2022

Township of Guelph/Eramosa | Asset Management Plan

This Asset Management Plan was prepared by:

Empowering your organization through advanced asset management, budgeting & GIS solutions

Key Statistics

Replacement cost of core asset portfolio

$264 million

Replacement cost of core infrastructure per household

$54,518 (2021)

Percentage of core assets in fair or better condition

88%

Percentage of core assets with assessed condition data

41%

Annual capital core infrastructure requirements

$6.20 million

Target reinvestment rate

2.35%

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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 forecasting.

Scope

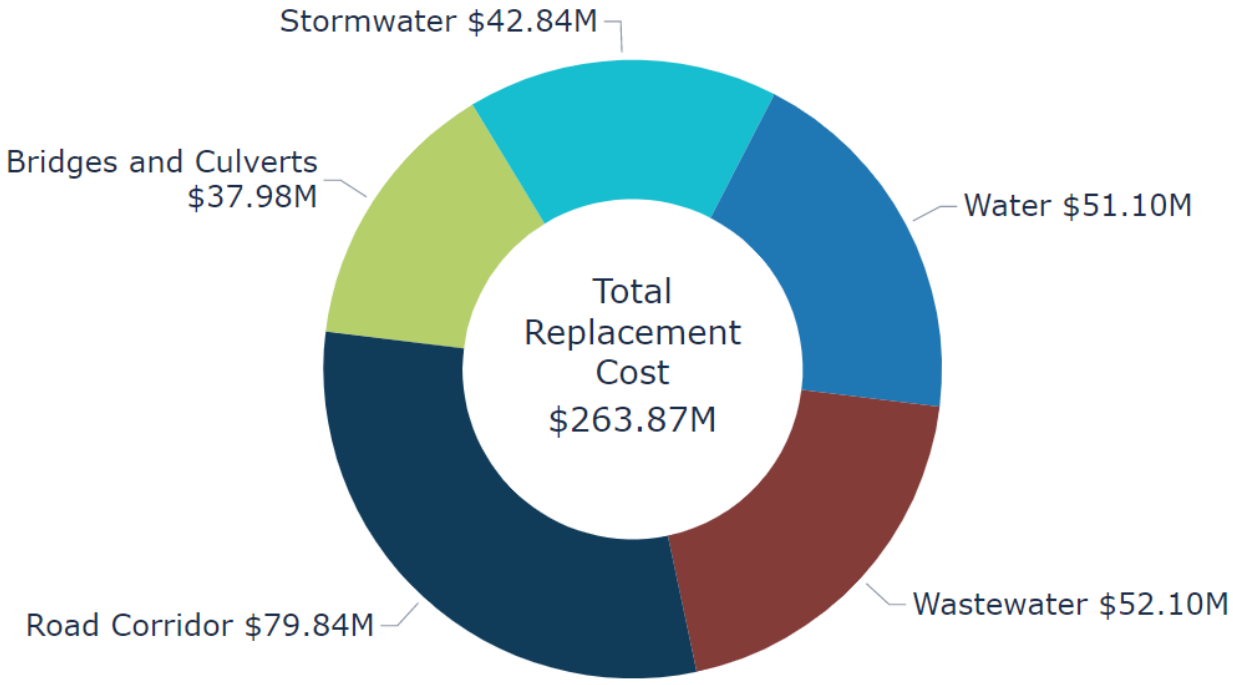
This Asset Management Plan (AMP) identifies the current practices and strategies that are in place to manage public infrastructure and makes recommendations where they can be further refined. Through the implementation of sound asset management strategies, the Township of Guelph/Eramosa can ensure that public infrastructure is managed to support the sustainable delivery of municipal services.

This AMP includes the following asset categories:

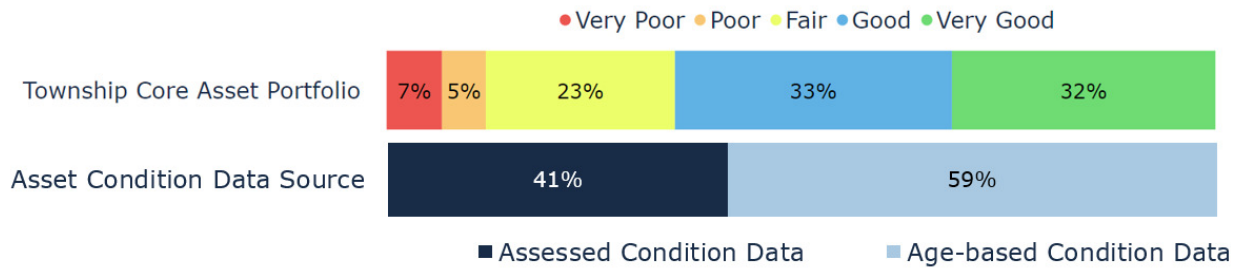
With the development of this AMP, the Township of Guelph/Eramosa has achieved compliance with O. Reg. 588/17 to the extent of the requirements that must be completed by July 1, 2022. There are additional requirements concerning non-core asset categories, proposed levels of service, and growth that must be met by July 1, 2024 and 2025.

Findings

The overall replacement cost of the asset categories included in this AMP totals $263.87 million and is based on the Township's primary tangible capital asset inventory as of December 31st, 2021.



About 88% of all assets analysed in this AMP are in fair or better condition and assessed condition data was available for 41% of assets.



For the remaining 59% of assets, assessed condition data was not available 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 asset management planning and a recurring recommendation in this AMP.

Another essential element to asset management planning is the accuracy and completeness of the primary asset inventory. It is important that staff continue to review and update the inventory to ensure that it is at a higher level of data maturity and reliability for the next iteration of the AMP.

The development of a long-term, sustainable financial plan requires an analysis of whole lifecycle costs. This AMP uses a combination of proactive lifecycle strategies (roads), scheduled lifecycle activities (bridges and culverts, wastewater, water) 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 Township's average annual capital requirement totals $6.20 million.

It is important to note that this AMP represents a snapshot in time and is based on the best available processes, data, and information at the Township. Strategic asset management planning is an ongoing and dynamic process that requires continuous improvement and dedicated resources.

Infrastructure Report Card

Core Asset Category	Replacement Cost (millions)	Annual Capital Requirements (millions)	Asset Condition (%)	Average Asset Age (Years)	Risk Rating
Road Corridor	$79.84	$2.92	67% (Good)	13.4	7.20 - Low
Bridges and Culverts	$37.98	$0.59	72% (Good)	45.3	4.75 - Very Low
Stormwater	$42.84	$0.66	73% (Very Good)	22.6	3.01 - Very Low
Wastewater	$52.10	$1.00	82% (Very Good)	28.6	4.38 - Very Low
Water	$51.10	$1.03	61% (Good)	27.1	7.37 - Low
Asset Portfolio	**$263.87**	**$6.20**	**71% (Good)**	**23.3**	**5.64 - Low**

Recommendations

Recommendations to guide continuous refinement of the Township's asset management program have been included in this AMP.

These include:

- Reviewing asset data to develop a complete and accurate asset inventory in a centralized database
- Implementing a data governance strategy to increase confidence and continuing to operationalize asset management through the use of the database and database functionality
- Developing a condition assessment strategy with a regular schedule
- Reviewing and updating lifecycle management strategies
- Developing and regularly reviewing short and long-term plans to meet capital requirements
- Continuing to measure current levels of service and identifying sustainable proposed levels of service

1 Introduction and 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 Township'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 milestone and requirements for asset management plans in Ontario between July 1, 2022 and 2025

1.1 Guelph/Eramosa Community Profile

Census Characteristic	Township of Guelph/Eramosa	Ontario
Population 2021	13,904	14,223,942
Population Change 2016-2021	8.2%	6%
Total Private Dwellings	4,993	5,929,250
Population Density	47.5/km^2	15.9/km^2
Land Area	292.8 km^2	892,411.76 km^2

The Township of Guelph/Eramosa is located in the southern end of Wellington County in southern Ontario. It is a unique mix of urban and rural areas which benefits from the Township's proximity to a number of major urban markets.

The Township area was first settled in the late 1700s and throughout the 19th and 20th centuries, it became a centre of agricultural excellence through rural and agricultural educational institutions. As with many rural townships, Guelph/Eramosa was created through the amalgamation of different municipalities in the late 1990s.

Due to its location and proximity to technology based-companies in the Waterloo region, the Township boasts a highly diversified and skilled labour market with involvement in various business sectors such as technology, agriculture, and other specialized industries.

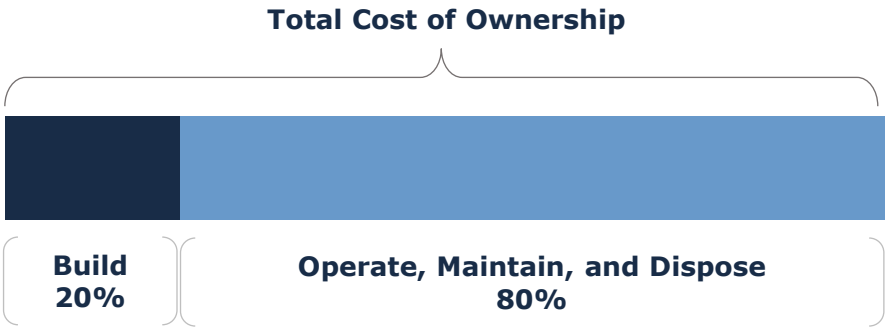
Municipal staff continue to operationalize asset management through refinements to the centralized asset inventory and identifying missing infrastructure data. This will lead to effective decision-making and the use of risk-based project prioritization, which is essential for capital planning since major infrastructure projects are heavily reliant on the availability of grants.

Staff and Council intend to support planned growth within the Township by investing in critical infrastructure and advancing their asset management program.

1.2 An Overview of Asset Management

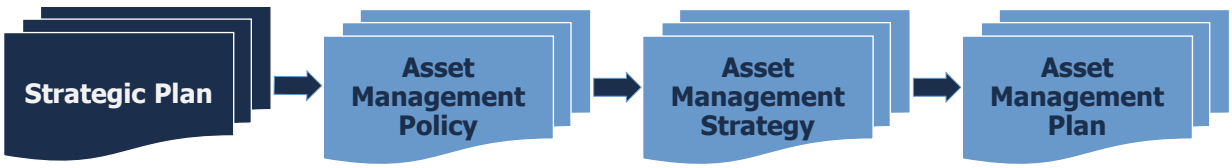
Municipalities are responsible for managing and maintaining a broad portfolio of infrastructure assets to deliver services to the community. The goal of asset management is to minimize the lifecycle costs of delivering infrastructure services, manage the associated risks, while maximizing the value ratepayers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

The diagram below depicts an industry standard approach and sequence developing a practical asset management program. Beginning with a Strategic Plan, followed by an Asset Management Policy and an Asset Management Strategy, concluding with an Asset Management Plan.



This industry standard, defined by the Institute of Asset Management (IAM), emphasizes the 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.

1.2.1 Asset Management Policy

An asset management policy represents a statement of the principles guiding the Township'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 Township's "Strategic Asset Management Policy" was approved by Council as on June 19th, 2019 in accordance with Ontario Regulation 588/17.

The policy provides a foundation for the development of an asset management program within the Town. It covers key components that define a comprehensive asset management policy:

- The policy's statements dictate the use of asset management practices to ensure all assets meet the agreed levels of service in the most efficient and effective manner;
- the policy commits to, where appropriate, incorporating asset management in the Town's other plans;
- there are formally defined roles and responsibilities of internal staff and stakeholders;
- the guiding principles include the use of a long-term view and effective prioritization in the management of infrastructure; and
- the policy statements are well defined.

As per Ontario Regulation 588/17, the Township will be required to review and update its Strategic Asset Management Policy in 2024.

1.2.2 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 Township plans to achieve asset management objectives through planned activities and decision-making criteria.

While not a static document, the strategy should not evolve and change frequently—unlike the asset management plan. The strategy provides a long-term outlook on the overall asset management program development and strengthening key elements of its framework.

The Township's strategic 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.

1.2.3 Asset Management Plan

The AMP presents the outcomes of the Township's asset management program and identifies the resource requirements needed to achieve a defined level of service. The AMP typically includes the following content:

- State of Infrastructure
- Asset Management Strategies
- Levels of Service
- Financial Strategies

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

The Township's last iteration of the AMP was completed in 2013. Since then, the asset inventory has been consolidated with critical core asset data as staff continue to refine the central asset inventory and improve the Township's established asset management processes.

This document is an AMP that has been prepared in accordance with the 2022 requirements of O. Reg. 588/17.

1.3 Key Concepts in Asset Management

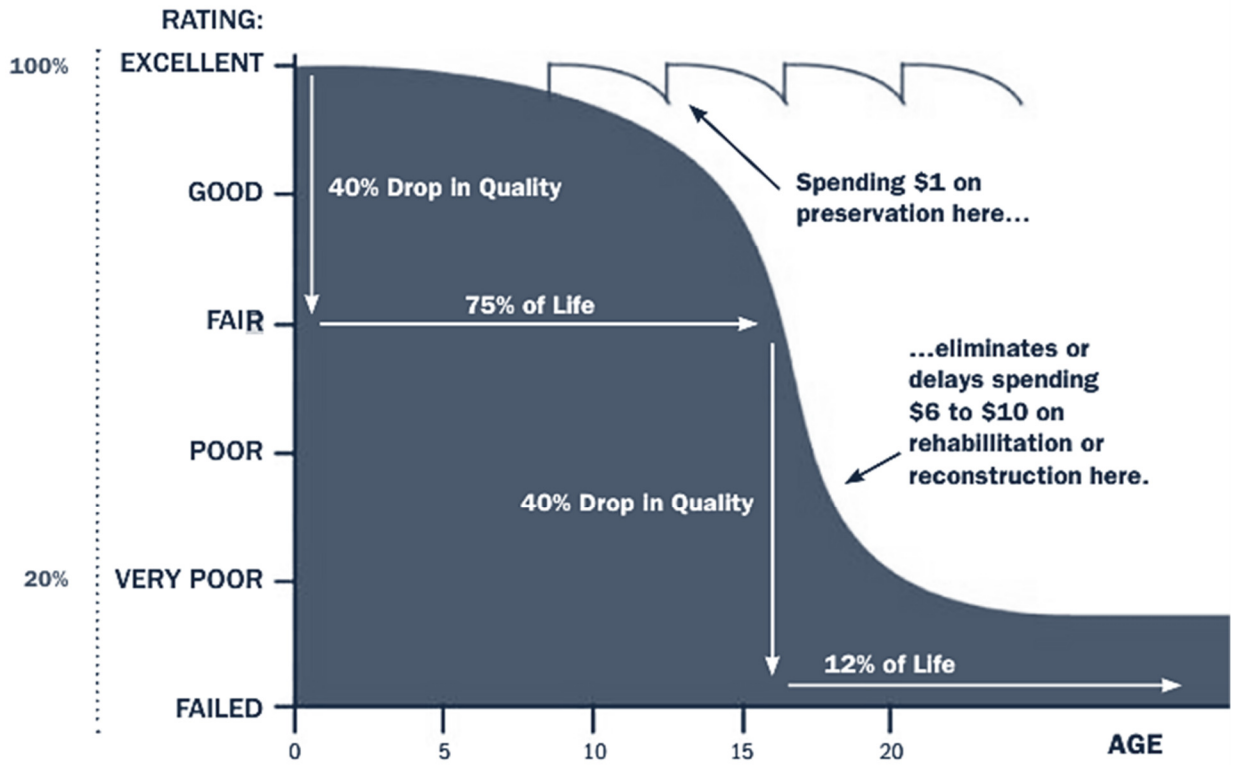
Effective asset management integrates several key components, including lifecycle management, risk management, and levels of service. These concepts are applied throughout this asset management plan and are described below in greater detail.

1.3.1 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. Since costs to rehabilitate tend to increase towards the end of life of an asset, proactive and timely intervention will lead to lower lifecycle costs.

This concept is further illustrated by the figure below, highlighting the cost impact of a maintenance activity contrasted by the cost impact of a rehabilitative activity later in the life of the asset.



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	$$
Replacement/ Reconstruction	Asset end-of-life activities that often involve the complete replacement of assets	Full Reconstruction	$$$
Replacement Upgrade	Asset end-of-life activities that involve the replacement of an asset to an 'upgraded' asset	Gravel Road to a Surface Treated Road	$$$

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 Township's approach to lifecycle management is described within each core 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.

1.3.2 Risk and Criticality

Asset risk and criticality are essential building blocks of asset management, integral in prioritizing projects and distributing funds where they are needed most based on a variety of factors. Assets in disrepair may fail to perform their intended function, pose substantial risk to the community, lead to unplanned expenditures, and create liability for the municipality. In addition, some assets are simply more important to the community than others, based on their financial significance, their role in delivering essential services, the impact of their failure on public health and safety, and the extent to which they support a high quality of life for community stakeholders.

Risk is a product of two variables: the probability that an asset will fail and the resulting consequences of that failure event. It can be a qualitative measurement, (low, medium, high) or quantitative measurement (1-5), that can be used to rank assets and projects, identify appropriate lifecycle strategies, optimize short- and long-term budgets, minimize service disruptions, and maintain public health and safety.

The approach used in this AMP relies on a quantitative measurement of risk associated with each asset. The probability and consequence of failure are each scored from 1 to 5, producing a minimum risk index of 1 for the lowest risk assets, and a maximum risk index of 25 for the highest risk assets.

Probability of Failure

Several factors can help decision-makers estimate the probability or likelihood of an asset's failure, including its condition, age, previous performance history, and exposure to extreme weather events, such as flooding and ice jams—both a growing concern for municipalities in Canada.

Consequence of Failure

Estimating criticality also requires identifying the types of consequences that the organization and community may face from an asset's failure and the magnitude of those consequences. Consequences of asset failure will vary across the infrastructure portfolio; the failure of some assets may result primarily in high direct financial cost but may pose limited risk to the community. Other assets may have a relatively minor financial value, but any downtime may pose significant health and safety hazards to residents.

The table below illustrates the various types of consequences that can be integrated in developing risk and criticality models for each asset category and segments within. We note that these consequences are common, but not exhaustive.

Type of Consequence	Description
Direct Financial	Direct financial consequences are typically measured as the replacement costs of the asset(s) affected by the failure event, including interdependent infrastructure.
Economic	Economic impacts of asset failure may include disruption to local economic activity and commerce, business closures, service disruptions, etc. Whereas direct financial impacts can be seen immediately or estimated within hours or days, economic impacts can take weeks, months, and years to emerge and may persist for even longer.
Socio-political	Socio-political impacts are more difficult to quantify and may include inconvenience to the public and key community stakeholders, adverse media coverage, and reputational damage to the community and the Township.
Environmental	Environmental consequences can include pollution, erosion, sedimentation, habitat damage, etc.
Health and Safety	Adverse health and safety impacts may include injury or death, or impeded access to critical services.
Strategic	Strategic impacts include the effects of an asset's failure on the community's long-term strategic objectives, including economic development, business attraction, etc.

This AMP includes a preliminary 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.

1.3.3 Levels of Service

A level of service (LOS) is a measure of what the Township is providing to the community and the nature and quality of that service. The preparation of the 2013 AMP included the development of a LOS framework that included O. Reg. 588/17 mandated performance measures and those that the Township identified as worth measuring and evaluating.

This AMP only includes measures that have been outlined for core infrastructure assets in O. Reg. 588/17. The Township measures the level of service provided at two levels: Community Levels of Service and Technical Levels of 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.

Community Levels of Service

Community levels of service are a simple, plain-language description or measure of the service that the community receives.

For core asset categories (roads, bridges and culverts, water, wastewater, storm sewer) the Province, through O. Reg. 588/17, has provided qualitative descriptions that are required to be included in this AMP. These descriptions can be found in the Levels of Service subsection within each asset category.

For non-core asset categories, the Township will need to review the previously identified measures in the 2013 AMP and determine the established levels of service by the July 2024 deadline.

Technical Levels of Service

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 Township's asset management strategies on the physical condition of assets or the quality/capacity of the services they provide.

For core asset categories (roads, bridges and culverts, water, sanitary, storm water) the Province, through O. Reg. 588/17, has provided technical key performance indicators (KPIs) that are required to be included in this AMP. These KPIs can be found in the Levels of Service subsection within each asset category.

