Asset Management Plan 2024

Township of Edwardsburgh Cardinal

September 2024

psdcitywide

This Asset Management Plan was prepared by:

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

Key Statistics

$269m	2023 Replacement Cost of Asset Portfolio
$82k	Replacement Cost of Infrastructure Per Household
62%	Percentage of Assets in Fair or Better Condition
61%	Percentage of Assets with Assessed Condition Data
$4.4m	Annual Capital Infrastructure Deficit
15 Years	Recommended Timeframe for Eliminating Annual Infrastructure Deficit
2.8%	Target Reinvestment Rate
1.1%	Actual Reinvestment Rate

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1. Executive Summary

Municipal infrastructure delivers critical services that are foundational to the economic, social, and environmental health and growth of a community. The goal of asset management is to enable infrastructure to deliver an adequate level of service in the most cost-effective manner. This involves the ongoing review and update of infrastructure information and data alongside the development and implementation of asset management strategies and long-term financial planning.

1.1 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 can ensure that public infrastructure is managed to support the sustainable delivery of municipal services.

This AMP include the following asset categories:

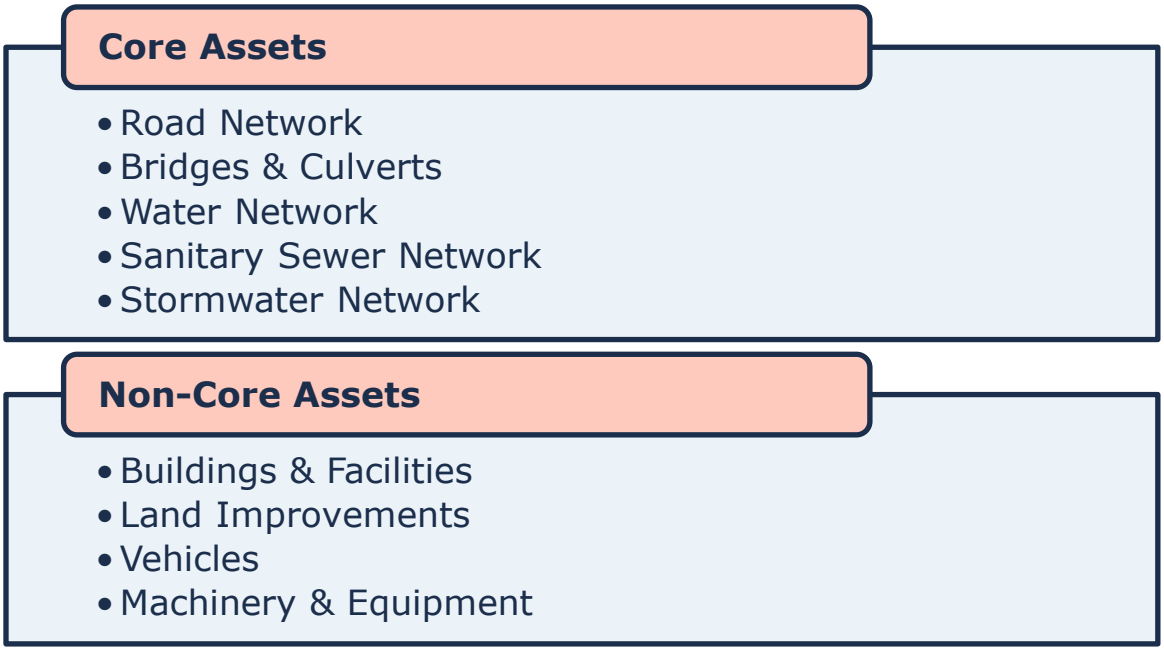


Figure 1 Core and Non-Core Asset Categories

1.2 O. Reg. 588/17 Compliance

With the development of this AMP the Municipality has achieved compliance with July 1, 2024, requirements under O. Reg. 588/17. This includes requirements for levels of service and inventory reporting for all asset categories. More detail on compliance can be found in section 2.5.1 O. Reg. 588/17 Compliance Review.

1.3 Findings

The overall replacement cost of the asset categories included in this AMP totals $269.5 million. 62% of all assets analyzed in this AMP are in fair or better condition and assessed condition data was available for 61% of assets. For the remaining 39% of assets, assessed condition data was unavailable, and asset age was used to approximate condition – a data gap that persists in most municipalities. Generally, age misstates the true condition of assets, making assessments essential to accurate asset management planning, and a recurring recommendation in this AMP.

