise Asset Management (EAM)

The combination of organizational tools and processes used to realize value from assets.

Estimated Service Life (ESL)

For new assets, this is the estimated expected life (usually in years) that an asset will function, assuming typical general maintenance is carried out. Typically, ESLs vary for different types of assets, such as a concrete culvert vs. a corrugated steel pipe.

Infrastructure

The physical structures and associated facilities that form the foundation of development, and by or through which a public service is provided.

Infrastructure Deficit

A spending shortfall in comparison to an established need. This can include the accumulated deficit that results year over year due to financial shortfalls.

Level of Service (LOS)

The parameters, or combination of parameters, which reflect social, political, environmental and economic outcomes that the organization delivers (ISO 55000). A means for capturing and realizing value from the City's assets through the delivery of services (e.g. parks, libraries, transit) to stakeholders (such as customers).

Lifecycle or Estimated Service Life

The useful life of an asset from acquisition to disposal, typically expressed in years.

Lifecycle Activity

An activity undertaken to sustain asset integrity and service levels occur over the life of an asset, such as demand management or rehabilitation.

Lifecycle Cost

The total cost of an asset throughout its life including planning, design, construction, acquisition, operation, maintenance, rehabilitation and disposal costs.

Lifecycle Management Strategy

The set of planned actions that will enable the assets to provide the desired levels of service in a sustainable way, while managing risk, at the lowest lifecycle cost.

Non-infrastructure Lifecycle Activities

Actions or policies that may not involve direct work done on assets, but may result in the lowering of costs and/or extend the useful life of an asset.

Ontario Regulation O.Reg.588/17

Under the Infrastructure for Jobs and Prosperity Act, 2015, principles are set out by the provincial government to regulate asset management planning for municipalities. On December 27, 2017, O. Reg. 588/17 was released which regulates asset management planning for municipal infrastructure.

Pavement Condition Index (PCI)

A numerical index generally utilized for the assessment of the condition & structural reliability of roads.

Public

Residents and businesses in the City of Welland, stakeholders, or other interested parties.