For non-core asset categories, the Township will need to review the previously identified technical KPIs in the 2013 AMP and determine the established level of service by the July 2024 deadline.

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 Township plans 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 Township. 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 2025, the Township must identify a lifecycle management and financial strategy which allows these targets to be achieved.

1.4 Climate Change

Climate change can cause severe impacts on human and natural systems around the world. The effects of climate change include increasing temperatures, higher levels of precipitation, droughts, and extreme weather events. In 2019, Canada's Changing Climate Report (CCCR 2019) was released by Environment and Climate Change Canada (ECCC).

The report revealed that between 1948 and 2016, the average temperature increase across Canada was 1.7°C; moreover, during this time period, Northern Canada experienced a 2.3°C increase. The temperature increase in Canada has doubled that of the global average. If emissions are not significantly reduced, the temperature could increase by 6.3°C in Canada by the year 2100 compared to 2005 levels. Observed precipitation changes in Canada include an increase of approximately 20% between 1948 and 2012. By the late 21st century, the projected increase could reach an additional 24%. During the summer months, some regions in Southern Canada are expected to experience periods of drought at a higher rate. Extreme weather events and climate conditions are more common across Canada. Recorded events include droughts, flooding, cold extremes, warm extremes, wildfires, and record minimum arctic sea ice extent.

The changing climate poses a significant risk to the Canadian economy, society, environment, and infrastructure. The impacts on infrastructure are often a result of climate-related extremes such as droughts, floods, higher frequency of freeze-thaw cycles, extended periods of high temperatures, high winds, and wildfires. Physical infrastructure is vulnerable to damage and increased wear when exposed to these extreme events and climate variabilities. Canadian municipalities are faced with the responsibility to protect their local economy, citizens, environment, and physical assets.

1.4.1 Guelph/Eramosa's Climate Profile

The Township of Guelph/Eramosa is expected to experience notable effects of climate change which include increased average annual temperatures, an increase in total annual precipitation, and an increase in the frequency and severity of extreme events. According to Climatedata.ca – a collaboration supported by Environment and Climate Change Canada (ECCC) – the Township of Guelph/Eramosa will likely experience the following trends:

Higher Average Annual Temperature:

1. Between the years 1981 to 2010 the annual average temperature was 6.8 ºC
2. Under a high emissions scenario, the annual average temperatures are projected to reach 8.7 ºC between the years 2021 to 2050 and around 12.2 ºC by the end of the century.

Increase in Average Annual Precipitation:

3. Under a high emissions scenario, Guelph Eramosa is projected to experience a 7% increase in precipitation by the year 2050 and a 15% increase by the end of the century.

Increase in Frequency of Extreme Weather Events:

4. It is expected that the frequency and severity of extreme weather events will change.
5. In some areas, extreme weather events will occur with greater frequency and severity than others.

1.4.2 Integrating Climate Change into Asset Management

Asset management practices aim to deliver sustainable service delivery - the delivery of services to residents today without compromising the services and well-being of future residents. Climate change threatens sustainable service delivery by reducing the useful life of an asset and increasing the risk of asset failure. Desired levels of service can be more difficult to achieve as a result of climate change impacts such as flooding, high heat, drought, and more frequent and intense storms.

To achieve the sustainable delivery of services, climate change considerations should be incorporated into asset management practices. The integration of asset management and climate change adaptation observes industry best practices and enables the development of a holistic approach to risk management.

1.5 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 and 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.

2019

Strategic Asset Management Policy

2022

Asset Management Plan for **Core Assets** with the following components:

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

2024

An Asset Management Plan for **Core and Non-Core Assets with the same components as 2022** and a Strategic Asset Management Policy Update

2025

An Asset Management Plan for **All Assets** with the following additional components:

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 strategies

1.5.1 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, 2022. The table also includes a reference to the section of this AMP which fulfils each requirement.

Appendix D provides a compliance snapshot for the 2024 and 2025 requirements.

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 for Core Assets Only
Replacement cost of assets in each category	S.5(2), 3(ii)	4.1.1 - 5.2.1	
Average age of assets in each category	S.5(2), 3(iii)	4.1.3 - 5.2.3	
Condition of core assets in each category	S.5(2), 3(iv)	4.1.2 – 5.2.2	
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	
Current levels of service in each category	S.5(2), 1(i-ii)	4.1.6 - 5.2.6	
Current performance measures in each category	S.5(2), 2	4.1.6 - 5.2.6	
Lifecycle activities needed to maintain current levels of service for 10 years	S.5(2), 4	4.1.4 - 5.2.4	
Costs of providing lifecycle activities for 10 years	S.5(2), 4	Appendix A	
Growth assumptions	S.5(2), 5(i-ii) S.5(2), 6(i-vi)	6.1-6.2	

2 Scope and Methodology

Key Insights

- This asset management plan includes 5 asset categories

- Asset data from various data sources has been consolidated into the Township’s tangible capital asset inventory and continues to be refined

- The source and recency of replacement costs impact 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 categories in this AMP

This asset management plan for the Township of Guelph/Eramosa is produced in compliance with Ontario Regulation 588/17. The July 2022 deadline under the regulation—the first of three AMPs—requires analysis of only core assets (roads, bridges and culverts, water, sanitary, and storm sewer).

The AMP summarizes the state of the infrastructure for the Township's core asset portfolio, establishes current levels of service and the associated technical and customer oriented KPIs, outlines lifecycle strategies for optimal asset management and performance, and provides the average annual capital requirements for the asset categories listed below.

Asset Category	Source of Funding
Road Corridor	Tax Funded
Bridges and Culverts	Tax Funded
Stormwater	Tax Funded
Wastewater	Rate Funded
Water	Rate Funded

2.2 Asset Inventory

The asset information presented in this AMP has been developed from the asset inventory that is stored in the Citywide™ Asset Manager database as of December 31, 2021. This inventory serves as the Township's tangible capital asset inventory and has been consolidated with additional asset data from the data sources listed below.

Asset Category	Asset Data Sources
Road Corridor	2022 Road Needs Study (RNS) Report by R.J. Burnside & Associates Limited
	Staff, consultant, and market data
Bridges and Culverts	2020 Ontario Structure Inspection Manual (OSIM) report by R.J. Burnside & Associates Limited
	Staff, consultant, and market data
Stormwater	Staff, consultant, and market data
	GIS infrastructure data
Wastewater	Staff, consultant, and market data
	GIS infrastructure data
Water	Staff, consultant, and market data
	GIS infrastructure data

2.3 Deriving Replacement Costs

There are a range of methods to determine the replacement cost of an asset, and some are more accurate and reliable than others. This AMP relies on two methodologies:

- **User-Defined Cost and Cost/Unit**: Based on costs provided by municipal staff which could include average costs from recent contracts; data from engineering reports and assessments; staff estimates based on knowledge and experience
- **Cost Inflation/CPI Tables**: Historical cost of the asset is inflated based on Consumer Price Index or Non-Residential Building Construction Price Index

User-defined costs based on reliable sources are a reasonably accurate and reliable way to determine asset replacement costs. Cost inflation is typically used in the absence of reliable replacement cost data. It is a reliable method for recently purchased and/or constructed assets where the total cost is reflective of the actual costs that the Township incurred. As assets age and new products and technologies become available, cost inflation becomes a less reliable method.

2.4 Estimated Useful Life and Service Life Remaining

The estimated useful life (EUL) of an asset is the period over which the Township 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 date and its EUL, the Township can determine the service life remaining (SLR) for each asset. Using condition data and the asset's SLR, the Township can more accurately forecast when it will require replacement. The SLR is calculated as follows:

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

2.5 Deriving Annual Capital Requirements

By dividing the replacement cost of an asset with the asset's estimated useful life and factoring in the cost and impact of any lifecycle activities, the average annual capital requirements can be derived. The average annual requirement is calculated as follows:

$$Annual\ Capital\ Requirement\ (Lifecycle\ Scenario) = \frac{(Replacement\ Cost + Cost\ of\ Lifecycle\ Activities)}{(EUL + Impact\ of\ Lifecycle\ Activities)}$$

$$Annual\ Capital\ Requirement\ (Replacement\ Only\ Scenario) = \frac{Replacement\ Cost}{Estimated\ Useful\ Life\ (EUL)}$$

2.6 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.

The reinvestment rate is calculated as follows:

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

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

2.7 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 Township'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	60-79
Fair	Requires attention	Signs of deterioration, some elements exhibit significant deficiencies	40-59
Poor	Increasing potential of affecting service	Approaching end of service life, condition below standard, large portion of system exhibits significant deterioration	20-39
Very Poor	Unfit for sustained service	Near or beyond expected service life, widespread signs of advanced deterioration, some assets may be unusable	0-19

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 E includes additional information on the role of asset condition data and provides basic guidelines for the development of a condition assessment program.

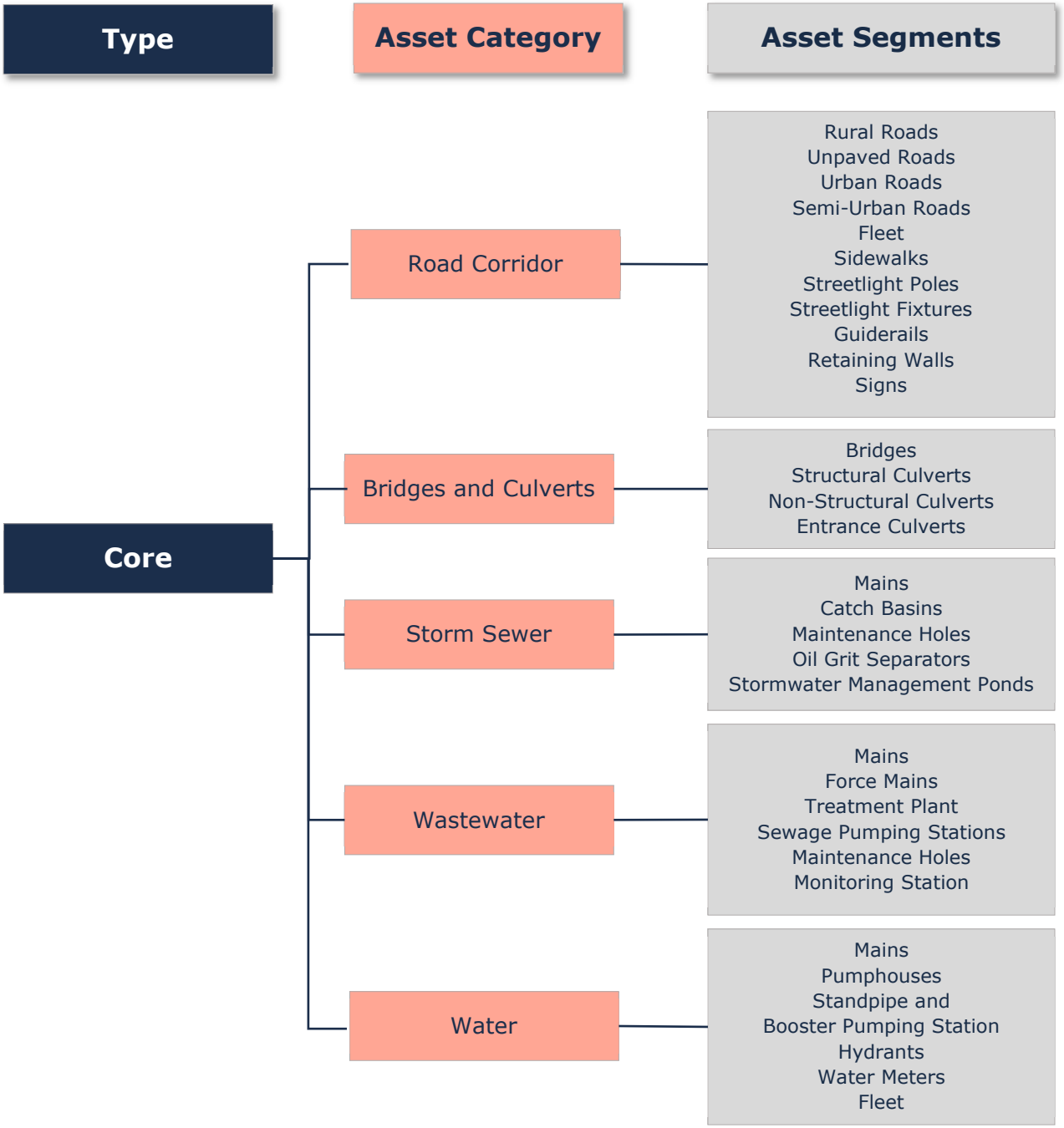
3 Core Asset Portfolio

Key Insights

- The total replacement cost of the Township's core asset portfolio is $263.87 million
- The Township's total target re-investment rate is 2.35%
- 88% of all assets are in fair or better condition
- 1% of assets have exceeded their service life and approximately 11% of assets may require replacement in the next 10 years
- Average annual capital requirements total $6.20 million per year across all assets

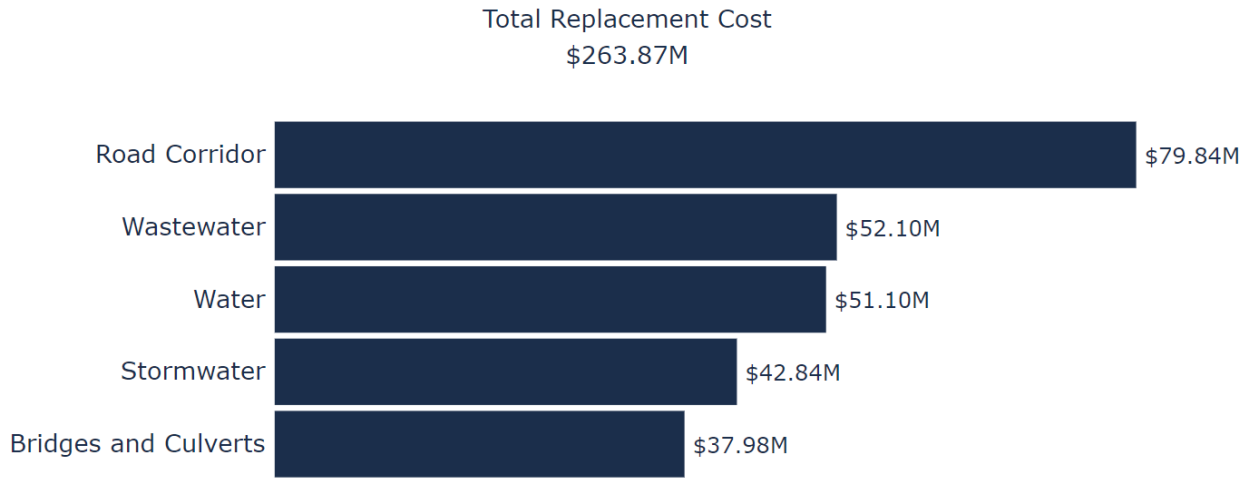
3.1 Asset Hierarchy

Asset hierarchy explains the relationship between individual assets and their components, and a wider, more expansive network and system. How assets are grouped in a hierarchy structure can impact how data is interpreted. Assets were structured to support meaningful, efficient reporting and analysis. Key category details are summarized at asset segment level



3.2 Replacement Cost of Asset Portfolio

The asset categories analyzed in this AMP have a total replacement cost of $263.87 million based on inventory data from 2021. This total was determined based on a combination of user-defined costs and historical cost inflation. This estimate reflects replacement of historical assets with similar, but not necessarily identical, assets available for procurement today.

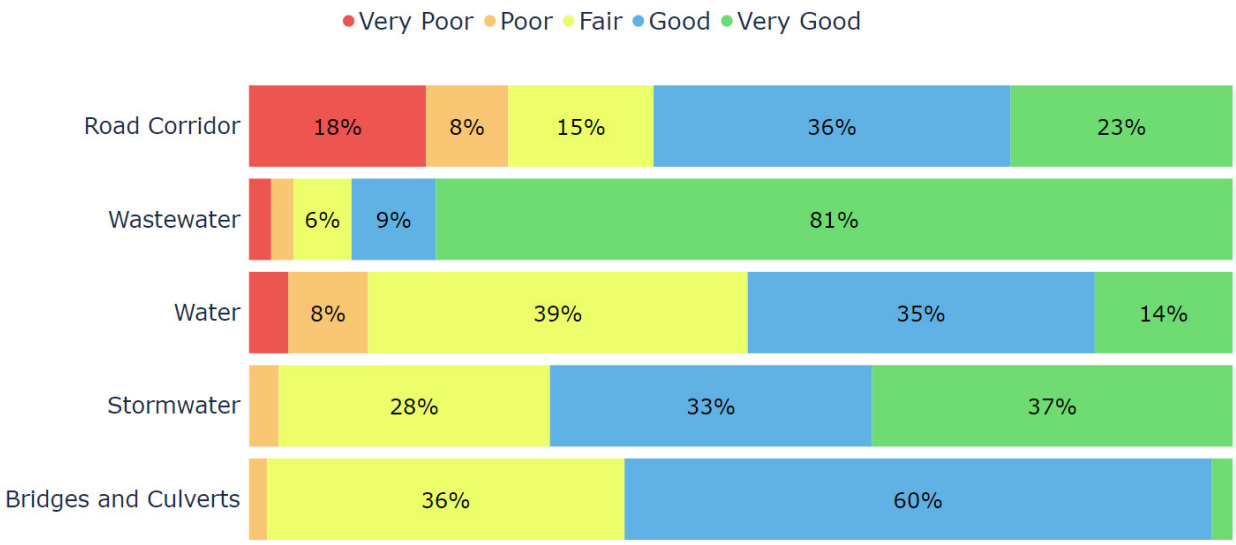


The following table identifies the methods employed to determine replacement costs across each asset category:

Asset Category	Replacement Cost Method		
	Defined Replacement Cost	Historical Cost Indexing	Replacement Cost Source
Road Corridor	91%	9%	Staff, Consultant, and Market Data Input
Wastewater	74%	26%	
Water	73%	27%	
Stormwater	100%	0%	
Bridges and Culverts	99%	1%	
Overall	**87%**	**13%**	

3.3 Condition of Asset Portfolio

The current condition of assets is central to all asset management planning. Collectively, 88% of core assets in the Township are in fair or better condition. This estimate relies on both age-based and field condition data.

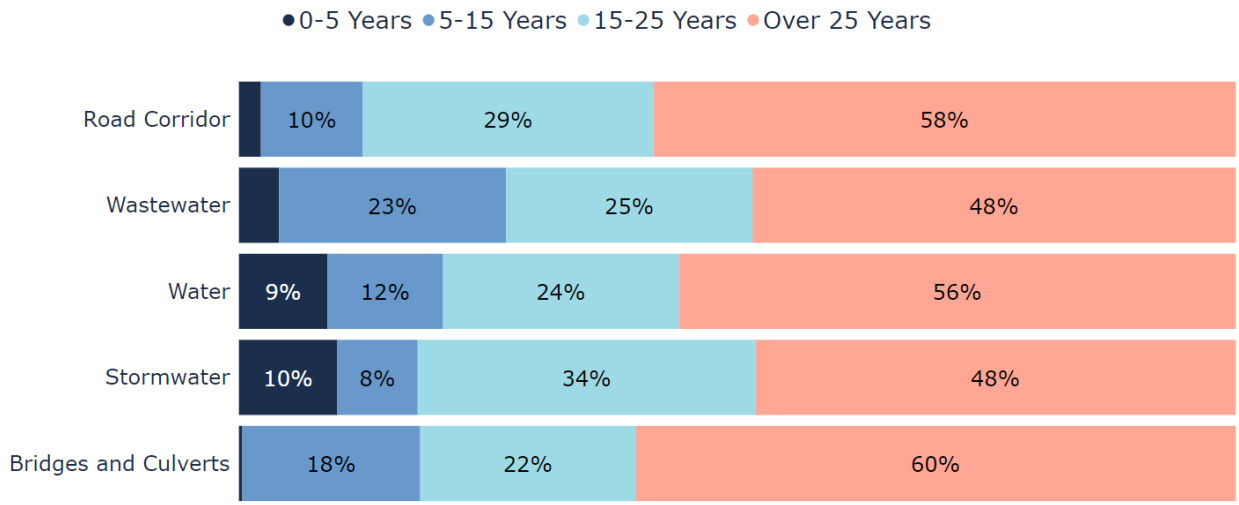


This AMP relies on assessed condition data for 41% of assets; for the remaining portfolio, age is used as an approximation of condition. Assessed condition data is invaluable in asset management planning as it reflects the true condition of the asset and its ability to perform its functions. The table below identifies the source of condition data used throughout this AMP.