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

To meet capital replacement and rehabilitation needs for existing infrastructure, prevent infrastructure backlogs, and achieve long-term sustainability, the Township's average annual capital requirement totals $7.5 million. Based on a historical analysis of sustainable capital funding sources, the Township is committing approximately $3.0 million towards capital projects or reserves per year. As a result, there is currently an annual funding gap of $4.4 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.

1.4 Recommendations

A financial strategy was developed to address the annual capital funding gap. The following graphics shows annual tax/rate change required to eliminate the Township's infrastructure deficit based on a 15-year plan:

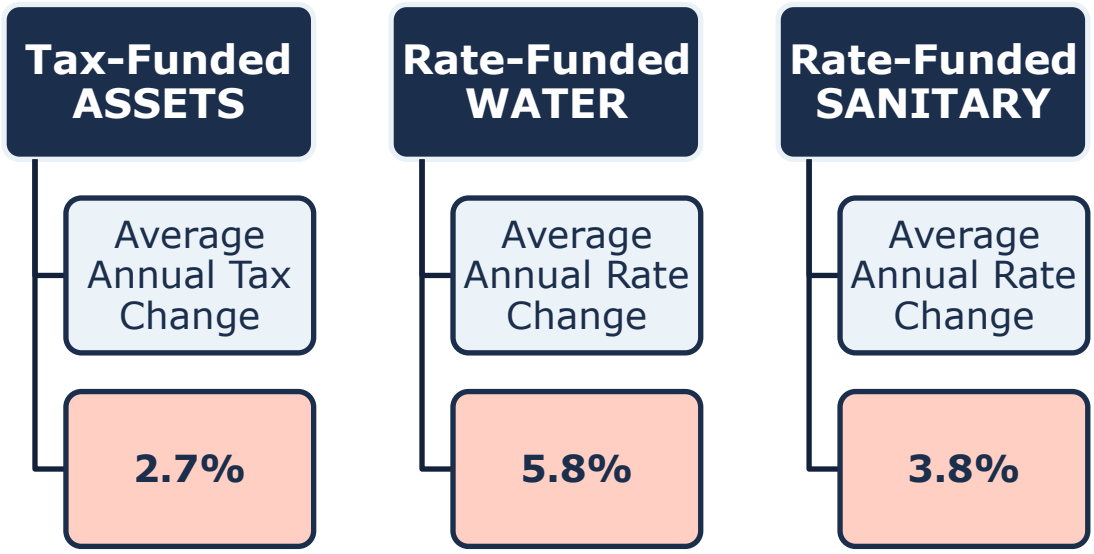


Figure 2 Proposed Tax/Rate Changes

2. Introduction & Context

2.1 Community Profile

The Township of Edwardsburgh Cardinal is a lower-tier Township municipality in the United Counties of Leeds and Grenville. The Township is comprised of three main centers, Cardinal, Johnstown and Spencerville. The Township is located in the northeast section of Leeds and Grenville with the Saint Lawrence River serving as the Township's southern boundary.

The area is renowned for its beautiful countryside settings, quaint downtown districts, and historic sites. Residents and visitors alike can enjoy various recreational facilities, schools, and parks, all contributing to the welcoming quality of life in the Township.

The community offers a blend of rural charm and accessibility to urban amenities, making it an attractive place to live and visit. The historic sites provide a glimpse into the Township's rich past, while the recreational facilities and parks offer numerous opportunities for outdoor activities and relaxation. The presence of schools and churches enhances the community feel, ensuring a family-friendly environment.

The Township has experienced consistent year over year population growth. Over the past two census years (2016-2021), the Township saw a 6.1% increase in population. A significant portion of the population is made up of seniors, with 20% being 65 years or older. Many of the residents are working-age adults, ranging from 15 to 64 years old, accounting for 65.2% of the population. Meanwhile, children aged 0 to 14 years represent 14.7% of the community, highlighting a diverse age distribution across the Township.

Census Characteristic	Township of Edwardsburgh Cardinal	Ontario
Population 2021	7,505	14,223,942
Population Change 2016-2021	6.1%	5.8%
Total Private Dwellings	3,285	5,929,250
Population Density	24.2/km^2	15.9/km^2
Land Area	309.91 km^2	892,411.76 km^2

Table 1 Township of Edwardsburgh Cardinal Community Profile

2.2 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.

2.2.1 Township of Edwardsburgh Cardinal Climate Profile

Edwardsburgh Cardinal is located in Ontario along the St. Lawerence River, within close proximity of Lake Ontario. The area is expected to experience notable effects of climate change which include higher 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 Edwardsburgh Cardinal may experience the following trends:

Higher Average Annual Temperature:

- Between the years 1971 and 2000 the annual average temperature was 6.5 ºC

- Under a high emissions scenario, the annual average temperatures are projected to increase to 9.2 ºC by the year 2050 and over 13.0 ºC by the end of the century.

