Wawa

August 2020

The Asset Management Plan for the Municipality of Wawa

PSD RESEARCH CONSULTING SOFTWARE

Key Statistics

$133.8 million Replacement cost of asset portfolio	**$116,327** Replacement cost of infrastructure per household (2016)
2.90% Target average annual infrastructure reinvestment rate	**0.81%** Actual average annual infrastructure reinvestment rate
64% Percentage of assets in fair or better condition	**35%** Percentage of assets with assessed condition data
42% Percentage of sustainable capital funding that comes from the Federal Gas Tax/OCIF	**28%** Percentage of annual infrastructure needs funded from sustainable revenue sources
$2.8 million Annual capital infrastructure deficit	**20 years** Recommended timeframe for eliminating annual infrastructure deficit

Table of Contents

Executive Summary

Municipal infrastructure provides the foundation for the economic, social and environmental health and growth of a community through the delivery of critical services. The goal of asset management is to deliver an adequate level of service in the most cost-effective manner. This involves the development and implementation of asset management strategies and long-term financial planning.

All municipalities in Ontario are required to complete an asset management plan (AMP) in accordance with Ontario Regulation 588/17 (O. Reg. 588/17). This AMP outlines the current state of asset management planning in the Municipality of Wawa. It identifies the current practices and strategies that are in place to manage public infrastructure and makes recommendations where they can be further refined. Through the implementation of sound asset management strategies, the Municipality can ensure that public infrastructure is managed to support the sustainable delivery of municipal services.

This AMP includes the following asset categories:

Asset Category	Source of Funding
Bridges & Culverts	Tax Levy
Buildings	
Land Improvements	
Machinery & Equipment	
Road Network	
Vehicles	
Storm Water Network	
Water Network	User Rates
Sanitary Sewer Network	

The overall replacement cost of the asset categories included in this AMP totals $133.8 million. 64% of all assets analysed in this AMP are in fair or better condition and assessed condition data was available for 35% of assets. For the remaining 65% of assets, assessed condition data was unavailable, and asset age was used to approximate condition – a data gap that persists in most municipalities. Generally, age misstates the true condition of assets, making assessments essential to accurate asset management planning, and a recurring recommendation in this AMP.

The development of a long-term, sustainable financial plan requires an analysis of whole lifecycle costs. This AMP has used a combination of proactive lifecycle strategies (paved roads) and replacement only strategies (all other assets) to determine the lowest cost option to maintain the current level of service.

To meet capital replacement and rehabilitation needs for existing infrastructure, prevent infrastructure backlogs, and achieve long-term sustainability, the Municipality's average annual

capital requirement totals $3.9 million. Based on a historical analysis of sustainable capital funding sources, the Municipality is committing approximately $1.1 million towards capital projects or reserves per year. As a result, there is currently an annual funding gap of $2.8 million.

A financial strategy was developed to address the annual capital funding gap. The following table compares to total and average annual tax/rate change required to eliminate the Municipality's infrastructure deficit:

Funding Source	Years Until Full Funding	Total Tax/Rate Change	Average Annual Tax/Rate Change
Tax-Funded Assets	20 Years	29.6%	1.5%
Rate-Funded (Water)	20 Years	96.4%	4.8%
Rate-Funded (Sanitary)	20 Years	62.7%	3.1%

This AMP represents a snapshot in time and is based on the best available processes, data, and information at the Municipality. Strategic asset management planning is an ongoing and dynamic process that requires continuous improvement and dedicated resources. Several recommendations have been developed to guide the continuous refinement of the Municipality's asset management program. These include:

a) regular and ongoing asset inventory data review to ensure that asset management planning and long-term projections are based on completed and accurate data
b) the development of a condition assessment strategy on a regular schedule according to defined criteria
c) the continuous review, development and implementation of optimal lifecycle management strategies
d) the development of short- and long-term capital plans for each asset category to ensure adequate revenue is available to meet capital requirements
e) the measurement of current levels of service across all asset categories and eventually the identification of proposed levels of service that are realistic and sustainable

The evaluation of the above items and further development of a data-driven, best-practice approach to asset management is recommended to ensure the Municipality is providing optimal value through its management of infrastructure and delivery of services.

With the development of this AMP the Municipality has achieved compliance with O. Reg. 588/17 to the extent of the requirements that must be completed by July 1, 2021. There are additional requirements concerning proposed levels of service and growth that must be met by July 1, 2023 and 2024.

AM Program Recommendations

Asset management is an ongoing practice that requires dedicated time and resources across all departments. The above recommendations include many key activities designed to enhance the accuracy and reliability of asset management planning.

However, it is far from a comprehensive list of all activities required to manage a municipal asset management program. Timelines, resources and effort for the above recommendations and all regular asset management activities should be reviewed regularly. Roles and responsibilities should be clearly defined and delegated to assigned resources to ensure that the Municipality's asset management program is progressing towards its strategic goals and objectives.

The following table provides a summarized list of recommendations to further the development of the Municipality's asset management program. A more detailed description of each recommendation can be found within the appropriate Asset Category in Section 4 of the AMP.

Recommendation Category	Recommendation Details	Applicable Asset Categories
Asset Inventory/Data Refinement	Develop Sidewalk Inventory	Road Network
	Develop a Component-Based Inventory	Buildings
	Review Replacement Costs	Buildings Machinery & Equipment Vehicles Land Improvements Water Network Sanitary Sewer Network
Condition Assessment Strategies	Develop a Condition Assessment Strategy	All Asset Categories
	Review Backlog Assets	Buildings Machinery & Equipment Vehicles Land Improvements Water Network
Lifecycle Management Strategies	Develop a Short-Term Capital Plan	Machinery & Equipment Vehicles Land Improvements
	Develop a Long-Term Capital Plan	Road Network Storm Water Network Buildings Water Network Sanitary Sewer Network
	Review Lifecycle Management Strategy	Road Network
Levels of Service	Measure Current Levels of Service	Road Network Bridges & Culverts Storm Water Network Water Network Sanitary Sewer Network
	Identify Additional LOS Metrics	Road Network Bridges & Culverts Storm Water Network Water Network Sanitary Sewer Network
	Identify Proposed Levels of Service	Road Network Bridges & Culverts Storm Water Network Water Network Sanitary Sewer Network
	Identify Current Levels of Service Metrics	Buildings Machinery & Equipment Vehicles Land Improvements

1 Introduction & Context

Key Insights

- The goal of asset management is to minimize the lifecycle costs of delivering infrastructure services, manage the associated risks, while maximizing the value ratepayers receive from the asset portfolio

- The Municipality's asset management policy provides clear direction to staff on their roles and responsibilities regarding asset management

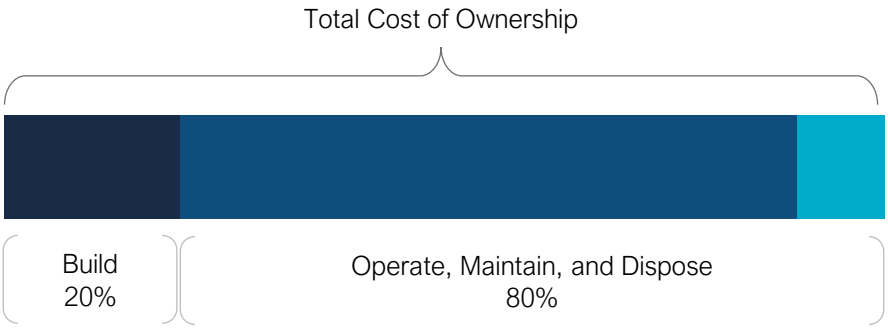
- An asset management plan is a living document that should be updated regularly to inform long-term planning

- Ontario Regulation 588/17 outlines several key milestones and requirements for asset management plans in Ontario between July 1, 2021 and 2024

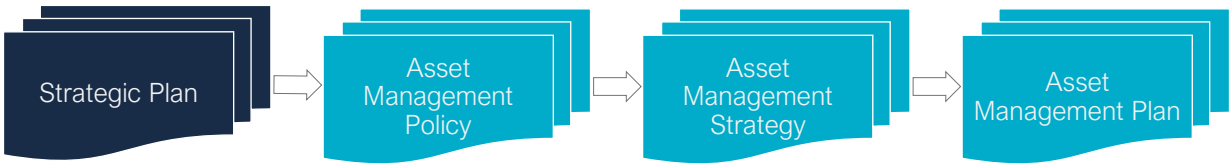
1.1 An Overview of Asset Management

Municipalities are responsible for managing and maintaining a broad portfolio of infrastructure assets to deliver services to the community. The goal of asset management is to minimize the lifecycle costs of delivering infrastructure services, manage the associated risks, while maximizing the value ratepayers receive from the asset portfolio.

The acquisition of capital assets accounts for only 10-20% of their total cost of ownership. The remaining 80-90% comes from operations and maintenance. This AMP focuses its analysis on the capital costs to maintain, rehabilitate and replace existing municipal infrastructure assets.



These costs can span decades, requiring planning and foresight to ensure financial responsibility is spread equitably across generations. An asset management plan is critical to this planning, and an essential element of a broader asset management program. The diagram below depicts an industry-standard approach and sequence to developing a practical asset management program.



The diagram, adopted from the Institute of Asset Management (IAM), illustrates the concept of 'line of sight', or alignment between the corporate strategic plan and various asset management documents. The strategic plan has a direct, and cascading impact on asset management planning and reporting.

1.1.1 Asset Management Policy

An asset management policy represents a statement of the principles guiding the municipality's approach to asset management activities. It aligns with the organizational strategic plan and provides clear direction to municipal staff on their roles and responsibilities as part of the asset management program.

The Municipality's Asset Management Policy was developed in 2019 (By-law No. 3204-19) in satisfaction of the requirements outlined in O. Reg. 588/17.

This Asset Management Plan satisfies the policy statement outlined in Section 4.3:

> "*The Municipality will develop an asset management plan that incorporates all infrastructure categories and assets that meet the capitalization thresholds outlined in the organization's Tangible Capital Asset Policy, and it will be updated at least every five years to promote, document and communicate continuous improvement*"

1.1.2 Asset Management Strategy

An asset management strategy outlines the translation of organizational objectives into asset management objectives and provides a strategic overview of the activities required to meet these objectives. It provides greater detail than the policy on how the municipality plans to achieve asset management objectives through planned activities and decision-making criteria.

The Municipality's Asset Management Policy contains many of the key components of an asset management strategy and may be expanded on in future revisions or as part of a separate strategic document.

1.1.3 Asset Management Plan

The asset management plan (AMP) provides a snapshot in time of the current state of municipal infrastructure assets as well as the current strategies in place to assist with planning and decision-making.

The focus of the AMP is not simply about identifying the money or resources that are required to meet lifecycle needs of infrastructure and maintain an adequate level of service. It should also identify the processes and strategies that are and can be implemented to improve decision-making outcomes.

The AMP is a living document that should be updated regularly as additional asset and financial data becomes available. This will allow the municipality to re-evaluate the state of infrastructure and identify how the organization's asset management and financial strategies are progressing.

1.2 Key Concepts in Asset Management

Effective asset management integrates several key components, including lifecycle management, risk management, and levels of service. These concepts are applied throughout this asset management plan and are described below in greater detail.

1.2.1 Lifecycle Management Strategies

The condition or performance of most assets will deteriorate over time. This process is affected by a range of factors including an asset's characteristics, location, utilization, maintenance history and environment. Asset deterioration has a negative effect on the ability of an asset to fulfill its intended function, and may be characterized by increased cost, risk and even service disruption.

To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

There are several field intervention activities that are available to extend the life of an asset. These activities can be generally placed into one of three categories: maintenance, rehabilitation and replacement. The following table provides a description of each type of activity and the general difference in cost.

Lifecycle Activity	Description	Example (Roads)	Cost
Maintenance	Activities that prevent defects or deteriorations from occurring	Crack Seal	$
Rehabilitation/ Renewal	Activities that rectify defects or deficiencies that are already present and may be affecting asset performance	Mill & Re-surface	$$
Replacement/ Reconstruction	Asset end-of-life activities that often involve the complete replacement of assets	Full Reconstruction	$$$

Depending on initial lifecycle management strategies, asset performance can be sustained through a combination of maintenance and rehabilitation, but at some point, replacement is required. Understanding what effect these activities will have on the lifecycle of an asset, and their cost, will enable staff to make better recommendations.

The Municipality's approach to lifecycle management is described within each asset category outlined in this AMP. Developing and implementing a proactive lifecycle strategy will help staff to determine which activities to perform on an asset and when they should be performed to maximize useful life at the lowest total cost of ownership.

1.2.2 Risk Management Strategies

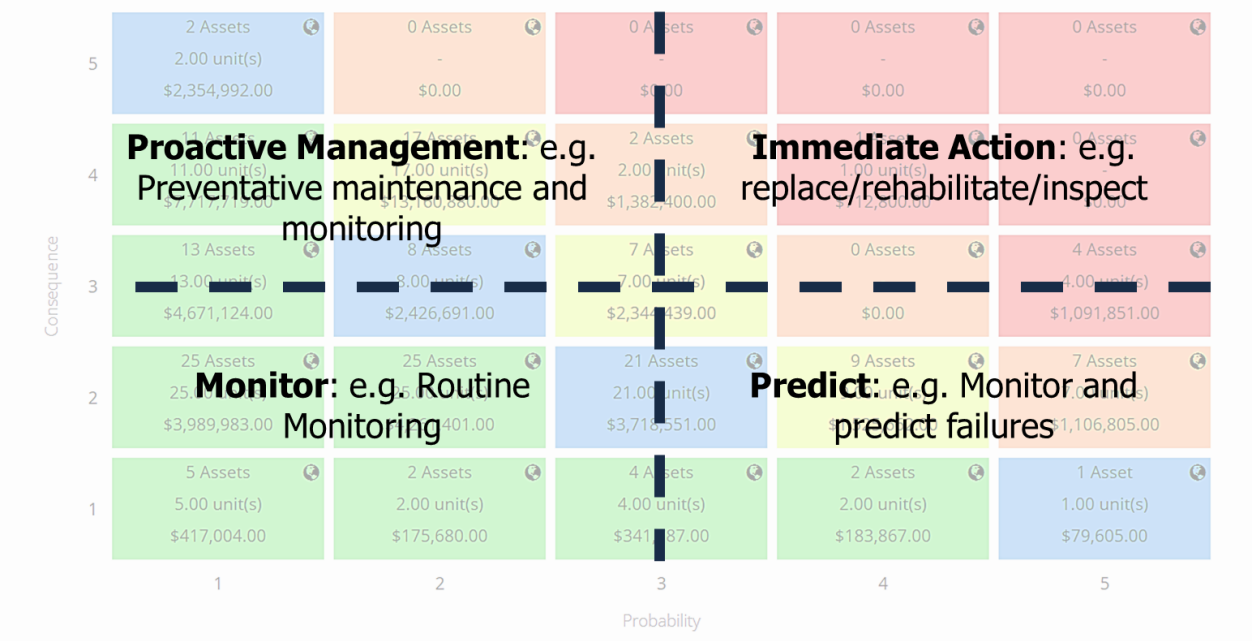
Municipalities generally take a 'worst-first' approach to infrastructure spending. Rather than prioritizing assets based on their importance to service delivery, assets in the worst condition are fixed first, regardless of their criticality. However, not all assets are created equal, and some assets pose a greater risk to service delivery if they were to fail.

For example, a road with a high volume of traffic that provides access to critical services poses a higher risk than a low volume rural road servicing a handful of properties. Asset risk and criticality is a key component of both short- and long-term planning.

$$\textbf{\textit{Risk Rating}} = \textit{Probability of Failure x Consequence of Failure}$$

This AMP includes a high-level evaluation of asset risk and criticality. Each asset has been assigned a probability of failure score and consequence of failure score based on available asset data. These risk scores can be used to prioritize maintenance, rehabilitation and replacement strategies for critical assets.

Risk matrices are a useful tool used to visualize risk across a group of assets. The following image provides an example of the actions or strategies that may be considered depending on an asset's risk rating.



1.2.3 Levels of Service

A level of service (LOS) is a measure of what the Municipality is providing to the community and the nature and quality of that service. Within each asset category in this AMP, technical metrics and qualitative descriptions that measure both technical and community levels of service have been established and measured as data is available.

These measures include a combination of those that have been outlined in O. Reg. 588/17 in addition to performance measures identified by the Municipality as worth measuring and evaluating. The Municipality measures the level of service provided at two levels: Community Levels of Service, and Technical Levels of Service.

Community Levels of Service

Definition: a simple, plain language description or measure of the service that the community receives.

Example: Description or images that illustrate the different levels of road class pavement condition

Technical Levels of Service

Definition: Technical levels of service are a measure of key technical attributes of the service being provided to the community. These include mostly quantitative measures and tend to reflect the impact of the municipality's asset management strategies on the physical condition of assets or the quality/capacity of the services they provide.

Example: Lane-km of local roads (MMS classes 5 and 6) per land area (km/km^2)

Current and Proposed Levels of Service

This AMP focuses on measuring the current level of service provided to the community. Once current levels of service have been measured, the Municipality will need to establish proposed levels of service over a 10-year period, in accordance with O. Reg. 588/17.

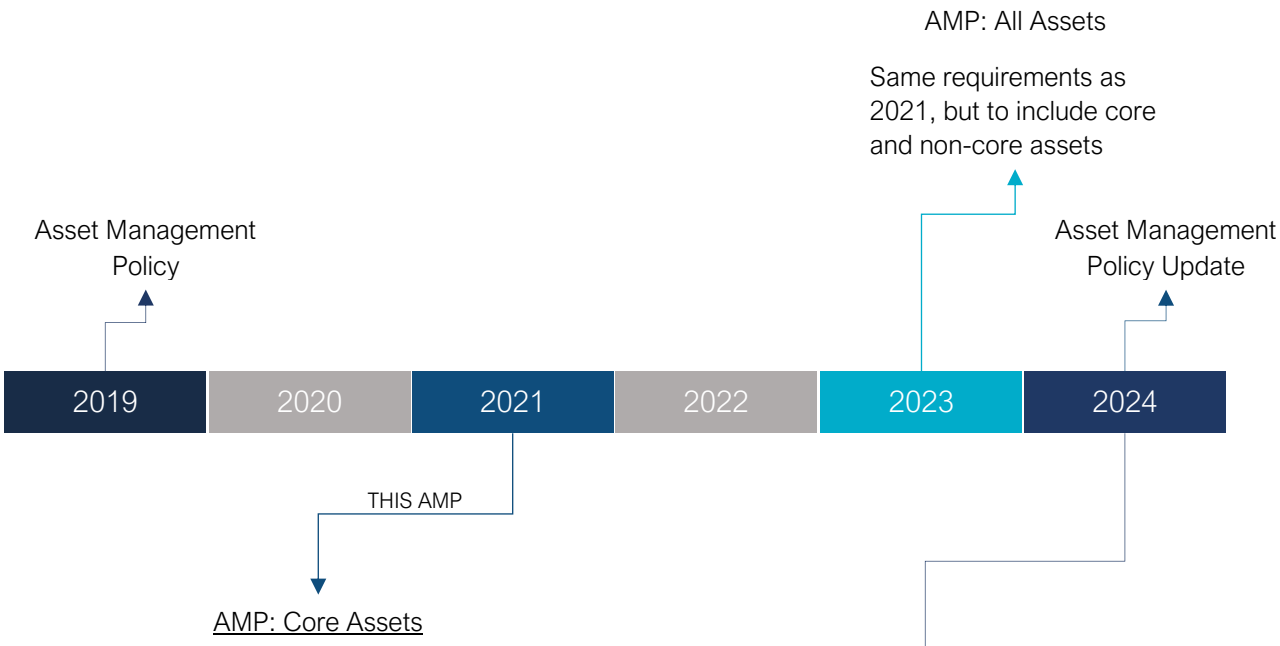
Proposed levels of service should be realistic and achievable within the timeframe outlined by the Municipality. They should also be determined with consideration of a variety of community expectations, fiscal capacity, regulatory requirements, corporate goals and long-term sustainability.

Once proposed levels of service have been established, and prior to July 2024, the Municipality must identify a lifecycle management and financial strategy which allows these targets to be achieved.

1.3 Ontario Regulation 588/17

As part of the *Infrastructure for Jobs and Prosperity Act, 2015*, the Ontario government introduced Regulation 588/17 - Asset Management Planning for Municipal Infrastructure (O. Reg 588/17). Along with creating better performing organizations, more liveable and sustainable communities, the regulation is a key, mandated driver of asset management planning and reporting. It places substantial emphasis on current and proposed levels of service and the lifecycle costs incurred in delivering them.

The diagram below outlines key reporting requirements under O. Reg 588/17 and the associated timelines.



1. Current levels of service
2. Inventory analysis
3. Lifecycle activities to sustain LOS
4. Cost of lifecycle activities
5. Population and employment forecasts
6. Discussion of growth impacts

1. Proposed levels of service for next 10 years
2. Updated inventory analysis
3. Lifecycle management strategy
4. Financial strategy and addressing shortfalls
5. Discussion of how growth assumptions impacted lifecycle and financial strategy

1.3.1 O. Reg. 588/17 Compliance Review

The following table identifies the requirements outlined in Ontario Regulation 588/17 for municipalities to meet by July 1, 2021. Next to each requirement a page or section reference is included in addition to any necessary commentary.

Requirement	O. Reg. Section	AMP Section Reference	Status
Summary of assets in each category	S.5(2), 3(i)	4.1.1 - 5.2.1	Complete
Replacement cost of assets in each category	S.5(2), 3(ii)	4.1.1 - 5.2.1	Complete
Average age of assets in each category	S.5(2), 3(iii)	4.1.3 - 5.2.3	Complete
Condition of core assets in each category	S.5(2), 3(iv)	4.1.2 – 5.2.2	Complete
Description of municipality's approach to assessing the condition of assets in each category	S.5(2), 3(v)	4.1.2 – 5.2.2	Complete
Current levels of service in each category	S.5(2), 1(i-ii)	4.1.6 - 5.2.6	Complete for Core Assets Only
Current performance measures in each category	S.5(2), 2	4.1.6 - 5.2.6	Complete for Core Assets Only
Lifecycle activities needed to maintain current levels of service for 10 years	S.5(2), 4	4.1.4 - 5.2.4	Complete
Costs of providing lifecycle activities for 10 years	S.5(2), 4	Appendix A	Complete
Growth assumptions	S.5(2), 5(i-ii) S.5(2), 6(i-vi)	6.1-6.2	Complete

2 Scope and Methodology

Key Insights

- This asset management plan includes 9 asset categories and is divided between tax-funded and rate-funded categories
- The source and recency of replacement costs impacts the accuracy and reliability of asset portfolio valuation
- Accurate and reliable condition data helps to prevent premature and costly rehabilitation or replacement and ensures that lifecycle activities occur at the right time to maximize asset value and useful life

2.1 Asset Data Hierarchy

This asset management plan uses a two-tier asset hierarchy to sort assets into both a primary functional category (e.g. Road Network) and a secondary departmental or characteristic-based segment (e.g. Paved Roads or Transportation Services).

2.1.1 Asset Categories

This asset management plan for the Municipality of Wawa is produced in compliance with Ontario Regulation 588/17. The July 2021 deadline under the regulation—the first of three AMP updates—requires analysis of only core assets (roads, bridges & culverts, water, wastewater, and stormwater). This AMP includes both core and non-core asset categories.

The AMP summarizes the state of the infrastructure for the Municipality's asset portfolio, establishes current levels of service and the associated technical and community oriented key performance indicators (KPIs), outlines lifecycle strategies for optimal asset management and performance, and provides financial strategies to reach sustainability for the asset categories listed below.

Asset Category	Source of Funding
Bridges & Culverts	Tax Levy
Buildings	
Land Improvements	
Machinery & Equipment	
Road Network	
Vehicles	
Storm Water Network	
Water Network	User Rates
Sanitary Sewer Network	

2.1.2 Asset Segments

Within each asset category a series of segments have been developed to allow for a more granular level of analysis. This secondary level of the asset data hierarchy aims to group assets together based on either departmental ownership or assets with similar characteristics. Examples of both approaches are found in the tables below

Asset Category	Asset Segment (Departmental)
Machinery & Equipment	Environmental Services
	General Government
	Protective Services

Asset Category	Asset Segment (Characteristics)
Water Network	Hydrants
	Pumping Stations
	Watermains

2.2 Deriving Replacement Costs

Replacement costs should reflect the total costs associated with the full replacement or reconstruction of an asset. They should include the combined cost of materials, plant, labour, engineering and administrative costs.

This AMP relies on two methods to determine asset replacement costs:

- Unit Cost: A unit-based cost (e.g. per metre) determined through a review of recent contracts, reports and/or staff estimates

- Historical Cost Inflation: Inflation of the asset cost recorded at the time it was initially acquired to today's value using an index (e.g. CPI or NRBCPI)

Historical cost inflation is typically used in the absence of reliable unit cost data. It is a fairly reliable method for recently purchased and/or constructed assets where the cost is reflective of the total capital costs that the Municipality incurred. As assets age, and new products and technologies impact procurement costs and construction methods, cost inflation becomes a less reliable technique to determine replacement cost.

The following table identifies the methods employed to determine replacement costs across each asset category:

Asset Category	Replacement Cost Method	
	Unit Cost	Cost Inflation
Bridges & Culverts	-	100%
Buildings	6%	94%
Land Improvements	100%	-
Machinery & Equipment	100%	-
Road Network	98%	2%
Vehicles	-	100%
Storm Water Network	100%	-
Water Network	55%	45%
Sanitary Sewer Network	64%	36%
Overall:	**48%**	**51%**

All unit costs were reviewed by Municipality of Wawa staff and determined to be the best available cost estimates at the time this AMP was developed.