Asset Category	% of Assets with Age-based Condition	% of Assets with Assessed Condition	Source of Assessed Condition Data
Road Corridor	11%	89%	2022 RNS
Wastewater	100%	0%	Age-based
Water	100%	0%	
Stormwater	100%	0%	
Bridges and Culverts	0%	100%	2020 OSIM
Overall	**59%**	**41%**	

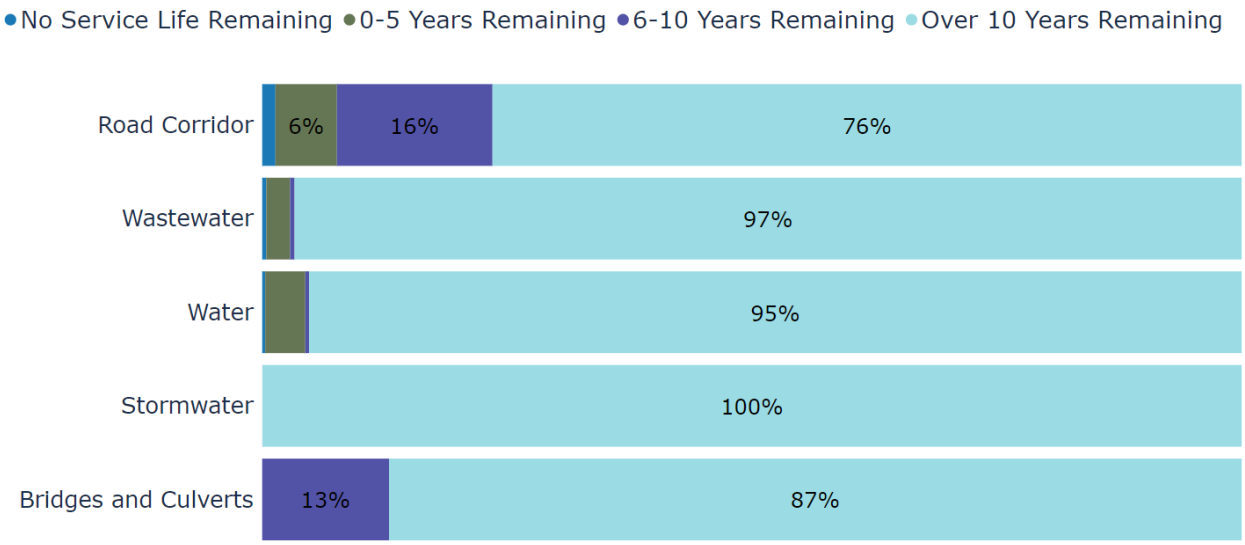
3.4 Asset Age

The percentage of core Township assets which are over 25 years old is 54% while 20% have been installed in the last 15 years.



3.5 Service Life Remaining

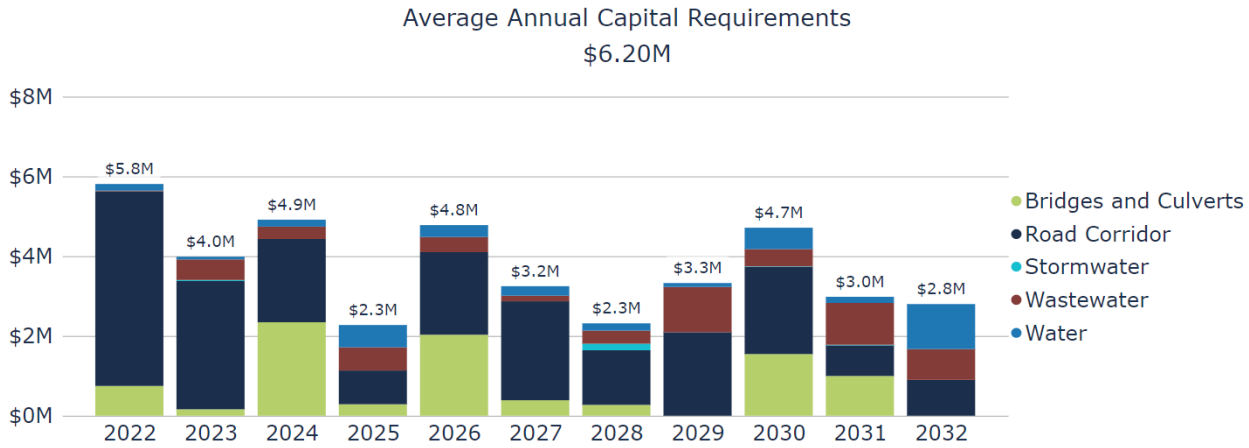
Based on the asset inventory, asset age, available assessed condition data, and estimated useful life, 11% of the Township's assets may require replacement within the next 10 years. Capital requirements over the next 10 years are identified in Appendix B.



3.6 Forecasted Capital Requirements

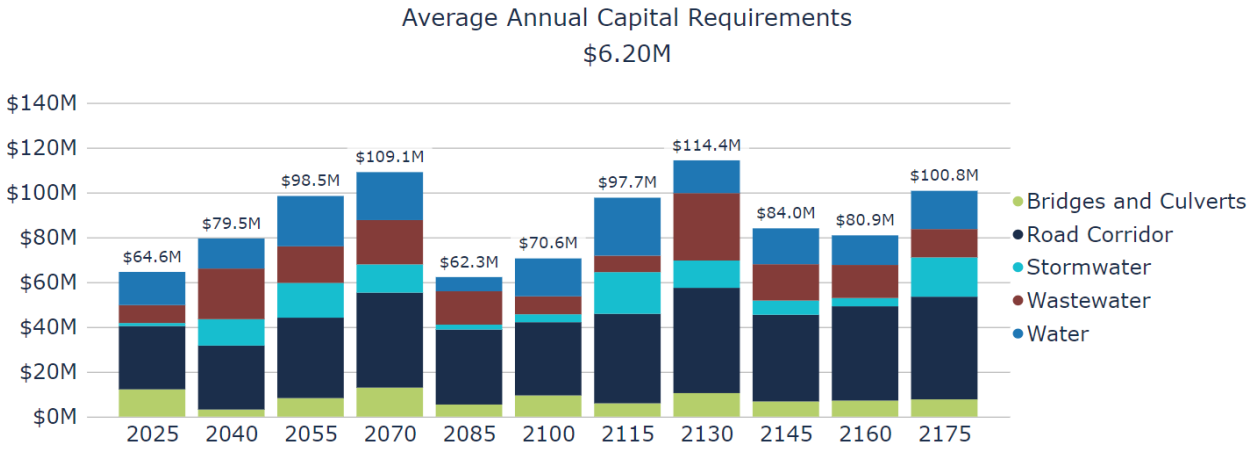
The development of a long-term capital forecast should include both asset rehabilitation and replacement requirements. With the development of asset-specific lifecycle strategies that include the timing and cost of future capital events, the Township can produce an accurate long-term capital forecast.

The graph below identifies the average annual capital requirements over the next 10 years and is based on the Township's inventory as of the end of 2021. This figure does not include assets that may be required due to growth.



The specific projected cost of lifecycle activities required over the next 10 years, to maintain the current level of service, can be found in Appendix A.

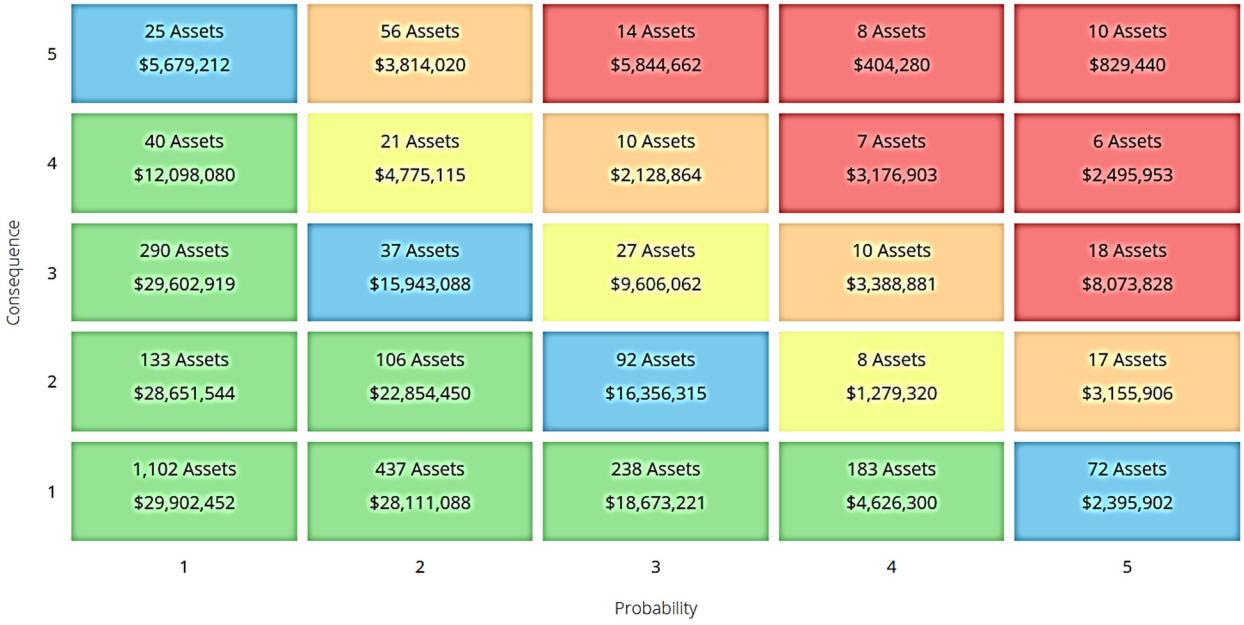
The graph below identifies capital requirements over the next 155 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 15-year bins and are based on the Township's asset inventory as of the end of 2021. This projection does not include assets that may be required for growth.



3.7 Risk & Criticality

Advanced risk models for core linear assets and high-level risk models for all other assets were developed as part of this asset management plan.

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the asset portfolio and is based on 2021 inventory data.



4 Road Corridor

Road corridor assets are a critical component of the provision of safe and efficient transportation services, connecting the many hamlets and rural areas that comprise the Township. These assets represent the highest value asset categories in the Township's asset portfolio. It includes all municipally owned and maintained roadways in addition to supporting roadside infrastructure.

The Public Works department manages the Township's road corridor assets, through the maintenance, rehabilitation, and reconstruction of roads and supporting roadside infrastructure. The department is also responsible for winter maintnenance including snow clearing, ice control, and snow removal operations.

The Township's roads and roadside inventory is managed in Citywide™ and consists of 591 active assets.

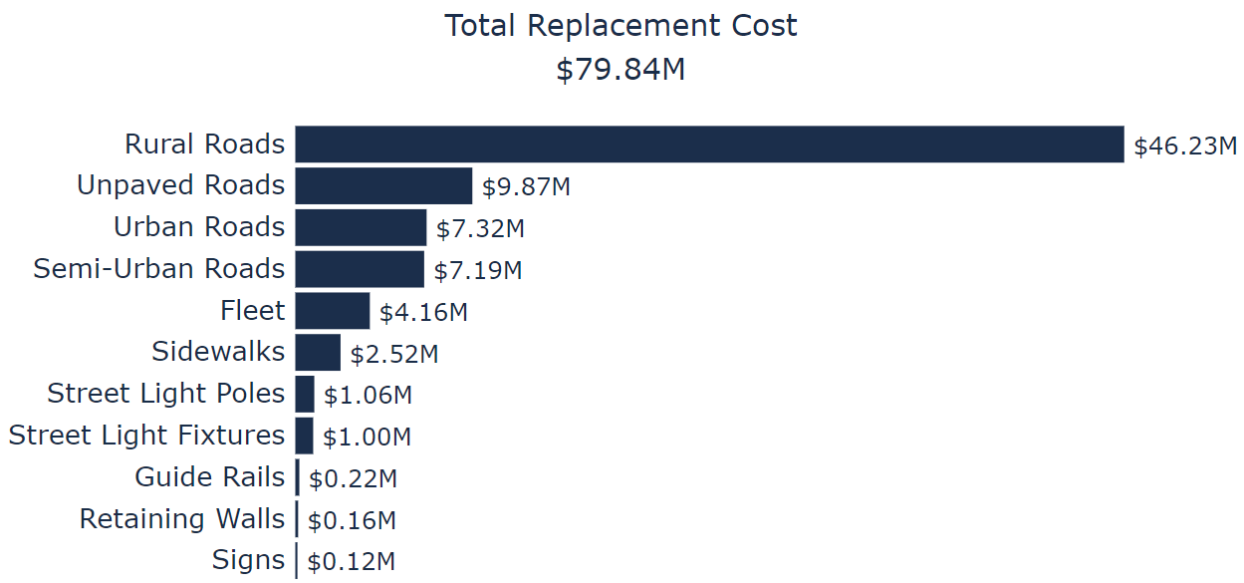
The state of the infrastructure for the road network is summarized in the following table.

Annual Capital Requirements	Average Condition	Risk Rating
$2.9 million	**Good (67%)**	**7.2 - Low**

4.1 Asset Inventory & Costs

The table below includes the quantity, total replacement cost and annual capital requirements of each asset segment in the Township's road corridor inventory.

Asset Segment	Quantity	Replacement Cost	Annual Capital Requirement
Rural Roads	131 km	$46,228,500	$1,779,531
Semi-Urban Roads	21 km	$7,186,260	$290,842
Urban Roads	20 km	$7,323,300	$247,307
Unpaved Roads	49 km	$9,874,000	$177,377
Fleet	26 assets	$4,156,462	$273,718
Sidewalks	35 km^2	$2,522,655	$78,833
Street Light Poles	514 assets	$1,058,203	$15,117
Street Light Fixtures	705 assets	$996,416	$34,413
Guide Rails	6 assets	$223,605	$8,944
Retaining Walls[1]	2 assets	$157,319	$5,244
Signs[1]	79 assets	$117,558	$11,756
Total		**$79,844,278**	**$2,923,082**



Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurately represent capital requirements.

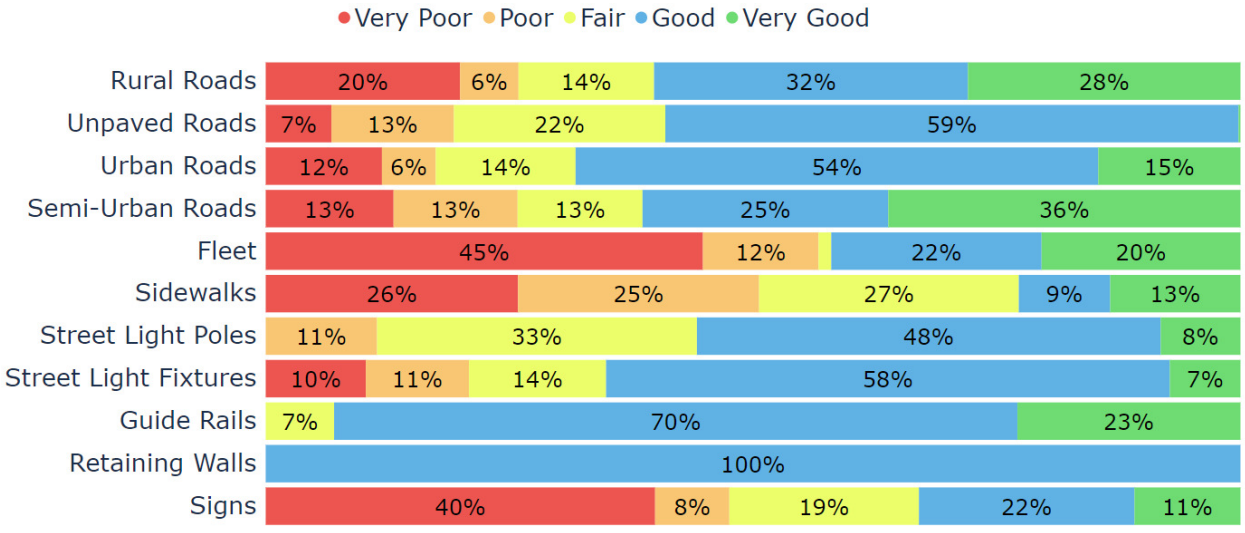
[1] Staff have indicated that the current asset listing for retaining walls and signs is incomplete. Staff are working to collect and consolidate the necessary data into the central asset inventory.

4.2 Asset Condition & Age

The table below identifies the current average condition, the average age, and the estimated useful life for each asset segment. The average condition (%) is a weighted value based on replacement cost.

Asset Segment	Estimated Useful Life (Years)[2]	Average Age (Years)	Average Condition
Rural Roads	15 - 25	10.0	70% (Good)
Semi-Urban Roads	15 - 25	6.3	72% (Good)
Urban Roads	15 - 25	9.5	73% (Good)
Unpaved Roads	50	7.5	66% (Fair)
Fleet	7 - 20	9.1	41% (Fair)
Sidewalks	30	19.9	43% (Fair)
Street Light Poles	70	32.6	61% (Good)
Street Light Fixtures	20 - 40	24.0	60% (Good)
Guide Rails	25	7.3	77% (Good)
Retaining Walls	30	6.1	80% (Very Good)
Signs	15	5.0	47% (Fair)
Average		**13.4**	**67% (Good)**

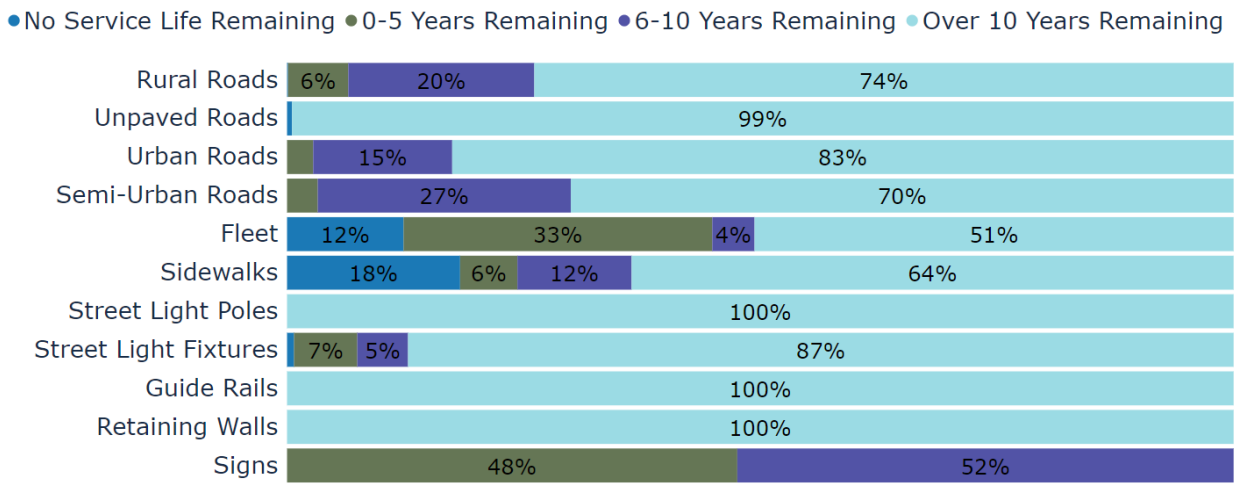
The graph below visually illustrates the average condition for each asset segment on a very good to very poor scale.



[2] The estimated useful life of road assets in this AMP is derived from the surface component of the road asset.

To ensure that the Township's road corridor assets continue to provide an acceptable level of service, the Township 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, replacement activities, and funding is required to increase the overall condition of the roads.

The graph below visually illustrates the average service life remaining for each asset segment, ranging from no service life remaining to over 10 years remaining.



Each asset's estimated useful life should also 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.