Increase in Total Annual Precipitation:

- Under a high emissions scenario, Edwardsburgh Cardinal is projected to experience a 12% increase in precipitation by the year 2050 and a 17% increase by the end of the century.

Increase in Frequency of Extreme Weather Events:

- It is expected that the frequency and severity of extreme weather events will change.
- In some areas, extreme weather events will occur with greater frequency and severity than others, especially those close to or on Lake Ontario.

2.2.2 Integration of Climate Change and 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.

In order 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.

2.3 Asset Management Overview

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

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

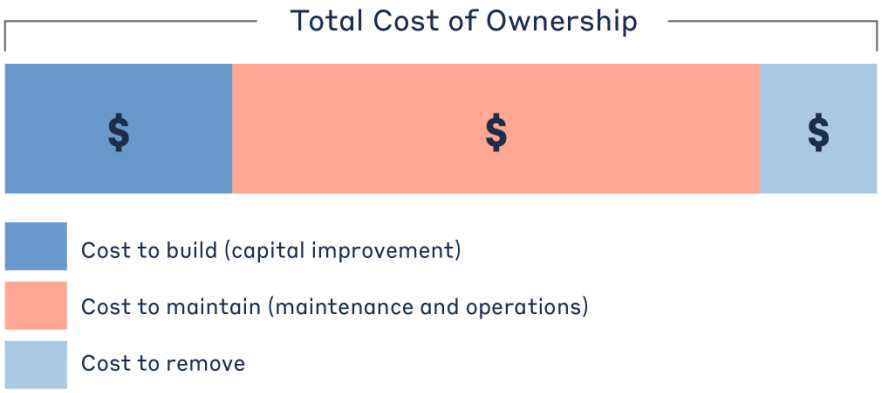


Figure 3 Total Cost of Asset Ownership

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 industry-standard approach and sequence to developing a practical asset management program begins 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.

2.3.1 Foundational Asset Management Documentation

The industry-standard approach and sequence to developing a practical asset management program begins with a Strategic Plan, followed by an Asset Management Policy and an Asset Management Strategy, concluding with an Asset Management Plan.

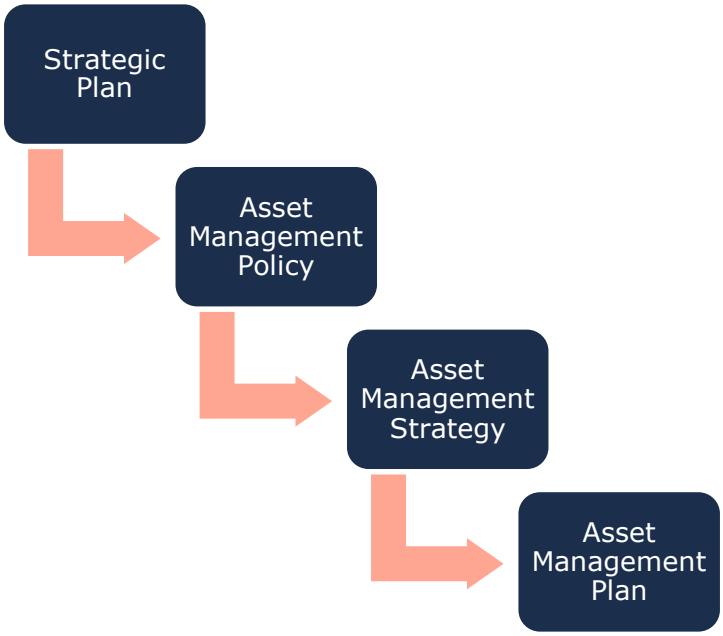


Figure 4 Foundational Asset Management Documents

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.

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 adopted By-law No. 2018-47 "A By-law to Adopt an Asset Management Strategy Policy" on July 23rd, 2018 in accordance with Ontario Regulation 588/17.

The objectives of the policy include:

- Fiscal Responsibility
- Delivery of Services/Programs
- Public Input/Council Direction
- Risk/Impact Mitigation

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.

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

Asset Management Plan

The asset management plan (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.

2.3.2 Key Concepts in Asset Management

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

Lifecycle Management Strategies

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

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

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

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.