Remaining Useful Life

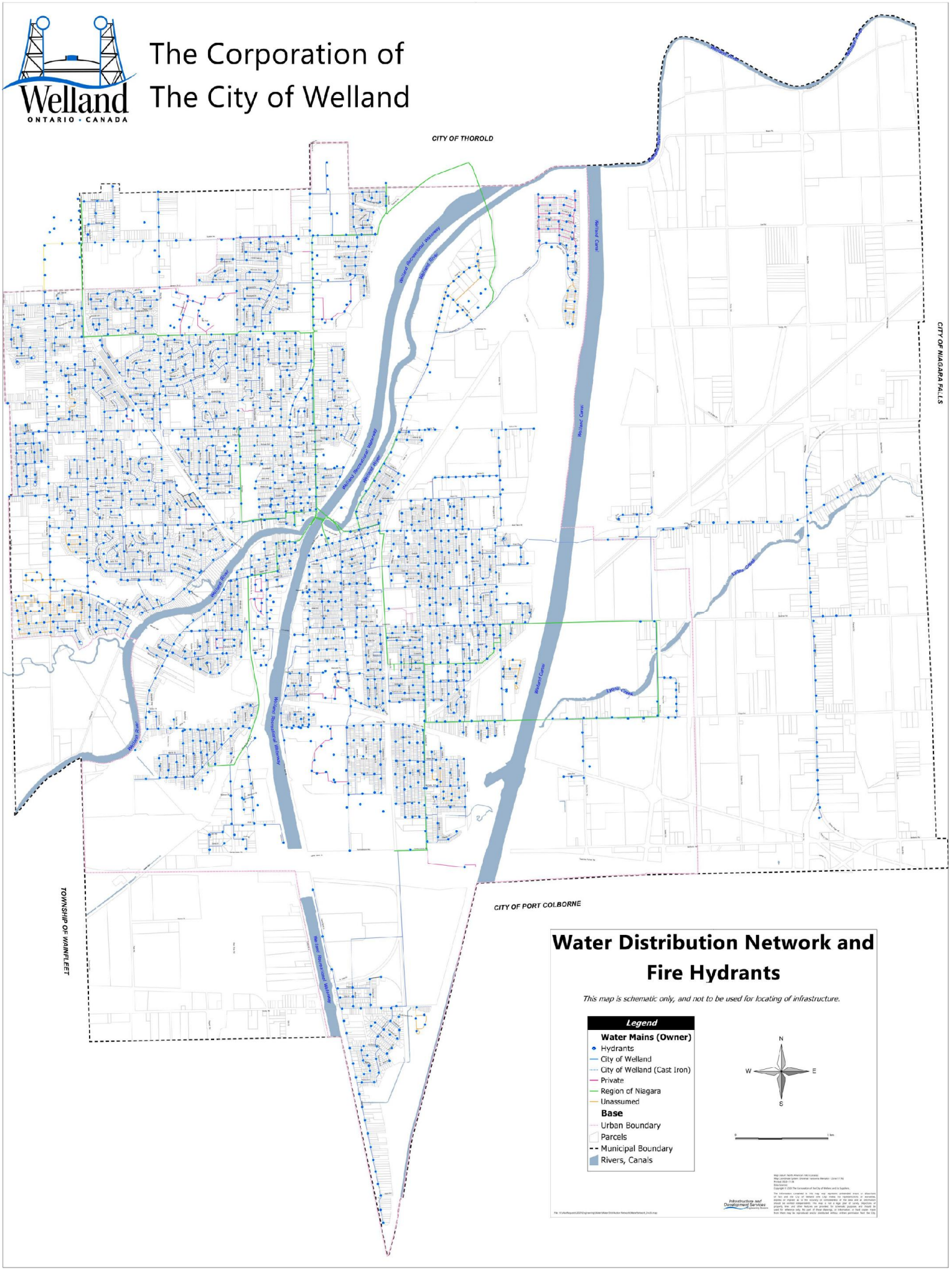
Time left (usually in years) in the asset before it is considered failed, usually related to an anticipated failure mode.

Service Enhancements

Projects, programs or initiatives that may change the level of service.

Appendix B: Level of Service Maps

The Corporation of The City of Welland



Water Distribution Network and Fire Hydrants

This map is schematic only, and not to be used for locating of infrastructure.

Legend

Water Mains (Owner)
- Hydrants
- City of Welland
- City of Welland (Cast Iron)
- Private
- Region of Niagara
- Unassumed