4.2.1 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 Township's current approach:

- A road needs study through an external consultant is conducted every 5 years. Staff also conduct visual inspections during road patrol.
- The most recent condition assessment was prepared by R.J. Burnside & Associates Ltd. in 2022.
- Routine road patrols are undertaken weekly, granular roads are also visually inspected during grading activities.
- Other road network assets are inspected as per O. Reg. 239/02.

In this AMP, the following rating criteria is used to determine the current condition of asphalt and surface treated road segments and forecast future capital requirements:

Condition (Roads)	PCI Rating
Very Good	90-100
Good	70-89
Fair	50-69
Poor	40-49
Very Poor	0-39

For all other assets the following rating criteria is used to determine the current condition and forecast future capital requirements:

Condition	Condition Rating
Very Good	80-100
Good	60-79
Fair	40-59
Poor	20-39
Very Poor	0-19

4.3 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 table outlines the Township's current lifecycle management strategy.

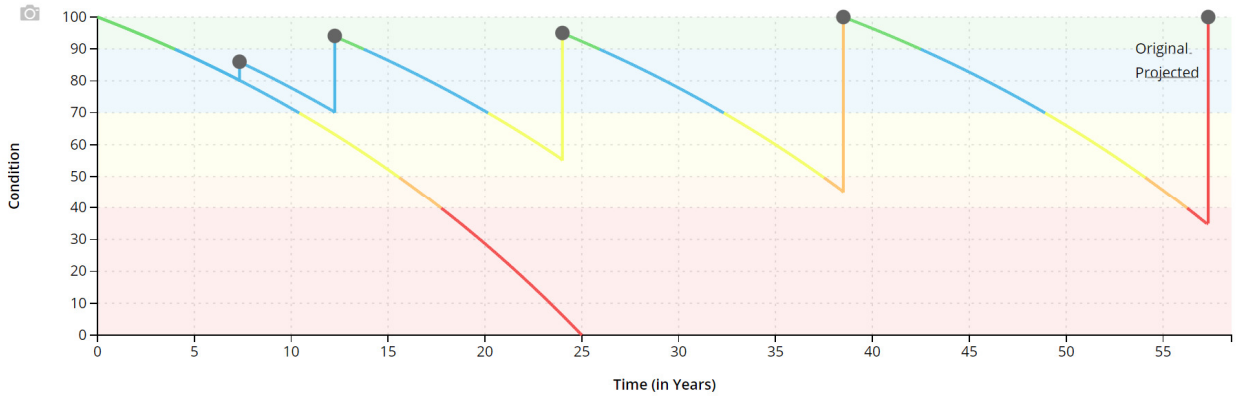
Activity Type	Description of Current Strategy
Maintenance	Pothole repairs are completed as required based on deficiencies identified through regular road patrols and feedback from the public.
	Seasonal maintenance activities include asphalt patching, graveling, and tree cutting.
	Summer maintenance activities include sidewalk repairs, grading, re-gravelling, applying dust suppressant, ditching, roadside mowing, tree trimming, brush cleanup, road sign installation/maintenance, and line painting.
	Winter maintenance activities include snow plowing, salting, and snow removal.
	A crack seal program is in place for asphalt roads.
Rehabilitation	Rehabilitation activites include surface treatments, asphalt overlays, pulverize and paving.
	Road replacement prioritization is determined by consideration of growth, risk, condition, health and safety, and social impact.
Replacement	Road reconstruction projects (base and surface) are identified based on road condition, risk, and sub-surface asset requirements (stormwater, wastewater, water).

The following lifecycle strategies have been developed to formalize the current approach to managing the lifecycle of asphalt, surface treated, and gravel roads.

Instead of allowing the roads to deteriorate until replacement is required, strategic preventative maintenance and rehabilitation is expected to extend the service life of roads at a lower total cost.

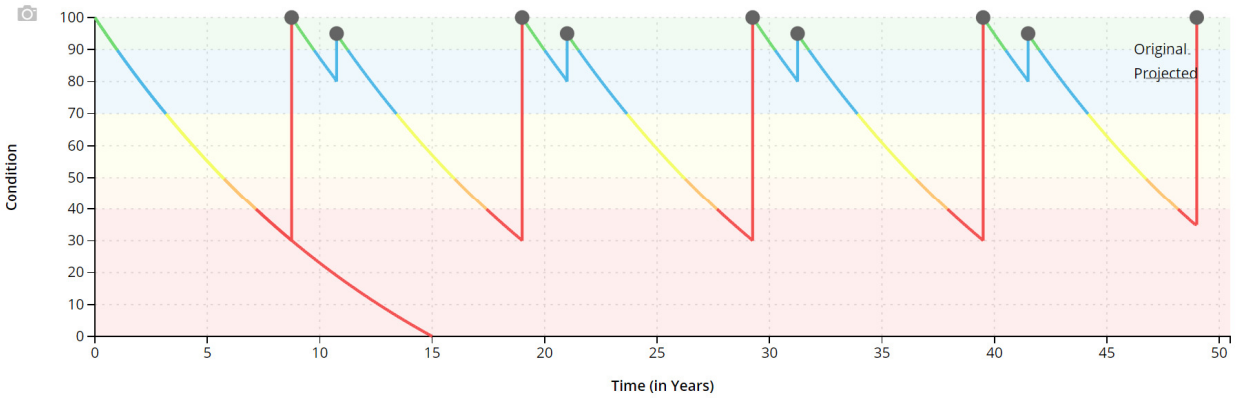
Asphalt Roads

Event Name	Event Class	Event Trigger
General Maintenance	Maintenance	As needed
Crack Sealing	Maintenance	Condition: 80
Microsurfacing	Preventative Maintenance	Condition: 70 - 80
Asphalt Overlay	Rehabilitation	Condition: 55 - 69
Pulverize and Pave	Rehabilitation	Condition: 45 - 60
Full Reconstruction	Replacement	Condition: 35

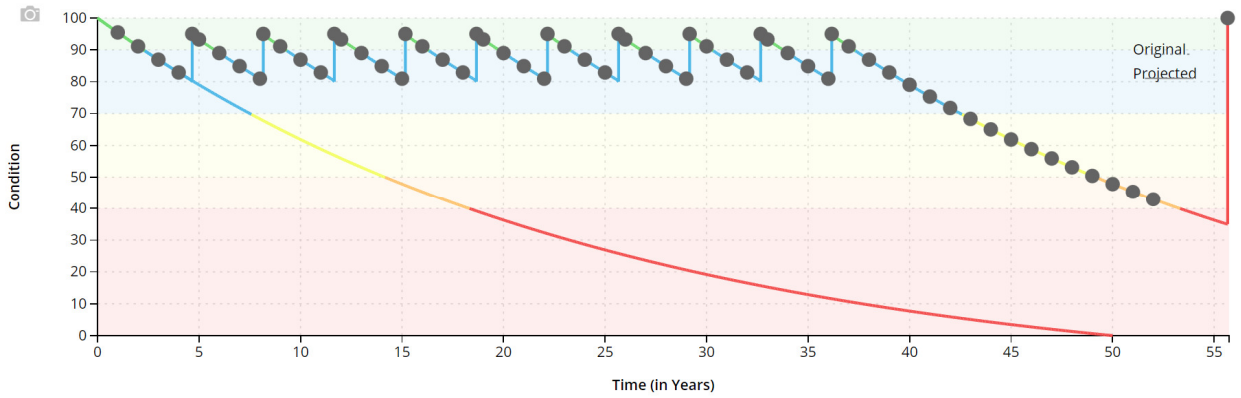


Surface Treated Roads

Event Name	Event Class	Event Trigger
General Maintenance	Maintenance	As needed
Surface Treatment – Single Lift	Rehabilitation	4 Treatments
Surface Treatment – Double Lift	Rehabilitation	4 Treatments
Full Reconstruction	Replacement	Condition: 35



Gravel Roads		
Event Name	**Event Class**	**Event Trigger**
General Maintenance	Maintenance	As needed
Dust Control/Suppressant	Maintenance	Localized
Gravelling	Maintenance	Annually
Spot Repairs and Regrading	Maintenance	Annually
Full Reconstruction	Replacement	Condition: 35

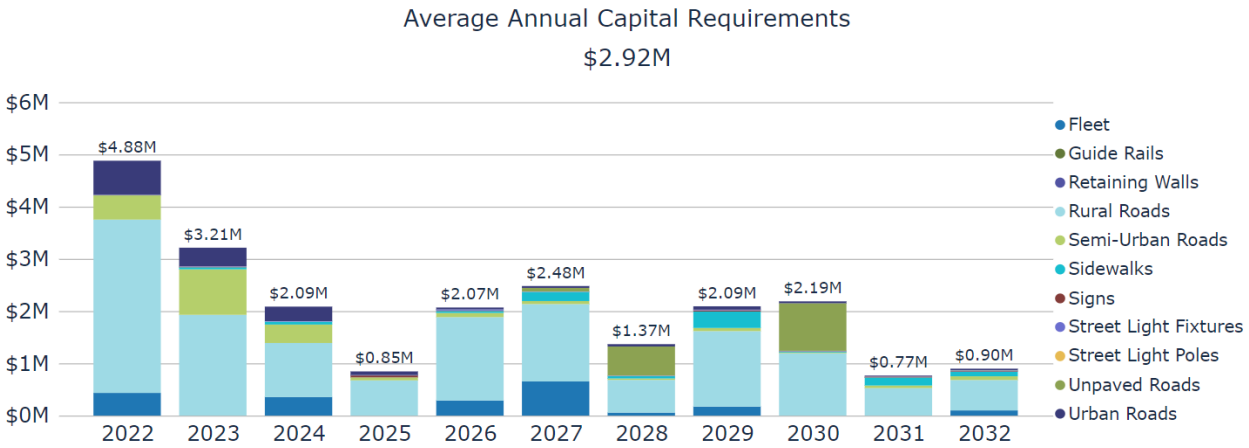


4.3.1 Forecasted Capital Requirements

Based on the lifecycle strategies identified previously for HCB, LCB, and gravel roads and assuming the end-of-life replacement of streetlights, the following graphs forecast short- and long-term capital requirements.

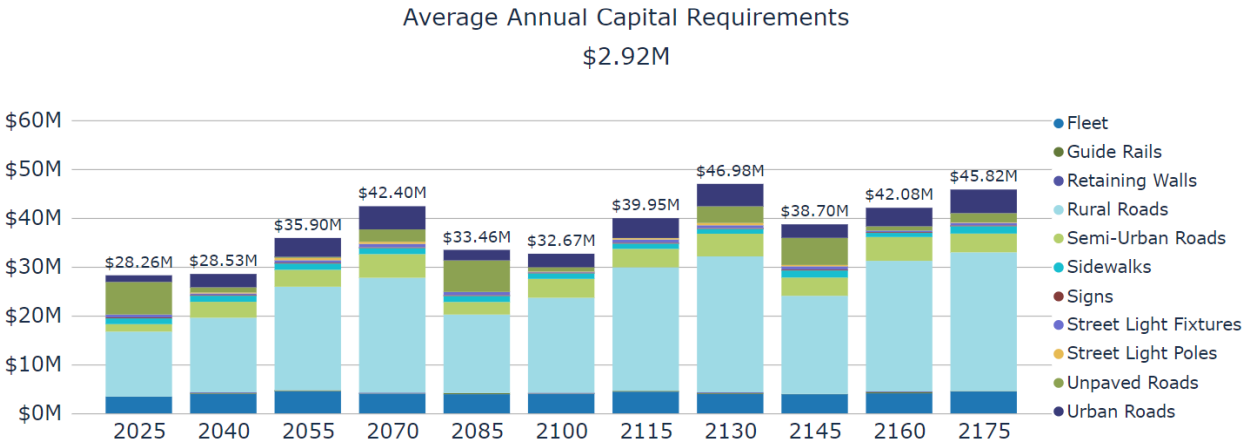
The annual capital requirement represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs.

The graph below provides a 10-year forecast of the capital requirements for roads and roadside assets, not including assets that will be required due to growth.



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

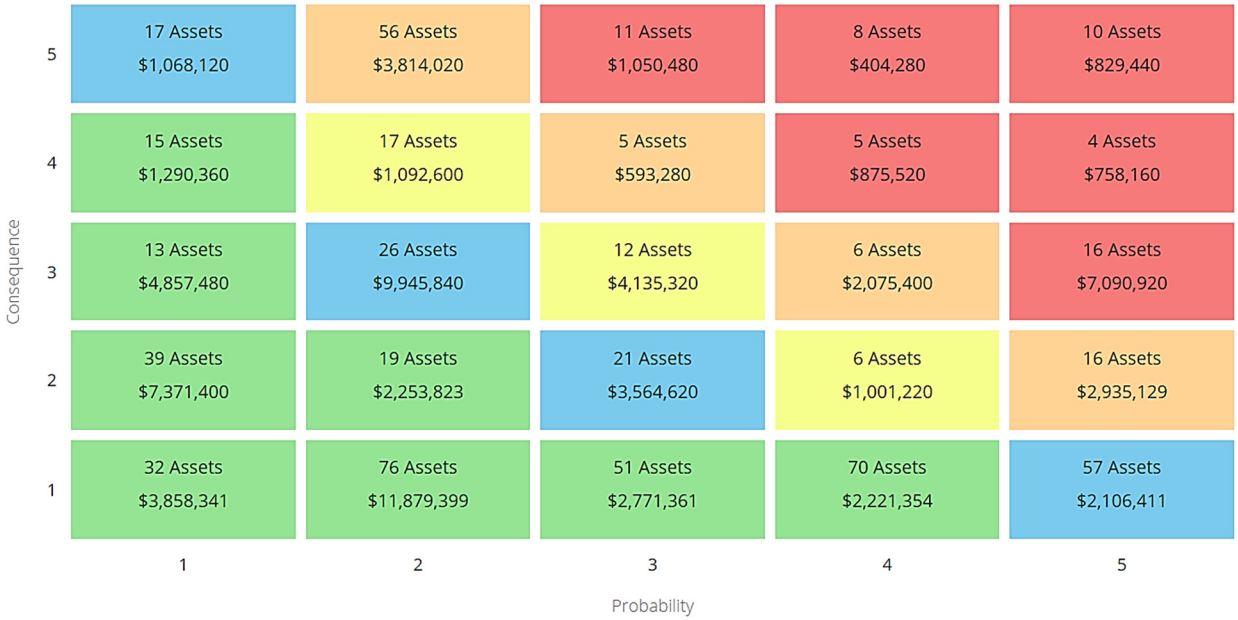
The graph below identifies capital requirements over the next 153 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 15-year bins and do not include assets that may be required due to growth.



4.4 Risk & Criticality

4.4.1 Risk Matrix

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 based on 2021 inventory data.



This is a high-level model developed for the purposes of this AMP and Township staff should review and adjust the risk model to reflect an evolving understanding of both the probability and consequences of asset failure.

The asset-specific attributes that municipal staff utilize to define and prioritize the criticality of roads and roadside assets are documented below:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition	Replacement Cost (Direct Financial)
Service Life Remaining	Roadside Environment (roads) (Operational)
AADT Ranges (roads)	Road Surface Type (roads) (Operational)
	AADT Ranges (roads) (Strategic)
	Road Corridor Asset Type

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

4.4.2 Risks to Current Asset Management Strategies

The following section summarizes key trends, challenges, and risks to service delivery that the Township is currently facing:

Climate Change and Extreme Events

An increase in freeze/thaw cycles causes road pavement to heave and settle. This can cause the accelerated deterioration of road surface pavement which leads to an increased need for maintenance and rehabilitation. The uncertainty surrounding the impact of extreme weather events can make changing conditions difficult to plan for.

Asset Data and Information

Some of the asset data is pooled, missing in the inventory, and/or incomplete. Both short- and long-term planning requires the regular collection, storage, and maintenance of infrastructure data to support asset management decision-making.

4.5 Levels of Service

The following tables identify the Township'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 Township has selected for this AMP.

4.5.1 Community Levels of Service

The following table outlines the qualitative descriptions that determine the community levels of service provided by road corridor assets.

Service Attribute	Qualitative Description	Current LOS (2021)
Scope	Description, which may include maps, of the road network in the municipality and its level of connectivity	The Township's road network spans a total of 221 km situated primarily within a rural setting, with areas of semi-urban and urban development. The road network also contains roadside appurtenances such as sidewalks, streetlights, and signs.
Quality	Description or images that illustrate the different levels of road class pavement condition	The Township completed a Road Needs Study report in 2022 in coordination with R.J. Burnside & Associates Ltd. Every road segment receives a pavement condition index (PCI) rating (0-100). The rating incorporates pavement roughness measurements and surface distresses (type, quantity, severity). Ratings are categorized into 5 general qualitative descriptors as detailed below: 0 to 29 – Failed 30 to 49 – Poor 50 to 69 – Fair 70 to 89 – Good 90 to 100 – Very Good

4.5.2 Technical Levels of Service

The following table outlines the quantitative metrics that determine the technical level of service provided by road corridor assets.

Service Attribute	Technical Metric	Current LOS (2021)
Scope	Lane-km of arterial roads (MMS classes 1 and 2) per land area (km/km^2)	0 km/km^2
	Lane-km of collector roads (MMS classes 3 and 4) per land area (km/km^2)	0 km/km^2
	Lane-km of local roads (MMS classes 5 and 6) per land area (km/km^2)	0.30 km/km^2
Quality	Average pavement condition index for paved roads in the municipality	71% (Good)
	Average surface condition for unpaved roads in the municipality (e.g., excellent, good, fair, poor)	66% (Fair)
Performance	Target reinvestment rate	3.66%
	Actual reinvestment rate	TBD

4.6 Recommendations

Asset Inventory

- The sign inventory includes several pooled assets that should be broken down into individual assets to allow for coordinated planning and analysis
- The current asset inventory does not account for additional roadside assets such as retaining walls.
- Continue to consolidate critical asset information from other asset data sources into the Township's centralized asset inventory.

Lifecycle Management Strategies

- Gather unit costs for assets that have relied primarily on historical inflation and review periodically to ensure a higher level of accuracy and within the context of current market condition
- Evaluate the efficacy of the Township's lifecycle management strategies at regular intervals to determine the impact cost, condition and risk.

Risk Management Strategies

- Implement risk-based decision-making as part of asset management planning and budgeting processes. This should include the regular review of high-risk assets to determine appropriate risk mitigation strategies.
- Review risk models on a regular basis and adjust according to an evolving understanding of the probability and consequences of asset failure.

Levels of Service

- Continue to measure current levels of service in accordance with the metrics identified in O. Reg. 588/17 and those metrics that the Township believes to provide meaningful and reliable inputs into asset management planning.
- 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 Bridges and Culverts

Bridges and culverts are another critical component of the transportation services provided to the community.

The Public Works department is responsible for the planning and managing of all bridges and structural culverts located across municipal roads with the goal of keeping structures in an adequate state of repair and minimizing service disruptions.

Based on the requirements outlined by the Ministry of Transportation, the most recent Ontario Structure Inspection (OSIM) was conducted in 2020 by R.J. Burnside & Associates Limited.

The Township's current bridges and culverts inventory is managed in Citywide™ and consists of 28 structures that have a span of 3 meters or more, categorizing them as either a bridge or a structural culvert asset.

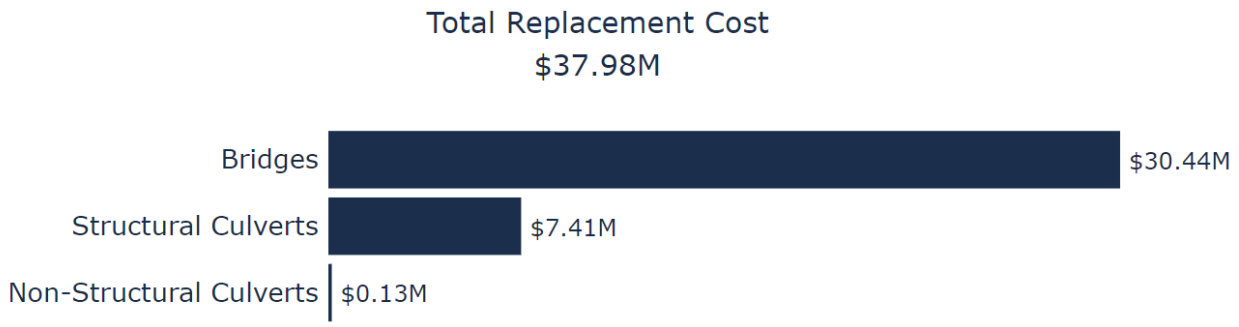
The state of the infrastructure for bridges and culverts is summarized in the following table.