2.3 Estimated Useful Life and Service Life Remaining

The estimated useful life (EUL) of an asset is the period over which the Municipality expects the asset to be available for use and remain in service before requiring replacement or disposal. The EUL for each asset in this AMP was assigned according to the knowledge and expertise of municipal staff and supplemented by existing industry standards when necessary.

By using an asset's in-service data and its EUL, the Municipality can determine the service life remaining (SLR) for each asset. Using condition data and the asset's SLR, the Municipality can more accurately forecast when it will require replacement. The SLR is calculated as follows:

$$Service\ Life\ Remaining\ (SLR) = In\ Service\ Date + Estimated\ Useful\ Life(EUL) - Current\ Year$$

2.4 Reinvestment Rate

As assets age and deteriorate they require additional investment to maintain a state of good repair. The reinvestment of capital funds, through asset renewal or replacement, is necessary to sustain an adequate level of service. The reinvestment rate is a measurement of available or required funding relative to the total replacement cost.

By comparing the actual vs. target reinvestment rate the Municipality can determine the extent of any existing funding gap. The reinvestment rate is calculated as follows:

$$Target\ Reinvestment\ Rate = \frac{Annual\ Capital\ Requirement}{Total\ Replacement\ Cost}$$

$$Actual\ Reinvestment\ Rate = \frac{Annual\ Capital\ Funding}{Total\ Replacement\ Cost}$$

2.5 Deriving Asset Condition

An incomplete or limited understanding of asset condition can mislead long-term planning and decision-making. Accurate and reliable condition data helps to prevent premature and costly rehabilitation or replacement and ensures that lifecycle activities occur at the right time to maximize asset value and useful life.

A condition assessment rating system provides a standardized descriptive framework that allows comparative benchmarking across the Municipality's asset portfolio. The table below outlines the condition rating system used in this AMP to determine asset condition. This rating system is aligned with the Canadian Core Public Infrastructure Survey which is used to develop the Canadian Infrastructure Report Card. When assessed condition data is not available, service life remaining is used to approximate asset condition.

Condition	Description	Criteria	Service Life Remaining (%)
Very Good	Fit for the future	Well maintained, good condition, new or recently rehabilitated	80-100
Good	Adequate for now	Acceptable, generally approaching mid-stage of expected service life	60-80
Fair	Requires attention	Signs of deterioration, some elements exhibit significant deficiencies	40-60
Poor	Increasing potential of affecting service	Approaching end of service life, condition below standard, large portion of system exhibits significant deterioration	20-40
Very Poor	Unfit for sustained service	Near or beyond expected service life, widespread signs of advanced deterioration, some assets may be unusable	0-20

The analysis in this AMP is based on assessed condition data only as available. In the absence of assessed condition data, asset age is used as a proxy to determine asset condition. Appendix D includes additional information on the role of asset condition data and provides basic guidelines for the development of a condition assessment program.

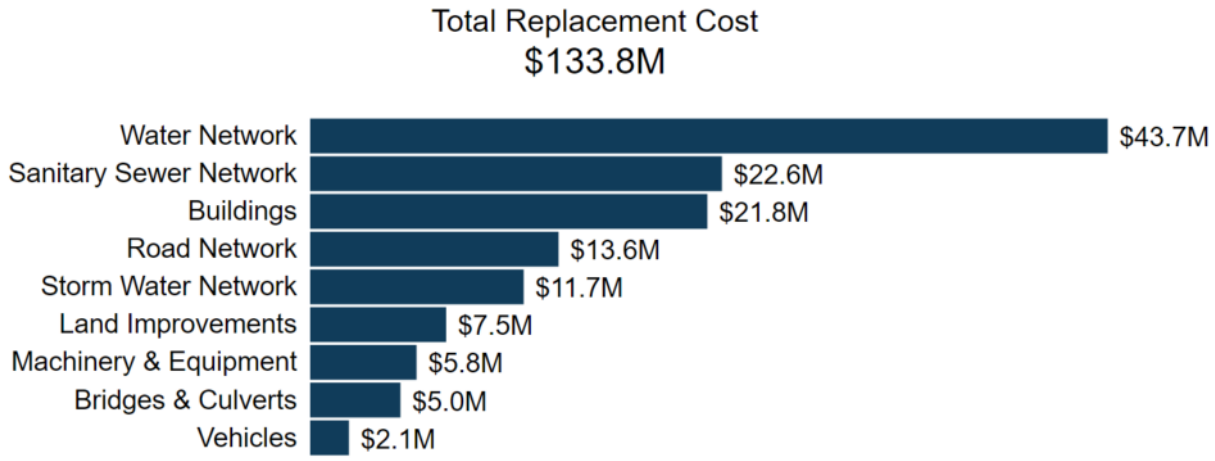
3 Portfolio Overview

Key Insights

- The total replacement cost of the Municipality's asset portfolio is $133.8 million
- The Municipality's target re-investment rate is 2.90%, and the actual re-investment rate is 0.81%, contributing to an expanding infrastructure deficit
- 64% of all assets are in fair or better condition
- 21% of assets are projected to require replacement in the next 10 years
- Average annual capital requirements total $3.9 million per year across all assets

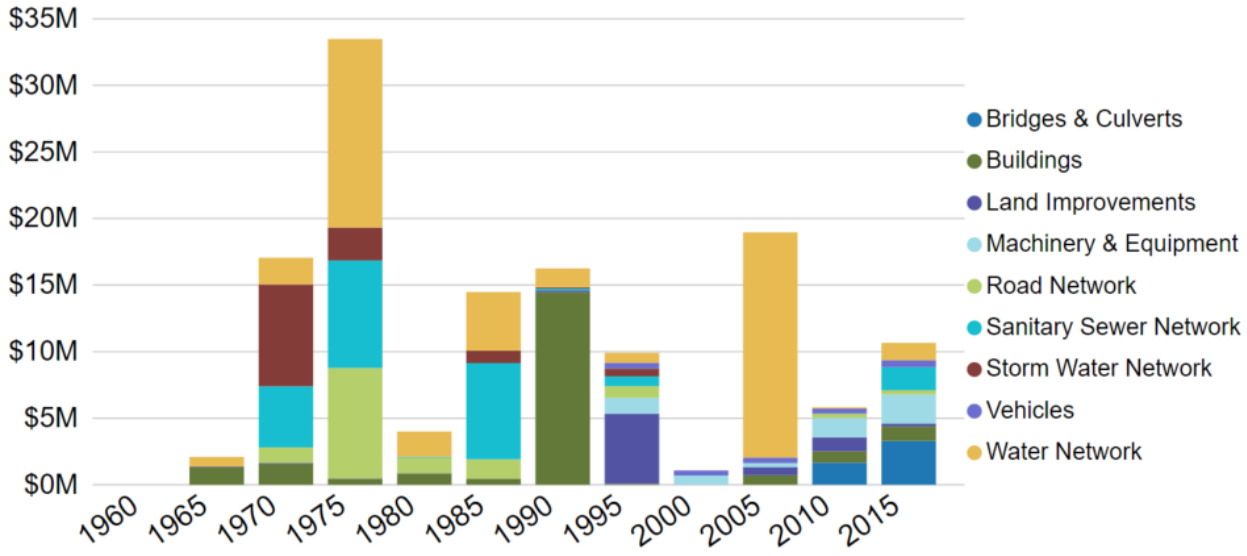
3.1 Total Replacement Cost of Asset Portfolio

The asset categories analyzed in this AMP have a total replacement cost of $133.8 million. This total was determined based on a combination of unit costs and historical cost inflation. This estimate reflects replacement of historical assets with similar, not necessarily identical, assets available for procurement today.



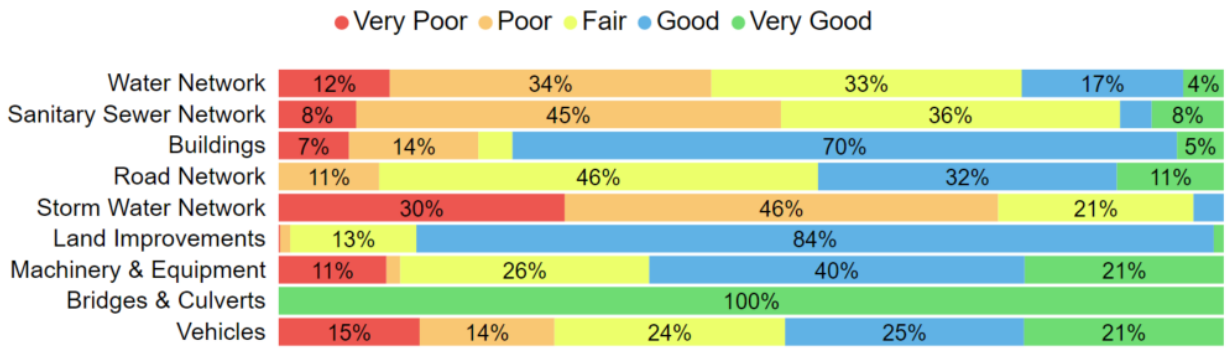
3.2 Installation Profile

The following graph illustrates the installation profile for the assets analysed in this AMP based on their in-service date and current replacement value.



3.3 Condition of Asset Portfolio

The current condition of the assets is central to all asset management planning. Collectively, **64%** of assets in Wawa are in fair or better condition. This estimate relies on both age-based and assessed condition data.



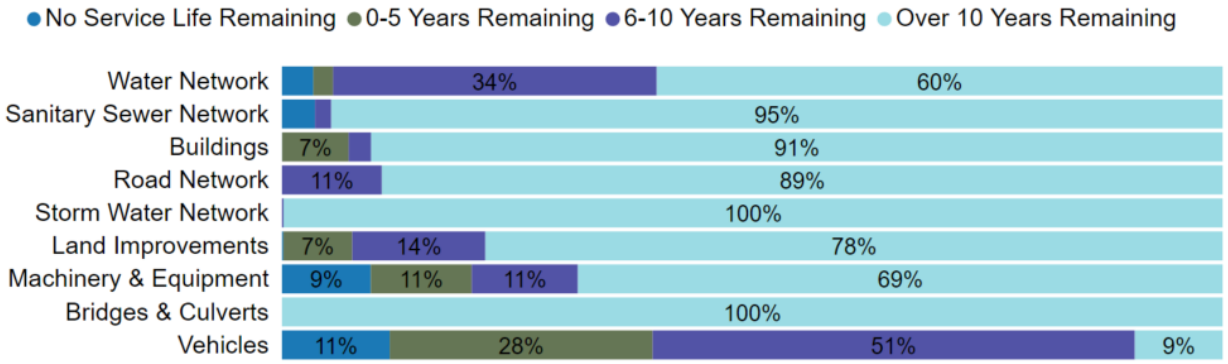
This AMP relies on assessed condition data for **35%** of assets; for the remaining portfolio, age is used as an approximation of condition. Assessed condition data is invaluable in asset management planning as it reflects the true condition of the asset and its ability to perform its functions. The table below identifies the source of condition data used throughout this AMP.

Asset Category	% of Assets with Assessed Condition	Source of Condition Data
Water Network	2%	Staff Assessments
Sanitary Sewer Network	0%	Age-based estimates
Buildings	85%	Staff Assessments
Road Network	95%	Staff & Engineering Assessments
Storm Water Network	0%	Age-based estimates
Land Improvements	90%	Staff Assessments
Machinery & Equipment	32%	Staff Assessments
Bridges & Culverts	76%	2018 OSIM Inspections
Vehicles	50%	Staff Assessments
Overall:	**35%**	

The development of a condition assessment program across all asset categories is critical to confidence in long-term asset management planning. **Appendix D** provides a high-level overview of the role of asset condition data and key considerations in the development of a condition assessment program.

3.4 Service Life Remaining

Based on asset age, available assessed condition data and estimated useful life, **21%** of the Municipality's assets have less than 10 years of service life remaining. Capital requirements over the next 10 years are identified in Appendix A.



Category	Estimated Useful Life Range (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Water Network	10-75 Years	39.3	19.4
Sanitary Sewer Network	20-75 Years	41.1	26.7
Buildings	9-40 Years	17.8	15.7
Road Network	20-40 Years	38.6	20.2
Storm Water Network	50-75 Years	44.0	19.3
Land Improvements	10-30 Years	19.7	10.5
Machinery & Equipment	3-20 Years	9.1	5.7
Bridges & Culverts	50 Years	4.4	44.0
Vehicles	5-15 Years	8.2	5.8
Total:		**39.4**	**19.8**

While capital planning horizons tend to be short (<10 Years), a sustainable lifecycle and financial strategy should consider the full lifecycle of all assets.

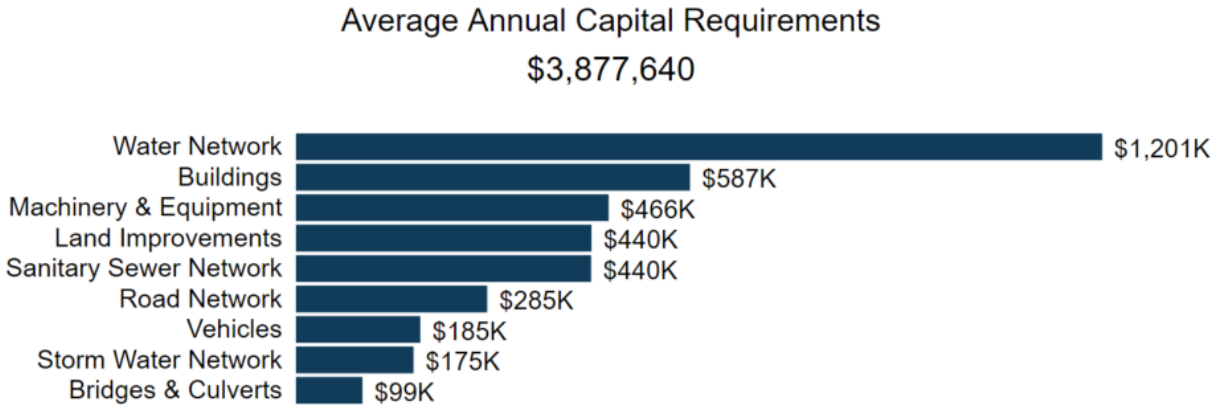
Short-term capital costs may be low for asset categories with long useful lives where infrastructure is relatively new. However, planning and saving for long-term capital costs is a key component of asset management planning.

The calculation of an average annual capital requirement considers the estimated useful life and cost of infrastructure to identify the amount that the Municipality should be allocating to meet capital needs regardless of whether the project costs will be incurred in the short- or long-term.

3.5 Forecasted Capital Requirements

3.5.1 Average Annual Capital Requirements

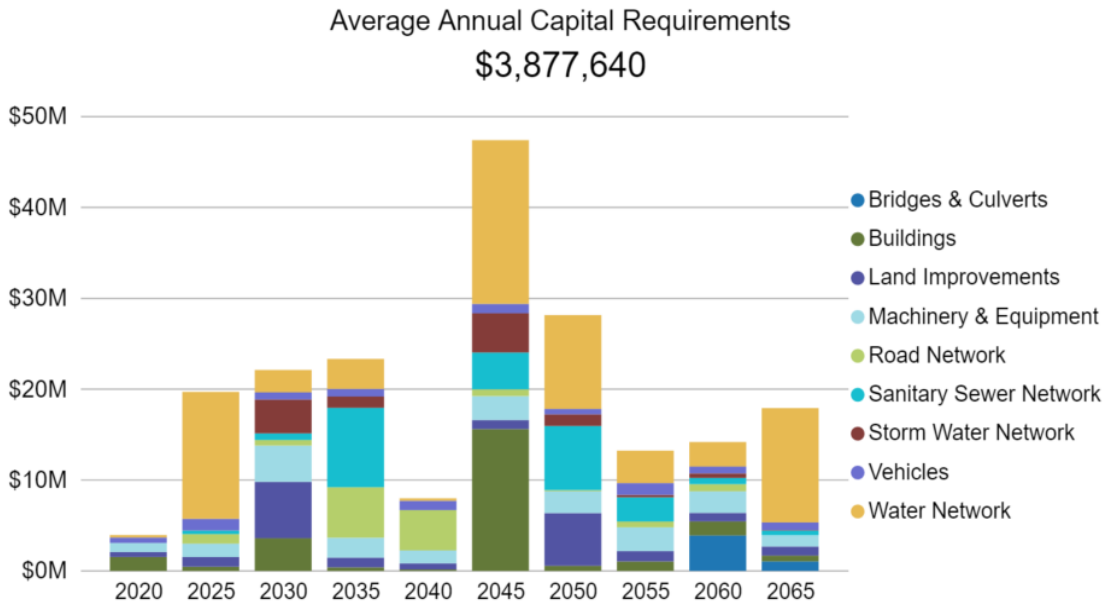
Annual capital requirements represent the amount the Municipality should allocate annually to each asset category to meet replacement needs as they arise, prevent infrastructure backlogs and achieve long-term sustainability.



In total, the Municipality must allocate approximately $3.9 million annually to address capital requirements for the assets included in this AMP.

3.5.2 Projected Capital Requirements (50 Years)

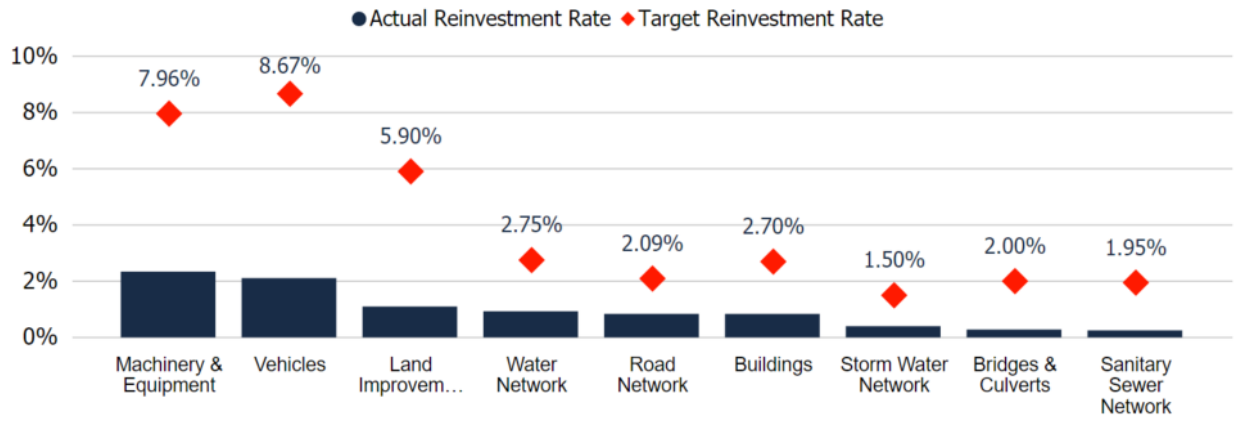
The following graph identifies projected capital requirements over the next 50 years.



The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix A.

3.6 Target vs. Actual Reinvestment Rate

The graph below depicts funding gaps or surpluses by comparing target vs actual reinvestment rate. To meet the long-term replacement needs, the Municipality should be allocating approximately $3.9 million annually, for a target reinvestment rate of 2.90%. Actual annual spending from sustainable revenue sources totals approximately $1.1 million, for an actual reinvestment rate of 0.81%.



4 Analysis of Tax-funded Assets

Key Insights

- Tax-funded assets are valued at $67.5 million
- 76% of tax-funded assets are in fair or better condition
- The average annual capital requirement to sustain the current level of service for tax-funded assets is approximately $2.2 million

4.1 Road Network

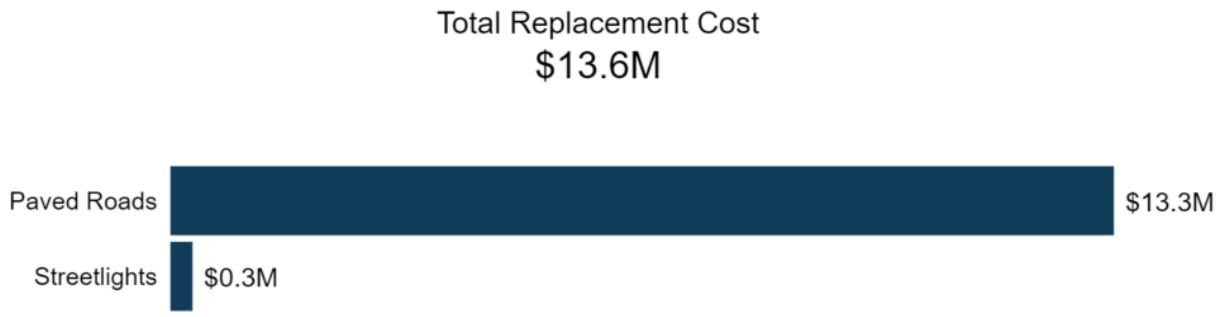
The Road Network is a critical component of the provision of safe and efficient transportation services. It includes all municipally owned and maintained roadways in addition to supporting roadside infrastructure streetlights.

The Municipality's Road Network is maintained by the Infrastructure Services Department.

4.1.1 Asset Inventory & Replacement Cost

The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the Municipality's Road Network inventory.

Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Paved Roads	30,102 metres	Cost/Unit	$13,304,987
Gravel Roads	50,959 metres	Not Planned for Replacement[1]	
Streetlights	444	CPI Tables	$313,727
			$13,618,714

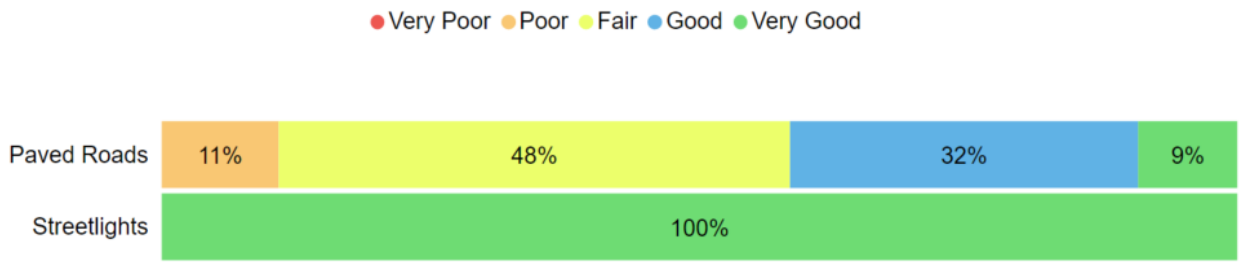


[1] Gravel roads have been included as they comprise a significant portion of the Municipality's road network. However, the lifecycle management strategies for these assets consist of perpetual maintenance activities and do not require capital costs for rehabilitation or replacement.

4.1.2 Asset Condition

The table below identifies the current average condition and source of available condition data for each asset segment. The Average Condition (%) is a weighted value based on replacement cost.

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Paved Roads	58%	Fair	98% Assessed
Streetlights	82%	Very Good	Age-based
	58%	**Fair**	**95% Assessed**



Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the municipality's current approach:

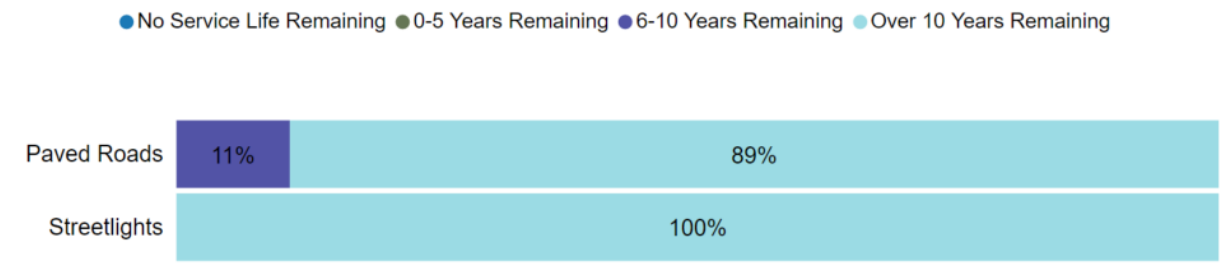
- Road pavement assessments are completed primarily to support grant funding applications on a case-by-case basis
- A recent Pavement Condition Review for 9 road sections was completed in 2019 with each section receiving an RCR (Ride Comfort Rating) and PCR (Pavement Condition Rating)
- Staff would like to complete network-wide assessments on a more regular schedule (3-5 years) to inform lifecycle planning, but are limited by current resources and the availability of funding

4.1.3 Estimated Useful Life & Average Age

The Estimated Useful Life for Road Network assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service.

Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Paved Roads	40 years	38.9	20.2
Streetlights	20 years	2.7	17.3
		38.6	**20.2**



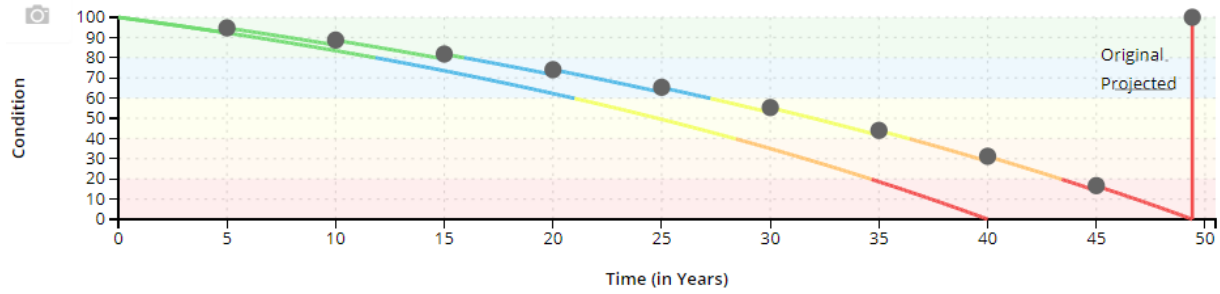
Each asset's Estimated Useful Life should be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

4.1.4 Lifecycle Management Strategy

The condition or performance of most assets will deteriorate over time. This process is affected by a range of factors including an asset's characteristics, location, utilization, maintenance history and environment.