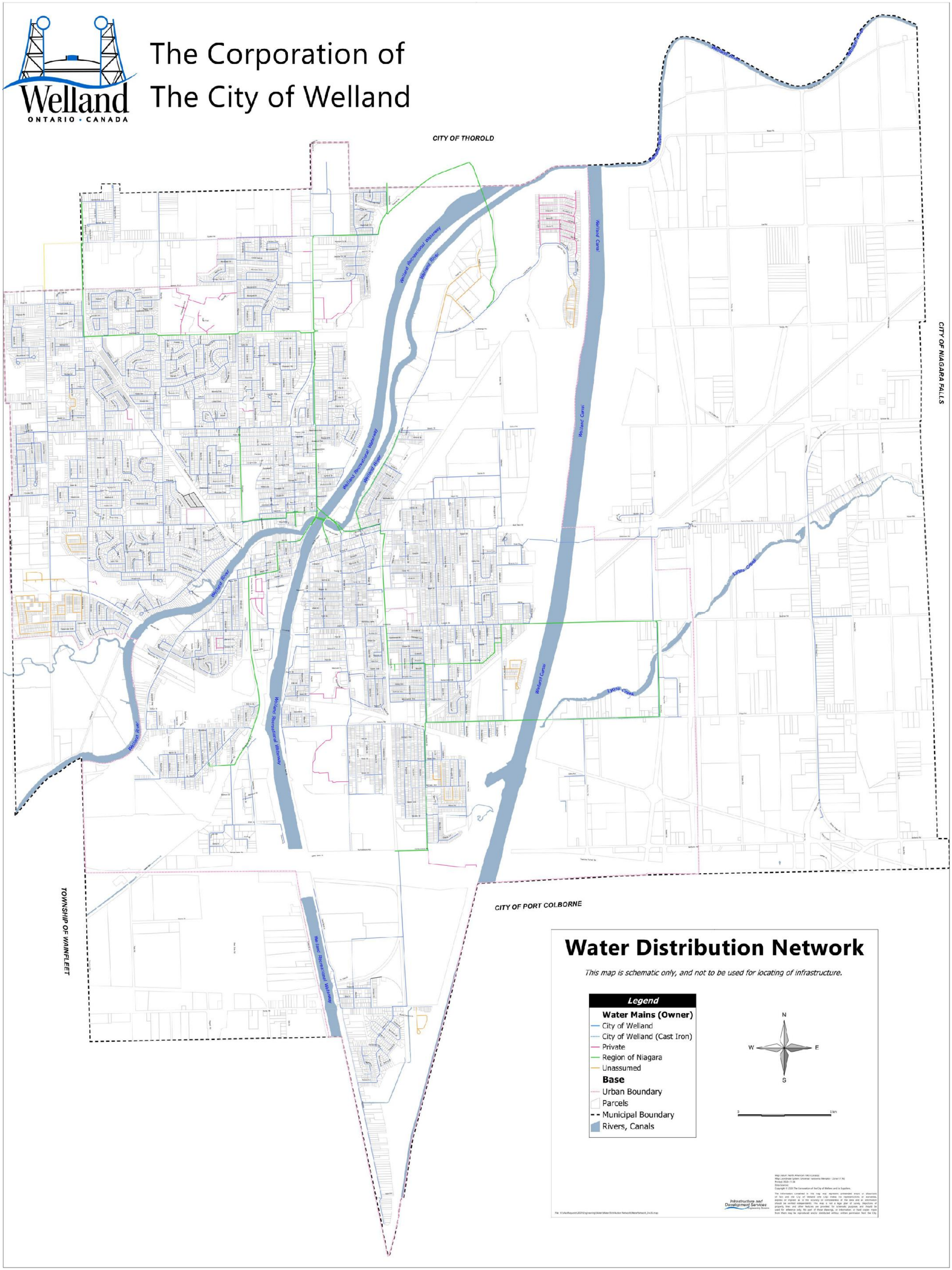
Base
- Urban Boundary
- Parcels
- Municipal Boundary
- Rivers, Canals