Annual Capital Requirements	Average Condition	Risk
$0.6 million	**Good (71%)**	**4.75 - Very Low**

5.1 Asset Inventory & Costs

The table below includes the quantity, total replacement cost and annual capital requirements of each asset segment in the Township's bridges and culverts inventory.

Asset Segment	Quantity	Replacement Cost	Annual Capital Requirement
Bridges	21 assets	$30,440,831	$468,368
Structural Culverts	7 assets	$7,410,653	$121,711
Non-Structural Culverts	2 (pooled assets)	$129,623	$3,704
Total		**$37,981,107**	**$593,783**



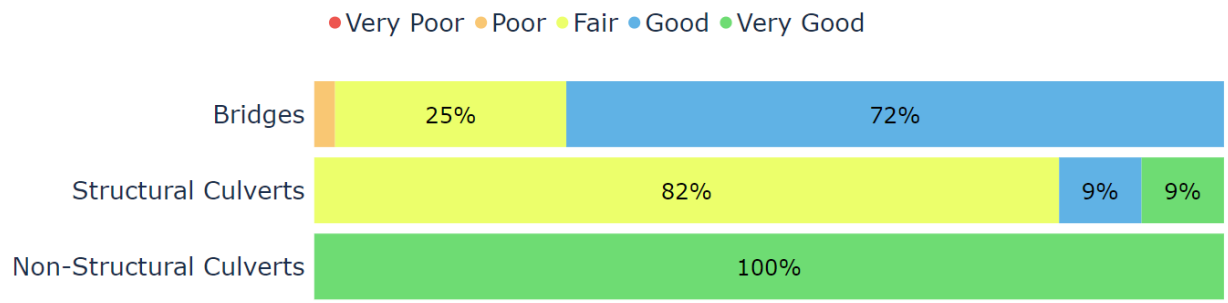
Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurately represent capital requirements.

5.2 Asset Condition & Age

The table below identifies the current average condition, the average age, and the estimated useful life for each asset segment. The average condition (%) is a weighted value based on replacement cost.

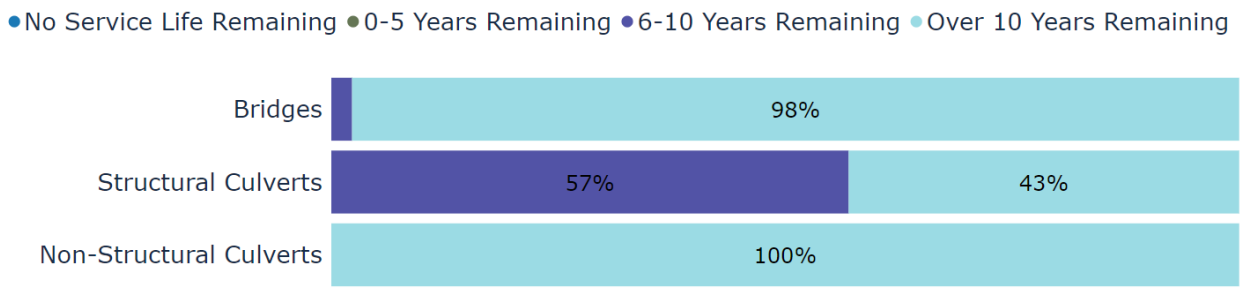
Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Condition
Bridges	75	53.3	73% (Good)
Structural Culverts	35 - 75	33.8	69% (Fair)
Non-Structural Culverts	35	1.1	97% (Very Good)
Average		**45.3**	**72% (Good)**

The graph below visually illustrates the average condition for each asset segment on a very good to very poor scale.



To ensure that the Township's bridges and culverts continues to provide an acceptable level of service, the Township 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 bridges and culverts.

The graph below visually illustrates the average service life remaining for each asset segment, ranging from no service life remaining to over 10 years remaining.



Each asset's estimated useful life should also 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.

5.2.1 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 Township's current approach:

- Condition assessments of all bridges and culverts with a span greater than or equal to 3 meters are completed every 2 years in accordance with the Ontario Structure Inspection Manual (OSIM)
- The most recent bridge and culvert inspection was conducted in 2020 by R.J. Burnside & Associates Limited.
- Bridge and culvert assets are visually inspected by municipal staff as needed

In this AMP and as per the OSIM reports, the bridge condition index (BCI) rating criteria is used to determine the current condition of assets and forecast future capital requirements:

Condition	BCI Rating
Very Good	90-100
Good	70-89
Fair	50-69
Poor	40-49
Very Poor	0-39

5.3 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 table outlines the Township's current lifecycle management strategy.

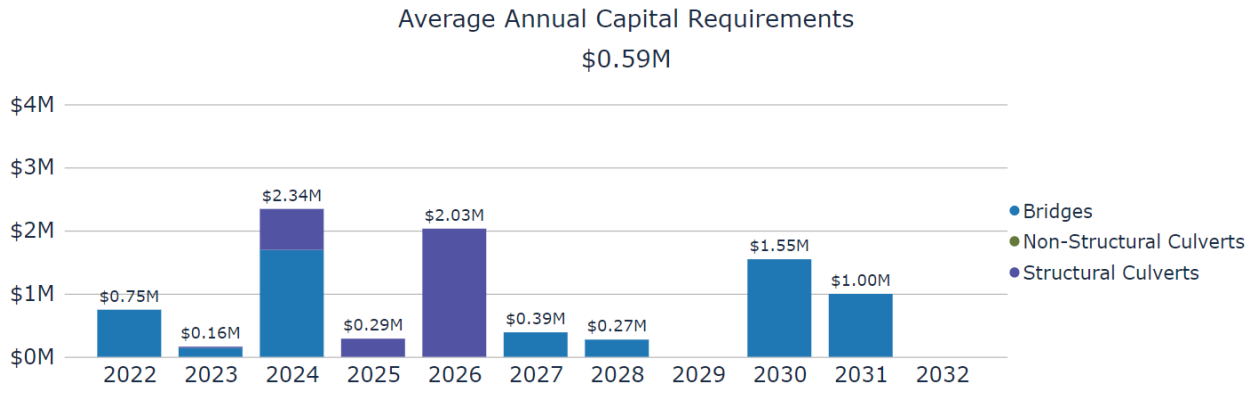
Activity Type	Description of Current Strategy
Maintenance	Typical maintenance includes: • Obstruction removal • Cleaning and sweeping • Erosion control • Brush and tree removal
	Biannual OSIM based inspections include a list of recommended maintenance activities that the Township considers and completes according to cost and urgency.
Rehabilitation	Biannual OSIM based inspections include a capital needs list identifying recommended rehabilitation and replacement activities with estimated costs and activity schedule
Inspection	The most recent inspection report was completed in 2020 by R.J. Burnside & Associates Limited.

5.3.1 Forecasted Capital Requirements

Assuming end-of-life replacement for all assets in this category, the following graphs forecasts short- and long-term capital requirements.

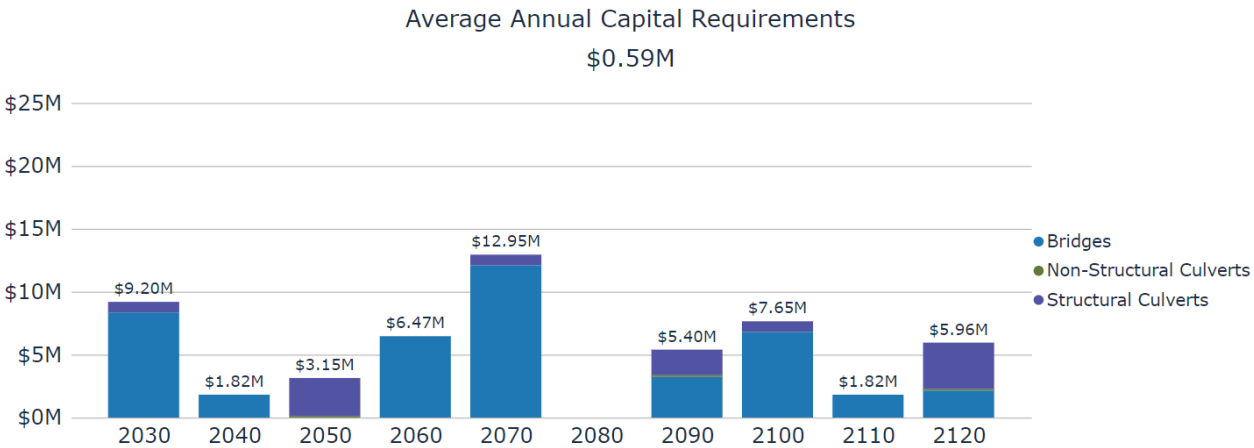
The annual capital requirement represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs.

The graph below provides a 10-year forecast of the capital requirements for bridge and structural culvert assets, not including assets that will be required due to growth.



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

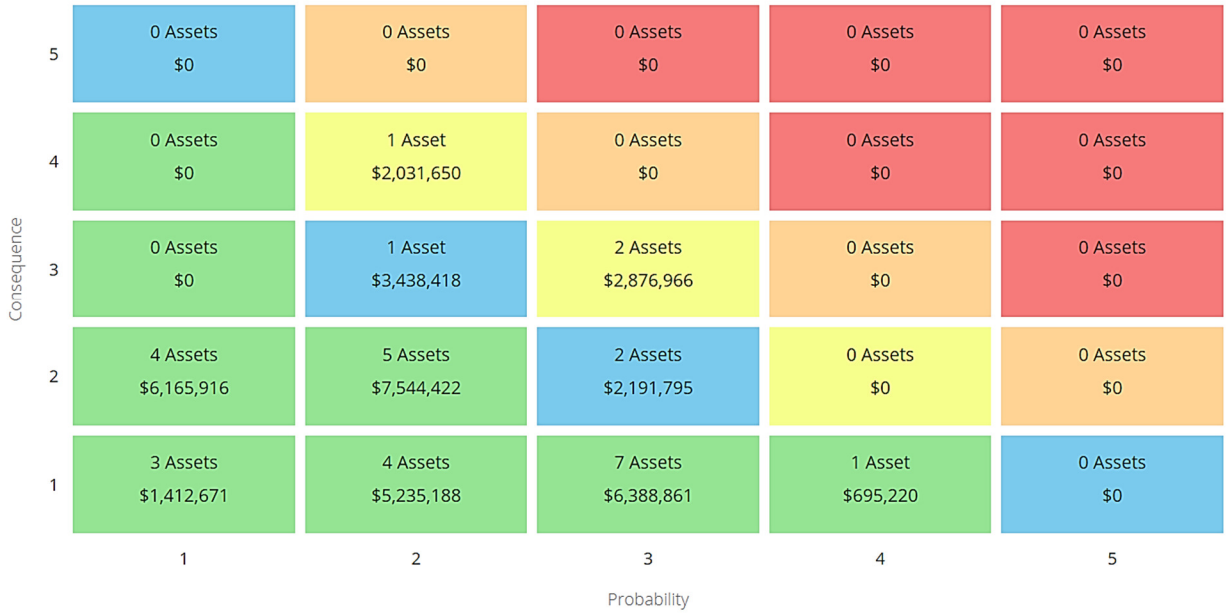
The graph below identifies capital requirements over the next 103 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 10-year bins and do not include assets that may be required due to growth.



5.4 Risk & Criticality

5.4.1 Risk Matrix

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 based on 2021 inventory data.



This is a high-level model developed for the purposes of this AMP and Township staff should review and adjust the risk model to reflect an evolving understanding of both the probability and consequences of asset failure.

The asset-specific attributes that municipal staff utilize to define and prioritize the criticality of the road network are documented below:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition	Replacement Cost (Direct Financial)
Service Life Remaining	AADT (Strategic)

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

5.4.2 Risks to Current Asset Management Strategies

The following section summarizes key trends, challenges, and risks to service delivery that the Township is currently facing:

Climate Change and Extreme Events

Flooding and extreme weather can cause damage to multiple elements of the Township's bridges including the deck, superstructure, substructure, and approaches. The rising levels of freshwater and the increased frequency and intensity of precipitation events are likely to advance the deterioration of bridge components. Staff should identify and monitor affected bridges and culverts. The Township should also prioritize infrastructure maintenance, rehabilitation, and replacement based on susceptibility to climate impacts.

Funding and Staff Capacity

The Township has a sizeable inventory of bridges and structural culverts that require regular maintenance and assessment. It can be challenging for staff to deploy optimal maintenance and assessment strategies. Major capital rehabilitation projects for bridges and culverts may also be deferred depending on the availability of grant funding opportunities. A long-term capital funding strategy can reduce dependency on grant funding and help prevent the deferral of necessary capital works.

5.5 Levels of Service

The following tables identify the Township's current level of service for bridges and 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 Township has selected for this AMP.

5.5.1 Community Levels of Service

The following table outlines the qualitative descriptions that determine the community levels of service provided by bridges and culverts.

Service Attribute	Qualitative Description	Current LOS (2021)
Scope	Description of the traffic that is supported by municipal bridges (e.g., heavy transport vehicles, motor vehicles, emergency vehicles, pedestrians, cyclists).	The traffic on bridges and structural culverts is generally light, but certain rural structures do support heavy vehicle traffic, such as construction vehicles, agricultural machinery and equipment.
Quality	Description or images of the condition of bridges & culverts and how this would affect use of the bridges & culverts	Good (BCI 70-100): Generally considered to be in good-excellent condition, and repair or rehabilitation work is not usually required within the next 5 years. Routine maintenance, such as sweeping, cleaning, and washing are still recommended. Fair (BCI 50-70): Generally considered to be in good-fair condition. Repair or rehabilitation work recommended is ideally scheduled to be completed within the next 5 years. Poor (BCI Less than 50): Generally considered poor with lower numbers representing structures nearing the end of their service life. The repair or rehabilitation of these structures is ideally best scheduled to be completed within approximately 1 year. However, if it is determined that the replacement of the structure would be a more viable, the structure can be identified for continued monitoring and scheduled for replacement within the short-term.

5.5.2 Technical Levels of Service

The following table outlines the quantitative metrics that determine the technical level of service provided by bridges and culverts.

Service Attribute	Technical Metric	Current LOS (2021)
Scope	% of bridges in the Municipality with loading or dimensional restrictions	0%
Quality	Average bridge condition index value for bridges in the Municipality	73%
	Average bridge condition index value for structural culverts in the Municipality	69%
Performance	Target reinvestment rate	1.56%
	Capital reinvestment rate	TBD

5.6 Recommendations

Data Review/Validation

- Continue to review and update the bridges and structural culverts inventory with assessed condition data, asset attribute data and replacement costs upon the completion of the OSIM inspection every 2 years.

Lifecycle Management Strategies

- Continue to incorporate the recommended maintenance, rehabilitative and renewal activities from OSIM inspections

Risk Management Strategies

- Implement risk-based decision-making as part of asset management planning and budgeting processes. This should include the regular review of high-risk assets to determine appropriate risk mitigation strategies.
- Review risk models on a regular basis and adjust according to an evolving understanding of the probability and consequences of asset failure.

Levels of Service

- Continue to measure current levels of service in accordance with the metrics identified in O. Reg. 588/17 and those metrics that the Township believes to provide meaningful and reliable inputs into asset management planning.
- 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 Stormwater

The Township is responsible for owning and maintaining a stormwater network of storm mains, catch basins, oil grit separators, maintenance holes and stormwater management (SWM) ponds. The current asset inventory is managed in Citywide™ and consists of 730 active assets.

The Township's Public Works department is responsible for planning and managing stormwater infrastructure.

Stormwater infrastructure generally poses the greatest uncertainty for municipalities, including Guelph/Eramosa. Staff continue to work to improve the accuracy and reliability of the stormwater infrastructure to assist with long-term asset management planning.

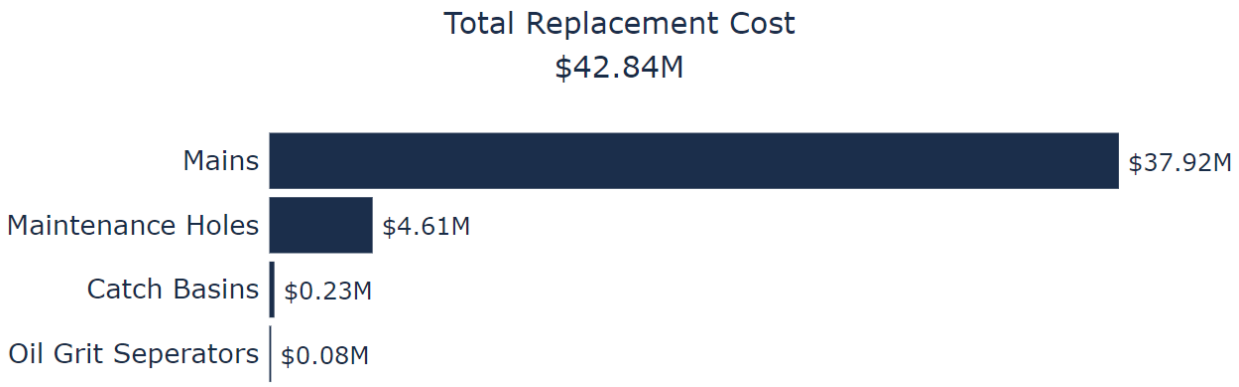
The state of the infrastructure for stormwater assets is summarized in the following table. It is important to acknowledge that the current stormwater inventory is incomplete, and the resulting output values will be revised as additional asset data becomes available.

Annual Capital Requirements	Average Condition	Risk
$0.66 million	**Very Good (81%)**	**3.01 - Very Low**

6.1 Asset Inventory & Costs

The table below includes the quantity, total replacement cost and annual capital requirements of each asset segment in the Township's stormwater inventory.

Asset Segment	Quantity	Replacement Cost	Annual Capital Requirement
Mains	25 km	$37,924,710	$592,574
Maintenance Holes	461 assets	$4,610,000	$57,900
Catch Basins	45 assets	$225,000	$4,500
Oil Grit Seperators	2 assets	$80,000	$1,000
SWM Ponds	6 assets	Not planned for replacement	
Total		**$42,839,710**	**$655,974**



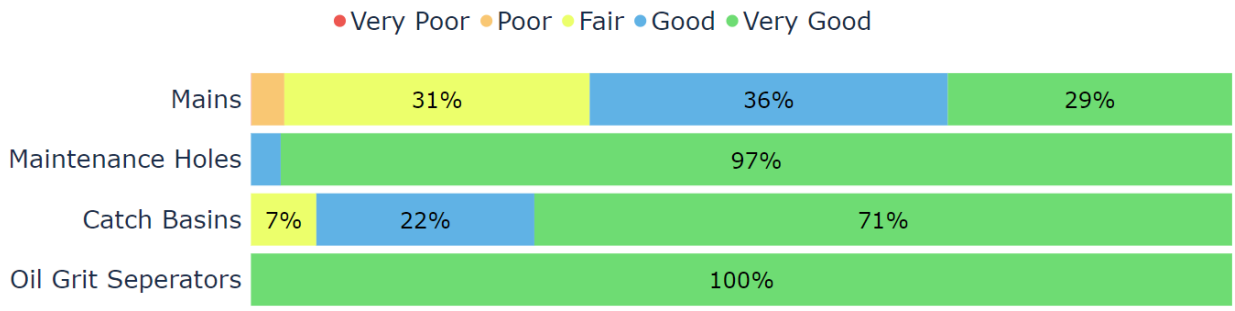
Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

6.2 Asset Condition & Age

The table below identifies the current average condition, the average age, and the estimated useful life for each asset segment. The average condition (%) is a weighted value based on replacement cost.