The following lifecycle strategies have been developed as a proactive approach to managing the lifecycle of Paved Roads. Instead of allowing the roads to simply deteriorate until replacement is required, strategic intervention is expected to extend the service life of roads at a lower total cost.

Paved Roads		
Event Name	Event Class	Event Trigger
Asphalt Patching/Crack Sealing	Preventative Maintenance	As-needed



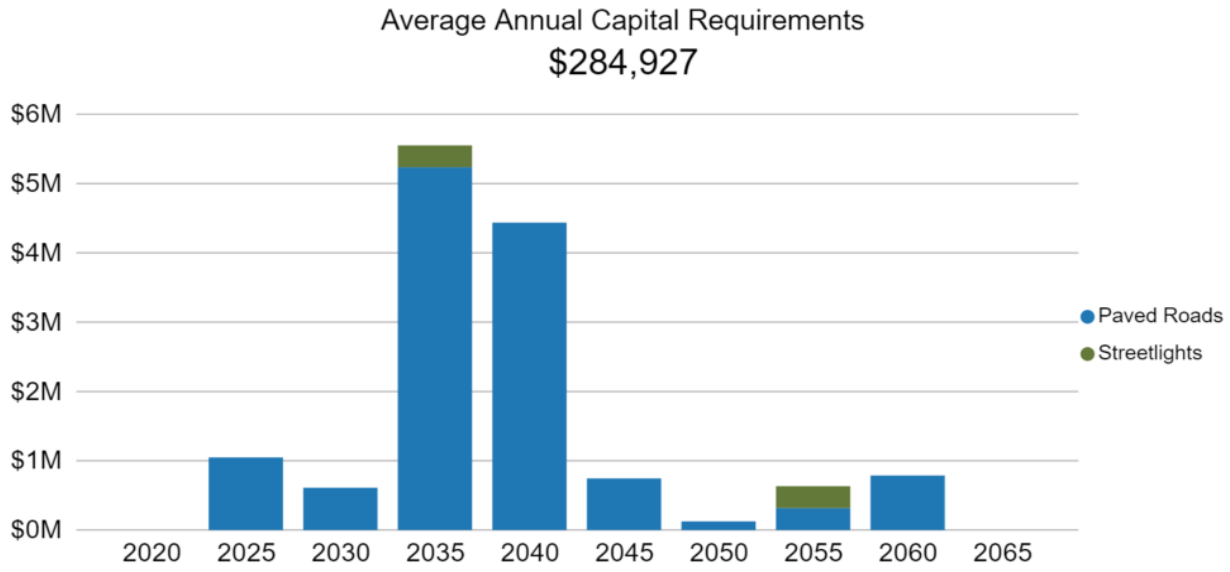
The following table further expands on the Municipality's current approach to lifecycle management:

Activity Type	Description of Current Strategy
Maintenance	**Gravel Roads:** dust control (calcium chloride) in May/June; magnesium crystal applied later in summer if necessary and grading as required
	Paved Roads: pothole repairs, crack sealing or cut-and-pave techniques
Rehabilitation	Ability to implement a proactive rehabilitation strategy (including re-surfacing) is limited due to availability of funding
	Based on life expectancy of roads, staff expect surface pavement to re-surface every 20 years and full road reconstruction approximately every 60-80 Years
	Rehabilitation projects are prioritized based on life expectancy, health & safety concerns and traffic counts
Replacement	Full road reconstruction is not common (last completed in 2007) and is only cost effective when coordinated with sub-surface infrastructure (water/sewer)
	There are currently several road projects (both rehab and replacement) expected to be funded through grants (Connecting Links & ICIP)
	Staff have developed a 3-year capital plan and are hoping to move towards at least a 5-year planning horizon in the near future

Forecasted Capital Requirements

Based on the lifecycle strategies identified previously for Paved Roads, and assuming the end-of-life replacement of all other assets in this category, the following graph forecasts capital requirements for the Road Network.

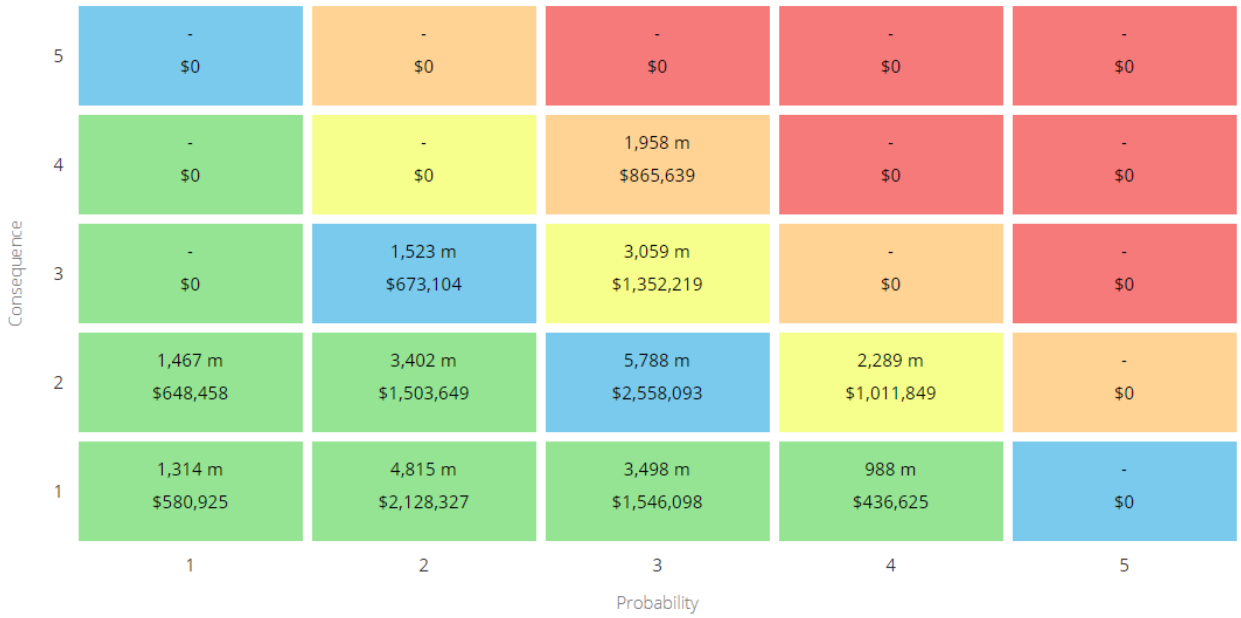
The annual capital requirement represents the average amount per year that the Municipality should allocate towards funding rehabilitation and replacement needs to meet future capital needs.



The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix A.

4.1.5 Risk & Criticality

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category. See Appendix C for the criteria used to determine the risk rating of each asset.



Critical Assets

The identification of critical assets will allow the Municipality to determine appropriate risk mitigation strategies and treatment options. This may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data.

The above matrix provides a high-level overview of the level of risk present according to the criteria outlined in Appendix C. This is a high-level model developed for the purposes of this AMP and Municipality staff should review and adjust the risk model to reflect an evolving understanding of both the probability and consequences of asset failure.

4.1.6 Levels of Service

The following tables identify the Municipality's current level of service for the Road Network. These metrics include the technical and community level of service metrics that are required as part of O. Reg. 588/17 as well as any additional performance measures that the Municipality has selected for this AMP.

Community Levels of Service

The following table outlines the qualitative descriptions that determine the community levels of service provided by the Road Network.

Service Attribute	Qualitative Description	Current LOS (2019)
Scope	Description, which may include maps, of the road network in the municipality and its level of connectivity	See Appendix B
Quality	Description or images that illustrate the different levels of road class pavement condition	A recent assessment completed in 2019 included Ride Comfort Ratings (RCR) and Pavement Condition Ratings (PCR) for 9 roads. These assessments were completed in accordance with the MTO's Flexible Pavement Condition Rating - Guidelines for Municipalities. The RCR is a 0-10 rating scale that ranges from 0 (Very Poor) to 10 (Excellent). The PCR is a 0-100 rating that ranges from 0 (Very Poor) to 100 (Excellent).

Technical Levels of Service

The following table outlines the quantitative metrics that determine the technical level of service provided by the Road Network.

Service Attribute	Technical Metric	Current LOS (2019)
Scope	Lane-km of arterial roads (MMS classes 1 and 2) per land area (km/km^2)	0.032
	Lane-km of collector roads (MMS classes 3 and 4) per land area (km/km^2)	0.460
	Lane-km of local roads (MMS classes 5 and 6) per land area (km/km^2)	0.427
Quality	Average pavement condition index for paved roads in the municipality	58 – Fair
	Average surface condition for unpaved roads in the municipality (e.g. excellent, good, fair, poor)	Fair
Performance	Capital reinvestment rate	0.84%

4.1.7 Recommendations

Asset Inventory/Data Refinement

- Develop Sidewalk Inventory - The Municipality's current asset inventory does not include sidewalks. As a key component of the transportation services provided to the community and an asset that deteriorates and requires rehabilitation/replacement, they should be inventoried to facilitate long-term planning.

Condition Assessment Strategies

- Develop a Condition Assessment Strategy – A handful of roads were assessed in 2019 by an engineering firm to support a grant application using RCR and PCR rating criteria. The remaining roads were assessed by internal staff for this AMP using a cursory 1-5 rating criteria. Moving forward a regular condition assessment strategy should be developed to consistently gather condition data across the whole road network. Additional supporting information can be found in Appendix D.

Lifecycle Management Strategies

- Review Lifecycle Management Strategy – Given a limited availability of capital funding and unique challenges presented by size and location, implementing a consistent road rehabilitation strategy is difficult. While a maintenance only strategy (asphalt patching/crack sealing) will help to extend the life of roads if applied correctly, a more regular schedule of road surface rehabilitation may be more cost effective and increase overall condition.
- Develop a Long-Term Capital Plan – Staff currently have a 3-year capital plan and are hoping to move towards a 5-year plan soon. Increased capital costs are expected for paved roads over the next 10-20 years due to their condition and age. Staff may consider a phased road reconstruction strategy in alignment with any required water/sewer/storm projects to minimize costs and impact on the transportation network.

Levels of Service

- Measure Current Levels of Service – This AMP contains a basic measurement of the Municipality's current levels of service according to the metrics established in O. Reg. 588/17 Staff should continue to measure the current levels of service according to these metrics to allow for trend analysis that informs long-term planning.
- Identify Additional LOS Metrics – Staff should identify additional LOS metrics that would inform both short and long-term asset management planning. See Appendix E for examples.
- Identify Proposed Levels of Service - Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

4.2 Bridges & Culverts

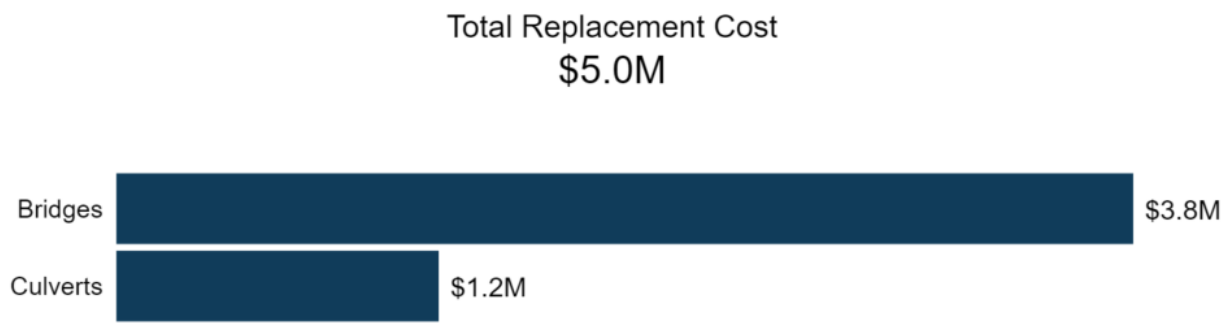
Bridges & Culverts are a critical component of the Municipality's transportation network. They facilitate the movement of passenger vehicles, trucks, pedestrians and cyclists. All bridge and structural culverts (>=3m in span) are subject to biennial inspections as per the Ontario Bridge Inspection Manual (OSIM).

The Municipality's Bridges & Culverts are maintained by the Infrastructure Services Department.

4.2.1 Asset Inventory & Replacement Cost

The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the Municipality's Bridges & Culverts inventory.

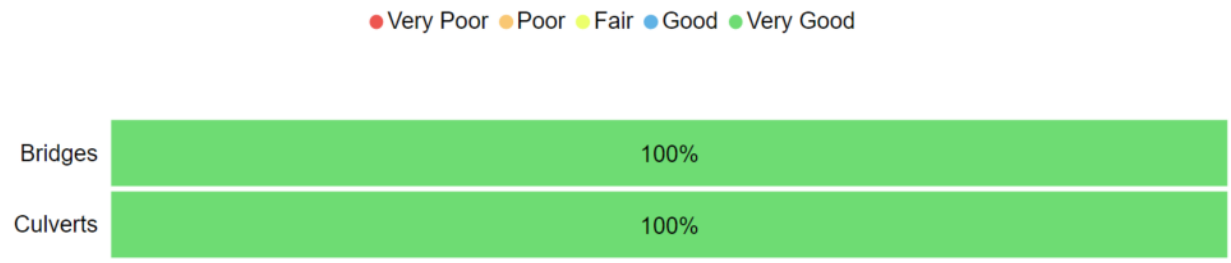
Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Bridges	3	CPI Tables	$3,763,516
Culverts	2	CPI Tables	$1,193,731
			$4,957,247



4.2.2 Asset Condition

The table below identifies the current average condition and source of available condition data for each asset segment. The Average Condition (%) is a weighted value based on replacement cost.

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Bridges	83%	Very Good	100% Assessed
Culverts	97%	Very Good	Age-based
	86%	**Very Good**	**76% Assessed**



Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the municipality's current approach:

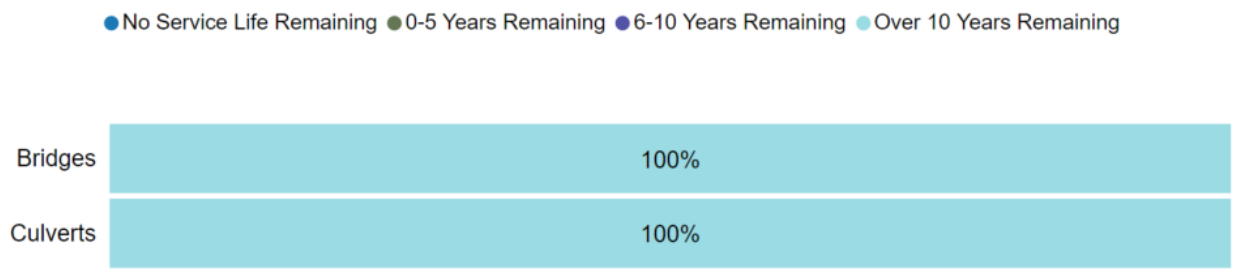
- OSIM Inspections completed every two years as per regulatory requirements by external consultants
- BCI ratings provided for each structure

4.2.3 Estimated Useful Life & Average Age

The Estimated Useful Life for Bridges & Culverts assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service.

Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Bridges	50 years	4.8	42.9
Culverts	50 years	3.2	46.8
		4.4	**44.0**



Each asset's Estimated Useful Life should be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

4.2.4 Lifecycle Management Strategy

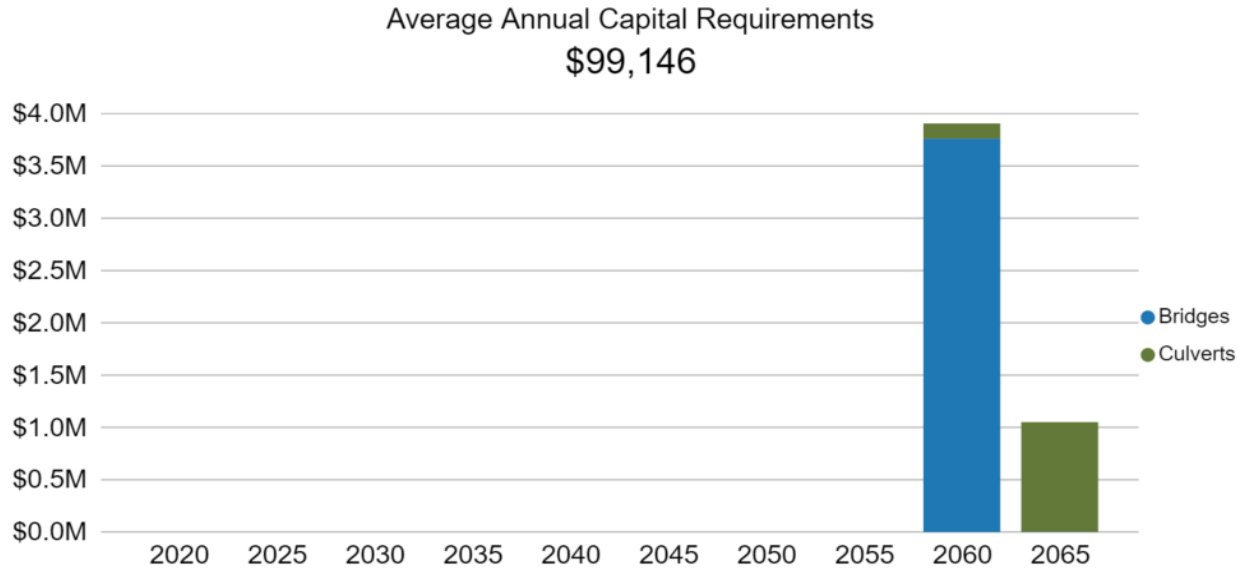
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

The following table outlines the Municipality's current lifecycle management strategy.

Activity Type	Description of Current Strategy
Maintenance	Fairly small O&M budget for bridges & culverts to clear blockages/ice or complete sealing/painting work
	Budget is mostly driven by results of OSIM inspections
Rehabilitation	Most bridges were replaced recently; more of a focus on preventative maintenance
	Health & safety issues are addressed immediately
Replacement	Recent replacements were due to floods/washouts and condition of those structures
	Existing structures are relatively new and no reconstruction projects are expected in the near future

Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Municipality should allocate towards funding rehabilitation and replacement needs.



The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix A.

4.2.5 Risk & Criticality

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category. See Appendix C for the criteria used to determine the risk rating of each asset.

Critical Assets

The identification of critical assets will allow the Municipality to determine appropriate risk mitigation strategies and treatment options. This may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data.

The above matrix provides a high-level overview of the level of risk present according to the criteria outlined in Appendix C. This is a high-level model developed for the purposes of this AMP and Municipality staff should review and adjust the risk model to reflect an evolving understanding of both the probability and consequences of asset failure.

4.2.6 Levels of Service

The following tables identify the Municipality's current level of service for the Bridges & Culverts. These metrics include the technical and community level of service metrics that are required as part of O. Reg. 588/17 as well as any additional performance measures that the Municipality has selected for this AMP.

Community Levels of Service

The following table outlines the qualitative descriptions that determine the community levels of service provided by the Bridges & Culverts.

Service Attribute	Qualitative Description	Current LOS (2019)
Scope	Description of the traffic that is supported by municipal bridges (e.g. heavy transport vehicles, motor vehicles, emergency vehicles, pedestrians, cyclists)	Municipal bridges form a key component of the Municipality's transportation network. There are no load or dimensional restrictions on any structures. Traffic that is supported by municipal bridges includes heavy transport vehicles, motor vehicles, emergency vehicles, pedestrians and cyclists
Quality	Description or images of the condition of bridges and how this would affect use of the bridges	See Appendix B
	Description or images of the condition of culverts and how this would affect use of the culverts	See Appendix B

Technical Levels of Service

The following table outlines the quantitative metrics that determine the technical level of service provided by the Bridges & Culverts.

Service Attribute	Technical Metric	Current LOS (2019)
Scope	% of bridges and structural culverts in the municipality with loading or dimensional restrictions	0%
Quality	Average bridge condition index value for bridges in the municipality	83
	Average bridge condition index value for structural culverts in the municipality	97
Performance	Capital reinvestment rate	0.28%

4.2.7 Recommendations

Levels of Service

- Measure Current Levels of Service – This AMP contains a basic measurement of the Municipality's current levels of service according to the metrics established in O. Reg. 588/17 Staff should continue to measure the current level of service according to these metrics to allow for trend analysis that informs long-term planning.

- Identify Additional LOS Metrics – Staff should identify additional LOS metrics that would inform both short and long-term asset management planning. See Appendix E for examples.

- Identify Proposed Levels of Service - Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

4.3 Storm Water Network

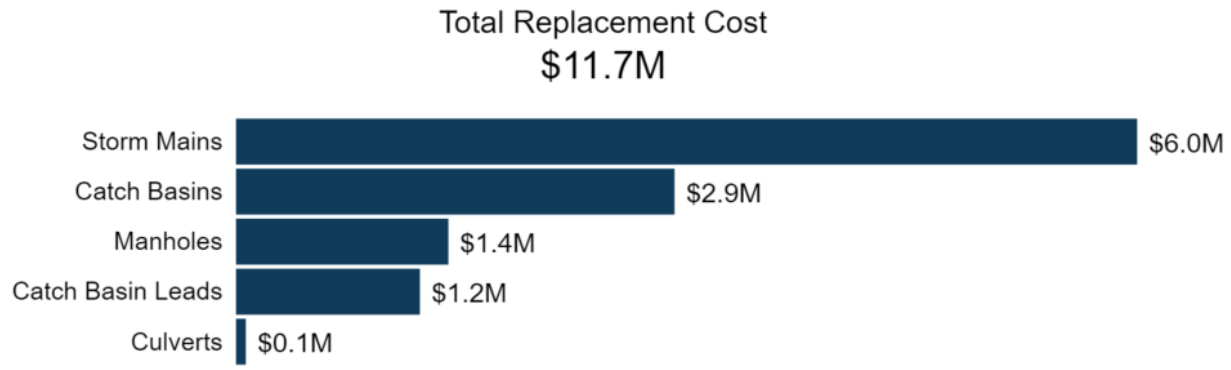
The Municipality is responsible for owning and maintaining a Storm Water Network consisting of 12.2 kilometres of storm sewer mains, catch basins, manholes, and drainage culverts.

The Storm Water Network is maintained throughout the year by the Infrastructure Services Department.

4.3.1 Asset Inventory & Replacement Cost

The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the Municipality's Storm Water Network inventory.

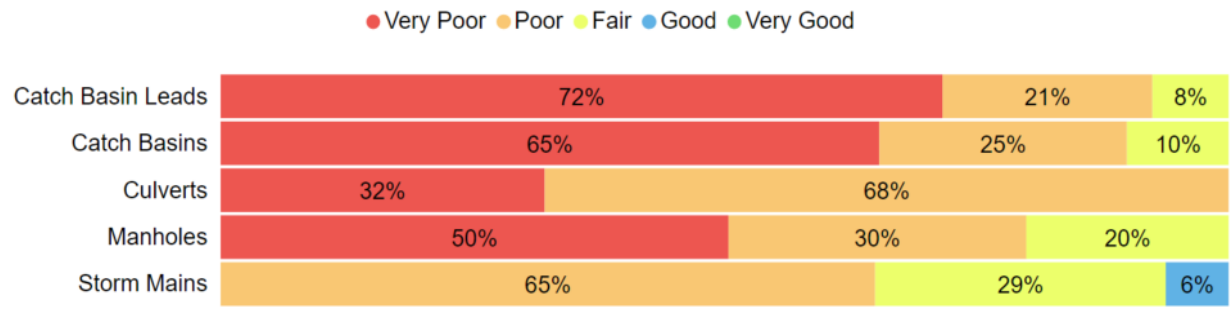
Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Catch Basin Leads	3,930 metres	Cost/Unit	$1,234,008
Catch Basins	346	Cost/Unit	$2,941,000
Culverts	341 metres	Cost/Unit	$67,344
Manholes	172	Cost/Unit	$1,425,000
Storm Mains	12,209 metres	Cost/Unit	$6,041,990
			$11,709,342



4.3.2 Asset Condition

The table below identifies the current average condition and source of available condition data for each asset segment. The Average Condition (%) is a weighted value based on replacement cost.

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Catch Basin Leads	24%	Poor	Age-based
Catch Basins	26%	Poor	Age-based
Culverts	32%	Poor	Age-based
Manholes	29%	Poor	Age-based
Storm Mains	42%	Fair	Age-based
	34%	**Poor**	**100% Age-based**



To ensure that the Municipality's Storm Water Network continues to provide an acceptable level of service, the Municipality should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of maintenance, rehabilitation and replacement activities is required to increase the overall condition of the Storm Water Network.

Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the municipality's current approach:

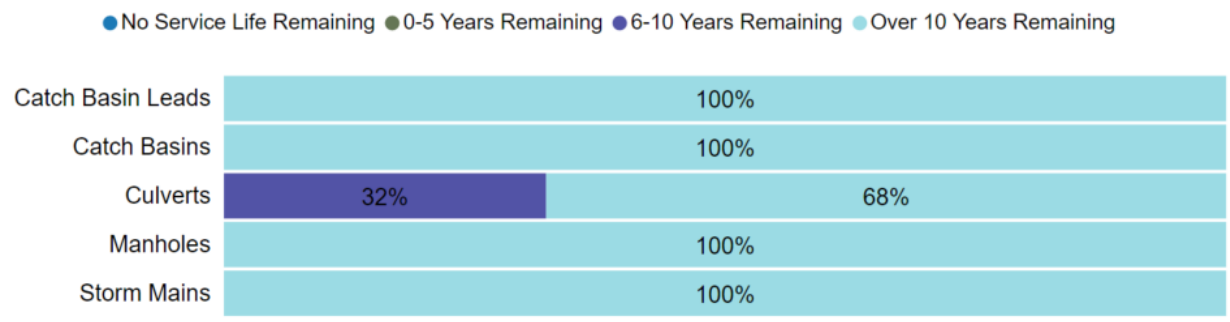
- There are few condition assessment strategies in place for the storm sewer network
- The Municipality owns a CCTV camera and some inspections are completed in select areas based on new construction projects; this is supplemented through occasional visual inspections as required

4.3.3 Estimated Useful Life & Average Age

The Estimated Useful Life for Storm Water Network assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service.

Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Catch Basin Leads	60 years	45.0	15.0
Catch Basins	60 years	44.6	15.4
Culverts	50 years	35.0	15.0
Manholes	60 years	42.5	17.5
Storm Mains	75 years	44.0	30.9
		44.0	**19.3**



Each asset's Estimated Useful Life should be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

4.3.4 Lifecycle Management Strategy

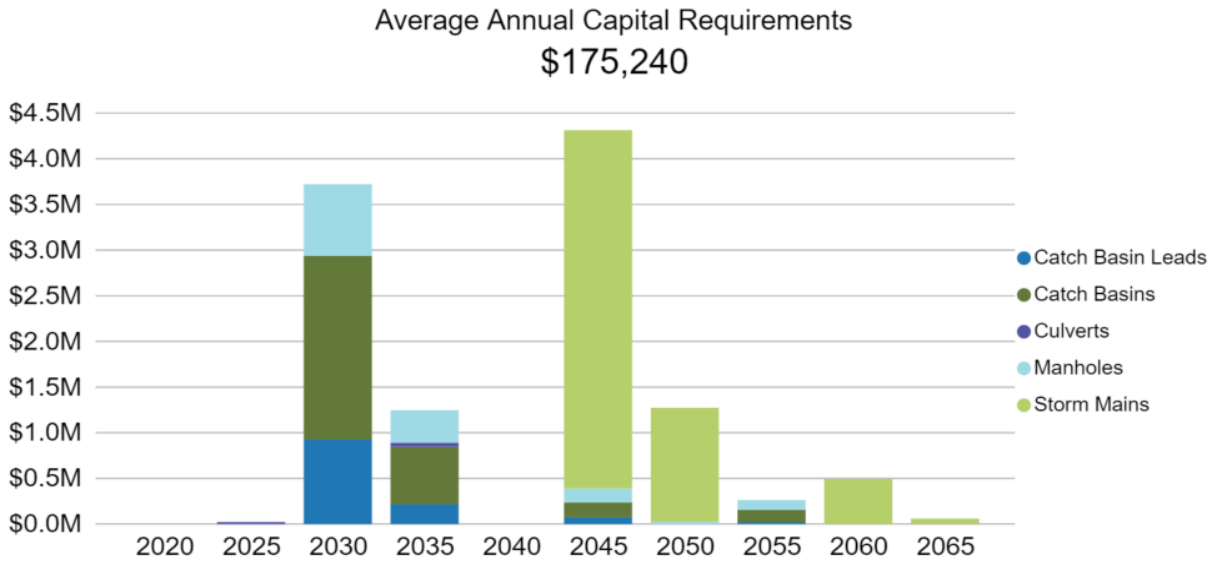
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

The following table outlines the Municipality's current lifecycle management strategy.

Activity Type	Description of Current Strategy
Maintenance	Catch basins are flushed/cleaned annually
	Any blockages or obstructions are removed from storm sewer mains as identified
	Freeze/thaw can pose some risks (water sitting on roadway until cleared)
	Fairly minimal O&M costs for the storm sewer network
Replacement	Replacement of storm sewer infrastructure is not common
	Any replacement projects would be based on condition, any capacity concerns and the availability of funding

Forecasted Capital Requirements

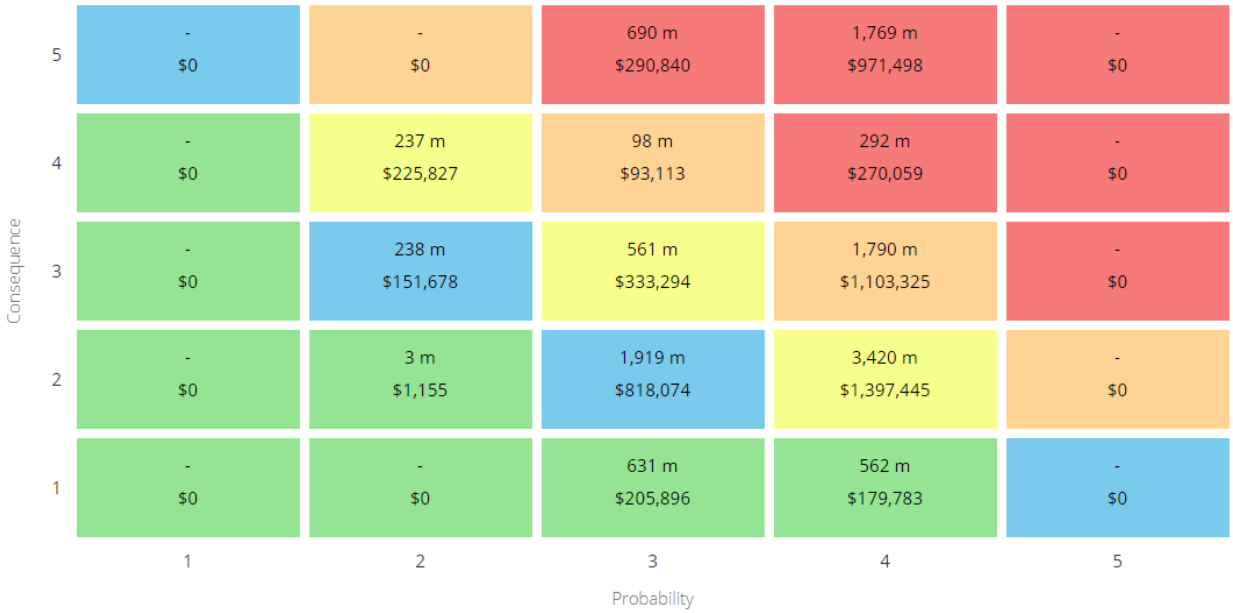
The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Municipality should allocate towards funding rehabilitation and replacement needs.



The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix A.

4.3.5 Risk & Criticality

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category. See Appendix C for the criteria used to determine the risk rating of each asset.



Critical Assets

The identification of critical assets will allow the Municipality to determine appropriate risk mitigation strategies and treatment options. This may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data.

The above matrix provides a high-level overview of the level of risk present according to the criteria outlined in Appendix C. This is a high-level model developed for the purposes of this AMP and Municipality staff should review and adjust the risk model to reflect an evolving understanding of both the probability and consequences of asset failure.

4.3.6 Levels of Service

The following tables identify the Municipality's current level of service for Storm Water Network. These metrics include the technical and community level of service metrics that are required as part of O. Reg. 588/17 as well as any additional performance measures that the Municipality has selected for this AMP.

Community Levels of Service

The following table outlines the qualitative descriptions that determine the community levels of service provided by Storm Water Network.

Service Attribute	Qualitative Description	Current LOS (2019)
Scope	Description, which may include map, of the user groups or areas of the municipality that are protected from flooding, including the extent of protection provided by the municipal stormwater system	See Appendix B

Technical Levels of Service

The following table outlines the quantitative metrics that determine the technical level of service provided by the Storm Water Network.

Service Attribute	Technical Metric	Current LOS (2019)
Scope	% of properties in municipality resilient to a 100-year storm	TBD[2]
	% of the municipal stormwater management system resilient to a 5-year storm	100%[3]
Performance	Capital reinvestment rate	0.40%

[2] There is insufficient data to confidently determine the % of properties resilient to a 100-year storm
[3] All existing stormwater infrastructure has been designed to handle at least a 1 in 5 year storm

4.3.7 Recommendations

Condition Assessment Strategies

- Develop a Condition Assessment Strategy - This AMP relies entirely on age-based estimates of asset condition for the Storm Water Network. Based on age there are substantial project capital cost requirements within the next 20 years. The completion of condition assessments will build confidence in the timing of projected capital costs. The Municipality should develop a formal condition assessment strategy which may include the use of CCTV cameras to inspect storm sewer mains.

Lifecycle Management Strategies

- Develop a Long-Term Capital Plan - With the majority of storm sewers constructed in the 1970s capital needs have been fairly minimal to date. In the next 10-30 years a significant portion of the Storm Water Network is expected to reach the end of its lifecycle and rehabilitation, or replacement may be required. While short-term capital project costs may be minimal, staff should start planning for future requirements to ensure that adequate reserves are available when those needs become realized.

Levels of Service

- Measure Current Levels of Service – This AMP contains a basic measurement of the Municipality's current level of service according to the metrics established in O. Reg. 588/17 Staff should continue to measure the current level of service according to these metrics to allow for trend analysis that informs long-term planning.

- Identify Additional LOS Metrics – Staff should identify additional LOS metrics that would inform both short and long-term asset management planning. See Appendix E for examples.

- Identify Proposed Levels of Service - Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

4.4 Buildings

The Municipality of Wawa owns and maintains several facilities and recreation centres that provide key services to the community. These include:

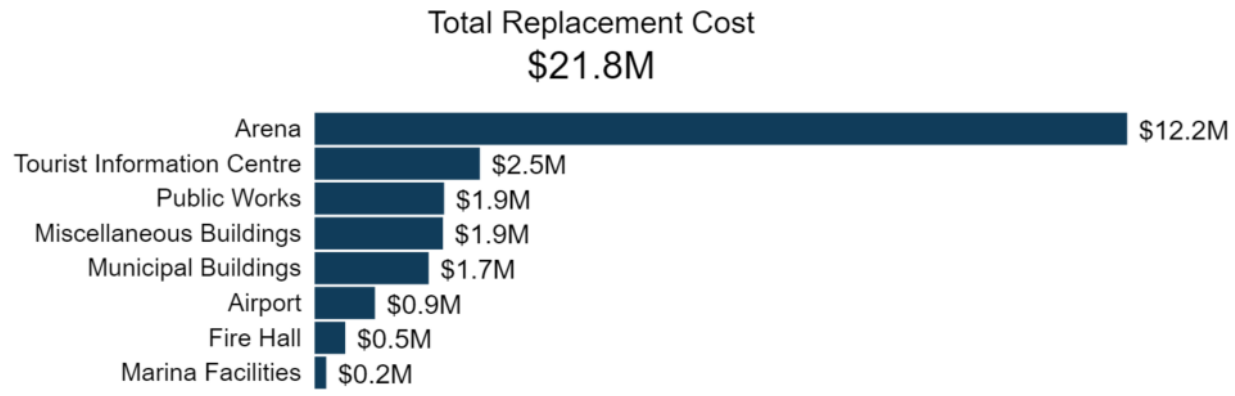
- an airport
- a fire hall to provide emergency services
- public works buildings to support the delivery of public works and operations
- a municipal building to provide municipal services
- a marina, tourist information centre, and more

Note: The analysis in this plan on Buildings & Facilities is preliminary and high-level. It does not include all recent capital expenditures and is not based on a sufficiently detailed analysis of the current condition of facilities. Additional work is required to refine the inventory and analysis alongside structural engineering reports.

4.4.1 Asset Inventory & Replacement Cost

The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the Municipality's Buildings inventory.

Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Airport	2	CPI Tables	$904,928
Arena	1	CPI Tables	$12,178,091
Fire Hall	1	CPI Tables	$459,869
Marina Facilities	2	CPI Tables	$174,849
Miscellaneous Buildings	7	CPI Tables	$1,924,226
Municipal Building	1	CPI Tables	$1,710,344
Public Works	2	CPI Tables	$1,941,311
Tourist Information Centre	1	CPI Tables	$2,477,473
			$21,771,091



4.4.2 Asset Condition

The table below identifies the current average condition and source of available condition data for each asset segment. The Average Condition (%) is a weighted value based on replacement cost.

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Airport	32%	Poor	88% Assessed
Arena	70%	Good	96% Assessed
Fire Hall	34%	Poor	98% Assessed
Marina Facilities	36%	Poor	86% Assessed
Miscellaneous Buildings	54%	Fair	51% Assessed
Municipal Building	46%	Fair	76% Assessed
Public Works	37%	Fair	54% Assessed
Tourist Information Centre	70%	Good	94% Assessed
	62%	**Good**	**85% Assessed**

To ensure that the Municipality's Buildings continues to provide an acceptable level of service, the Municipality should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of maintenance, rehabilitation and replacement activities is required to increase the overall condition of the Buildings.

4.4.3 Estimated Useful Life & Average Age

The Estimated Useful Life for Buildings assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service.

Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Airport	10-40 years	23.3	11.3
Arena	17-40 years	10.6	18.5
Fire Hall	9-40 years	25.9	6.5
Marina Facilities	20-40 years	20.3	13.1
Miscellaneous Buildings	15-40 years	22.4	15.2
Municipal Building	20-40 years	12.2	16.3
Public Works	20-40 years	20.0	19.3
Tourist Information Centre	20-40 years	11.2	19.8
		17.8	**15.7**

Each asset's Estimated Useful Life should be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

4.4.4 Lifecycle Management Strategy

The Municipality is still evaluating the full extent of capital requirements for Buildings & Facilities and this analysis will be included in the next iteration of the Asset Management Plan.

Staff do not expect to take a “worst-first” approach to facility rehabilitation and replacement. Instead, capital planning will rely on a review of risk, criticality and service levels. The potential relocation of workforce and offices will also be considered as appropriate.

Both the Arena and Municipal Building has been identified as requiring immediate capital rehabilitation.

4.4.5 Risk & Criticality

Buildings are considered a non-core asset category. As such, the Municipality has until July 1, 2023 to identify asset risk and determine asset criticality.

4.4.6 Levels of Service

Buildings are considered a non-core asset category. As such, the Municipality has until July 1, 2023 to determine the qualitative descriptions and technical metrics that measure the current level of service provided.

4.4.7 Recommendations

Asset Inventory/Data Refinement

- Develop a Component-Based Inventory - The Municipality's asset inventory contains a single record for most facilities with additional listings as enhancements/betterments were completed. However, the inventory does not have an adequate breakdown of major facility components (e.g. roofing, HVAC, electrical). Facilities consist of several major components that have unique useful lives and require asset-specific lifecycle strategies. Staff should work towards a component-based inventory of all facilities to allow for component-based lifecycle planning.

- Review Replacement Costs – The replacement costs developed for Facilities in this AMP are entirely based on the inflation of historical costs. Replacement costs should be updated according to the best available information on the cost to replace the asset in today's value.

Condition Assessment Strategies

- Develop a Condition Assessment Strategy - Staff completed a cursory review of facility condition to inform the development of this AMP (85% assessed). The Municipality should implement regular condition assessment procedures for all facilities to better inform short- and long-term capital requirements. Detailed component-based facility assessments should be considered for structures that exhibit moderate to severe signs of deterioration. Additional guidance can be found in Appendix D.

- Review Backlog Assets - Review assets that have surpassed their estimated useful life to determine if immediate replacement is required or whether these assets are expected to remain in-service. Adjust the service life and/or condition ratings for these assets accordingly.

Lifecycle Management Strategies

- Develop a Long-Term Capital Plan – Based on age and condition, there are a handful of facilities that are projected for rehabilitation or replacement in the near future. A long-term capital plan should be developed to meet projected capital requirements. Detailed facility assessments are required to determine the true extent of lifecycle requirements.

Levels of Service

- Identify Current Levels of Service Metrics - Municipality staff need to identify the qualitative descriptions and technical metrics that will measure the current level of service provided by facilities by July 1, 2023 according to O. Reg. 588/17. See Appendix E for examples.

4.5 Machinery & Equipment

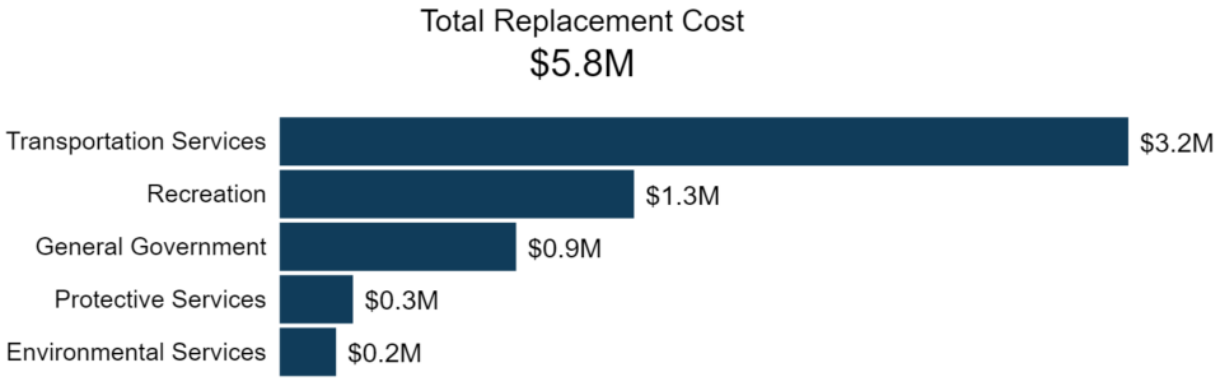
In order to maintain the high quality of public infrastructure and support the delivery of core services, municipalities own and employ various types of machinery and equipment. This includes:

- Landfill compactors to support waste disposal
- Tele-communications equipment, software and network hardware
- Fire equipment to support the delivery of protective services
- Mowers, ice resurfacers, and fitness equipment to provide recreation services
- Snow blowers, loaders, graders and fuel systems to support public works and transportation services

4.5.1 Asset Inventory & Replacement Cost

The following table includes the quantity, replacement cost method and total replacement cost of each asset segment in the Municipality's Machinery & Equipment inventory.

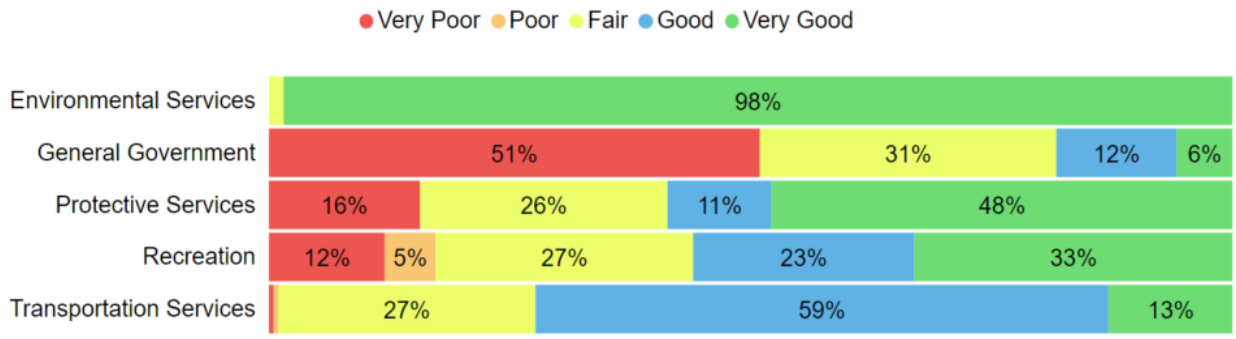
Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Environmental Services	2	CPI Tables	$210,404
General Government	28	CPI Tables	$879,953
Protective Services	6	CPI Tables	$273,167
Recreation	38	CPI Tables	$1,330,270
Transportation Services	26	CPI Tables	$3,157,084
			$5,850,878



4.5.2 Asset Condition

The table below identifies the current average condition and source of available condition data for each asset segment. The Average Condition (%) is a weighted value based on replacement cost.

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Environmental Services	87%	Very Good	Age-based
General Government	31%	Poor	39% Assessed
Protective Services	64%	Good	52% Assessed
Recreation	63%	Good	12% Assessed
Transportation Services	69%	Good	47% Assessed
	62%	**Good**	**32% Assessed**



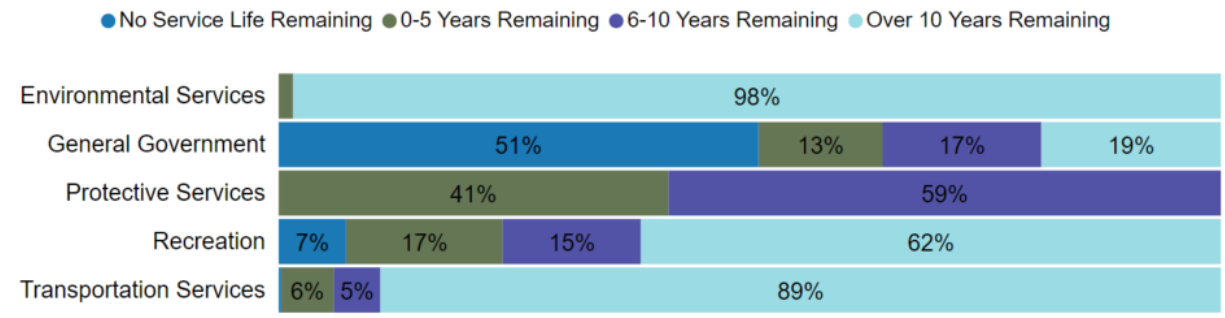
To ensure that the Municipality's Machinery & Equipment continues to provide an acceptable level of service, the Municipality should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of maintenance, rehabilitation and replacement activities is required to increase the overall condition of the Machinery & Equipment.

4.5.3 Estimated Useful Life & Average Age

The Estimated Useful Life for Machinery & Equipment assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service.

Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Environmental Services	5-13 years	1.9	7.1
General Government	3-20 years	10.5	-1.2[4]
Protective Services	10-20 years	12.5	5.8
Recreation	3-20 years	7.8	7.3
Transportation Services	5-20 years	9.3	10.5
		9.1	**5.7**



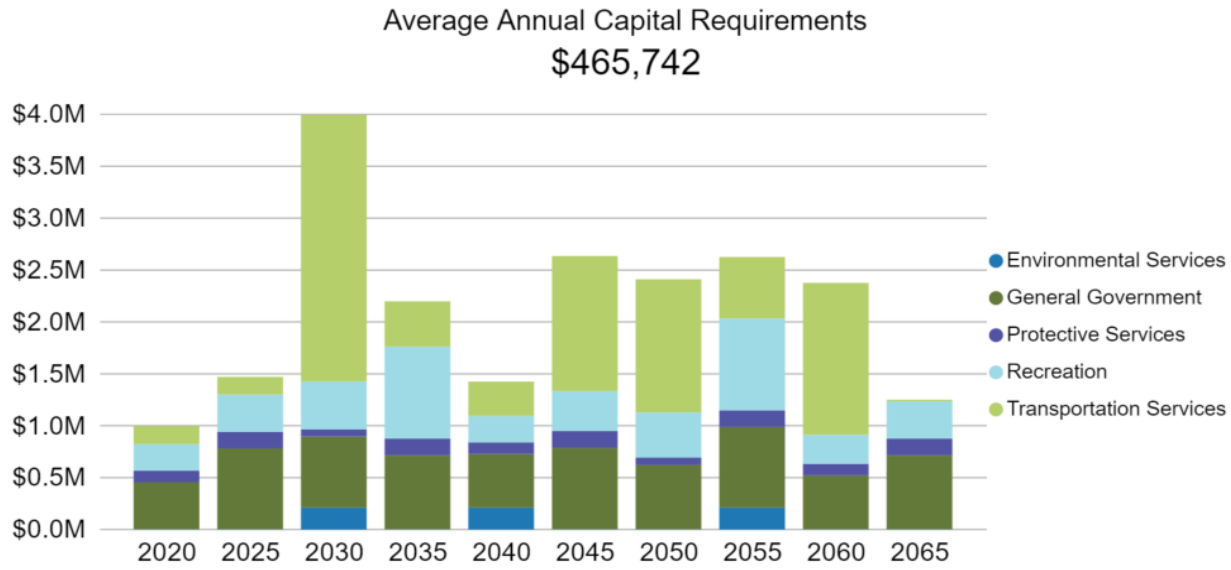
Each asset's Estimated Useful Life should be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

[4] A negative value implies that the average asset has surpassed it's estimated useful life and likely requires inspection to determine appropriate lifecycle activity.

4.5.4 Lifecycle Management Strategy

Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Municipality should allocate towards funding rehabilitation and replacement needs.



4.5.5 Risk & Criticality

Machinery & Equipment is considered a non-core asset category. As such, the Municipality has until July 1, 2023 to identify asset risk and determine asset criticality.

4.5.6 Levels of Service

Machinery & Equipment is considered a non-core asset category. As such, the Municipality has until July 1, 2023 to determine the qualitative descriptions and technical metrics that measure the current level of service provided.

4.5.7 Recommendations

Asset Inventory/Data Refinement

- **Review Replacement Costs** - The replacement costs developed for Machinery & Equipment in this AMP are entirely based on the inflation of historical costs. Replacement costs should be updated according to the best available information on the cost to replace the asset in today's value.

Condition Assessment Strategies

- **Develop a Condition Assessment Strategy** - Staff completed a cursory review of equipment condition to inform the development of this AMP (32% assessed). The Municipality should implement regular condition assessment procedures for all equipment to better inform short- and long-term capital requirements.

- **Review Backlog Assets** - Review assets that have surpassed their estimated useful life to determine if immediate replacement is required or whether these assets are expected to remain in-service. Adjust the service life and/or condition ratings for these assets accordingly.

Lifecycle Management Strategies

- **Develop a Short-Term Capital Plan -** Given the relatively short useful life of equipment (5-20 years) a short-term capital plan should be prepared and updated annually to ensure capital funds are available to meet projected requirements.

Levels of Service

- **Identify Current Levels of Service Metrics** - Municipality staff need to identify the qualitative descriptions and technical metrics that will measure the current levels of service provided by machinery & equipment by July 1, 2023 according to O. Reg. 588/17. See Appendix E for examples.