Lifecycle Activity	Cost	Typical Associated Risks
Maintenance Activities that prevent defects or deteriorations from occurring	**$**	• Balancing limited resources between planned maintenance and reactive, emergency repairs and interventions; • Diminishing returns associated with excessive maintenance activities, despite added costs; • Intervention selected may not be optimal and may not extend the useful life as expected, leading to lower payoff and potential premature asset failure;
Rehabilitation/ Renewal Activities that rectify defects or deficiencies that are already present and may be affecting asset performance	**$$$**	• Useful life may not be extended as expected; • May be costlier in the long run when assessed against full reconstruction or replacement; • Loss or disruption of service, particularly for underground assets;

Lifecycle Activity	Cost	Typical Associated Risks
Replacement/ Reconstruction Asset end-of-life activities that often involve the complete replacement of assets	**$$$$$**	• Incorrect or unsafe disposal of existing asset; • Costs associated with asset retirement obligations; • Substantial exposure to high inflation and cost overruns; • Replacements may not meet capacity needs for a larger population; • Loss or disruption of service, particularly for underground assets;

Table 2 Lifecycle Management: Typical Lifecycle Interventions

The Township's approach to lifecycle management is described within each asset category outlined in this AMP. Staff will continue to evolve and innovate current practices for developing and implementing proactive lifecycle strategies 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.

Risk & 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, (i.e. low, medium, high) or quantitative measurement (i.e. 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.

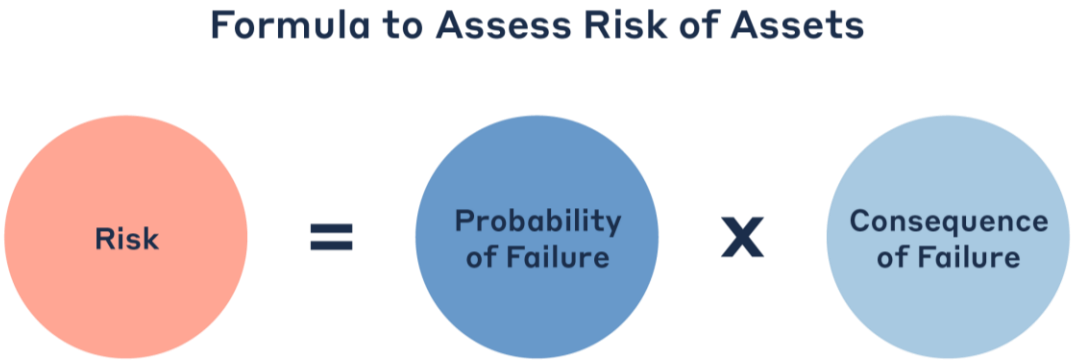


Figure 5 Risk Equations

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.

Table 3 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 Municipality.
Environmental	Environmental consequences can include pollution, erosion, sedimentation, habitat damage, etc.
Public Health and Safety	Adverse health and safety impacts may include injury or death, or impeded access to critical services.
Strategic	These include the effects of an asset's failure on the community's long-term strategic objectives, including economic development, business attraction, etc.

Table 3 Risk Analysis: Types of Consequences of Failure

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.

These models have been built in Citywide for continued review, updates, and refinements.

Levels of Service

A level of service (LOS) is a measure of the services that the Township is providing to the community and the nature and quality of those services. 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.

The Township measures the level of service provided at two levels: Community Levels of Service, and Technical Levels of Service. This AMP includes those LOS that are required under O. Reg. 588/17 as well as any additional metrics the Township wishes to track.

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 as applicable (Roads, Bridges & Culverts, Stormwater, Water, and Sanitary) the province, through O. Reg. 588/17, has provided qualitative descriptions that are required to be included in this AMP.

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 as applicable (Roads, Bridges & Culverts, Stormwater, Water, and Sanitary) the province, through O. Reg. 588/17, has also provided technical metrics that are required to be included in this AMP.

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

Municipality must identify a lifecycle management and financial strategy which allows these targets to be achieved.

2.4 Scope & Methodology

2.4.1 Asset Categories for this AMP

This asset management plan for the Township of Edwardsburgh Cardinal is produced in compliance with O. Reg. 588/17. The July 2024 deadline under the regulation—the second of three AMPs—requires analysis of core and non-core asset categories.