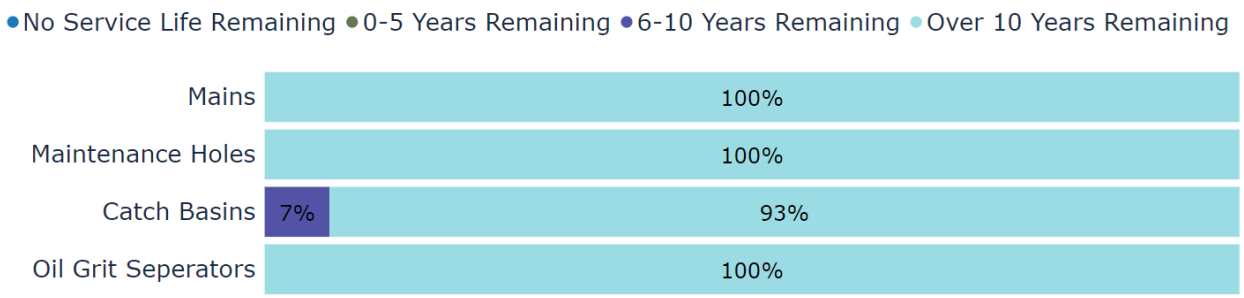
Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Condition
Mains	50 - 80	22.6	94% (Very Good)
Maintenance Holes	50 - 80	22.8	95% (Very Good)
Catch Basins	50	19.4	88% (Very Good)
Oil Grit Seperators	80	12.1	99% (Very Good)
Average		**22.6**	**81% (Very Good)**

The graph below visually illustrates the average condition for each asset segment on a very good to very poor scale.



To ensure that the Township's stormwater assets continue to provide an acceptable level of service, the Township 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 stormwater assets.

The graph below visually illustrates the average service life remaining for each asset segment, ranging from service life exceeded to over 10 years remaining.



Each asset's estimated useful life should also 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.

6.2.1 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 Township's current approach:

- There are no formal condition assessment programs in place for stormwater infrastructure
- Currently age-based estimates are used to determine asset condition, although confidence in the accuracy of these estimates is low
- As the Township refines the available asset inventory for stormwater assets, a regular condition assessment cycle should be established

In this AMP the following rating criteria is used to determine the current condition of stormwater segments and forecast future capital requirements:

Condition	Rating
Very Good	80-100
Good	60-79
Fair	40-59
Poor	20-39
Very Poor	0-19

6.3 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.

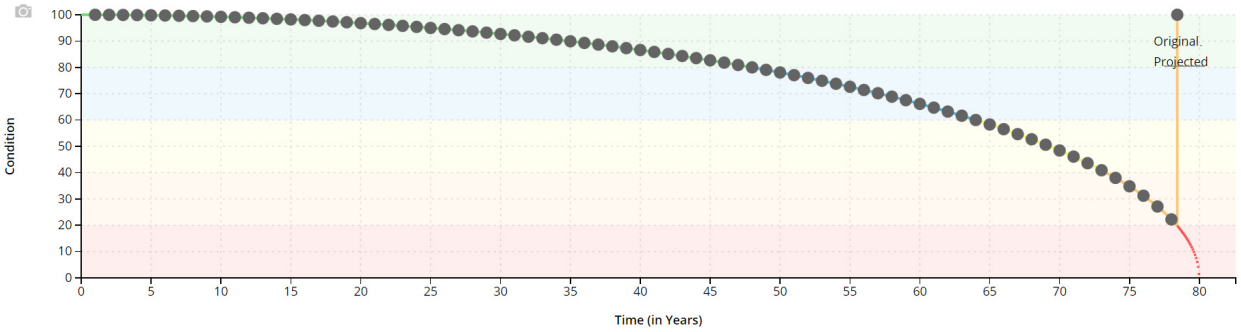
The following table outlines the Township's current lifecycle management strategy.

Activity Type	Description of Current Strategy
Maintenance	Maintenance activities are completed to a lesser degree compared to other asset systems
	Primary activities include catch basin cleaning and storm main flushing
	All other maintenance activities are completed on a reactive basis when operational issues are identified (e.g., blockages, backups)
Rehabilitation	Trenchless re-lining has the potential to reduce total lifecycle costs
Replacement	Staff attempt to coordinate stormwater capital projects with road reconstruction project to produce cost efficiencies

The following lifecycle strategies have been developed to formalize a proactive approach to managing the lifecycle of stormwater mains.

Instead of allowing the stormwater mains to deteriorate until replacement is required, strategic rehabilitation is expected to extend the service life of stormwater mains at a lower total cost.

Stormwater Mains		
Event Name	**Event Class**	**Event Trigger**
CCTV/Zoom Camera Inspection	Preventative Maintenance	As needed
Flushing/Cleaning (50% of network per year)	Maintenance	Annually
Full Replacement	Replacement	Condition: 20

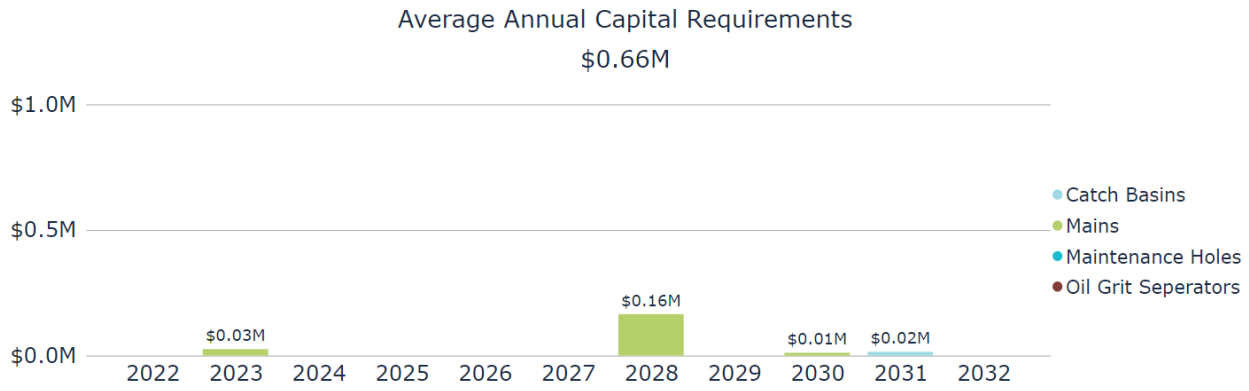


6.3.1 Forecasted Capital Requirements

Based on the current asset inventory and assuming end-of-life replacement of all assets in this category, the following graph forecasts long-term capital requirements.

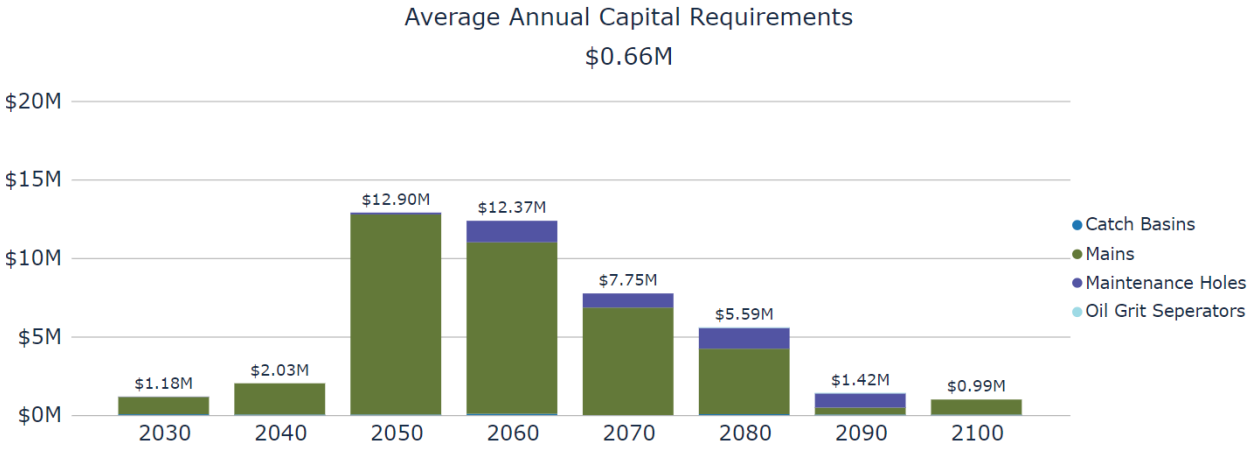
The annual capital requirement represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs.

The graph below provides a 10-year forecast of the capital requirements for stormwater assets, not including assets that will be required due to growth.



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

The graph below identifies capital requirements over the next 78 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 10-year bins and do not include assets that may be required due to growth.



6.4 Risk & Criticality

6.4.1 Risk Matrix

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 based on 2021 inventory data.

This is a high-level model developed for the purposes of this AMP and Township staff should review and adjust the risk model to reflect an evolving understanding of both the probability and consequences of asset failure.

The asset-specific attributes that municipal staff utilize to define and prioritize the criticality of the stormwater infrastructure are documented below:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition	Replacement Cost (Financial)
Service Life Remaining	Pipe Diameter (Linear Assets) (Operational)
Pipe Material (Linear Assets)	

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

6.4.2 Risks to Current Asset Management Strategies

The following section summarizes key trends, challenges, and risks to service delivery that the Township is currently facing:

Asset Data and Information

Staff and external consultants are currently consolidating critical stormwater data into the Township's primary asset inventory.

Climate Change & Extreme Weather Events

With the intensity and frequency of climate change and extreme weather events increasing, the Township's stormwater assets face a higher probability of inflow and infiltration issues.

6.5 Levels of Service

The following tables identify the Township's current level of service for the stormwater infrastructure. 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 Township has selected for this AMP.

6.5.1 Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2021)
Scope	Description, which may include map, of the relevant areas of the municipality that are protected from flooding, including the extent of protection provided by the municipal storm sewer system	Engineered municipal Stormwater systems are found in 4 hamlet areas: Rockwood, Hamilton Drive, Gazer Mooney and Cedar Brae. Systems have been designed to convey minor events up to 5-year in the piped system and major events (100-year) overland within the right of way safely to a natural outlet or an engineered stormwater management pond.

6.5.2 Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2021)
Scope	% of properties in municipality resilient to a 100-year storm	100%
	% of the municipal storm sewer management system resilient to a 5-year storm	100%
Performance	Target reinvestment rate	1.53%
	Actual reinvestment rate	TBD

6.6 Recommendations

Asset Inventory

- Staff have recently developed the initial stormwater inventory. The continued development of the comprehensive inventory should be a priority.

Condition Assessment Strategies

- The development of a comprehensive inventory should be accompanied by a system-wide assessment of the condition of all stormwater assets through Closed Circuit Television Video (CCTV) inspections.

Risk Management Strategies

- Implement risk-based decision-making as part of asset management planning and budgeting processes. This should include the regular review of high-risk assets to determine appropriate risk mitigation strategies.
- Review risk models on a regular basis and adjust according to an evolving understanding of the probability and consequences of asset failure.

Lifecycle Management Strategies

- Document and review lifecycle management strategies for stormwater assets on a regular basis to achieve the lowest total cost of ownership while maintaining adequate service levels.

Levels of Service

- Measure current levels of service in accordance with the metrics that the Township has established in this AMP. Additional metrics can be established as they are determined to provide meaningful and reliable inputs into asset management planning.
- 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.

7 Wastewater

The Township is responsible for providing sanitary sewer services to residents through the collection, storage, and treatment of sanitary sewage.

Wastewater infrastructure is managed by the Public Works department and consists of:

- a wastewater treatment facility in Rockwood;
- 35 km of sanitary mains;
- 372 maintenance holes;
- 5 lift stations as well as a monitoring station; and
- vehicles, specialized machinery and equipment to support in the management and delivery of wastewater services.

Staff continue to consolidate critical asset attribute data into the Township's primary central asset inventory, which is managed in Citywide™ and comprises of 799 assets.

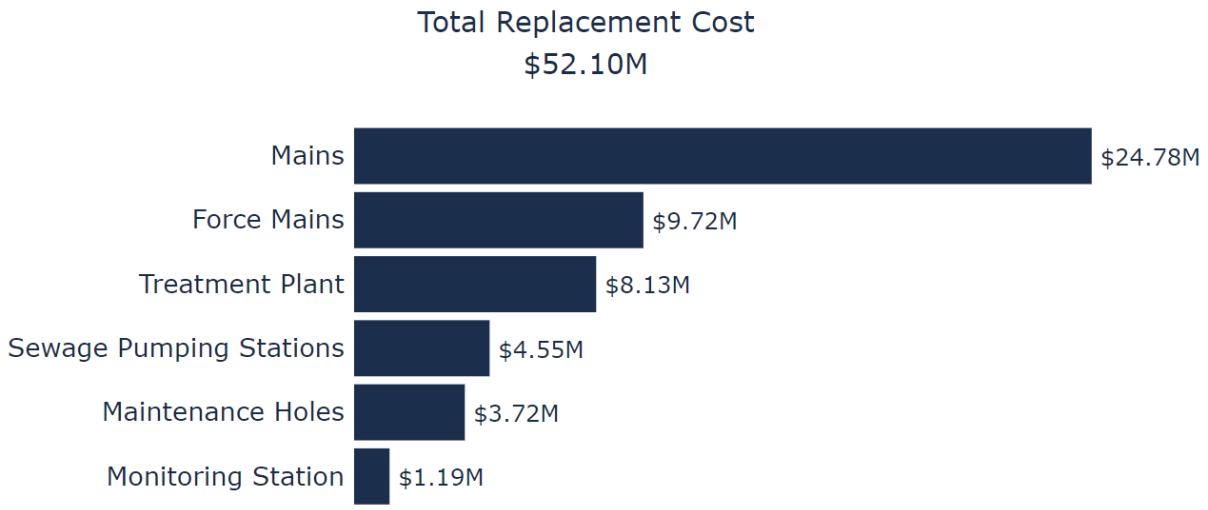
The state of the infrastructure for wastewater assets is summarized in the following table.

Annual Capital Requirements	Average Condition	Risk
$1.0 million	**Very Good (82%)**	**4.38 - Very Low**

7.1 Asset Inventory & Costs

The table below includes the quantity, total replacement cost and annual capital requirements of each asset segment in the Township's wastewater inventory.

Asset Segment	Quantity	Replacement Cost	Annual Capital Requirement
Mains	25 km	$24,781,925	$316,029
Force Mains	10 km	$9,719,000	$130,967
Treatment Plant	13 assets	$8,134,641	$206,862
Sewage Pumping Stations	26 assets	$4,591,730	$250,155
Maintenance Holes	372 assets	$3,720,000	$48,322
Monitoring Station	6 assets	$1,191,110	$44,829
Total		**$52,138,406**	**$997,164**



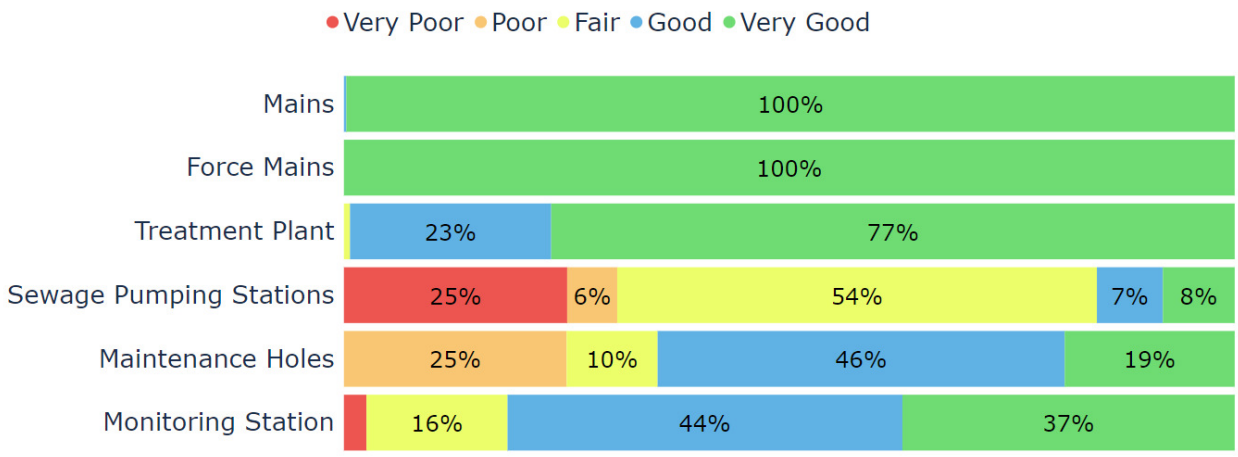
Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

7.2 Asset Condition & Age

The table below identifies the current average condition, the average age, and the estimated useful life for each asset segment. The average condition (%) is a weighted value based on replacement cost.

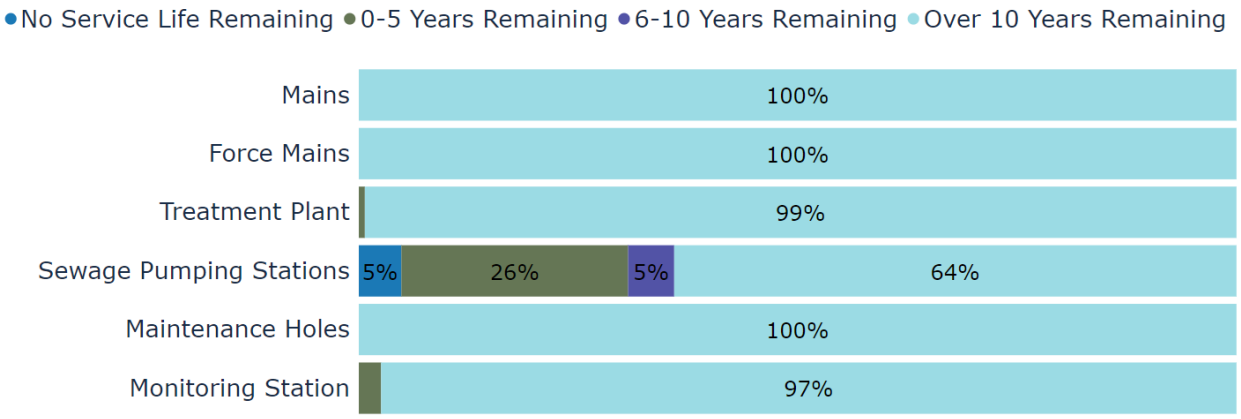
Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Condition
Mains	80	29.6	90% (Very Good)
Force Mains	80	28.6	85% (Very Good)
Treatment Plant	7 - 100	5.0	88% (Very Good)
Sewage Pumping Stations	5 - 50	11.3	44% (Very Good)
Maintenance Holes	60 - 80	29.6	60% (Good)
Monitoring Station	7 - 50	7.9	72% (Good)
Average		**28.6**	**82% (Very Good)**

The graph below visually illustrates the average condition for each asset segment on a very good to very poor.



To ensure that the Township's wastewater assets continue to provide an acceptable level of service, the Township 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 wastewater assets.

The graph below visually illustrates the average service life remaining for each asset segment, ranging from service life exceeded to over 10 years remaining.



Each asset's estimated useful life should also 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.

7.2.1 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 Township's current approach:

- CCTV inspections are conducted on as-needed basis as well as in coordination with road and/or other subsurface construction projects
- Sanitary facilities are inspected under an established schedule and deficiencies are tracked through the Supervisory Control and Data Acquisition (SCADA) system
- Staff rely on a variety of metrics including age, pipe material and diameter, location, and available CCTV assessments to determine the projected condition of linear assets

In this AMP the following rating criteria is used to determine the current condition of wastewater assets and forecast future capital requirements:

Condition	Rating
Very Good	80-100
Good	60-79
Fair	40-59
Poor	20-39
Very Poor	0-19

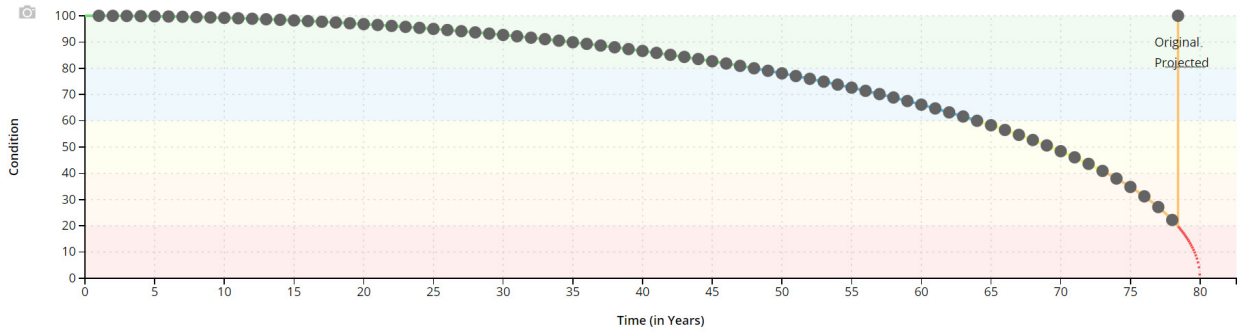
7.3 Lifecycle Management Strategy

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 Township's current lifecycle management strategy.