4.6 Vehicles

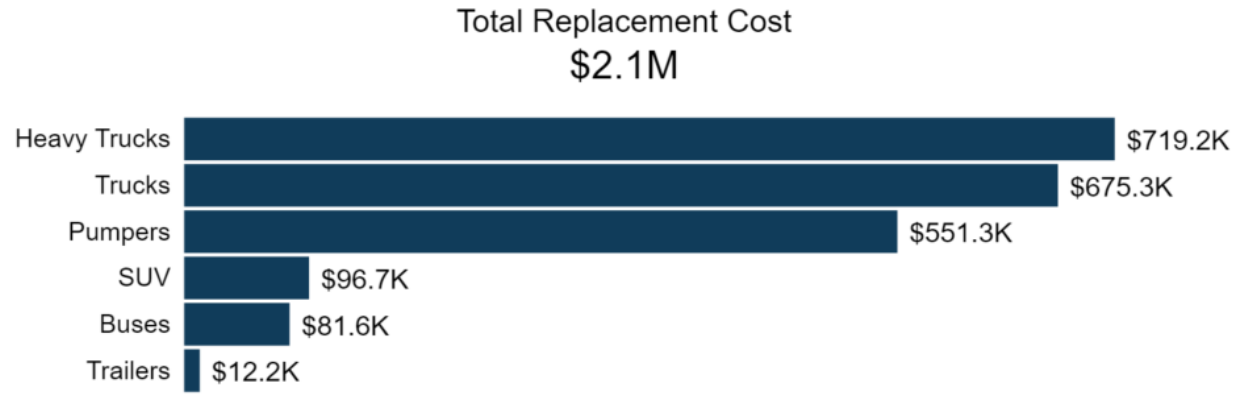
Vehicles allow staff to efficiently deliver municipal services and personnel. Municipal vehicles are used to support several service areas, including:

- A bus to provide transit services
- Trucks, SUVs, and trailers to support municipal operations
- Pumpers and rescue vans to provide emergency services

4.6.1 Asset Inventory & Replacement Cost

The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the Municipality's Vehicles.

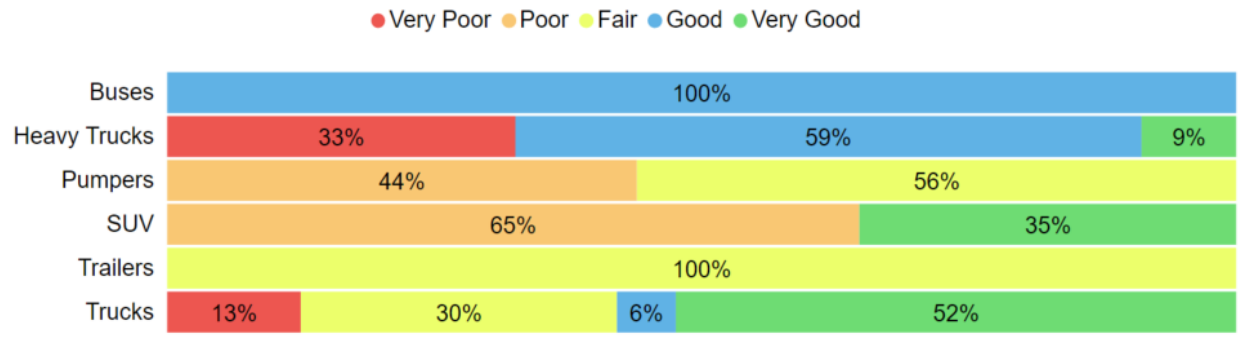
Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Buses	1	CPI Tables	$81,589
Heavy Trucks	4	CPI Tables	$719,222
Pumpers	2	CPI Tables	$551,283
SUV	2	CPI Tables	$96,671
Trailers	1	CPI Tables	$12,209
Trucks	15	CPI Tables	$675,347
			$2,136,321



4.6.2 Asset Condition

The table below identifies the current average condition and source of available condition data for each asset segment. The Average Condition (%) is a weighted value based on replacement cost.

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Buses	62%	Good	Age-based
Heavy Trucks	46%	Fair	28% Assessed
Pumpers	41%	Fair	100% Assessed
SUV	49%	Fair	100% Assessed
Trailers	49%	Fair	100% Assessed
Trucks	64%	Good	29% Assessed
	51%	**Fair**	**50% Assessed**



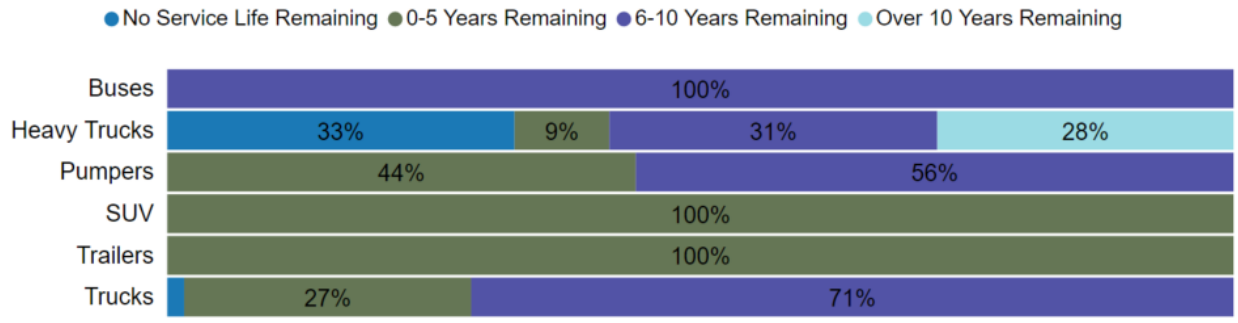
To ensure that the Municipality's Vehicles continue to provide an acceptable level of service, the Municipality should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of maintenance, rehabilitation and replacement activities is required to increase the overall condition of the Vehicles.

4.6.3 Estimated Useful Life & Average Age

The Estimated Useful Life for Vehicles assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service.

Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Buses	15 years	5.8	9.3
Heavy Trucks	5-15 years	11.1	5.8
Pumpers	15 Years	19.0	5.9
SUV	5 years	8.7	2.9
Trailers	10 years	10.8	4.9
Trucks	10-15 years	5.9	5.9
		8.2	**5.8**

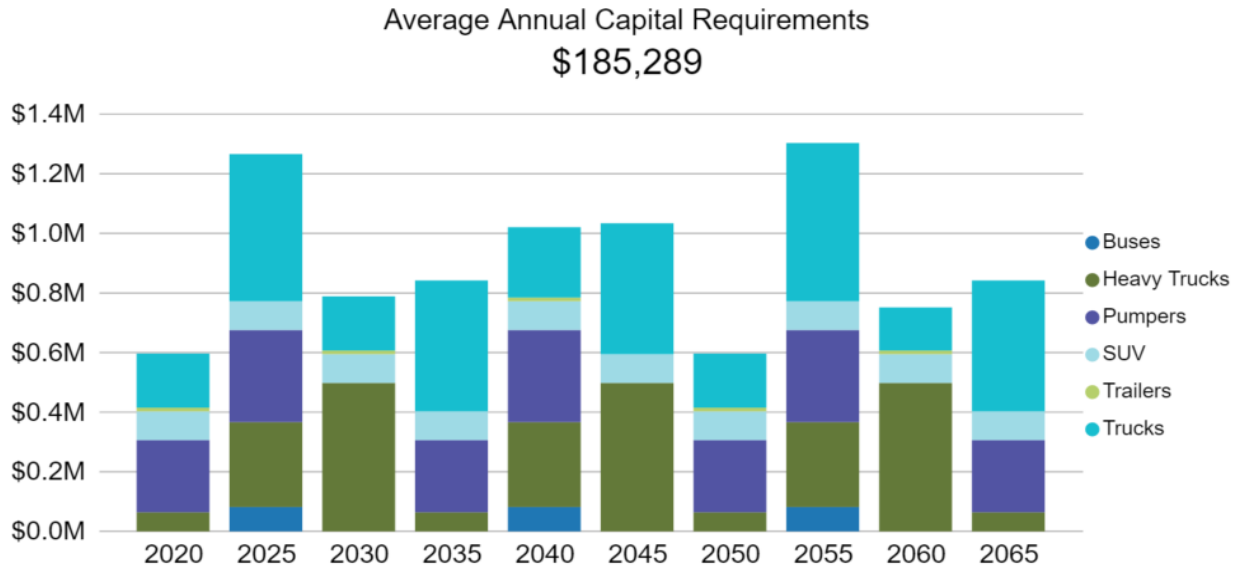


Each asset's Estimated Useful Life should be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

4.6.4 Lifecycle Management Strategy

Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Municipality should allocate towards funding rehabilitation and replacement needs.



4.6.5 Risk & Criticality

Vehicles is considered a non-core asset category. As such, the Municipality has until July 1, 2023 to identify asset risk and determine asset criticality.

4.6.6 Levels of Service

Vehicles is considered a non-core asset category. As such, the Municipality has until July 1, 2023 to determine the qualitative descriptions and technical metrics that measure the current level of service provided.

4.6.7 Recommendations

Asset Inventory/Data Refinement

- Review Replacement Costs - The replacement costs developed for Vehicles in this AMP are entirely based on the inflation of historical costs. Replacement costs should be updated according to the best available information on the cost to replace the asset in today's value.

Condition Assessment Strategies

- Develop a Condition Assessment Strategy - Staff provided assessed condition data for about half of all vehicles during the development of this AMP. Formal condition assessment procedures should be developed to ensure that asset management planning is based on the best available data regarding asset condition. See Appendix D for additional guidance.

- Review Backlog Assets - Review assets that have surpassed their estimated useful life to determine if immediate replacement is required or whether these assets are expected to remain in-service. Adjust the service life and/or condition ratings for these assets accordingly.

Lifecycle Management Strategies

- Develop a Short-Term Capital Plan - Given the relatively short useful life of vehicles (5-15 years) a short-term capital plan should be prepared and updated annually to ensure capital funds are available to meet projected requirements.

Levels of Service

- Identify Current Levels of Service Metrics - Municipality staff need to identify the qualitative descriptions and technical metrics that will measure the current levels of service provided by vehicles by July 1, 2023 according to O. Reg. 588/17. See Appendix E for examples.

4.7 Land Improvements

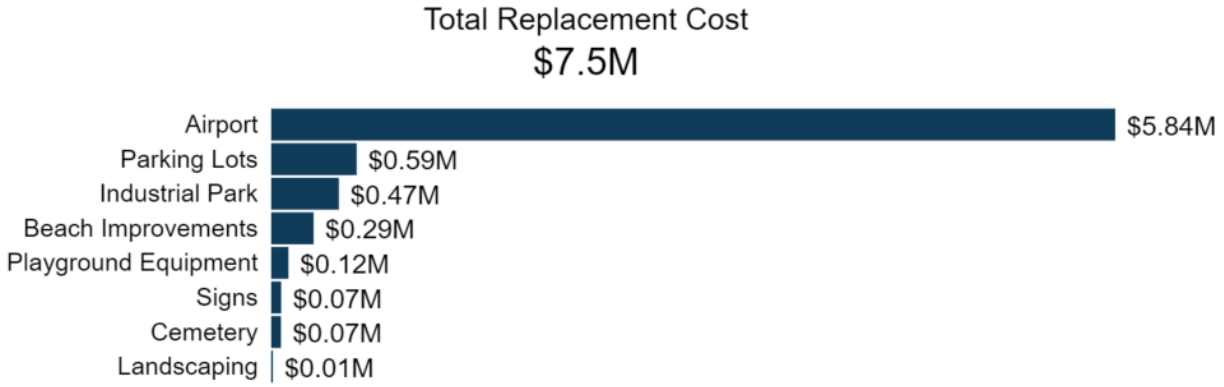
The Municipality of Wawa owns a small number of assets that are considered Land Improvements. This category includes:

- Airport runway and apron
- Beach walkways and pavilions, and playground equipment
- Cemeteries, fencing, landscaping and signs
- Parking lots

4.7.1 Asset Inventory & Replacement Cost

The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the Municipality's Land Improvements inventory.

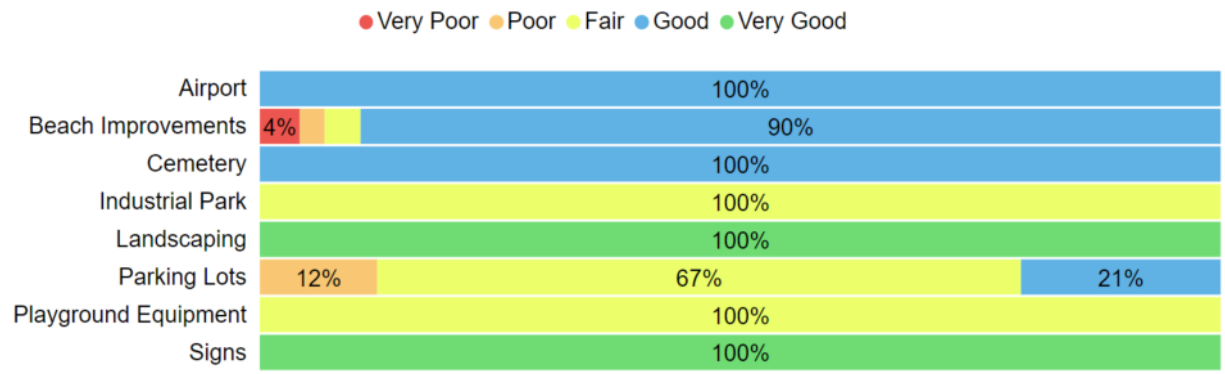
Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Airport	2	CPI Tables	$5,837,164
Beach Improvements	4	CPI Tables	$293,718
Cemetery	3	CPI Tables	$67,827
Industrial Park	1	CPI Tables	$468,566
Landscaping	1	CPI Tables	$11,929
Parking Lots	11	CPI Tables	$591,693
Playground Equipment	2	CPI Tables	$119,607
Tourism Signs	9	CPI Tables	$69,295
			$7,459,799



4.7.2 Asset Condition

The table below identifies the current average condition and source of available condition data for each asset segment. The Average Condition (%) is a weighted value based on replacement cost.

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Airport	70%	Good	100% Assessed
Beach Improvements	64%	Good	92% Assessed
Cemetery	78%	Good	Age-based
Industrial Park	48%	Fair	Age-based
Landscaping	89%	Very Good	Age-based
Parking Lots	51%	Fair	100% Assessed
Playground Equipment	53%	Fair	50% Assessed
Tourism Signs	91%	Very Good	Age-based
	67%	**Good**	**90% Assessed**



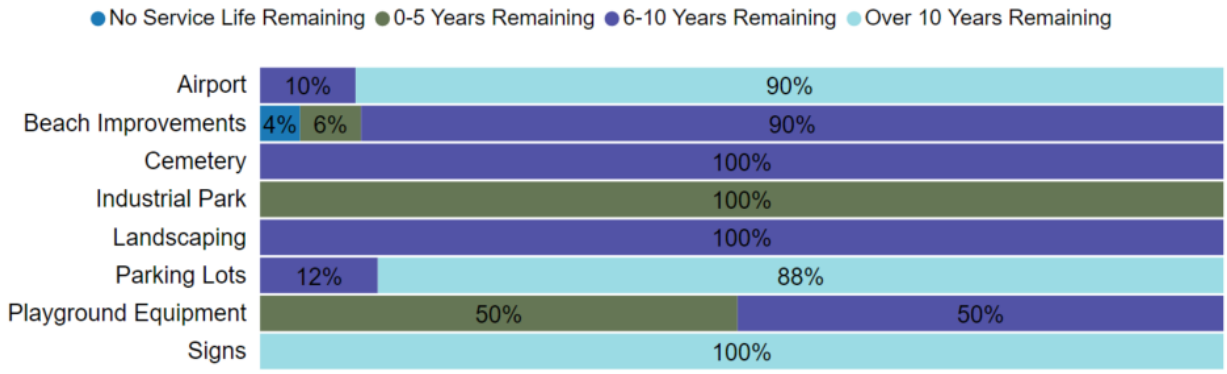
To ensure that the Municipality's Land Improvements continues to provide an acceptable level of service, the Municipality should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of maintenance, rehabilitation and replacement activities is required to increase the overall condition of the Land Improvements.

4.7.3 Estimated Useful Life & Average Age

The Estimated Useful Life for Land Improvements assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service.

Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Airport	10-20 years	15.4	10.4
Beach Improvements	10 years	9.9	3.4
Cemetery	10 years	2.2	7.8
Industrial Park	10 years	5.3	4.8
Landscaping	10 years	1.1	8.9
Parking Lots	30 years	35.4	13.8
Playground Equipment	10 years	8.7	5.3
Tourism Signs	20 years	1.7	18.3
		19.7	**10.5**

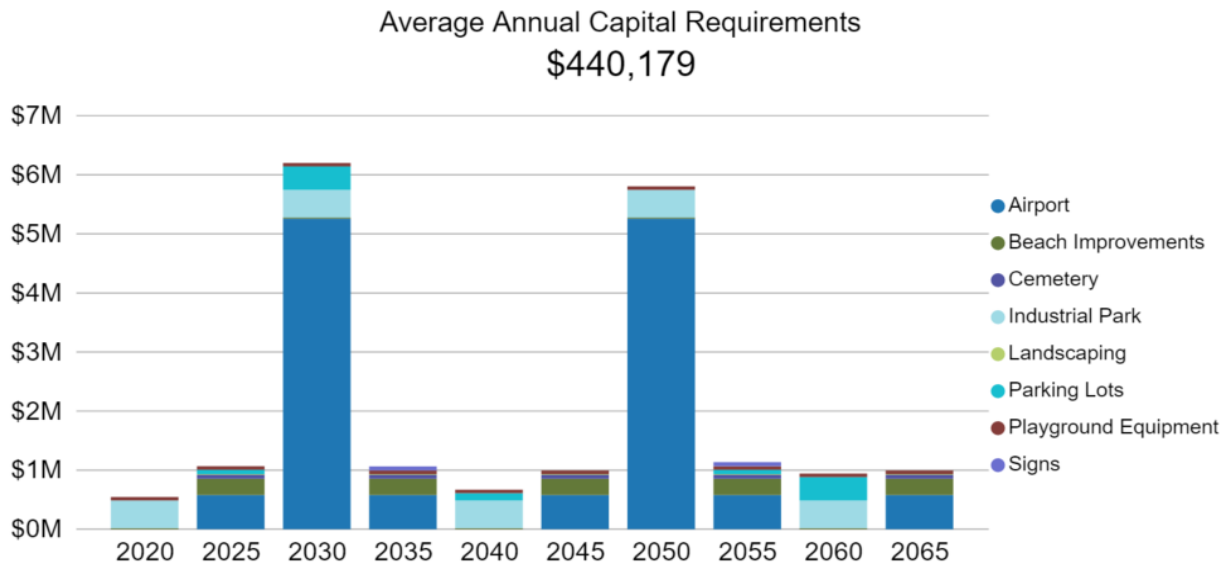


Each asset's Estimated Useful Life should be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

4.7.4 Lifecycle Management Strategy

Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Municipality should allocate towards funding rehabilitation and replacement needs.



4.7.5 Risk & Criticality

Land Improvements is considered a non-core asset category. As such, the Municipality has until July 1, 2023 to identify asset risk and determine asset criticality.

4.7.6 Levels of Service

Land Improvements is considered a non-core asset category. As such, the Municipality has until July 1, 2023 to determine the qualitative descriptions and technical metrics that measure the current level of service provided.

4.7.7 Recommendations

Asset Inventory/Data Refinement

- Review Replacement Costs - The replacement costs developed for Land Improvements in this AMP are entirely based on the inflation of historical costs. Replacement costs should be updated according to the best available information on the cost to replace the asset in today's value.

Condition Assessment Strategies

- Develop a Condition Assessment Strategy - Staff provided assessed condition data for about 90% of all land improvements during the development of this AMP. Formal condition assessment procedures should be developed to ensure that asset management planning is based on the best available date regarding asset condition. See Appendix D for additional guidance.

- Review Backlog Assets - Review assets that have surpassed their estimated useful life to determine if immediate replacement is required or whether these assets are expected to remain in-service. Adjust the service life and/or condition ratings for these assets accordingly.

Lifecycle Management Strategies

- Develop a Short-Term Capital Plan - Given the relatively short useful life of land improvements (10-30 years) a short-term capital plan should be prepared and updated annually to ensure capital funds are available to meet projected requirements.

Levels of Service

- Identify Current Levels of Service Metrics - Municipality staff need to identify the qualitative descriptions and technical metrics that will measure the current levels of service provided by facilities by July 1, 2023 according to O. Reg. 588/17. See Appendix E for examples.

5 Analysis of Rate-funded Assets

Key Insights

- Rate-funded assets are valued at $66.2 million
- 51% of rate-funded assets are in fair or better condition
- The average annual capital requirement to sustain the current level of service for rate-funded assets is approximately $1.6 million

5.1 Water Network

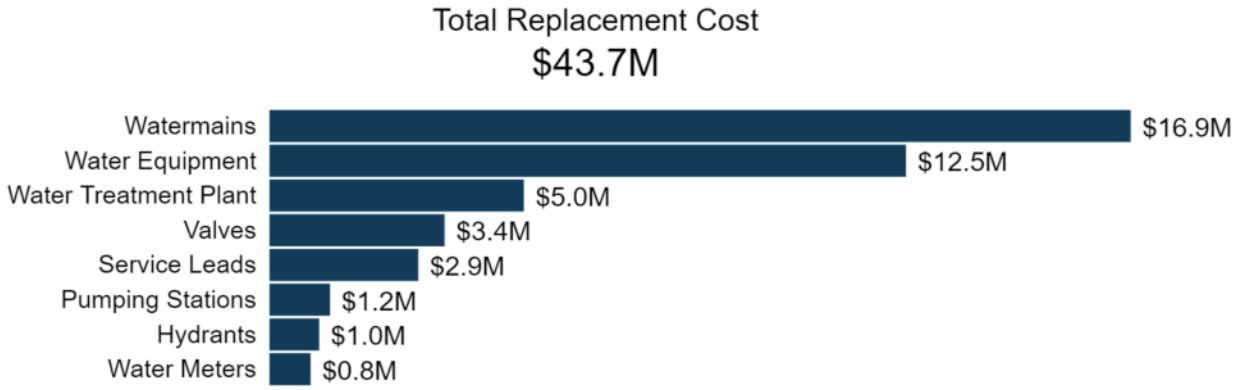
The Municipality of Wawa operates and maintains a water network that serves approximately 3,000 people. The water treatment plant has a rated capacity of 7,880 m^3/day. The water network is subject to numerous Acts and Regulations and is regularly subjected to compliance-based certification processes.

The Water Network is operated and maintained throughout the year by the Infrastructure Services Department.

5.1.1 Asset Inventory & Replacement Cost

The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the Municipality's Water Network inventory.

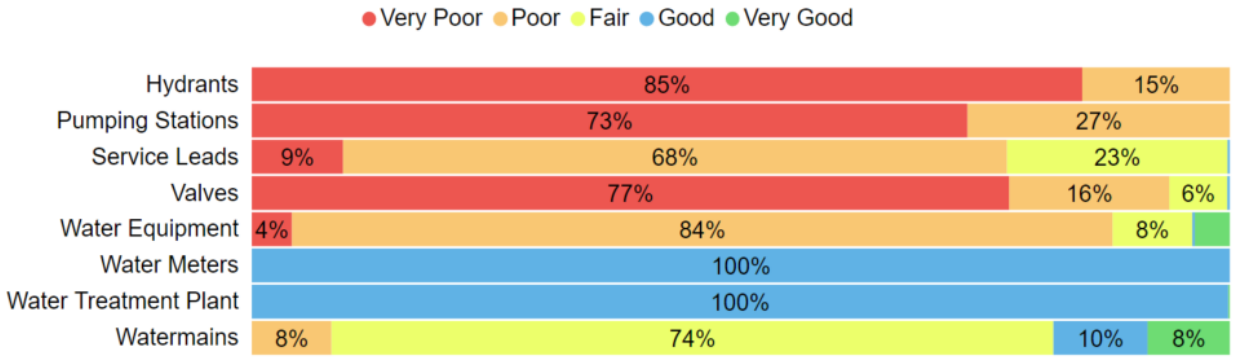
Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Hydrants	119	Cost/Unit	$975,800
Pumping Stations	3	CPI Tables	$1,188,863
Service Leads	13,696 metres	Cost/Unit	$2,919,501
Valves	1579	Cost/Unit	$3,435,750
Water Equipment	16	CPI Tables	$12,488,592
Water Meters	2	Cost/Unit	$807,099
Water Treatment Plant	2	CPI Tables	$4,990,967
Watermains	31,412 metres	Cost/Unit	$16,897,736
			$43,704,307



5.1.2 Asset Condition

The table below identifies the current average condition and source of available condition data for each asset segment. The Average Condition (%) is a weighted value based on replacement cost.

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Hydrants	7%	Very Poor	Age-based
Pumping Stations	12%	Very Poor	Age-based
Service Leads	34%	Poor	Age-based
Valves	21%	Poor	Age-based
Water Equipment	33%	Poor	7% Assessed
Water Meters	67%	Good	Age-based
Water Treatment Plant	65%	Good	Age-based
Watermains	51%	Fair	Age-based
	42%	**Fair**	**2% Assessed**



To ensure that the Municipality's Water Network continues to provide an acceptable level of service, the Municipality should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of maintenance, rehabilitation and replacement activities is required to increase the overall condition of the Water Network.

Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the municipality's current approach:

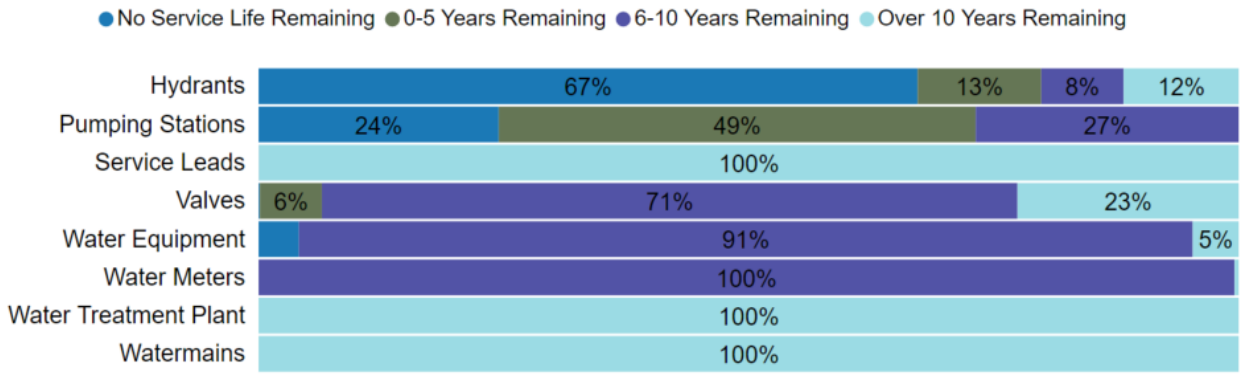
- No formal condition assessment program in place for the Water Network, although water hydrants and WTP components are visually inspected regularly
- With only 3 operators responsible for treatment, collection and distribution systems there is a lack of time and resources to complete network-wide assessments on a regular basis

5.1.3 Estimated Useful Life & Average Age

The Estimated Useful Life for Water Network assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service.

Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Hydrants	40 years	39.2	0.8
Pumping Stations	40 years	40.0	0.0
Service Leads	60 years	40.1	19.9
Valves	50 years	39.3	10.6
Water Equipment	10-20 years	17.2	3.8
Water Meters	14-15 years	4.6	10.1
Water Treatment Plant	20-40 years	8.3	21.7
Watermains	75 years	38.7	36.3
		39.3	**19.4**



Each asset's Estimated Useful Life should be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

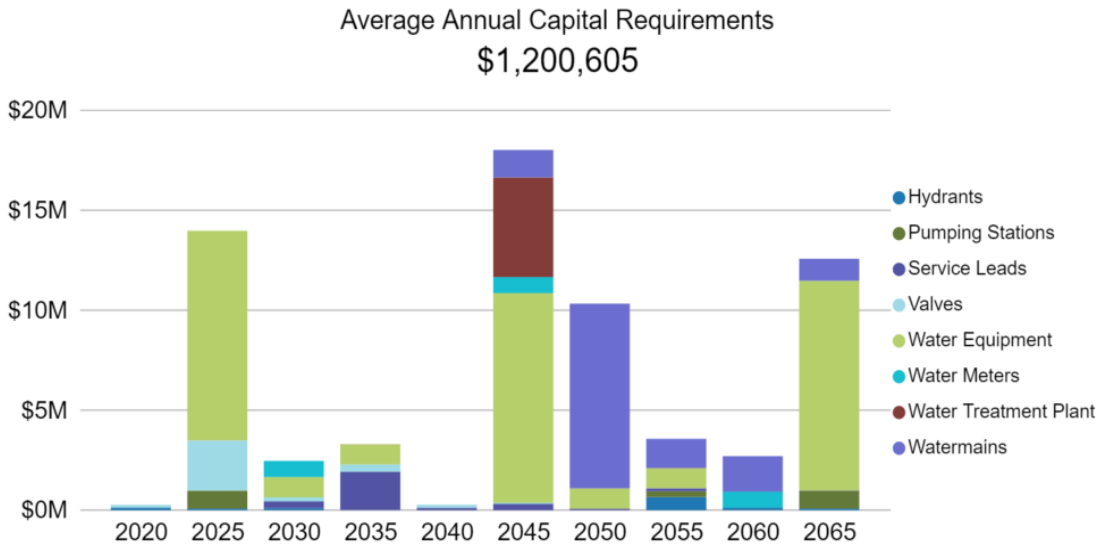
5.1.4 Lifecycle Management Strategy

The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration. The following table outlines the Municipality's current lifecycle management strategy:

Activity Type	Description of Current Strategy
Maintenance	Water main flushing is completed twice annually in the Spring and Fall
	Staff hope to implement a valve exercising program as a preventative maintenance activity to ensure proper valve functioning
	Operating costs for water treatment and flushing comprise the majority of the entire O&M budget for the Water Network
Rehabilitation /Replacement	The water treatment plant was replaced in 2006 and plant components are replaced as needed, typically at a high cost
	Replacing components of water distribution system is more reactive and depends on the identification of breaks, leaks or other operational concerns
	A 3-year capital plan has been prepared for the Water Network and staff hope to work towards a 5-year plan

Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Municipality should allocate towards funding rehabilitation and replacement needs.



The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix A.

5.1.5 Risk & Criticality

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category. See Appendix C for the criteria used to determine the risk rating of each asset.

Critical Assets

The identification of critical assets will allow the Municipality to determine appropriate risk mitigation strategies and treatment options. This may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data.

The above matrix provides a high-level overview of the level of risk present according to the criteria outlined in Appendix C. This is a high-level model developed for the purposes of this AMP and Municipality staff should review and adjust the risk model to reflect an evolving understanding of both the probability and consequences of asset failure.

5.1.6 Levels of Service

The following tables identify the Municipality's current level of service for Water Network. These metrics include the technical and community level of service metrics that are required as part of O. Reg. 588/17 as well as any additional performance measures that the Municipality has selected for this AMP.

Community Levels of Service

The following table outlines the qualitative descriptions that determine the community levels of service provided by Water Network.

Service Attribute	Qualitative Description	Current LOS (2019)
Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal water system	See Appendix B
	Description, which may include maps, of the user groups or areas of the municipality that have fire flow	See Appendix B
Reliability	Description of boil water advisories and service interruptions	Maintenance and rehabilitation of our water systems can lead to temporary disruptions. The length of the interruption would depend on the nature of the maintenance or rehabilitation. Water main breaks may require several blocks to be turned off during the time of repair, approximately 4-8 hours, and sufficient notice is provided to all directly affected. Water hydrant flushing will cause pressure drop in areas and could lead to colour changes in the water. Valve exercising program can lead to short events of low flow or no flow lasting 1-3 minutes.

Technical Levels of Service

The following table outlines the quantitative metrics that determine the technical level of service provided by the Water Network.

Service Attribute	Technical Metric	Current LOS (2019)
Scope	% of properties connected to the municipal water system	54%[5]
	% of properties where fire flow is available	100%[6]
Reliability	# of connection-days per year where a boil water advisory notice is in place compared to the total number of properties connected to the municipal water system	0
	# of connection-days per year where water is not available due to water main breaks compared to the total number of properties connected to the municipal water system	0.00152[7]
Performance	Capital re-investment rate	0.93%

[5] Based on 1,315 water accounts compared to 2,436 total municipal properties. Total includes rural properties beyond the range of the water system
[6] This is based only on properties connected to the water system
[7] 2 or 3 instances of low flow or no flow due to water main breaks per year

5.1.7 Recommendations

Asset Inventory/Data Refinement

- Review Replacement Costs – Unit costs have been reviewed and applied to all linear water infrastructure. Non-linear infrastructure, including equipment, pumping stations and the water treatment plant, rely on the inflation of historical costs. These costs should be reviewed and updated according to the best available information on the cost to replace the asset in today's value.

Condition Assessment Strategies

- Develop a Condition Assessment Strategy - This AMP relies on age-based condition data for almost all water network infrastructure. The development of a network-wide condition assessment program will provide greater reliability in the accuracy of the current condition data.
- Review Backlog Assets - Review assets that have surpassed their estimated useful life to determine if immediate replacement is required or whether these assets are expected to remain in-service. Adjust the service life and/or condition ratings for these assets accordingly.

Lifecycle Management Strategies

- Develop a Long-Term Capital Plan - Similar to other sub-surface infrastructure, most of the Water Network was built around the same time (1970 and 1980s). Some of this infrastructure (hydrants and pumping stations) may be approaching the end of their service life. To determine the full extent of capital requirements these assets should be assessed, and useful lives reviewed. Once completed a long-term capital plan should be developed to identify cost requirements and a financial plan.

Levels of Service

- Measure Current Levels of Service – This AMP contains a basic measurement of the Municipality's current level of service according to the metrics established in O. Reg. 588/17 Staff should continue to measure the current level of service according to these metrics to allow for trend analysis that informs long-term planning.
- Identify Additional LOS Metrics – Staff should identify additional LOS metrics that would inform both short and long-term asset management planning. See Appendix E for examples.
- Identify Proposed Levels of Service - Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

5.2 Sanitary Sewer Network

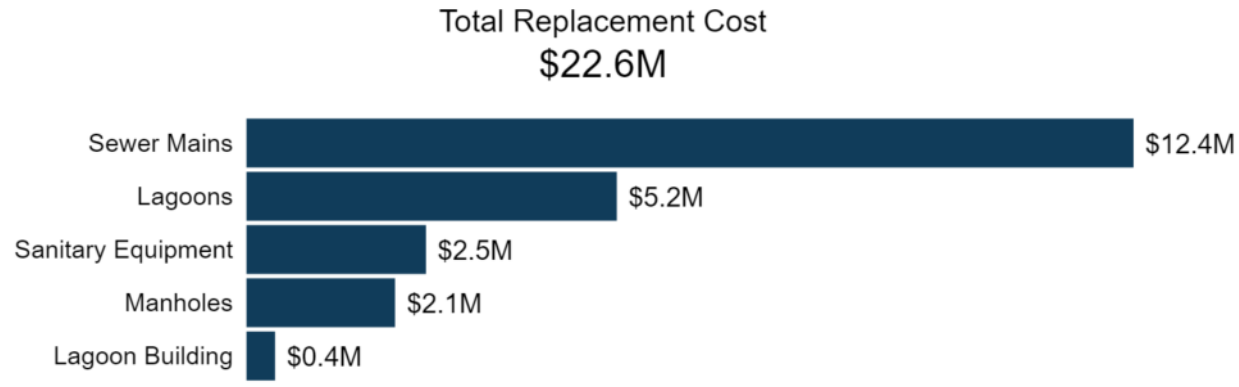
The Municipality of Wawa operates and maintains a sanitary sewer network including a wastewater collection system (20 km of sewer mains) consisting of primarily gravity mains and a handful of force mains. The Sewage Treatment Plant was constructed in 1988 and is a Class 1 plant which consists of 2 aeration ponds that are used for primary treatment.

The Sanitary Sewer Network is operated and maintained throughout the year by the Infrastructure Services Department.

5.2.1 Asset Inventory & Replacement Cost

The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the Municipality's Sanitary Sewer Network inventory.

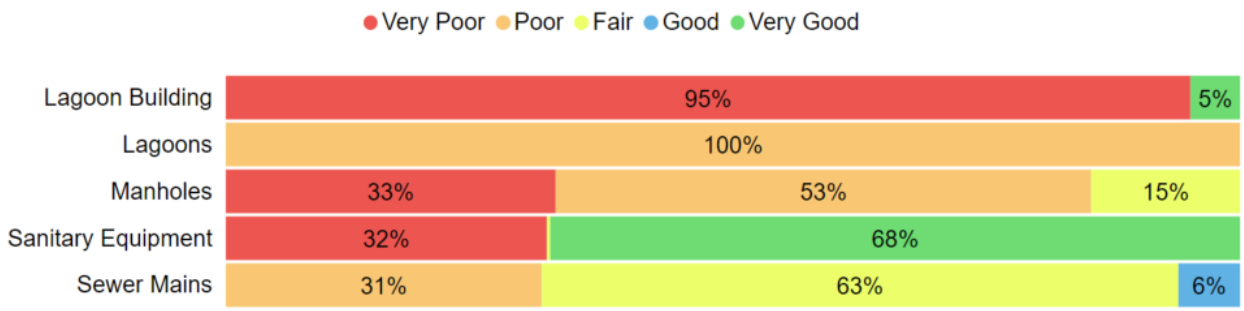
Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Lagoon Building	1	CPI Tables	$402,302
Lagoons	2	CPI Tables	$5,177,886
Manholes	252	Cost/Unit	$2,079,000
Sanitary Sewer Equipment	4	CPI Tables	$2,511,191
Sewer Mains	20,345 metres	Cost/Unit	$12,397,912
			$22,568,291



5.2.2 Asset Condition

The table below identifies the current average condition and source of available condition data for each asset segment. The Average Condition (%) is a weighted value based on replacement cost.

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Lagoon Building	23%	Poor	Age-based
Lagoons	36%	Poor	Age-based
Manholes	30%	Poor	Age-based
Sanitary Sewer Equipment	61%	Good	Age-based
Sewer Mains	44%	Fair	Age-based
	43%	**Fair**	**Age-based**



To ensure that the Municipality's Sanitary Sewer Network continues to provide an acceptable level of service, the Municipality should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of maintenance, rehabilitation and replacement activities is required to increase the overall condition of the Sanitary Sewer Network.

Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the municipality's current approach:

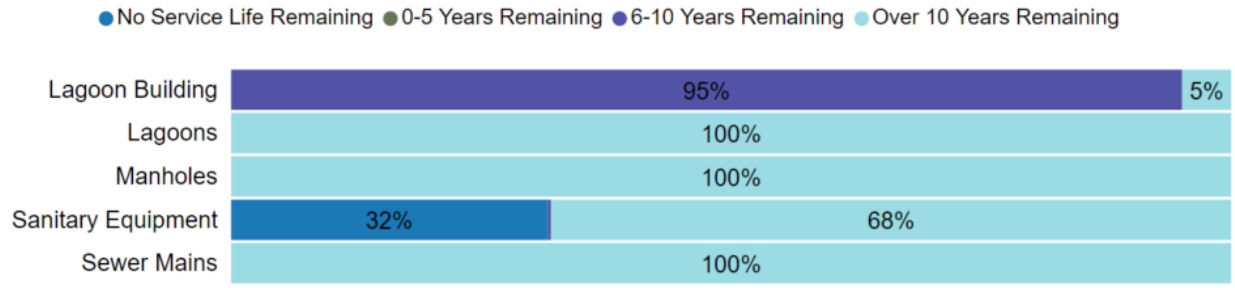
- CCTV inspections are completed on a case-by-case basis
- Similar to stormwater infrastructure inspections are typically completed in coordination with ongoing construction projects
- Financial and time constraints prevent a more network-wide approach to assessment at this time

5.2.3 Estimated Useful Life & Average Age

The Estimated Useful Life for Sanitary Sewer Network assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service.

Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Lagoon Building	20-40 years	12.0	14.7
Lagoons	20-50 years	32.0	18.0
Manholes	60 years	41.9	18.1
Sanitary Sewer Equipment	20 years	11.8	8.2
Sewer Mains	75 years	41.1	33.9
		41.1	**26.7**



Each asset's Estimated Useful Life should be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

5.2.4 Lifecycle Management Strategy

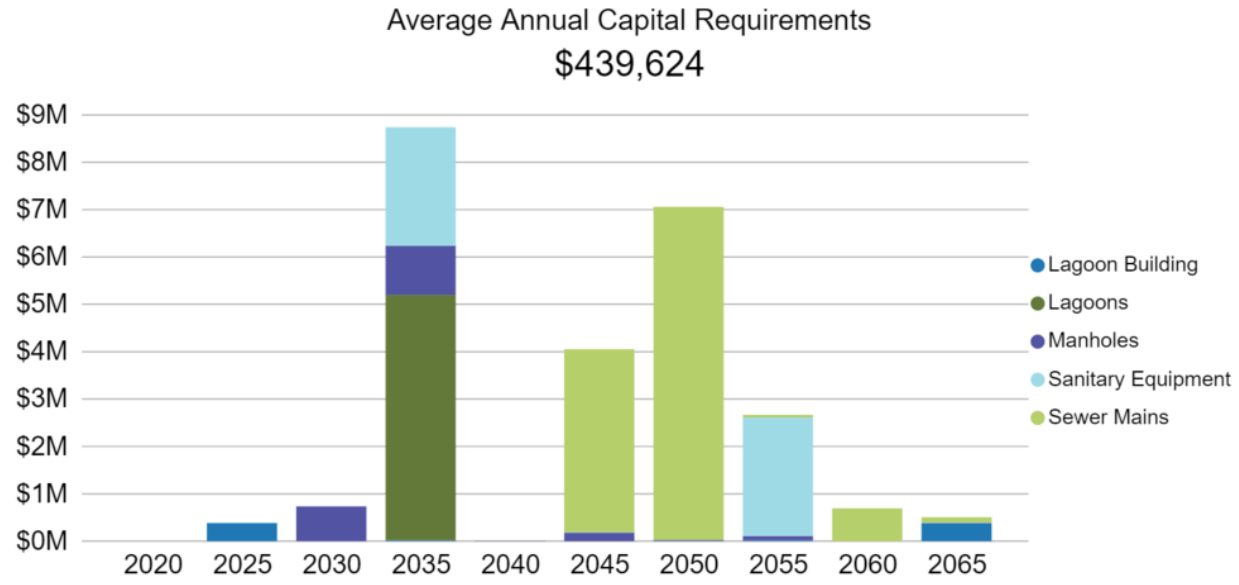
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

The following table outlines the Municipality's current lifecycle management strategy.

Activity Type	Description of Current Strategy
Maintenance	O&M strategy is primarily reactive and based on issue identification (blockages etc.)
	Sanitary sewers are flushed as often as possible to maintain operational capacity
Replacement	WWTP was upgraded in 2016 (reduction in hydro costs); lagoon facility; sludge survey completed every 5 years; plant itself is fairly low maintenance compared to WTP
	In 2016 the aeration system re-done at the lagoon; portion of Toronto Ave has been reconstructed over the past couple of years
	Future replacements will be coordinated with road/water projects

Forecasted Capital Requirements

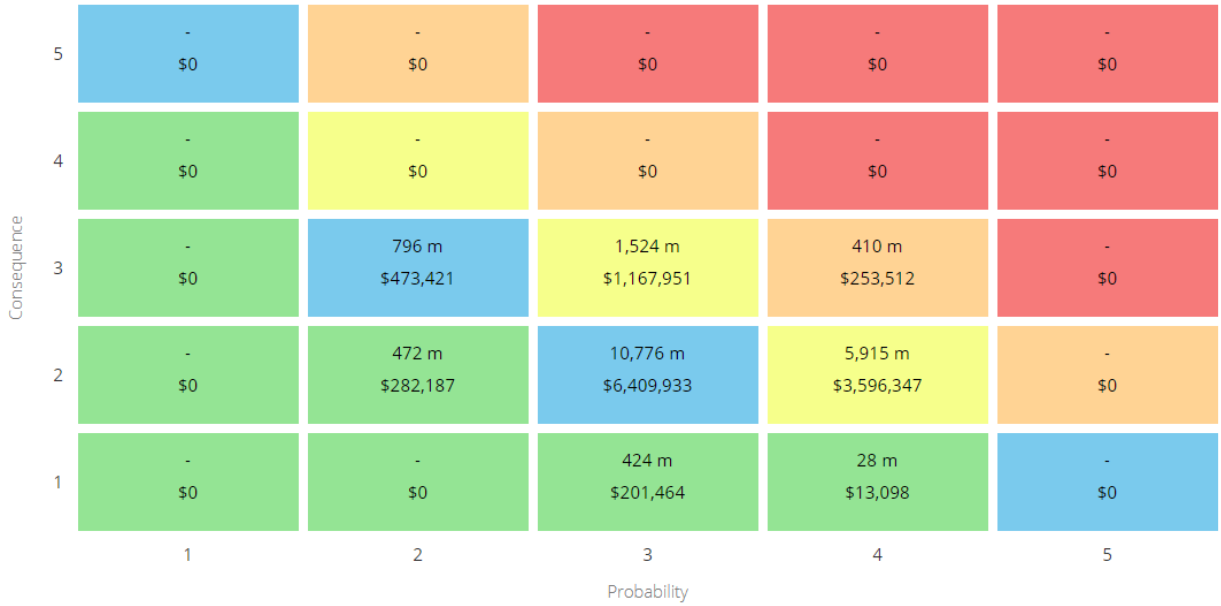
The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Municipality should allocate towards funding rehabilitation and replacement needs.



The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix A.

5.2.5 Risk & Criticality

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category. See Appendix C for the criteria used to determine the risk rating of each asset.



Critical Assets

The identification of critical assets will allow the Municipality to determine appropriate risk mitigation strategies and treatment options. This may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data.

The above matrix provides a high-level overview of the level of risk present according to the criteria outlined in Appendix C. This is a high-level model developed for the purposes of this AMP and Municipality staff should review and adjust the risk model to reflect an evolving understanding of both the probability and consequences of asset failure.

5.2.6 Levels of Service

The following tables identify the Municipality's current level of service for Sanitary Sewer Network. These metrics include the technical and community level of service metrics that are required as part of O. Reg. 588/17 as well as any additional performance measures that the Municipality has selected for this AMP.

Community Levels of Service

The following table outlines the qualitative descriptions that determine the community levels of service provided by Sanitary Sewer Network.

Service Attribute	Qualitative Description	Current LOS (2019)
Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal wastewater system	See Appendix B
Reliability	Description of how combined sewers in the municipal wastewater system are designed with overflow structures in place which allow overflow during storm events to prevent backups into homes	No combined sewers
	Description of the frequency and volume of overflows in combined sewers in the municipal wastewater system that occur in habitable areas or beaches	No combined sewers
	Description of how stormwater can get into sanitary sewers in the municipal wastewater system, causing sewage to overflow into streets or backup into homes	Stormwater can enter into sanitary sewers due to cracks in sanitary mains or through indirect connections (e.g. weeping tiles). In the case of heavy rainfall events, sanitary sewers may experience a volume of water and sewage that exceeds its designed capacity. In some cases, this can cause water and/or sewage to overflow backup into homes. The disconnection of weeping tiles from sanitary mains and the use of sump pumps and pits

Service Attribute	Qualitative Description	Current LOS (2019)
		directing storm water to the storm drain system can help to reduce the chance of this occurring.
	Description of how sanitary sewers in the municipal wastewater system are designed to be resilient to stormwater infiltration	The municipality follows a series of design standards that integrate servicing requirements and land use considerations when constructing or replacing sanitary sewers. These standards have been determined with consideration of the minimization of sewage overflows and backups.
	Description of the effluent that is discharged from sewage treatment plants in the municipal wastewater system	Effluent refers to water pollution that is discharged from a wastewater treatment plant, and may include suspended solids, total phosphorous and biological oxygen demand. The Environmental Compliance Approval (ECA) identifies the effluent criteria for municipal wastewater treatment plants.

Technical Levels of Service

The following table outlines the quantitative metrics that determine the technical level of service provided by the Sanitary Sewer Network.

Service Attribute	Technical Metric	Current LOS (2019)
Scope	% of properties connected to the municipal wastewater system	50%[8]
Reliability	# of events per year where combined sewer flow in the municipal wastewater system exceeds system capacity compared to the total number of properties connected to the municipal wastewater system	0
	# of connection-days per year having wastewater backups compared to the total number of properties connected to the municipal wastewater system	0
	# of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system	0
Performance	Capital re-investment rate	0.25%

[8] All properties in town connected; none on Government Road past Tamarack except Greywater

5.2.7 Recommendations

Asset Inventory/Data Refinement

- Review Replacement Costs – Unit costs have been reviewed and applied to all linear sanitary infrastructure. Non-linear infrastructure, including lagoons and equipment, rely on the inflation of historical costs. These costs should be reviewed and updated according to the best available information on the cost to replace the asset in today's value.

Condition Assessment Strategies

- Develop a Condition Assessment Strategy - This AMP relies on age-based condition data for all sanitary network infrastructure. The development of a network-wide condition assessment program will provide greater reliability in the accuracy of the current condition data.

Lifecycle Management Strategies

- Develop a Long-term Capital Plan - Similar to other sub-surface infrastructure, most of the Sanitary Sewer Network was built around the same time (1970s). While capital costs are expected to be minimal in the short-term, within 20-40 years significant capital costs are projected for the rehabilitation and/or replacement of sanitary infrastructure. To ensure that money is available to meet future replacement requirements a long-term capital plan should be developed.

Levels of Service

- Measure Current Levels of Service – This AMP contains a basic measurement of the Municipality's current level of service according to the metrics established in O. Reg. 588/17 Staff should continue to measure the current level of service according to these metrics to allow for trend analysis that informs long-term planning.

- Identify Additional LOS Metrics – Staff should identify additional LOS metrics that would inform both short and long-term asset management planning. See Appendix E for examples.

- Identify Proposed Levels of Service - Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

6 Impacts of Growth

Key Insights

- Understanding the key drivers of growth and demand will allow the Municipality to more effectively plan for new infrastructure, and the upgrade or disposal of existing infrastructure

- The costs of growth should be considered in long-term funding strategies that are designed to maintain the current level of service

6.1 Description of Growth Assumptions

The demand for infrastructure and services will change over time based on a combination of internal and external factors. Understanding the key drivers of growth and demand will allow the Municipality to more effectively plan for new infrastructure, and the upgrade or disposal of existing infrastructure. Increases or decreases in demand can affect what assets are needed and what level of service meets the needs of the community.

6.1.1 Census Profile – Population/Households/Employment

The following table outlines trends in population, private dwellings and employment over the last three census periods:

	2006	2011	2016	Net Change (2006-2016)
Population				
Total Population	3,204	2,975	2,905	**-299**
Households				
Private Dwellings[9]	1,453	1,310	1,279	**-174**
Employment				
Participation Rate	64.4%	66.1%	61.9%	**-2.5%**
Employment Rate	60.2%	60.8%	58.0%	**-2.2%**
Unemployment Rate	6.6%	8.0%	6.3%	**-0.3%**

6.2 Impact of Growth on Lifecycle Activities

By July 1, 2024 the Municipality's asset management plan must include a discussion of how the assumptions regarding future changes in population and economic activity informed the preparation of the lifecycle management and financial strategy.