N
W
E
S

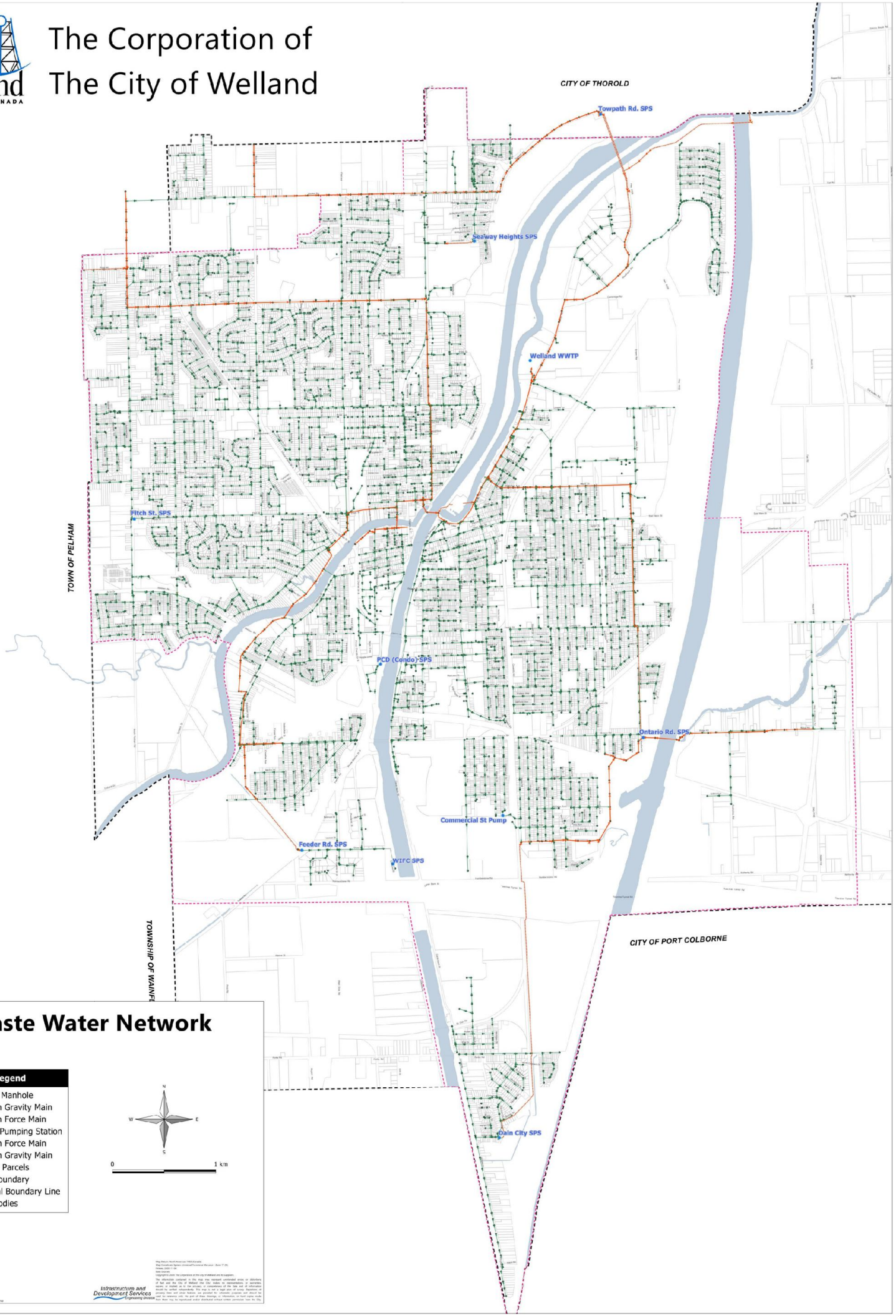
0 1 km

Infrastructure and Development Services

The Corporation of The City of Welland



The Corporation of
The City of Welland



Waste Water Network

Legend