Activity Type	Description of Current Strategy
Inspection/ Maintenance	Annual maintenance of mains that consists of main flushing, and inspections
	Annual maintenance of manholes that consists of manhole inspection, lid replacement, lining and grouting
	Inspection and maintenance of sanitary facilities is determined through the SCADA system
Rehabilitation	Trenchless re-lining has the potential to reduce total lifecycle costs and should be considered as a rehabilitative activity
Replacement	Similar to other sub-surface infrastructure, staff attempt to coordinate wastewater capital projects with road reconstruction projects in order to produce cost efficiencies

The following lifecycle strategy has been developed to formalize the Township's current strategy in managing the lifecycle of wastewater mains.

Wastewater Mains		
Event Name	**Event Class**	**Event Trigger**
CCTV/Zoom Camera Inspection	Preventative Maintenance	As needed
Flushing/Cleaning (50% of network per year)	Maintenance	Annually
Full Replacement	Replacement	Condition: 10

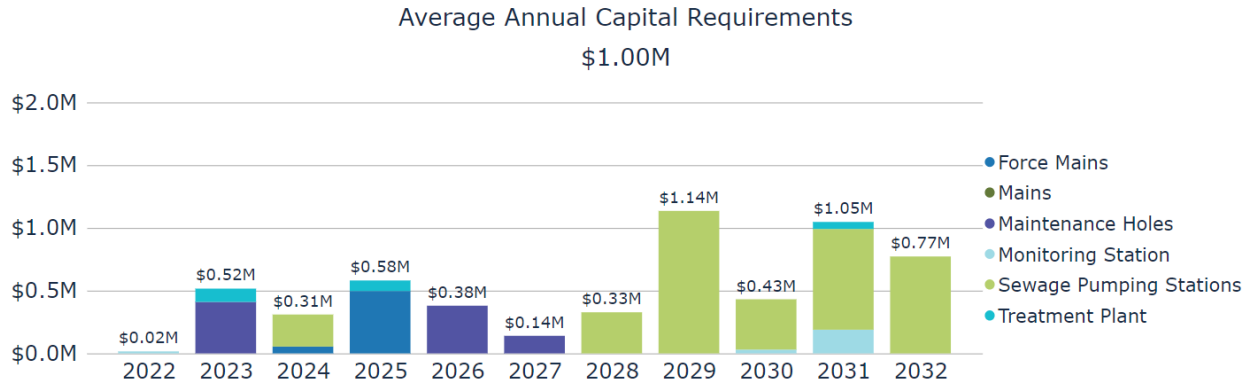


7.3.1 Forecasted Capital Requirements

Based on the current asset inventory, the specific capital-based activities outlined in the 2020 water and wastewater rate study, and assuming end-of-life replacement of all assets in this category, the following graph forecasts long-term capital requirements.

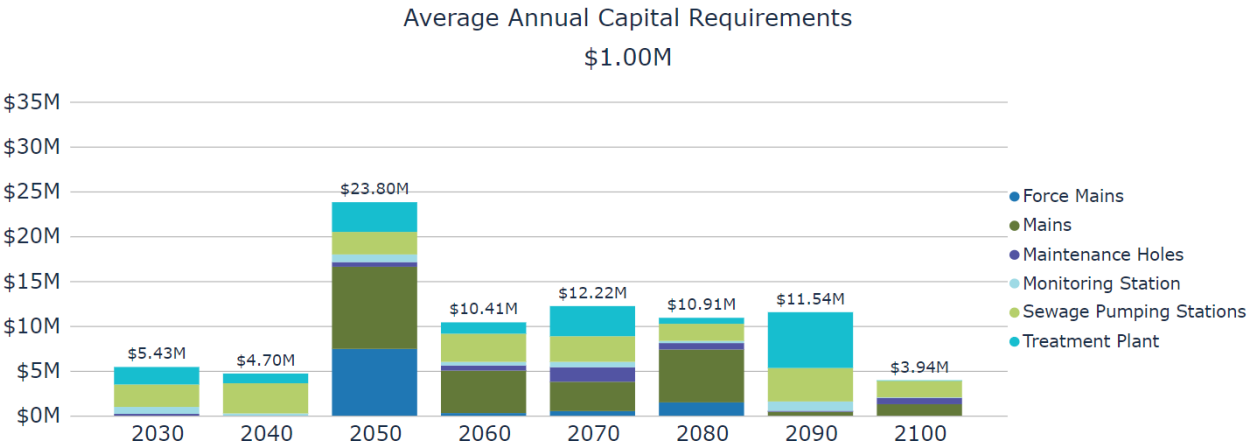
The annual capital requirement represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs.

The graph below provides a 10-year forecast of the capital requirements for wastewater assets, not including assets that will be required due to growth.



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

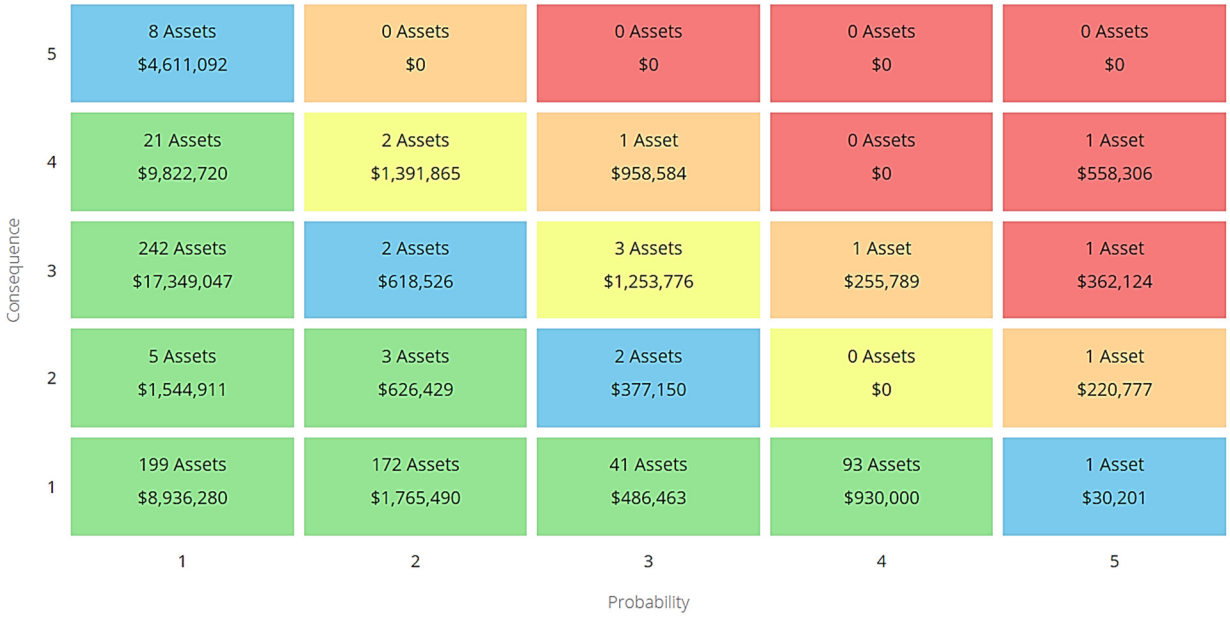
The graph below identifies capital requirements over the next 83 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 10-year bins and do not include assets that may be required due to growth.



7.4 Risk & Criticality

7.4.1 Risk Matrix

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 based on 2021 inventory data.



This is a high-level model developed for the purposes of this AMP and Township staff should review and adjust the risk model to reflect an evolving understanding of both the probability and consequences of asset failure.

The asset-specific attributes that municipal staff utilize to define and prioritize the criticality of vehicles are documented below:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition	Replacement Cost (Financial)
Service Life Remaining	Pipe Diameter (Linear Assets) (Operational)
Pipe Material (Linear Assets)	Main Type (Strategic)
Asset Risk (based on staff analysis)	Asset Function (Strategic)

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

7.4.2 Risks to Current Asset Management Strategies

Climate Change & Extreme Weather Events

With the intensity and frequency of climate change and extreme weather events increasing, the Township's wastewater system faces a higher probability of inflow and infiltration issues.

7.5 Levels of Service

The following tables identify the Township's current level of service for wastewater. 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 Township has selected for this AMP.

7.5.1 Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2021)
Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal wastewater system	The Village of Rockwood is the serviced by Collection System consists of gravity sanitary sewers, 5 sewage pumping stations, a pre-treatment plant with [6500] meters of force main which conveys the sewage from the Alma Street Pre-treatment Transfer Station to the City of Guelph. Four of the [5] sewage pumping stations service approximately two-thirds of the Village. Wastewater flows being collected at the Lou's Blvd., Mill Run, and Ridge Road Sewage Pumping Stations. The Valley Road Sewage Pumping Station (SPS) collects wastewater from these three [3] SPS and from a gravity portion of the sanitary sewer network. From the north, Rockwood SPS [5th SPS) discharges into the existing gravity sanitary sewer system and is conveyed to Alma pre-treatment transfer station. The Gazer Mooney subdivision area is serviced by gravity sanitary sewers and one sewage pumping system and force main which discharges into the City of Guelph sanitary sewer system.

Service Attribute	Qualitative Description	Current LOS (2021)
	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	There are no combined sewers within the Township.
	Description of the frequency and volume of overflows in combined sewers in the municipal wastewater system that occur in habitable areas or beaches	
Reliability	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 damaged 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 directing storm water to the storm drain system can help to reduce the chance of this occurring. The Township 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.

Service Attribute	Qualitative Description	Current LOS (2021)
	Description of how sanitary sewers in the municipal wastewater system are designed to be resilient to stormwater infiltration	Sealed maintenance holes and pipes according to municipal standards for installation and materials for infrastructure to ensure resilience against stormwater infiltration.
	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.

7.5.2 Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2021)
Scope	% of properties connected to the municipal wastewater system	100%
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	N/A
	# of connection-days per year having wastewater backups compared to the total number of properties connected to the municipal wastewater system	0.0005
	# of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system	0
Performance	Target reinvestment rate	1.91%
	Actual reinvestment rate	TBD

7.6 Recommendations

Asset Inventory

- Continue to refine and consolidate asset infrastructure data into the Township's centralized asset inventory to ensure all critical wastewater assets are accounted for and to support accurate capital forecasting.
- Review and revise replacement costs and critical attribute data periodically

Condition Assessment Strategies

- Identify condition assessment strategies for high value and high-risk wastewater assets.

Risk Management Strategies

- Implement risk-based decision-making as part of asset management planning and budgeting processes. This should include the regular review of high-risk assets to determine appropriate risk mitigation strategies.
- Review risk models on a regular basis and adjust according to an evolving understanding of the probability and consequences of asset failure.

Lifecycle Management Strategies

- Evaluate the efficacy of the Township's lifecycle management strategies at regular intervals to determine the impact cost, condition, and risk.

Levels of Service

- Continue to measure current levels of service in accordance with the metrics that the Township has established in this AMP. Additional metrics can be established as they are determined to provide meaningful and reliable inputs into asset management planning.
- 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.

8 Water

The Township is responsible for providing water services to residents through the collection, storage, and distribution of water.

Water infrastructure operated and managed by the Public Works department and consists of:

- 2 distribution systems located in Hamilton Drive and Rockwood;
- 34 km of water mains;
- 227 hydrants;
- a standpipe and booster pumping station;
- 5 pumphouses and 5 groundwater wells;
- vehicles, specialized machinery and equipment to support in the management and delivery of water services.

The Township also owns the Gazer/Mooney system; however, it is operated by the City of Guelph.

Staff continue to consolidate critical asset attribute data into the Township's primary central asset inventory, which is managed in Citywide™ and comprises of 1,408 assets.

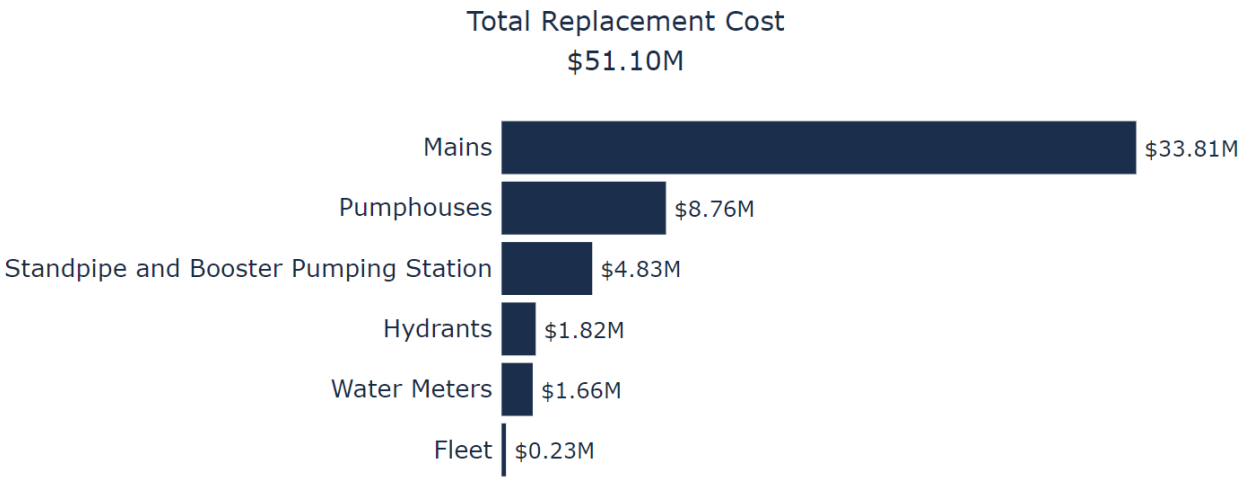
The state of the infrastructure for water assets summarized in the following table.

Annual Capital Requirements	Average Condition	Risk
$1.03 million	**Good (61%)**	**7.37 - Low**

8.1 Asset Inventory & Costs

The table below includes the quantity, total replacement cost and annual capital requirements of each asset segment in the Township's water asset inventory.

Asset Segment	Quantity	Replacement Cost	Annual Capital Requirement
Mains	34 km	$33,814,100	$524,191
Pumphouses	31 assets	$8,755,997	$245,979
Standpipe and Booster Pumping Station	4 assets	$4,828,384	$146,966
Hydrants	227 assets	$1,816,000	$23,158
Water Meters	663 assets	$1,657,500	$66,300
Fleet	6 assets	$231,199	$23,120
Total		**$51,103,180**	**$1,029,714**



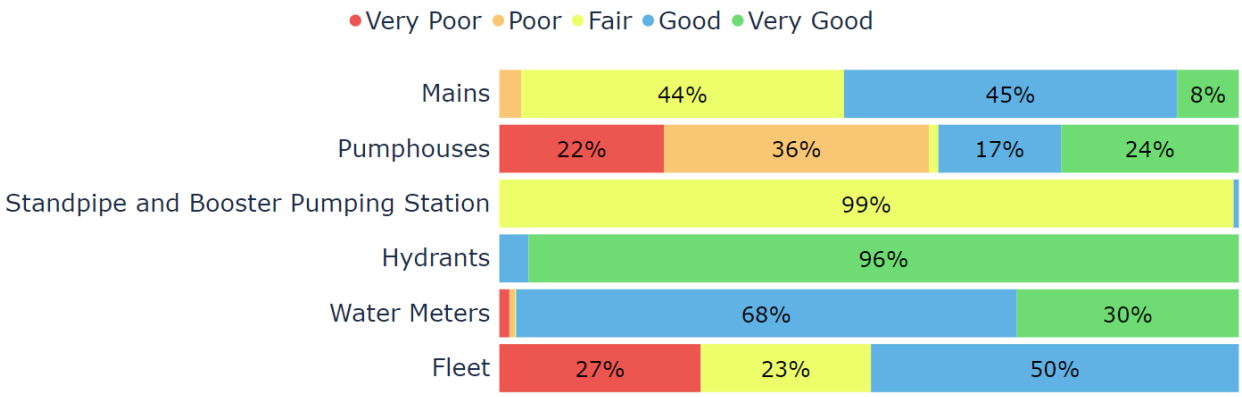
Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to represent realistic capital requirements more accurately.

8.2 Asset Condition & Age

The table below identifies the current average condition, the average age, and the estimated useful life for each asset segment. The average condition (%) is a weighted value based on replacement cost.

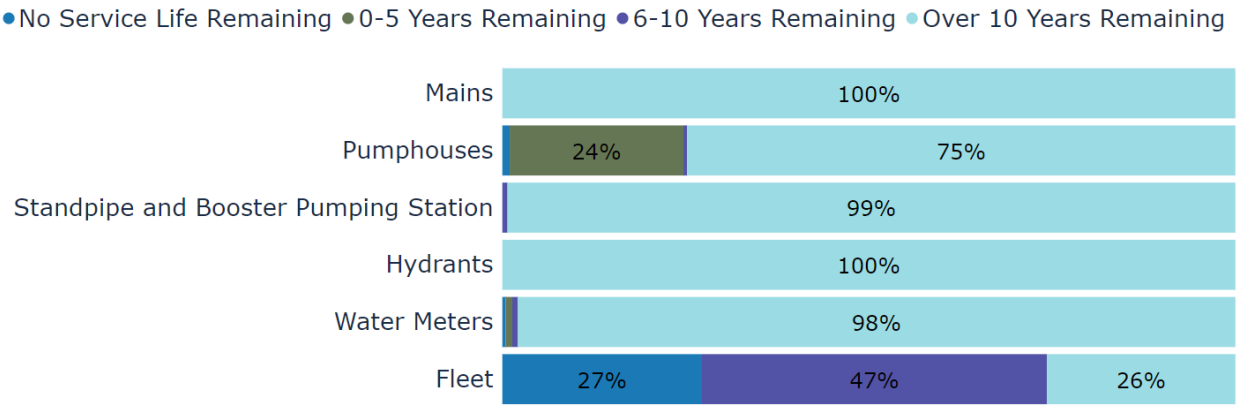
Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Condition
Mains	80	30.7	63% (Good)
Pumphouses	7 - 50	14.3	48% (Fair)
Standpipe and Booster Pumping Station	10 - 50	14.3	52% (Fair)
Hydrants	80	26.8	92% (Very Good)
Water Meters	25	15.9	75% (Good)
Fleet	10	7.5	51% (Fair)
Average		**27.1**	**61% (Good)**

The graph below visually illustrates the average condition for each asset segment on a very good to very poor scale.



To ensure that the Township's water assets continue to provide an acceptable level of service, the Township 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 water assets.

The graph below visually illustrates the average service life remaining for each asset segment, ranging from service life exceeded to over 10 years remaining.



Each asset's estimated useful life should also 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.