Planning for forecasted population growth may require the expansion of existing infrastructure and services. As growth-related assets are constructed or acquired, they should be integrated into the Municipality's AMP. While the addition of residential units will add to the existing assessment base and offset some of the costs associated with growth, the Municipality will need to review the lifecycle costs of growth-related infrastructure. These costs should be considered in long-term funding strategies that are designed to, at a minimum, maintain the current level of service.

[9] Occupied by usual residents

7 Financial Strategy

Key Insights

- The Municipality is committing approximately $1.1 million towards capital projects per year from sustainable revenue sources

- Given the annual capital requirement of $3.9 million, there is currently a funding gap of $2.8 million annually

- For tax-funded assets, we recommend increasing tax revenues by 1.5% each year for the next 20 years to achieve a sustainable level of funding

- For the Sanitary Sewer Network, we recommend increasing rate revenues by 3.1% annually for the next 20 years to achieve a sustainable level of funding

- For the Water Network, we recommend increasing rate revenues by 4.8% annually for the next 20 years to achieve a sustainable level of funding

7.1 Financial Strategy Overview

For an asset management plan to be effective and meaningful, it must be integrated with financial planning and long-term budgeting. The development of a comprehensive financial plan will allow the Municipality of Wawa to identify the financial resources required for sustainable asset management based on existing asset inventories, desired levels of service, and projected growth requirements.

This report develops such a financial plan by presenting several scenarios for consideration and culminating with final recommendations. As outlined below, the scenarios presented model different combinations of the following components:

1. The financial requirements for:
    a. Existing assets
    b. Existing service levels
    c. Requirements of contemplated changes in service levels (none identified for this plan)
    d. Requirements of anticipated growth (none identified for this plan)

2. Use of traditional sources of municipal funds:
    a. Tax levies
    b. User fees
    c. Reserves
    d. Debt
    e. Development charges

3. Use of non-traditional sources of municipal funds:
    a. Reallocated budgets
    b. Partnerships
    c. Procurement methods

4. Use of Senior Government Funds:
    a. Gas tax
    b. Annual grants

Note: Periodic grants are normally not included due to Provincial requirements for firm commitments. However, if moving a specific project forward is wholly dependent on receiving a one-time grant, the replacement cost included in the financial strategy is the net of such grant being received.

If the financial plan component results in a funding shortfall, the Province requires the inclusion of a specific plan as to how the impact of the shortfall will be managed. In determining the legitimacy of a funding shortfall, the Province may evaluate a Municipality's approach to the following:

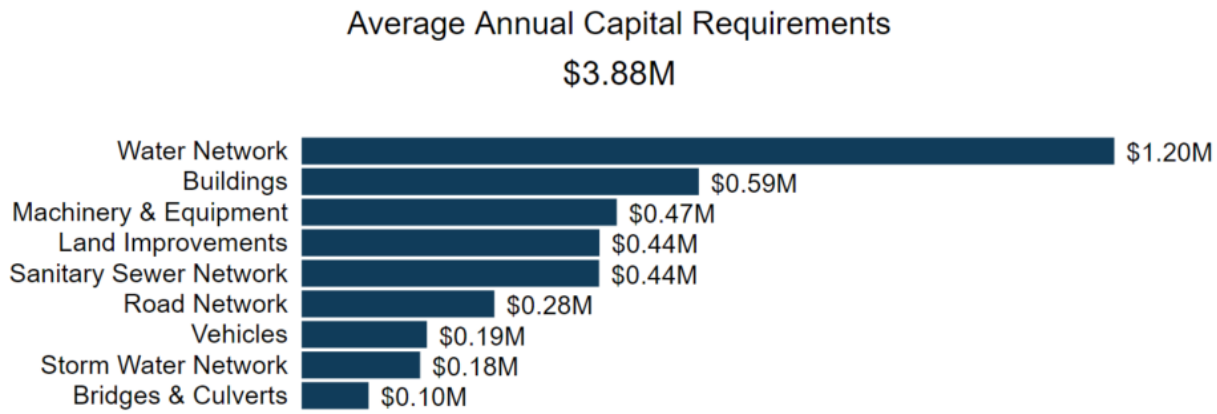
1. In order to reduce financial requirements, consideration has been given to revising service levels downward.

2. All asset management and financial strategies have been considered. For example:
    a. If a zero-debt policy is in place, is it warranted? If not the use of debt should be considered.
    b. Do user fees reflect the cost of the applicable service? If not, increased user fees should be considered.

7.1.1 Annual Requirements & Capital Funding

Annual Requirements

The annual requirements represent the amount the Municipality should allocate annually to each asset category to meet replacement needs as they arise, prevent infrastructure backlogs and achieve long-term sustainability. In total, the Municipality must allocate approximately $3.9 million annually to address capital requirements for the assets included in this AMP.



For most asset categories the annual requirement has been calculated based on a “replacement only” scenario, in which capital costs are only incurred at the construction and replacement of each asset.

However, for the Road Network, lifecycle management strategies have been developed to identify capital cost savings that are realized through strategic rehabilitation and renewal. The development of these strategies allows for a comparison of potential cost avoidance if the strategies were to be implemented. The following table compares two scenarios for the Road Network:

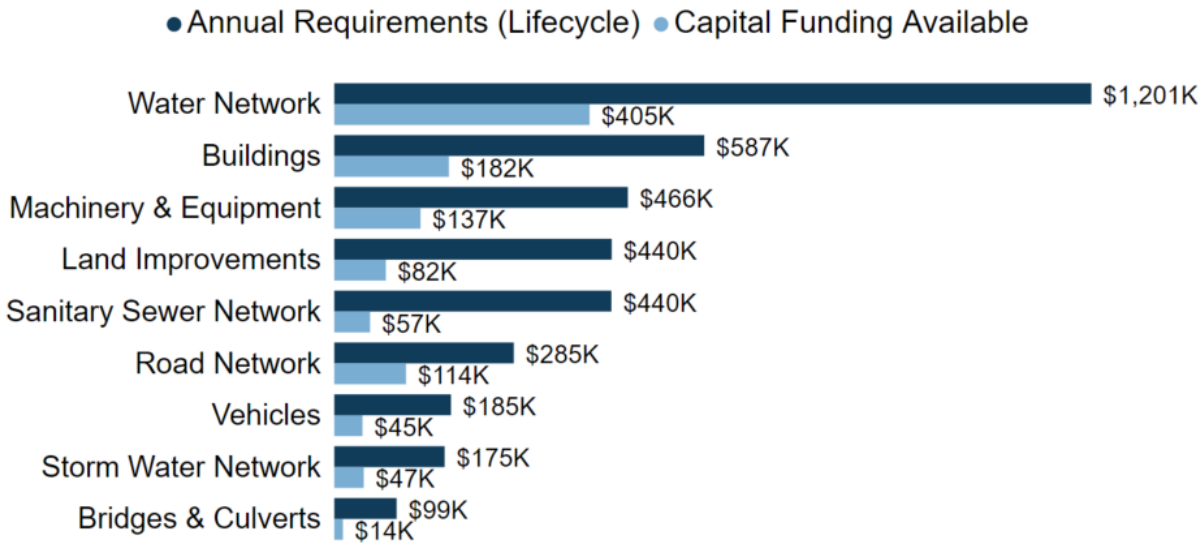
1. Replacement Only Scenario: Based on the assumption that assets deteriorate and – without regularly scheduled maintenance and rehabilitation – are replaced at the end of their service life.
2. Lifecycle Strategy Scenario: Based on the assumption that lifecycle activities are performed at strategic intervals to extend the service life of assets until replacement is required.

Asset Category	Annual Requirements (Replacement Only)	Annual Requirements (Lifecycle Strategy)	Difference
Road Network	$348,000	$285,000	$63,000

The implementation of a proactive lifecycle strategy for roads leads to a potential annual cost avoidance of $63,000 for the Road Network. This represents an overall reduction of the annual requirements for each category by 18%. As the lifecycle strategy scenario represents the lowest cost option available to the Municipality, we have used these annual requirements in the development of the financial strategy.

Annual Funding Available

Based on a historical analysis of capital funding sources, the Municipality is committing approximately $1.1 million towards capital projects per year from sustainable revenue sources. Given the annual capital requirement of $3.9 million, there is currently a funding gap of $2.8 million annually.



7.2 Funding Objective

We have developed a scenario that would enable Wawa to achieve full funding within 1 to 20 years for the following assets:

1. **Tax Funded Assets:** Bridges & Culverts, Road Network, Stormwater Network, Buildings & Facilities, Machinery & Equipment, Land Improvements, Vehicles
2. **Rate-Funded Assets:** Water Network, Sanitary Sewer Network

Note: For the purposes of this AMP, we have excluded gravel roads since they are a perpetual maintenance asset and end of life replacement calculations do not normally apply. If gravel roads are maintained properly, they can theoretically have a limitless service life.

For each scenario developed we have included strategies, where applicable, regarding the use of cost containment and funding opportunities.

7.3 Financial Profile: Tax Funded Assets

7.3.1 Current Funding Position

The following tables show, by asset category, Wawa's average annual asset investment requirements, current funding positions, and funding increases required to achieve full funding on assets funded by taxes.

Asset Category	Avg. Annual Requirement	Annual Funding Available				Annual Deficit
		Taxes	Gas Tax & OCIF	Other	Total Available	
Road Network	285,000	40,000	74,000	0	114,000	171,000
Storm Water Network	175,000	25,000	22,000	0	47,000	128,000
Bridges & Culverts	99,000	14,000	0	0	14,000	85,000
Buildings & Facilities	587,000	82,000	77,000	23,000	182,000	405,000
Machinery & Equipment	466,000	65,000	62,000	10,000	137,000	329,000
Land Improvements	440,000	62,000	0	20,000	82,000	358,000
Vehicles	185,000	26,000	9,000	10,000	45,000	140,000
	2,237,000	**314,000**	**244,000**	**63,000**	**621,000**	**1,616,000**

The average annual investment requirement for the above categories is $2,237,000. Annual revenue currently allocated to these assets for capital purposes is $621,000 leaving an annual deficit of $1,616,000. Put differently, these infrastructure categories are currently funded at 28% of their long-term requirements.

7.3.2 Full Funding Requirements

In 2020, Municipality of Wawa has annual tax revenues of $4,941,000. As illustrated in the following table, without consideration of any other sources of revenue or cost containment strategies, full funding would require the following tax change over time:

Asset Category	Tax Change Required for Full Funding
Road Network	3.5%
Storm Water Network	2.6%
Bridges & Culverts	1.7%
Buildings & Facilities	8.2%
Machinery & Equipment	6.7%
Land Improvements	7.2%
Vehicles	2.8%
Other	0.0%
	32.7%

The following changes in costs and/or revenues over the next number of years should also be considered in the financial strategy:

a) Wawa's debt payments for these asset categories will be increasing by $91,000 over the next 5 years and decreasing by $152,000 over the next 10 years. Although not shown in the table, debt payment decreases will be $152,000 and $152,000 over the next 15 and 20 years respectively.

Our recommendations include capturing the above changes and allocating them to the infrastructure deficit outlined above. The table below outlines this concept and presents several options:

	Without Capturing Changes				With Capturing Changes			
	5 Years	10 Years	15 Years	20 Years	5 Years	10 Years	15 Years	20 Years
Infrastructure Deficit	1,616,000	1,616,000	1,616,000	1,616,000	1,616,000	1,616,000	1,616,000	1,616,000
Change in Debt Costs	N/A	N/A	N/A	N/A	91,000	-152,000	-152,000	-152,000
Resulting Infrastructure Deficit:	**1,616,000**	**1,616,000**	**1,616,000**	**1,616,000**	**1,707,000**	**1,464,000**	**1,464,000**	**1,464,000**
Tax Increase Required	32.7%	32.7%	32.7%	32.7%	34.5%	29.6%	29.6%	29.6%
Annually:	**6.5%**	**3.3%**	**2.2%**	**1.6%**	**6.9%**	**3.0%**	**2.0%**	**1.5%**

7.3.3 Financial Strategy Recommendations

Considering all the above information, we recommend the 20-year option with capturing the changes. This involves full funding being achieved over 20 years by:

a) when realized, reallocating the debt cost reductions of $152,000 to the infrastructure deficit as outlined above.
b) increasing tax revenues by 1.5% each year for the next 20 years solely for the purpose of phasing in full funding to the asset categories covered in this section of the AMP.
c) allocating the current gas tax, OCIF & other revenue as outlined previously.
d) increasing existing and future infrastructure budgets by the applicable inflation index on an annual basis in addition to the deficit phase-in.

Notes:

1. As in the past, periodic senior government infrastructure funding will most likely be available during the phase-in period. By Provincial AMP rules, this periodic funding cannot be incorporated into an AMP unless there are firm commitments in place. We have included OCIF formula-based funding, if applicable, since this funding is a multi-year commitment[10].

2. We realize that raising tax revenues by the amounts recommended above for infrastructure purposes will be very difficult to do. However, considering a longer phase-in window may have even greater consequences in terms of infrastructure failure.

Although this option achieves full funding on an annual basis in 20 years and provides financial sustainability over the period modeled, the recommendations do require prioritizing capital projects to fit the resulting annual funding available. Current data shows a pent-up investment demand $151,000 for the Buildings & Facilities, $652,000 for Machinery & Equipment, $245,000 for Vehicles, and $12,000 for Land Improvements.

Prioritizing future projects will require the current data to be replaced by condition-based data. Although our recommendations include no further use of debt, the results of the condition-based analysis may require otherwise.

[10] The Municipality should take advantage of all available grant funding programs and transfers from other levels of government. While OCIF has historically been considered a sustainable source of funding, the program is currently undergoing review by the provincial government. Depending on the outcome of this review, there may be changes that impact its availability.

7.4 Financial Profile: Rate Funded Assets

7.4.1 Current Funding Position

The following tables show, by asset category, Wawa's average annual asset investment requirements, current funding positions, and funding increases required to achieve full funding on assets funded by rates.

Asset Category	Avg. Annual Requirement	Annual Funding Available				Annual Deficit
		Rates	To Operations	OCIF	Total Available	
Water Network	1,201,000	826,000	-575,000	154,000	405,000	796,000
Sanitary Sewer Network	440,000	611,000	-611,000	57,000	57,000	383,000
	1,641,000	**1,437,000**	**-1,186,000**	**211,000**	**462,000**	**1,179,000**

The average annual investment requirement for the above categories is $1,641,000. Annual revenue currently allocated to these assets for capital purposes is $462,000 leaving an annual deficit of $1,179,000. Put differently, these infrastructure categories are currently funded at 28% of their long-term requirements.

7.4.2 Full Funding Requirements

In 2020, Wawa had annual sanitary revenues of $611,000 and annual water revenues of $826,000. As illustrated in the table below, without consideration of any other sources of revenue, full funding would require the following changes over time:

Asset Category	Rate Change Required for Full Funding
Water Network	96.4%
Sanitary Sewer Network	62.7%

Through the following table, we have expanded the above scenario to present multiple options. Due to the significant increases required, we have provided phase-in options of up to 20 years.

	Water Network				Sanitary Sewer Network			
	5 Years	10 Years	15 Years	20 Years	5 Years	10 Years	15 Years	20 Years
Rate Increase Required	96.4%	96.4%	96.4%	96.4%	62.7%	62.7%	62.7%	62.7%
Annually:	**19.3%**	**9.6%**	**6.4%**	**4.8%**	**12.5%**	**6.3%**	**4.2%**	**3.1%**

7.4.3 Financial Strategy Recommendations

Considering all of the above information, we recommend the 20-year option. This involves full funding being achieved over 20 years by:

a) increasing rate revenues by 3.1% for sanitary services and 4.8% for water services each year for the next 20 years solely for the purpose of phasing in full funding to the asset categories covered in this section of the AMP.

b) increasing existing and future infrastructure budgets by the applicable inflation index on an annual basis in addition to the deficit phase-in.

Notes:

1. As in the past, periodic senior government infrastructure funding will most likely be available during the phase-in period. This periodic funding should not be incorporated into an AMP unless there are firm commitments in place.

2. We realize that raising rate revenues for infrastructure purposes will be very difficult to do. However, considering a longer phase-in window may have even greater consequences in terms of infrastructure failure.

3. Any increase in rates required for operations would be in addition to the above recommendations.

Although this option achieves full funding on an annual basis in 20 years and provides financial sustainability over the period modeled, the recommendations do require prioritizing capital projects to fit the resulting annual funding available. Current data shows a pent-up investment demand of $1,464,000 for the Water Network and $795,000 for the Sanitary Sewer Network.

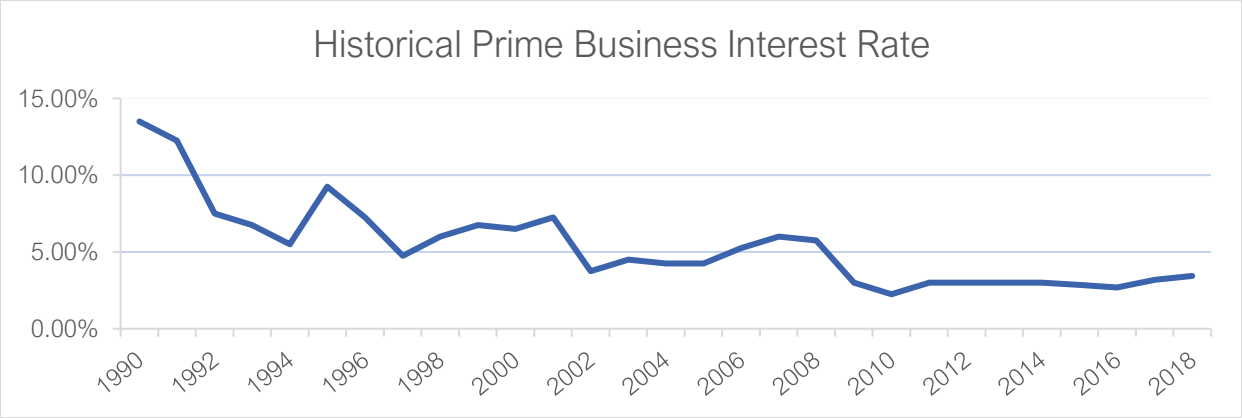
Prioritizing future projects will require the current data to be replaced by condition-based data. Although our recommendations include no further use of debt, the results of the condition-based analysis may require otherwise.

7.5 Use of Debt

For reference purposes, the following table outlines the premium paid on a project if financed by debt. For example, a $1M project financed at 3.0%[11] over 15 years would result in a 26% premium or $260,000 of increased costs due to interest payments. For simplicity, the table does not consider the time value of money or the effect of inflation on delayed projects.

Interest Rate	Number of Years Financed					
	5	10	15	20	25	30
7.0%	22%	42%	65%	89%	115%	142%
6.5%	20%	39%	60%	82%	105%	130%
6.0%	19%	36%	54%	74%	96%	118%
5.5%	17%	33%	49%	67%	86%	106%
5.0%	15%	30%	45%	60%	77%	95%
4.5%	14%	26%	40%	54%	69%	84%
4.0%	12%	23%	35%	47%	60%	73%
3.5%	11%	20%	30%	41%	52%	63%
3.0%	9%	17%	26%	34%	44%	53%
2.5%	8%	14%	21%	28%	36%	43%
2.0%	6%	11%	17%	22%	28%	34%
1.5%	5%	8%	12%	16%	21%	25%
1.0%	3%	6%	8%	11%	14%	16%
0.5%	2%	3%	4%	5%	7%	8%
0.0%	0%	0%	0%	0%	0%	0%

It should be noted that current interest rates are near all-time lows. Sustainable funding models that include debt need to incorporate the risk of rising interest rates. The following graph shows where historical lending rates have been:



[11] Current municipal Infrastructure Ontario rates for 15-year money is 3.2%.

A change in 15-year rates from 3% to 6% would change the premium from 26% to 54%. Such a change would have a significant impact on a financial plan.

The following tables outline how Wawa has historically used debt for investing in the asset categories as listed. There is currently $4,134,000 of debt outstanding for the assets covered by this AMP with corresponding principal and interest payments of $309,000, well within its provincially prescribed maximum of $2,589,000.

Asset Category	Current Debt Outstanding	Use of Debt in the Last Five Years				
		2015	2016	2017	2018	2019
Road Network	162,000	0	0	0	0	0
Storm Water Network	0	0	0	0	0	0
Bridges & Culverts	0	0	0	0	0	0
Buildings & Facilities	1,610,000	0	0	0	0	0
Machinery & Equipment	89,000	0	0	0	0	0
Land Improvements	0	0	0	0	0	0
Vehicles	0	0	0	0	0	0
Other	0	0	0	0	0	0
Total Tax Funded:	1,861,000	**0**	**0**	**0**	**0**	**0**
Water Network	2,273,000	0	0	0	0	0
Sanitary Sewer Network	0	0	0	0	0	0
Total Rate Funded:	**2,273,000**	**0**	**0**	**0**	**0**	**0**

Asset Category	Principal & Interest Payments in the Next Ten Years						
	2020	2021	2022	2023	2024	2025	2030
Road Network	31,000	31,000	31,000	31,000	31,000	31,000	0
Storm Water Network	0	0	0	0	0	0	0
Bridges & Culverts	0	0	0	0	0	0	0
Buildings & Facilities	80,000	212,000	212,000	212,000	212,000	212,000	0
Machinery & Equipment	41,000	41,000	4,000	4,000	2,000	0	0
Land Improvements	0	0	0	0	0	0	0
Vehicles	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0
Total Tax Funded:	**152,000**	**284,000**	**247,000**	**247,000**	**245,000**	**243,000**	**0**
Water Network	157,000	157,000	157,000	157,000	157,000	157,000	157,000
Sanitary Sewer Network	0	0	0	0	0	0	0
Total Rate Funded:	**157,000**	**157,000**	**157,000**	**157,000**	**157,000**	**157,000**	**157,000**

The revenue options outlined in this plan allow Wawa to fully fund its long-term infrastructure requirements without further use of debt.

7.6 Use of Reserves

7.6.1 Available Reserves

Reserves play a critical role in long-term financial planning. The benefits of having reserves available for infrastructure planning include:

a) the ability to stabilize tax rates when dealing with variable and sometimes uncontrollable factors
b) financing one-time or short-term investments
c) accumulating the funding for significant future infrastructure investments
d) managing the use of debt
e) normalizing infrastructure funding requirements

By asset category, the table below outlines the details of the reserves currently available to the Municipality.

Asset Category	Balance at December 31, 2019
Road Network	435,000
Storm Water Network	362,000
Bridges & Culverts	381,000
Buildings & Facilities	784,000
Machinery & Equipment	1,093,000
Land Improvements	459,000
Vehicles	651,000
Other	0
Total Tax Funded:	**4,165,000**
Water Network	802,000
Sanitary Sewer Network	464,000
Total Rate Funded:	**1,266,000**

There is considerable debate in the municipal sector as to the appropriate level of reserves that a Municipality should have on hand. There is no clear guideline that has gained wide acceptance. Factors that municipalities should take into account when determining their capital reserve requirements include:

a) breadth of services provided
b) age and condition of infrastructure
c) use and level of debt
d) economic conditions and outlook
e) internal reserve and debt policies.

These reserves are available for use by applicable asset categories during the phase-in period to full funding. This coupled with Wawa's judicious use of debt in the past, allows the scenarios to assume that, if required, available reserves and debt capacity can be used for high priority and emergency infrastructure investments in the short- to medium-term.

7.6.2 Recommendation

In 2024, Ontario Regulation 588/17 will require Wawa to integrate proposed levels of service for all asset categories in its asset management plan update. We recommend that future planning should reflect adjustments to service levels and their impacts on reserve balances.

8 Appendices

Key Insights

- Appendix A identifies projected 10-year capital requirements for each asset category
- Appendix B includes several maps that have been used to visualize the current level of service
- Appendix C identifies the criteria used to calculate risk for each asset category
- Appendix D provides additional guidance on the development of a condition assessment program
- Appendix E provides examples of key performance indicators that may be considered in the development of a levels of service framework

Appendix A: 10-Year Capital Requirements

The following tables identify the capital cost requirements for each of the next 10 years in order to meet projected capital requirements and maintain the current level of service.

Road Network											
Asset Segment	Backlog	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Paved Roads	$0	$0	$0	$0	$0	$0	$0	$636,546	$0	$276,126	$394,923
Streetlights	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$636,546**	**$0**	**$276,126**	**$394,923**

Bridges & Culverts											
Asset Segment	Backlog	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Bridges	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Culverts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

Storm Water Network											
Asset Segment	Backlog	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Catch Basin Leads	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Catch Basins	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Culverts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$21,645
Manholes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Storm Mains	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$21,645**

Water Network											
Asset Segment	Backlog	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Hydrants	$656,000	$0	$0	$0	$0	$123,000	$0	$0	$49,200	$0	$32,800
Pumping Stations	$291,264	$0	$0	$0	$0	$0	$578,321	$0	$0	$0	$319,278
Service Leads	$0	$0	$0	$0	$0	$0	$0	$783	$0	$0	$0
Valves	$4,250	$0	$0	$60,750	$0	$82,500	$74,500	$36,250	$8,000	$4,000	$2,389,250
Water Equipment	$512,588	$0	$0	$0	$0	$0	$0	$9,820,815	$654,509	$0	$0
Water Meters	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment Plant	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Watermains	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$1,464,102	**$0**	**$0**	**$60,750**	**$0**	**$205,500**	**$652,821**	**$9,857,848**	**$711,709**	**$4,000**	**$2,741,328**

Sanitary Sewer Network											
Asset Segment	Backlog	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Lagoon Buildings	$0	$0	$0	$0	$0	$0	$0	$0	$0	$382,570	$0
Lagoons	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Manholes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sanitary Sewer Equipment	$794,866	$0	$0	$0	$0	$0	$0	$0	$0	$8,654	$0
Sewer Mains	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$794,866	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$391,224**	**$0**

All Asset Categories											
Asset Segment	Backlog	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Road Network	$0	$0	$0	$0	$0	$0	$0	$636,546	$0	$276,126	$394,923
Bridges & Culverts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Storm Water Network	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$21,645
Water Network	$1,464,102	$0	$0	$60,750	$0	$205,500	$652,821	$9,857,848	$711,709	$4,000	$2,741,328
Sanitary Sewer Network	$794,866	$0	$0	$0	$0	$0	$0	$0	$0	$391,224	$0
	$2,258,968	**$ 0**	**$ 0**	**$60,750**	**$ 0**	**$205,500**	**$652,821**	**$10,494,394**	**$711,709**	**$671,350**	**$3,157,896**

Note: Non-core asset categories have been excluded from this table, as staff are still in the process of refining inventory and condition data. These categories will be included in the next iteration of the AMP.