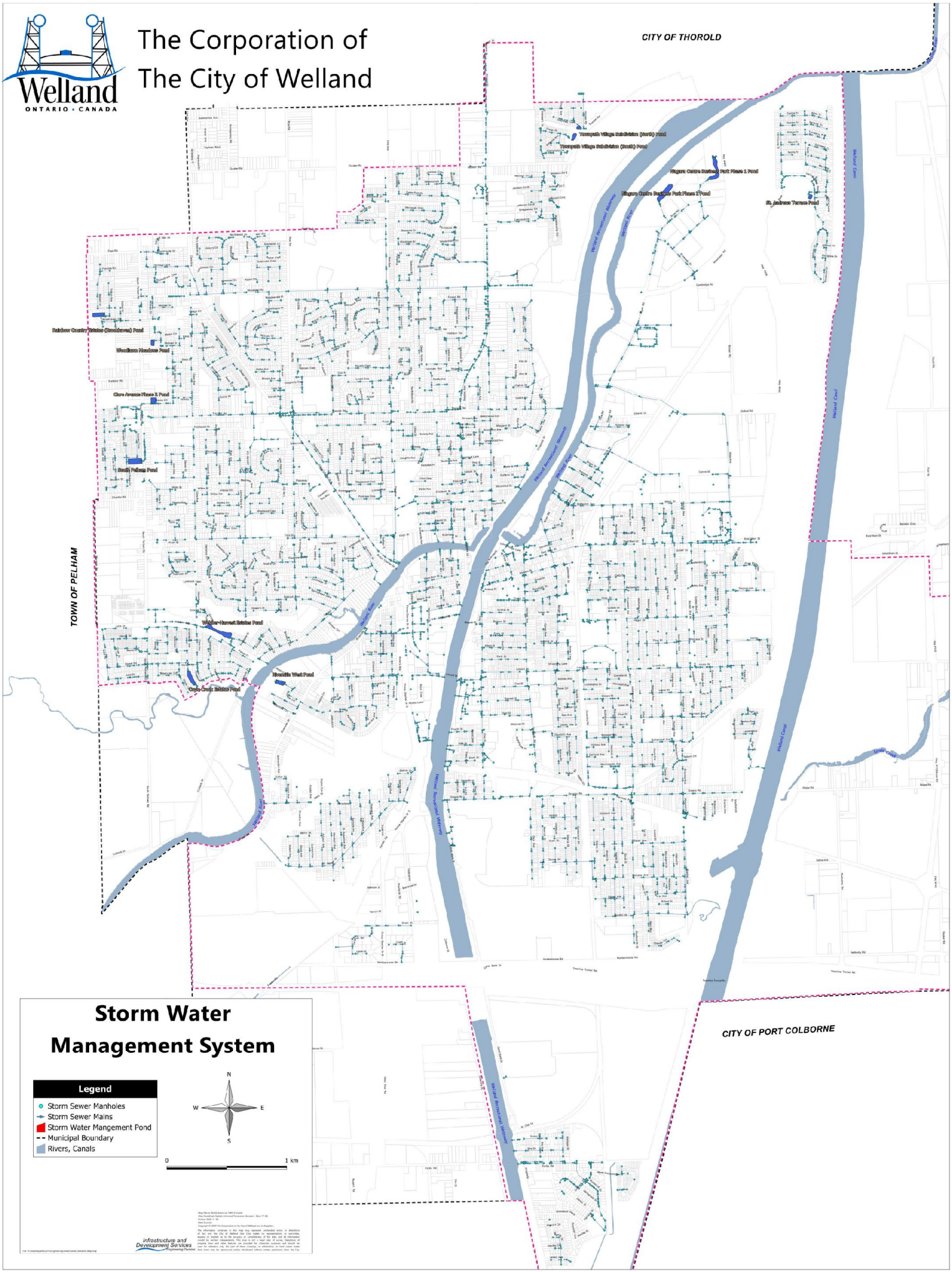
- Sanitary Manhole
- CoW San Gravity Main
- CoW San Force Main
- Sewage Pumping Station
- RMN San Force Main
- RMN San Gravity Main
- Property Parcels
- Urban Boundary
- Municipal Boundary Line
- Water Bodies