8.2.1 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 Township's current approach:

- CCTV inspections are conducted on as-needed basis as well as in coordination with road and/or other subsurface construction projects
- Inspections as required under O. Reg. 170/3: Drinking Water Systems are conducted
- Wells and pumps are monitored under an established schedule and deficiencies are tracked through the SCADA system
- Staff rely on a variety of metrics including age, pipe material and diameter, location, and available CCTV assessments to determine the projected condition of linear assets

In this AMP the following rating criteria is used to determine the current condition of land improvements segments and forecast future capital requirements:

Condition	Rating
Very Good	80-100
Good	60-79
Fair	40-59
Poor	20-39
Very Poor	0-19

8.3 Lifecycle Management Strategy

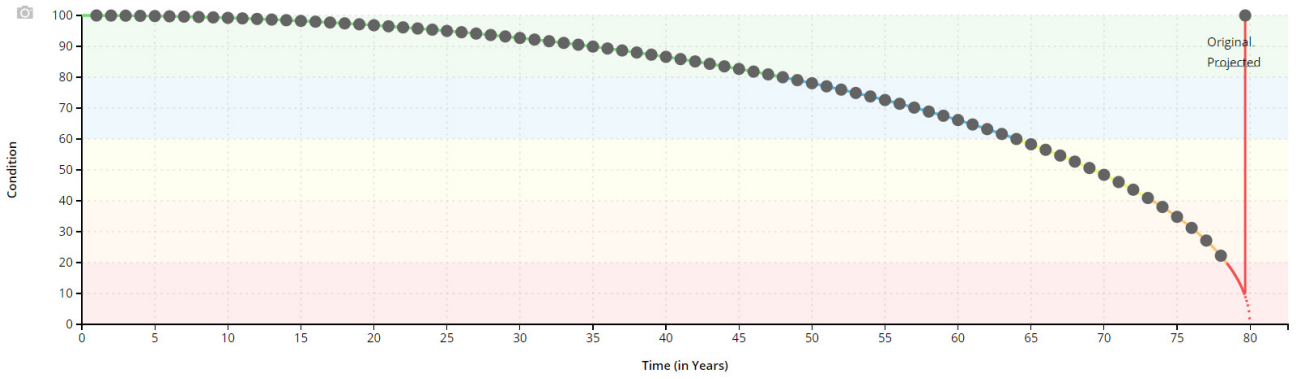
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Preventative Maintenance/ Maintenance	Valves undergo annual maintenance as part of preventative maintenance
	Wells and pumps are inspected and undergo maintenance under a formal schedule
	Main flushing of the entire network is conducted twice a year
	Periodic pressure testing occurs in order to identify deficiencies and potential leaks
Rehabilitation/ Replacement	In the absense of mid-lifecycle rehabilitative activities, most mains are simply maintained with the goal of full replacement once service life is exceeded
	Water main replacement is prioritized based on an analysis of the main break rate, asset functionality and design capacity as well as any issues identified during maintenance activities
	Similar to other sub-surface infrastructure, Staff coordinate water replacement projects with road reconstruction projects in order to produce cost efficiencies

The following lifecycle strategies have been developed to formalize the current approach to managing the lifecycle of water mains.

Water Mains		
Event Name	**Event Class**	**Event Trigger**
Main Flushing and/or Swabbing	Maintenance	Semi-Annually
Full Replacement	Replacement	Condition: 10

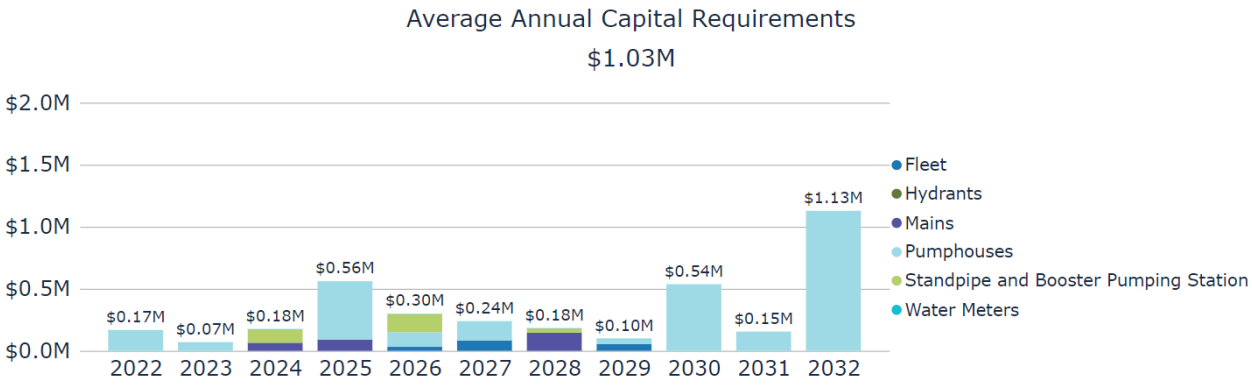


8.3.1 Forecasted Capital Requirements

Based on the current asset inventory, the specific capital-based activities outlined in the 2020 water and wastewater rate study, and assuming end-of-life replacement of all assets in this category, the following graph forecasts long-term capital requirements.

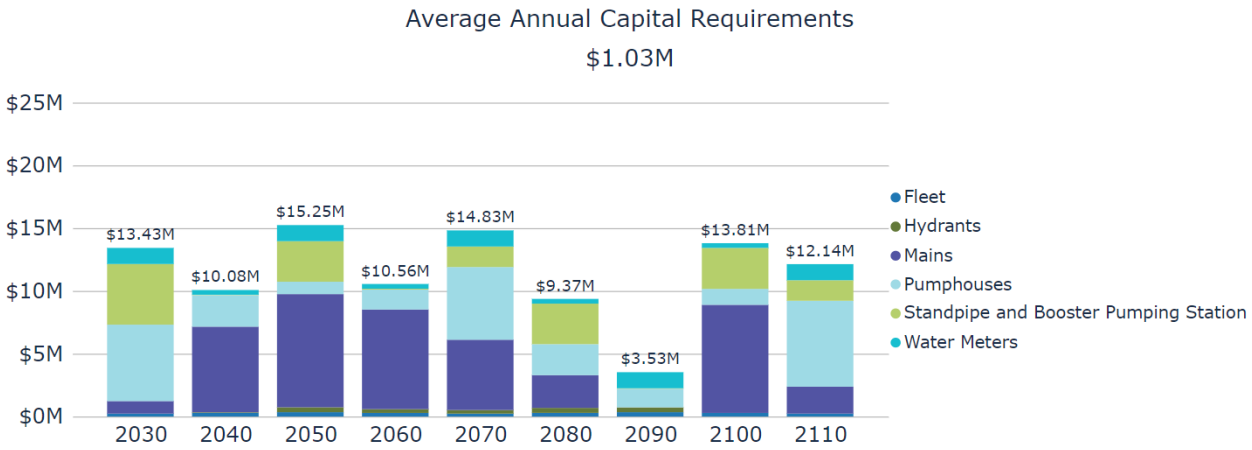
The annual capital requirement represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs.

The graph below provides a 10-year forecast of the capital requirements for water assets, not including assets that will be required due to growth.



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

The graph below identifies capital requirements over the next 88 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 10-year bins and do not include assets that may be required due to growth.



8.4 Risk & Criticality

8.4.1 Risk Matrix

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 based on 2021 inventory data.

This is a high-level model developed for the purposes of this AMP and Township staff should review and adjust the risk model to reflect an evolving understanding of both the probability and consequences of asset failure.

The asset-specific attributes that municipal staff utilize to define and prioritize the criticality of park and land improvements are documented below:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition	Replacement Cost (Financial)
Service Life Remaining	Pipe Diameter (Linear Assets) (Operational)
Pipe Material (Linear Assets)	Asset Function (Strategic)
Asset Risk (based on staff analysis)	

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

8.4.2 Risks to Current Asset Management Strategies

Assessed Condition Data

Water assets such as mains are difficult to visually inspect, in contrast to storm and sanitary mains which can have CCTV inspections. Water main condition assessments generally rely on age-based estimates of current condition and pipe material to try and predict when mains need to be replaced.

8.5 Levels of Service

The following tables identify the Township's current level of service for water assets. 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 Township has selected for this AMP.

8.5.1 Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2021)
Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal water system	The Rockwood (RWD) Water Supply System is a Class I Water Treatment Subsystem and a Class II Water Distribution Subsystem consisting of four municipal groundwater wells, a booster pumping station/standpipe and distribution system. The system includes two pressure zones. A Supervisory Control and Data Acquisition (SCADA) system monitors and controls the operation of the system. The system provides potable water and fire protection to the entire serviced area of Rockwood. The Hamilton Drive Water Supply System is a Class II Water Distribution and Supply Subsystem consisting of two municipal wells and standpipe reservoir. The system consists of one pressure zone is controlled via a SCADA system. The system provided potable water and fire protection to the Hamilton Drive Hamlet bounded by Victoria Road to the east, Conservation Road to the north, Highway 6 to the west and the Speed River to the south. The Gazer/Mooney Subdivision Distribution System is a Class 1 Distribution Subsystem serving the Promenade Park Hamlet located in the Township of Guelph/Eramosa. It has approximately 72 metered water service connections, 1.5 kilometers of underground watermains, six fire hydrants and an approximate population of 216 residents. All the water for the Gazer/Mooney Subdivision Distribution System is supplied

		from the Guelph Drinking Water System. All water is treated to provincial standards in the Guelph Drinking Water System and no further treatment chemicals are added to the Gazer/Mooney Subdivision Distribution System. The system is operated by agreement by City of Guelph Water Services.
	Description, which may include maps, of the user groups or areas of the municipality that have fire flow	All areas serviced by the municipal water infrastructure have fire flow.
Reliability	Description of boil water advisories and service interruptions	Boil water advisories are rare. They are triggered by adverse water samples, watermain breaks, massive flooding, or pump/equipment failures. The highest risk system is a small rural area servicing 35 homes. There have been no boil water advisories in the past 2 years.

8.5.2 Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2021)
Scope	% of properties connected to the municipal water system	98%
	% of properties where fire flow is available	100%
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	0.001
Performance	Target reinvestment rate	2.01%
	Actual reinvestment rate	TBD

8.6 Recommendations

Asset Inventory

- Continue to refine and consolidate asset infrastructure data into the Township's centralized asset inventory to ensure all critical water assets are accounted for and able to support accurate capital forecasting.
- Review and revise replacement costs and critical attribute data periodically

Condition Assessment Strategies

- Identify condition assessment strategies for high value and high-risk water assets.

Risk Management Strategies

- Implement risk-based decision-making as part of asset management planning and budgeting processes. This should include the regular review of high-risk assets to determine appropriate risk mitigation strategies.
- Review risk models on a regular basis and adjust according to an evolving understanding of the probability and consequences of asset failure.

Levels of Service

- Continue to measure current levels of service in accordance with the metrics that the Township has established in this AMP. Additional metrics can be established as they are determined to provide meaningful and reliable inputs into asset management planning.
- 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.

9 Impacts of Growth

Key Insights

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

- Moderate population and employment growth are expected

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

9.1 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 Township 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.

9.1.1 Development Charges Background Study (2018)

In 2018, the Township of Guelph/Eramosa retained Watson & Associates Economists Ltd. to undertake the D.C. study process and prepare a Development Charges Background Study, pursuant to Section 10 of the Development Charges Act, 1007 (DCA).

The following tables outline the population and employment forecasts allocated to the Township in the study:

Population Forecast from 2016 to 2040				
Municipality	**2018**	**2028**	**2038**	**2041**
Township of Guelph/Eramosa	13,344	14,002	14,211	14,197

Employment Forecast from 2016 to 2040				
Municipality	**2018**	**2028**	**2038**	**2041**
Township of Guelph/Eramosa	5,746	6,494	6,589	6,630

As a requirement of the Development Charges Act under subsection 10(2)(c), an analysis must be undertaken to assess the long-term capital and operating cost impacts for the capital infrastructure projects identified within the Development Charges.

The background study must also include an asset management plan that deals with all assets proposed to be funded, in whole or in part, by D.C.s. The asset management plan must show that the assets are financially sustainable over their full lifecycle.

9.1.2 Wellington County Official Plan (1999)

In 1999, Wellington County adopted the Official Plan to direct and guide the actions of local municipalities and the County in policy development and physical planning on a very broad basis.

For the Township of Guelph/Eramosa, this plan serves as the principal document used to guide long range planning within the Township. It establishes a vision in which planning and stewardship protect and enhance a diverse landscape, lifecycle, and a sense of community for the County.

The County is responsible for the allocation of growth to the local municipalities, which is based on a combination of local factors including: local planning policy; historic and recent growth trends; market demand; and the capacity to accommodate growth from land supply and servicing perspectives.

The most recent revision of the plan occurred in June of 2022.

9.2 Impact of Growth on Lifecycle Activities

By July 1, 2025, the Township'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 Township'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 Township 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.

10 Appendices

Key Insights

- Appendix A identifies projected 10-year capital requirements for each asset category
- Appendix B provides a tailored list of next steps to advance the Township's asset management program
- Appendix C provides an overall compliance snapshot related to O. Reg. 588/17
- Appendix D provides additional guidance on the development of a condition assessment program

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 Corridor											
	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Fleet	$434,590	$0	$353,906	$0	$289,805	$654,213	$57,665	$172,237	$0	$0	$99,537
Guide Rails	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Retaining Walls	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rural Roads	$3,318,270	$1,929,580	$1,036,350	$674,800	$1,595,320	$1,480,820	$625,620	$1,445,560	$1,193,340	$526,790	$581,760
Semi-Urban Roads	$466,080	$871,400	$353,180	$57,510	$80,400	$58,330	$27,840	$60,180	$14,840	$49,200	$71,580
Sidewalks	$0	$39,024	$54,853	$0	$36,552	$173,879	$44,172	$314,592	$16,224	$154,296	$88,920
Signs	$0	$10,572	$0	$36,392	$8,956	$0	$0	$22,860	$8,458	$17,539	$12,781
Street Light Fixtures	$7,354	$8,532	$10,022	$7,674	$22,917	$7,532	$9,930	$12,851	$7,694	$7,871	$7,845
Street Light Poles	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Unpaved Roads	$0	$0	$0	$0	$0	$69,800	$558,000	$0	$911,000	$0	$5,600
Urban Roads	$653,840	$355,780	$278,120	$69,420	$35,600	$36,240	$44,790	$64,230	$35,880	$12,150	$30,240
	$4,880,134	**$3,214,888**	**$2,086,431**	**$845,796**	**$2,069,550**	**$2,480,814**	**$1,368,017**	**$2,092,510**	**$2,187,436**	**$767,846**	**$898,263**

Bridges and Culverts

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Bridges	$747,000	$142,000	$1,694,402	$0	$0	$388,500	$273,000	$0	$1,546,188	$996,670	$0
Non-Structural Culverts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Structural Culverts	$0	$20,000	$649,000	$288,000	$2,031,021	$0	$0	$0	$0	$0	$0
	$747,000	**$162,000**	**$2,343,402**	**$288,000**	**$2,031,021**	**$388,500**	**$273,000**	**$0**	**$1,546,188**	**$996,670**	**$0**

Stormwater

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Catch Basins	$0	$0	$0	$0	$0	$0	$0	$0	$0	$15,000	$0
Mains	$0	$25,500	$0	$0	$0	$0	$164,700	$0	$11,250	$0	$0
Maintenance Holes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Oil Grit Seperators	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	$0	**$25,500**	**$0**	**$0**	**$0**	**$0**	**$164,700**	**$0**	**$11,250**	**$15,000**	**$0**

Wastewater

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Force Mains	$0	$0	$54,000	$497,000	$0	$0	$0	$0	$0	$0	$0
Mains	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Maintenance Holes	$0	$410,000	$0	$0	$380,000	$140,000	$0	$0	$0	$0	$0
Monitoring Station	$16,000	$0	$0	$0	$0	$0	$0	$0	$30,201	$188,575	$0
Sewage Pumping Stations	$0	$0	$255,789	$0	$0	$0	$327,587	$1,135,290	$401,000	$802,906	$772,149
Treatment Plant	$0	$106,000	$0	$83,950	$0	$0	$0	$0	$0	$55,950	$0
	$16,000	**$516,000**	**$309,789**	**$580,950**	**$380,000**	**$140,000**	**$327,587**	**$1,135,290**	**$431,201**	**$1,047,431**	**$772,149**

Water											
	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Fleet	$0	$0	$0	$0	$32,068	$84,118	$0	$55,616	$0	$0	$0
Hydrants	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Mains	$0	$0	$65,000	$91,000	$0	$0	$146,000	$0	$0	$0	$0
Pumphouses	$164,171	$66,000	$0	$465,900	$117,146	$151,000	$0	$41,000	$537,162	$154,926	$1,128,790
Standpipe and Booster Pumping Station	$0	$0	$108,000	$0	$146,000	$0	$34,202	$0	$0	$0	$0
Water Meters	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$0	$0	$0
	$166,671	**$68,500**	**$175,500**	**$559,400**	**$297,714**	**$237,618**	**$182,702**	**$99,116**	**$537,162**	**$154,926**	**$1,128,790**

Asset Portfolio					
Asset Category	**2022**	**2023**	**2024**	**2025**	**2026**
Road Corridor	$4,880,134	$3,214,888	$2,086,431	$845,796	$2,069,550
Bridges and Culverts	$747,000	$162,000	$2,343,402	$288,000	$2,031,021
Stormwater	$0	$25,500	$0	$0	$0
Wastewater	$16,000	$516,000	$309,789	$580,950	$380,000
Water	$166,671	$68,500	$175,500	$559,400	$297,714
	$5,809,805	**$3,986,888**	**$4,915,122**	**$2,274,146**	**$4,778,285**

Asset Portfolio						
Asset Category	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**
Road Corridor	$2,480,814	$1,368,017	$2,092,510	$2,187,436	$767,846	$898,263
Bridges and Culverts	$388,500	$273,000	$0	$1,546,188	$996,670	$0
Stormwater	$0	$164,700	$0	$11,250	$15,000	$0
Wastewater	$140,000	$327,587	$1,135,290	$431,201	$1,047,431	$772,149
Water	$237,618	$182,702	$99,116	$537,162	$154,926	$1,128,790
	$3,246,932	**$2,316,006**	**$3,326,916**	**$4,713,237**	**$2,981,873**	**$2,799,202**

Appendix B: Next Steps

A workplan has been provided to the Township to advance its Asset Management Program. These steps are ranked based on their overall asset management value to the Township. Value considers the priority and impact of a recommendation relative to its cost. Steps with a high program value have significant impact and priority and low cost.

Next Steps	AM Program Value
Conduct a TCA data review to identify inactive, missing and/or incomplete assets in the CityWide™ asset inventory.	1 (Highest)
Review and confirm that all assets have been accounted for in the asset inventory, particularly for non-core assets.	2
Implement a data governance strategy and framework to maintain the high level of data maturity.	3
Develop detailed LOS frameworks for all assets and identify proposed LOS	4
Continue to integrate data from various studies, reports, and staff journals within CityWide™ to ensure a centralized, comprehensive, and current asset inventory.	5
Develop a process for reporting on LOS and considering LOS results in infrastructure operational and capital decisions.	6
Review, consider, and as appropriate, account for growth and demand changes to infrastructure management.	7
Provide opportunities for staff and elected officials to attend webinars, educational conferences, and workshops to expand their technical knowledge of asset management principles and practices	8
An asset management strategy enforces the asset management policy and aligns it to the asset management plan. Consider developing a formalized, documented asset management strategy.	9
Financial strategies are inextricably linked to LOS (current and proposed) and risk, both of which guide lifecycle decision-making. Frameworks for linking financial strategies to LOS and risk should be established.	10
Consider developing an infrastructure master plan that considers the strategic plan and integrates with land use planning to guide investments.	11

Appendix C: O. Reg. 588/17 - Compliance

O. Reg. Requirements	2022 Compliance		2024 Compliance		2025 Compliance
	Core	Non-Core	Core	Non-Core	Core and Non-Core
1.0 Asset Inventory					
1.1 Asset Summary	**Yes**	**N/A**	**Yes**	**No**	**No**
1.2 Replacement Cost					
1.3 Average Age					
1.4 Condition					
1.5 Condition Assessment Approach					
2.0 Lifecycle Activities					
2.1 Identify Full Asset Lifecycle	**Yes**	**N/A**	**Yes**	**No**	**No**
2.2 Document Lifecycle Activities					
2.3 Quantify Asset Risk					
2.4 Lifecycle Cost Analysis					
3.0 Growth					
3.1 Population and Economic assumptions	**Yes**	**N/A**	**Yes**	**No**	**No**
3.2 Document impact of growth on capital planning	**N/A**		**No**	**No**	
4.0 Current Level of Service					
4.1 Define and document current LOS metrics	**Yes**	**N/A**	**Yes**	**No**	**No**
5.0 Proposed Level of Service					
5.1 Define Proposed LOS	**N/A**		**N/A**		**No**
5.2 Difference b/w Current and Proposed LOS					
5.3 Required Lifecycle Activities and associated Risk					
5.4 Achievability of Proposed LOS					
5.5 Affordability of Proposed LOS					
5.6 Lifecycle activities and risk associated with potential funding shortfall					

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 Township'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 Township'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 Township 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 Township 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 Township 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 Township 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