Appendix B: Level of Service Maps & Images

Images of Bridge in Good Condition (Wawa Creek Bridge)

Municipality of Wawa
Wawa Creek Bridge

Site Photograph Photo No.: 1

Description
Structure approach - looking north. Note no snowplow markers on hazard signage.

Municipality of Wawa
Wawa Creek Bridge

Site Photograph Photo No.: 3

Description
Minor erosion of asphalt granular sealing at road shoulders.

Site Photograph Photo No.: 2

Description
Downstream façade of bridge.

Site Photograph Photo No.: 4

Description
Upstream façade.

Images of Culvert in Good Condition (Catfish Creek Culvert)

Municipality of Wawa
Catfish Creek Culvert

Site Photograph Photo No.: 1

Description
Structure approach - looking northeast. Note no snowplow markers on hazard signage.

Municipality of Wawa
Catfish Creek Culvert

Site Photograph Photo No.: 3

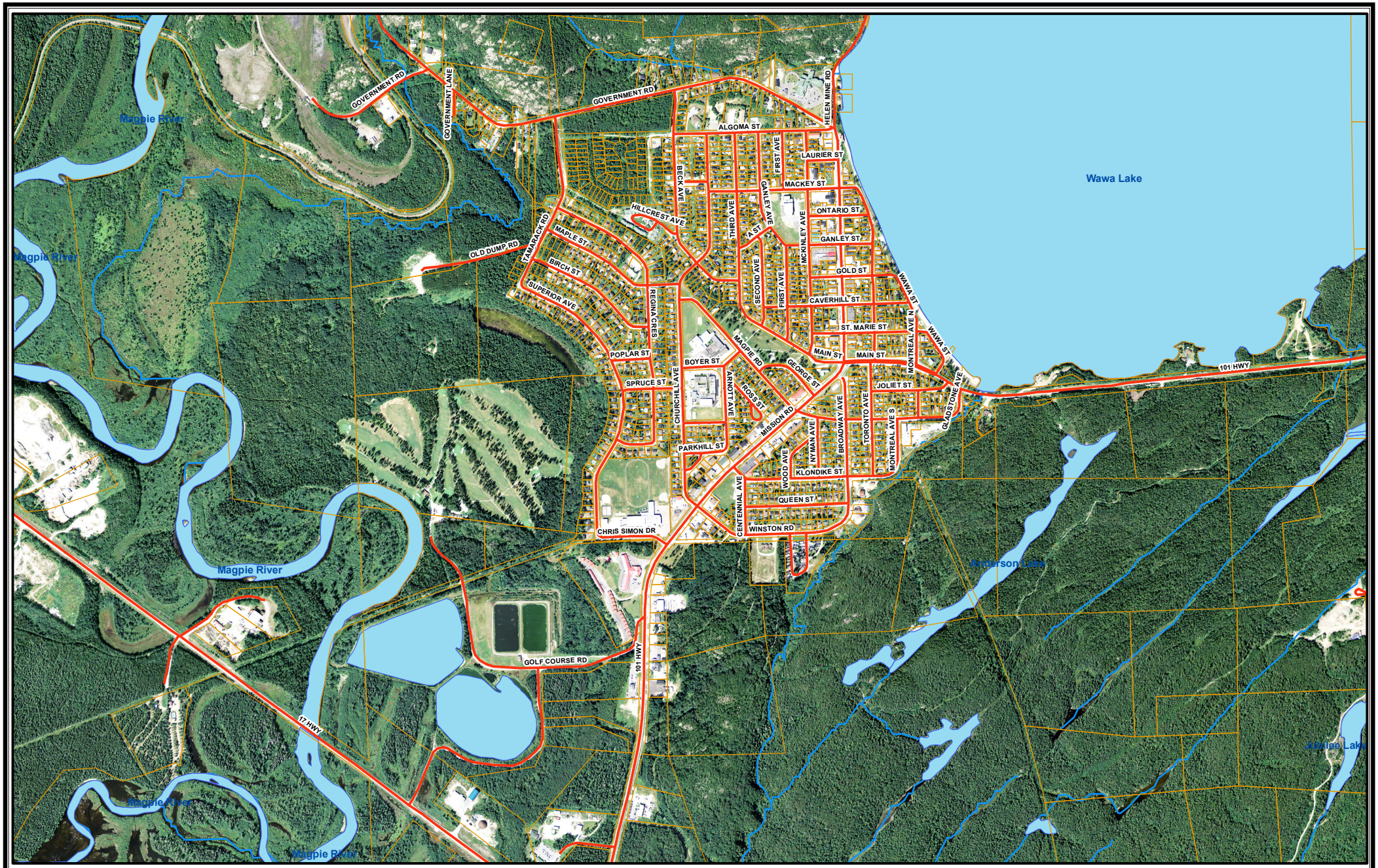
Description
Culvert outlet end - looking upstream

Site Photograph Photo No.: 2

Description
Structure approach - looking southwest.

Site Photograph Photo No.: 4

Description
Culvert inlet end - looking downstream.



Legend

- Roads
- Municipality of Wawa
- Lakes
- Rivers and Creeks

Wawa Road Network
Municipality of Wawa

0 135 270 540 810
Meters

NITGC
NORTHERN INFORMATION TECHNOLOGY AND GEOMATICS COOPERATIVE

N
W E
S

Maps are provided as a courtesy only and the Municipality of Wawa makes no warranties as to the accuracy of this information. This map is not intended to be used for conveyance, authoritative definition of the legal boundary, or property title. This is not a survey product.

08/05/2020

Legend

- Roads
- Municipality of Wawa
- Lakes
- Rivers and Creeks

08/05/2020

Wawa Road Network
Michipicoten River Village
Municipality of Wawa

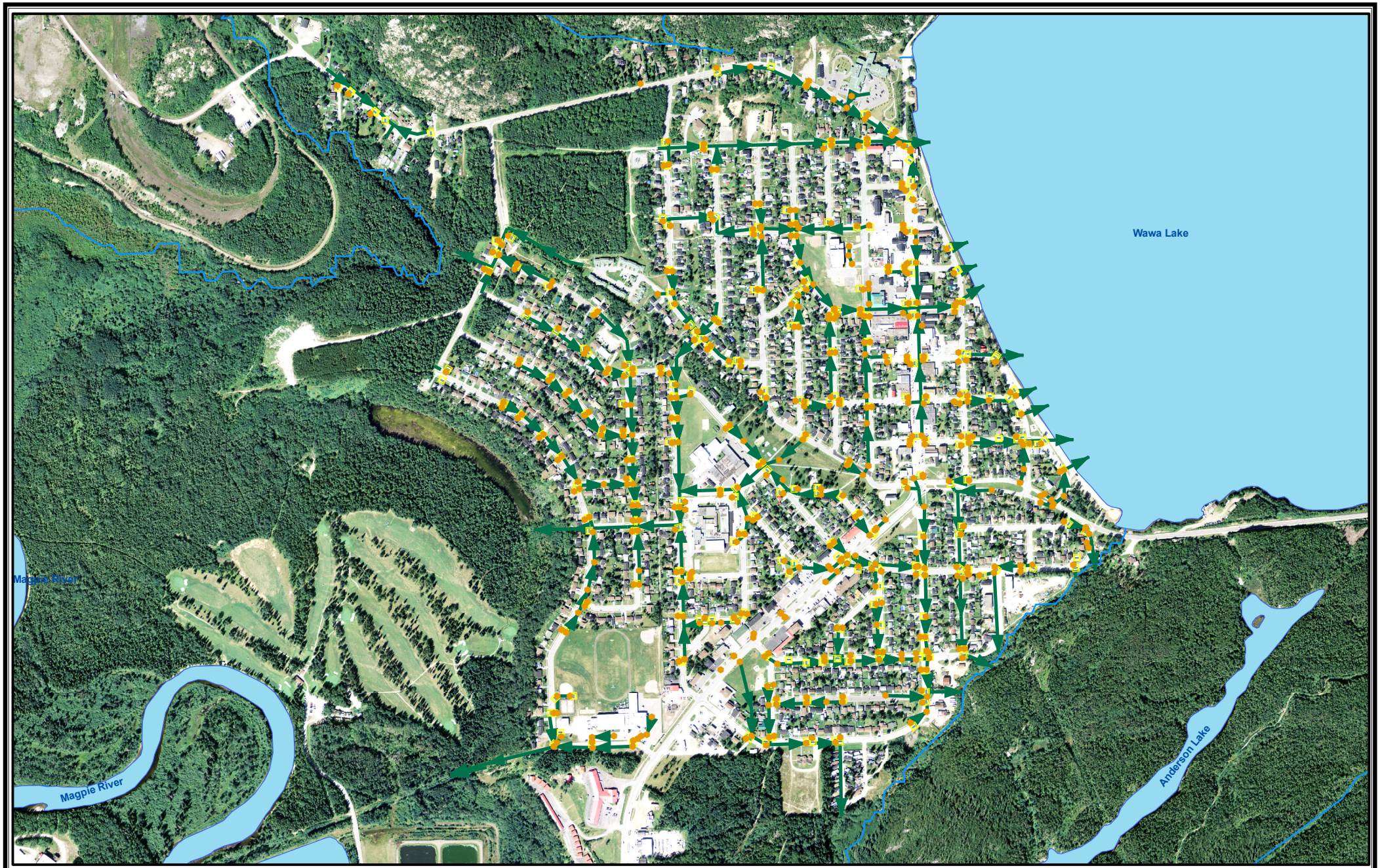
0 125 250 500 750

Meters

NITGC

NORTHERN INFORMATION TECHNOLOGY AND GEOMATICS COOPERATIVE

N W E S



Legend

- Catch Basin
- Storm
- STORM, CBMH
- STORM, MH
- Rivers and Creeks

08/05/2020

Wawa Storm Network
Municipality of Wawa

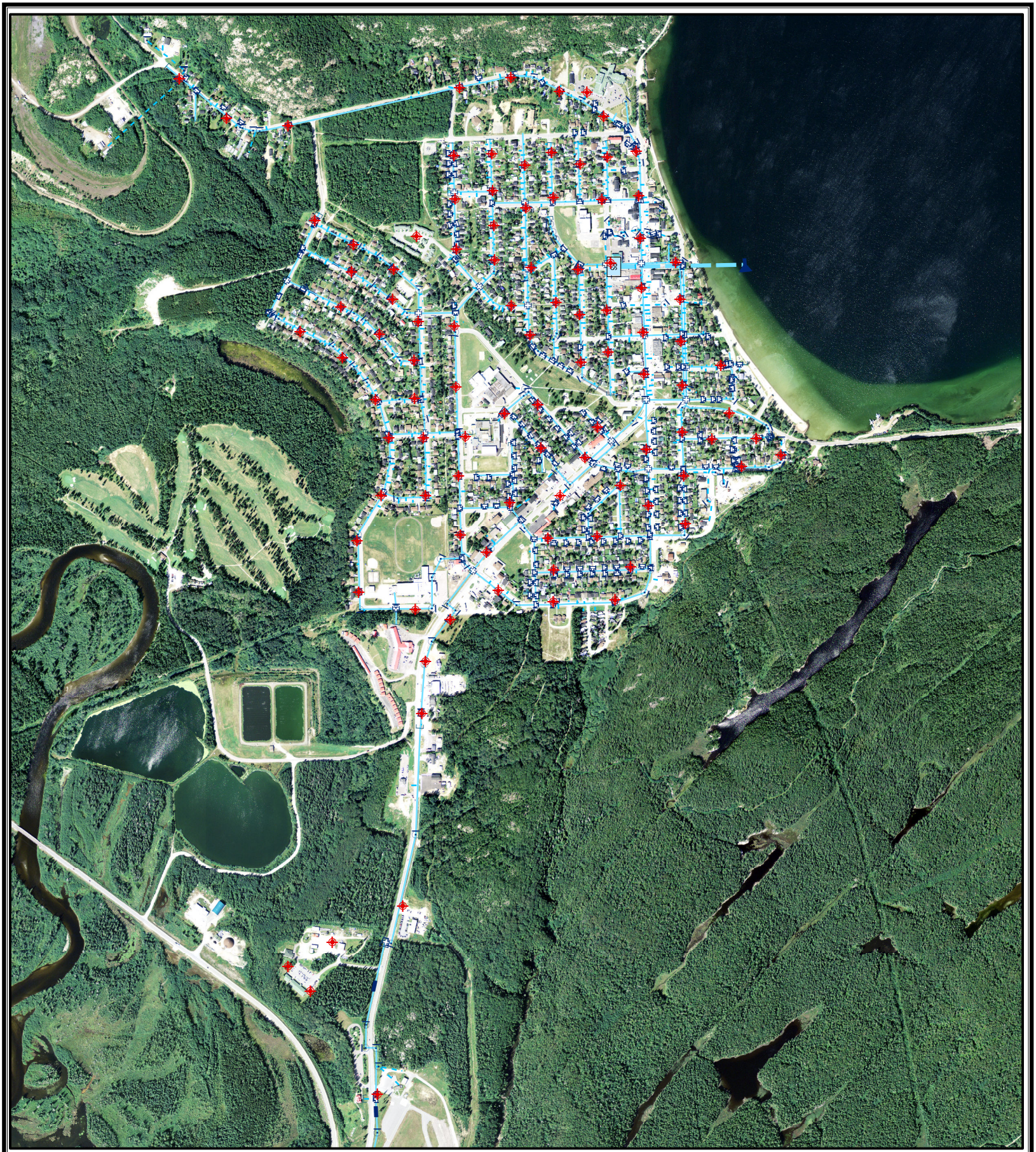
0 90 180 360 540

Meters

NITGC

NORTHERN INFORMATION TECHNOLOGY AND GEOMATICS COOPERATIVE

N W E S



Legend

- Hydrant
- 13 - 300
- 301 - 900
- Service Lead
- Tank
- PS Pump Station
- Intake
- Bend
- Cap
- Cross
- Reducer
- Saddle
- Sleeve
- Tee

08/05/2020

Wawa Water Network
Municipality of Wawa

0 100 200 400 600

Meters

NITGC

NORTHERN INFORMATION TECHNOLOGY AND GEOMATICS COOPERATIVE

N W E S

Legend

- Hydrant
- 13 - 300
- 301 - 900
- Service Lead
- Tank
- PS Pump Station
- Intake
- Bend
- Cap
- Cross
- Reducer
- Saddle
- Sleeve
- Tee

08/05/2020

Wawa Water Network
Michipicoten River Village
Municipality of Wawa

0 75 150 300 450

Meters

NITGC

NORTHERN INFORMATION TECHNOLOGY AND GEOMATICS COOPERATIVE

N W E S

Legend

- Hydrant
- 13 - 300
- 301 - 900
- Service Lead
- Tank
- PS Pump Station
- Intake
- Bend
- Cap
- Cross
- Reducer
- Saddle
- Sleeve
- Tee

08/05/2020

Wawa Water Network
Pinewood Dr/Highway 17
Municipality of Wawa

0 100 200 400 600

Meters

NITGC

NORTHERN INFORMATION TECHNOLOGY AND GEOMATICS COOPERATIVE

N W E S

Legend

- SAN, CHAM
- SAN, MH
- PS Pumping Station
- Lagoons
- Bend
- Coupling
- Elbow_11.25D
- Elbow_45D
- Endcap
- Tee
- Wye
- Sanitary
- Sanitary

Wawa Sewer Network
Municipality of Wawa

0 90 180 360 540

Meters

NITGC

NORTHERN INFORMATION TECHNOLOGY AND GEOMATICS COOPERATIVE

N W E S

08/05/2020

Appendix C: Risk Rating Criteria

Probability of Failure

Asset Category Rated
Road Network (Roads)
Bridges & Culverts
Storm Water Network (Mains)
Water Network (Mains)
Sanitary Sewer Network (Mains)

Risk Criteria	Criteria Weighting	Value/Range	Probability of Failure Score
Condition	100%	80-100	1
		60-79	2
		40-59	3
		20-39	4
		0-19	5

Consequence of Failure

Asset Category	Risk Criteria	Value/Range	Consequence of Failure Score
Road Network (Roads)	Replacement Cost (100%)	$500,000+	5
		$350,000 - $500,000	4
		$200,000 - $350,000	3
		$50,000 - $150,000	2
		$0 - $50,000	1
Bridges & Culverts	Replacement Cost (100%)	$2,000,000+	5
		$1,500,000-$2,000,000	4
		$1,000,000-$1,500,000	3
		$500,000-$1,000,000	2
		$0 - $500,000	1
Storm Water Network (Mains)	Pipe Diameter (100%)	UNKN	5
		1050mm	5
		900mm	4
		825mm	4
		750mm	4
		675mm	3
		600mm	3
		525mm	3
		450mm	3
		375mm	2
		350mm	2
		300mm	2
		250mm	1
		200mm	1
		150mm	1
Water Network (Mains)	Pipe Diameter (100%)	600mm	5
		300mm	4
		250mm	3
		200mm	3
		150mm	2
		100mm	2
		50mm	1

Asset Category	Risk Criteria	Value/Range	Consequence of Failure Score
		37mm	1
		19mm	1
Sanitary Sewer Network (Mains)	Pipe Diameter (100%)	UNKN	5
		525mm	5
		500mm	5
		450mm	4
		375mm	3
		300mm	3
		250mm	2
		200mm	2
		150mm	1
	Sewer Type	FM	4
		GRAV	2

Appendix D: Condition Assessment Guidelines

The foundation of good asset management practice is accurate and reliable data on the current condition of infrastructure. Assessing the condition of an asset at a single point in time allows staff to have a better understanding of the probability of asset failure due to deteriorating condition.

Condition data is vital to the development of data-driven asset management strategies. Without accurate and reliable asset data, there may be little confidence in asset management decision-making which can lead to premature asset failure, service disruption and suboptimal investment strategies. To prevent these outcomes, the Municipality's condition assessment strategy should outline several key considerations, including:

- The role of asset condition data in decision-making
- Guidelines for the collection of asset condition data
- A schedule for how regularly asset condition data should be collected

Role of Asset Condition Data

The goal of collecting asset condition data is to ensure that data is available to inform maintenance and renewal programs required to meet the desired level of service. Accurate and reliable condition data allows municipal staff to determine the remaining service life of assets, and identify the most cost-effective approach to deterioration, whether it involves extending the life of the asset through remedial efforts or determining that replacement is required to avoid asset failure.

In addition to the optimization of lifecycle management strategies, asset condition data also impacts the Municipality's risk management and financial strategies. Assessed condition is a key variable in the determination of an asset's probability of failure. With a strong understanding of the probability of failure across the entire asset portfolio, the Municipality can develop strategies to mitigate both the probability and consequences of asset failure and service disruption. Furthermore, with condition-based determinations of future capital expenditures, the Municipality can develop long-term financial strategies with higher accuracy and reliability.

Guidelines for Condition Assessment

Whether completed by external consultants or internal staff, condition assessments should be completed in a structured and repeatable fashion, according to consistent and objective assessment criteria. Without proper guidelines for the completion of condition assessments there can be little confidence in the validity of condition data and asset management strategies based on this data.

Condition assessments must include a quantitative or qualitative assessment of the current condition of the asset, collected according to specified condition rating criteria, in a format that can be used for asset management decision-making. As a result, it is important that staff adequately define the condition rating criteria that should be used and the assets that require a discrete

condition rating. When engaging with external consultants to complete condition assessments, it is critical that these details are communicated as part of the contractual terms of the project.
There are many options available to the Municipality to complete condition assessments. In some cases, external consultants may need to be engaged to complete detailed technical assessments of infrastructure. In other cases, internal staff may have sufficient expertise or training to complete condition assessments.

Developing a Condition Assessment Schedule

Condition assessments and general data collection can be both time-consuming and resource-intensive. It is not necessarily an effective strategy to collect assessed condition data across the entire asset inventory. Instead, the Municipality should prioritize the collection of assessed condition data based on the anticipated value of this data in decision-making. The International Infrastructure Management Manual (IIMM) identifies four key criteria to consider when making this determination:

1. Relevance: every data item must have a direct influence on the output that is required
2. Appropriateness: the volume of data and the frequency of updating should align with the stage in the assets life and the service being provided
3. Reliability: the data should be sufficiently accurate, have sufficient spatial coverage and be appropriately complete and current
4. Affordability: the data should be affordable to collect and maintain

Appendix E: Level of Service Metrics (Examples)

Road Network, Bridges & Culverts

Indicator Type	KPI (Reported Annually)
Strategic	• Percentage of total reinvestment compared to asset replacement value • Completion of strategic plan objectives (related to right-of-way)
Financial Indicators	• Annual revenues compared to annual expenditures • Annual replacement value depreciation compared to annual expenditures • Cost per capita for roads, and bridges & culverts • Maintenance cost per square metre • Revenue required to maintain annual network growth • Total cost of borrowing vs. total cost of service
Tactical	• Overall Bridge Condition Index (BCI) as a percentage of desired BCI • Percentage of road network rehabilitated/reconstructed • Percentage of paved road lane km rated as poor to very poor • Percentage of bridges and large culverts rated as poor to very poor • Percentage of asset class value spent on O&M • Percentage of signage that pass reflectivity test. The remaining should be replaced
Operational Indicators	• Percentage of roads inspected within the last five years • Percentage of bridges and large culverts inspected within the last two years • Operating costs for paved lane per km • Operating costs for bridge and large culverts per square metre • Percentage of customer requests with a 24-hour response rate

Water, Sanitary and Storm Networks

Indicator Type	KPI (Reported Annually)
Strategic	• Percentage of total reinvestment compared to asset replacement value • Completion of strategic plan objectives (related water / sanitary / storm)
Financial Indicators	• Annual revenues compared to annual expenditures • Annual replacement value depreciation compared to annual expenditures • Total cost of borrowing compared to total cost of service • Revenue required to maintain annual network growth • Lost revenue from system outages
Tactical	• Percentage of water / sanitary / storm network rehabilitated / reconstructed • Overall water / sanitary / storm network condition index as a percentage of desired condition index • Annual adjustment in condition indexes • Annual percentage of growth in water / sanitary / storm network • Percentage of mains where the condition is rated poor or critical for each network • Percentage of water / sanitary / storm network replacement value spent on operations and maintenance
Operational Indicators	• Percentage of water / sanitary / storm network inspected • Operating costs for the collection of wastewater per kilometre of main. • Number of wastewater main backups per 100 kilometres of main • Operating costs for storm water management (collection, treatment, and disposal) per kilometre of drainage system. • Operating costs for the distribution/ transmission of drinking water per kilometre of water distribution pipe. • Number of days when a boil water advisory issued by the medical officer of health, applicable to a municipal water supply, was in effect. • Number of water main breaks per 100 kilometres of water distribution pipe in a year. • Number of customer requests received annually per water / sanitary / storm networks • Percentage of customer requests responded to within 24 hours per water / sanitary / storm network

Buildings & Facilities

Indicator Type	KPI (Reported Annually)
Strategic	• Percentage of total reinvestment compared to asset replacement value Completion of strategic plan objectives (related buildings and facilities)
Financial Indicators	• Annual revenues compared to annual expenditures • Annual replacement value depreciation compared to annual expenditures • Revenue required to meet growth related demand • Repair and maintenance costs per square metre Energy, utility and water cost per square metre
Tactical	• Percentage of component value replaced • Overall facility condition index as a percentage of desired condition index • Annual adjustment in condition indexes • Annual percentage of new facilities (square metre) • Percent of facilities rated poor or critical • Percentage of facilities replacement value spent on operations and maintenance Increase facility utilization rate by [x] percent by 2020. • $Utilization\ Rate = \frac{Occupied\ Space}{Facility\ Usable\ Area}$
Operational Indicators	• [x] sq.ft. of facilities per full-time employee (or equivalent), i.e., maintenance staff • Percentage of facilities inspected within the last five years • Number/type of service requests Percentage of customer requests responded to within 24 hours

Fleet & Equipment

Indicator Type	KPI (Reported Annually)
Strategic	• Percentage of total reinvestment compared to asset replacement value Completion of strategic plan objectives
Financial Indicators	• Annual revenues compared to annual expenditures • Annual replacement value depreciation compared to annual expenditures • Revenue required to maintain annual network growth • Total cost of borrowing vs. total cost of service
Tactical	• Percentage of all vehicles replaced • Average age of fleet vehicles • Percent of vehicles rated poor or critical • Percentage of fleet replacement value spent on operations and maintenance
Operational Indicators	• Average downtime per fleet category • Average utilization per fleet category and/or each vehicle • Ratio of preventative maintenance repairs vs. reactive repairs • Percent of vehicles that received preventative maintenance • Number/type of service requests Percentage of customer requests responded to within 24 hours