N
W
E
S

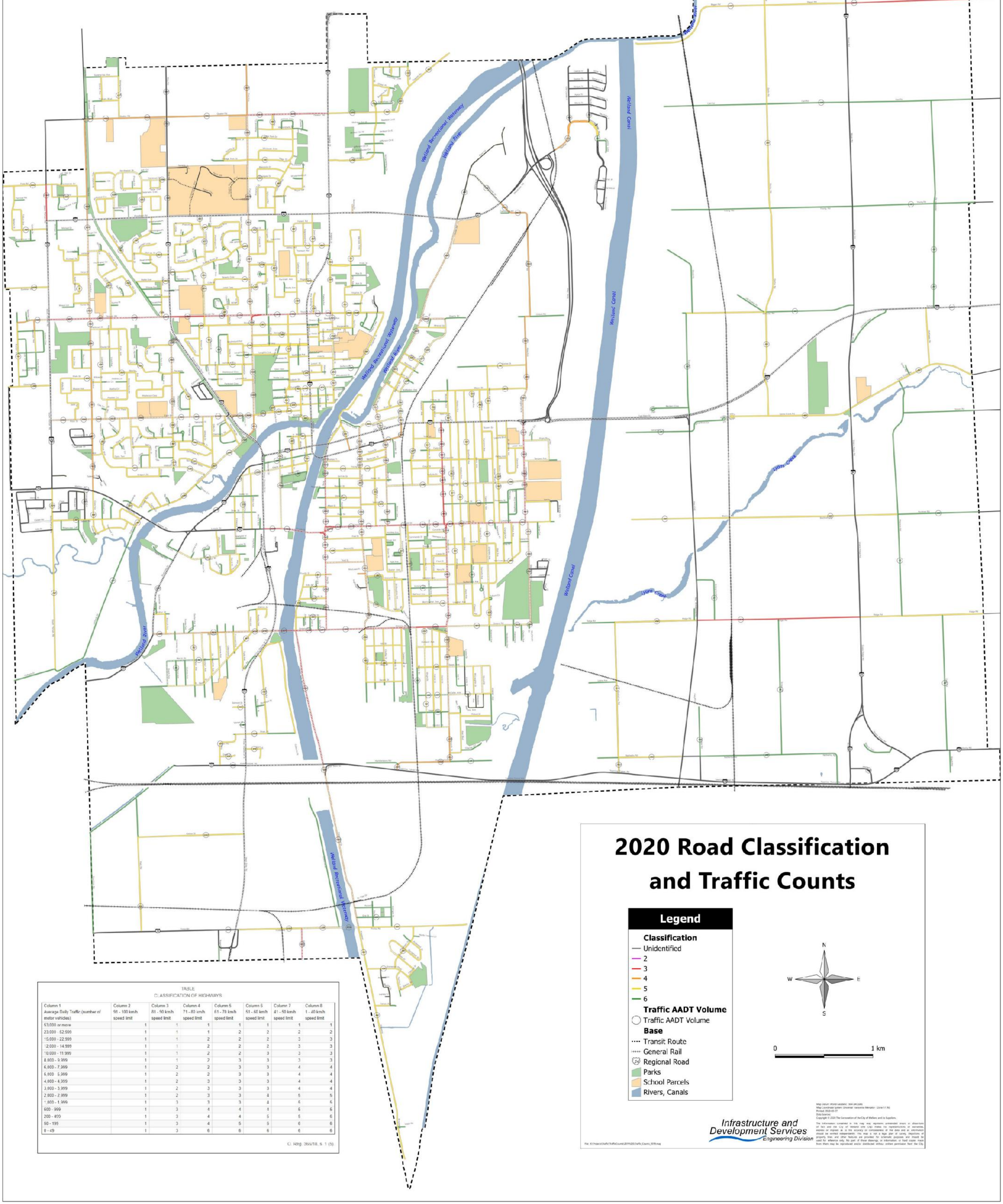
0 1 km

Infrastructure and Development Services
Engineering Division

The Corporation of The City of Welland



The Corporation of The City of Welland



2020 Road Classification and Traffic Counts

TABLE
CLASSIFICATION OF HIGHWAYS

Column 1 Average Daily Traffic (number of motor vehicles)	Column 2 91 - 100 km/h speed limit	Column 3 81 - 90 km/h speed limit	Column 4 71 - 80 km/h speed limit	Column 5 61 - 70 km/h speed limit	Column 6 51 - 60 km/h speed limit	Column 7 41 - 50 km/h speed limit	Column 8 1 - 40 km/h speed limit
53,000 or more	1	1	1	1	1	1	1
23,000 - 52,999	1	1	1	2	2	2	2
15,000 - 22,999	1	1	2	2	2	3	3
12,000 - 14,999	1	1	2	2	2	3	3
10,000 - 11,999	1	1	2	2	3	3	3
8,000 - 9,999	1	1	2	3	3	3	3
6,000 - 7,999	1	2	2	3	3	4	4
5,000 - 5,999	1	2	2	3	3	4	4
4,000 - 4,999	1	2	3	3	3	4	4
3,000 - 3,999	1	2	3	3	3	4	4
2,000 - 2,999	1	2	3	3	4	5	5
1,000 - 1,999	1	3	3	3	4	5	5
500 - 999	1	3	4	4	4	5	6
200 - 499	1	3	4	4	5	5	6
50 - 199	1	3	4	5	5	6	6
0 - 49	1	3	6	6	6	6	6

O. Reg. 366/18, s. 1 (5).