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

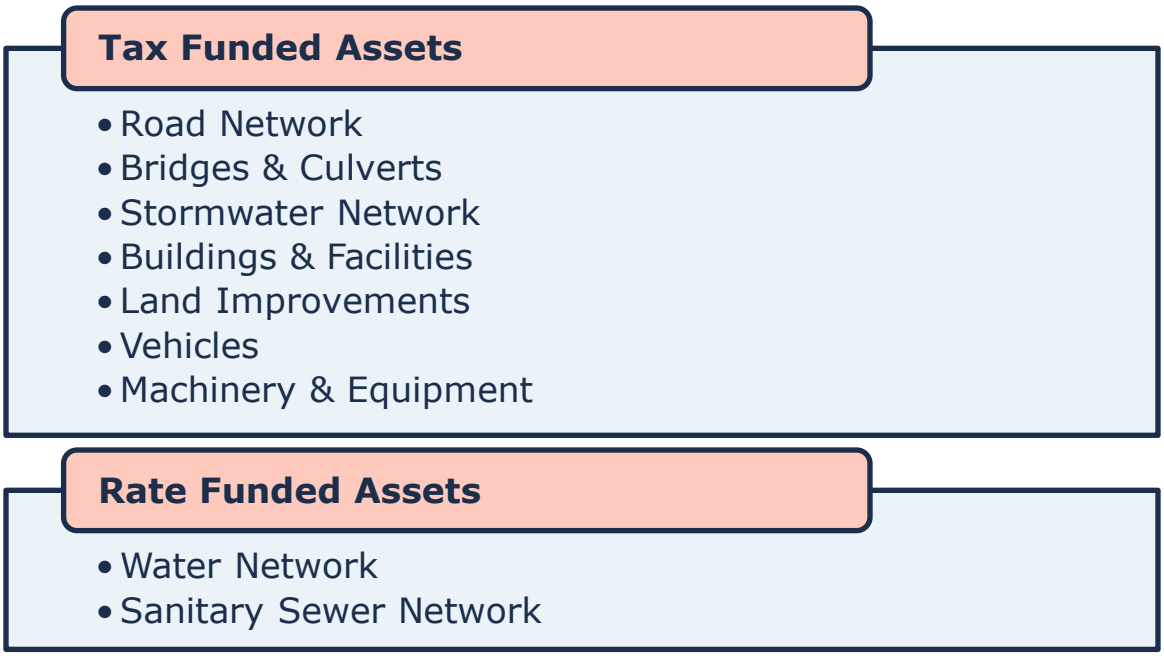


Figure 6 Tax Funded and Rate Funded Asset Categories

2.4.2 Data Effective Date

It is important to note that this plan is based on data as of **December 2023**; therefore, it represents a snapshot in time using the best available processes, data, and information at the Municipality. Strategic asset management planning is an ongoing and dynamic process that requires continuous data updates and dedicated data management resources.

2.4.3 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 Per 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 costs of the assets are 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.

2.4.4 Estimated Service Life & 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 data 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:

Figure 7 Service Life Remaining Calculation

2.4.5 Reinvestment Rate

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

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

Figure 8 Target Reinvestment Rate Calculation

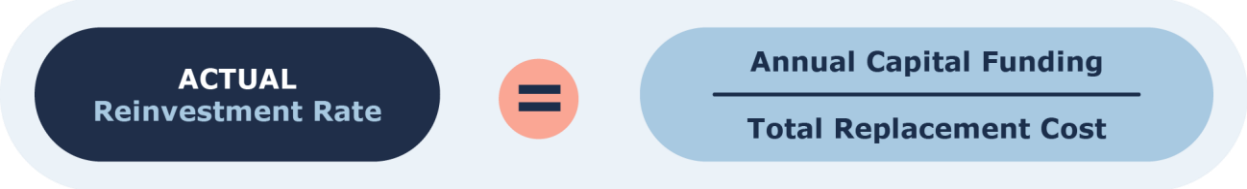


Figure 9 Actual Reinvestment Rate Calculation

2.4.6 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	60-80
Fair	Requires attention	Signs of deterioration, some elements exhibit significant deficiencies	40-60
Poor	Increasing potential of affecting service	Approaching end of service life, condition below standard, large portion of system exhibits significant deterioration	20-40
Very Poor	Unfit for sustained service	Near or beyond expected service life, widespread signs of advanced deterioration, some assets may be unusable	0-20

Table 4 Standard Condition Rating Scale

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.

Condition vs. Suitability

It is important to note that condition is only one aspect of determining an asset's suitability to providing the service intended. Other factors, such as capacity, should be considered on a category level.

For example, a Town Hall Office Facility may be in good condition with sufficient service life remaining, but only has office space for 20 employees. If the municipality requires office space for 30 employees, solutions should be considered which may include replacement amongst other alternatives such as secondary office space, remote work options, etc. As these considerations are nuanced for the specific asset, suitability factors may not be directly addressed as part of this Asset Management Plan.

2.5 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)[1]. Along with creating better performing organizations, more liveable and sustainable communities, the regulation is a key, mandated driver of asset management planning and reporting. It places substantial emphasis on current and proposed levels of service and the lifecycle costs incurred in delivering them.

Figure 10 below outlines key reporting requirements under O. Reg 588/17 and the associated timelines.

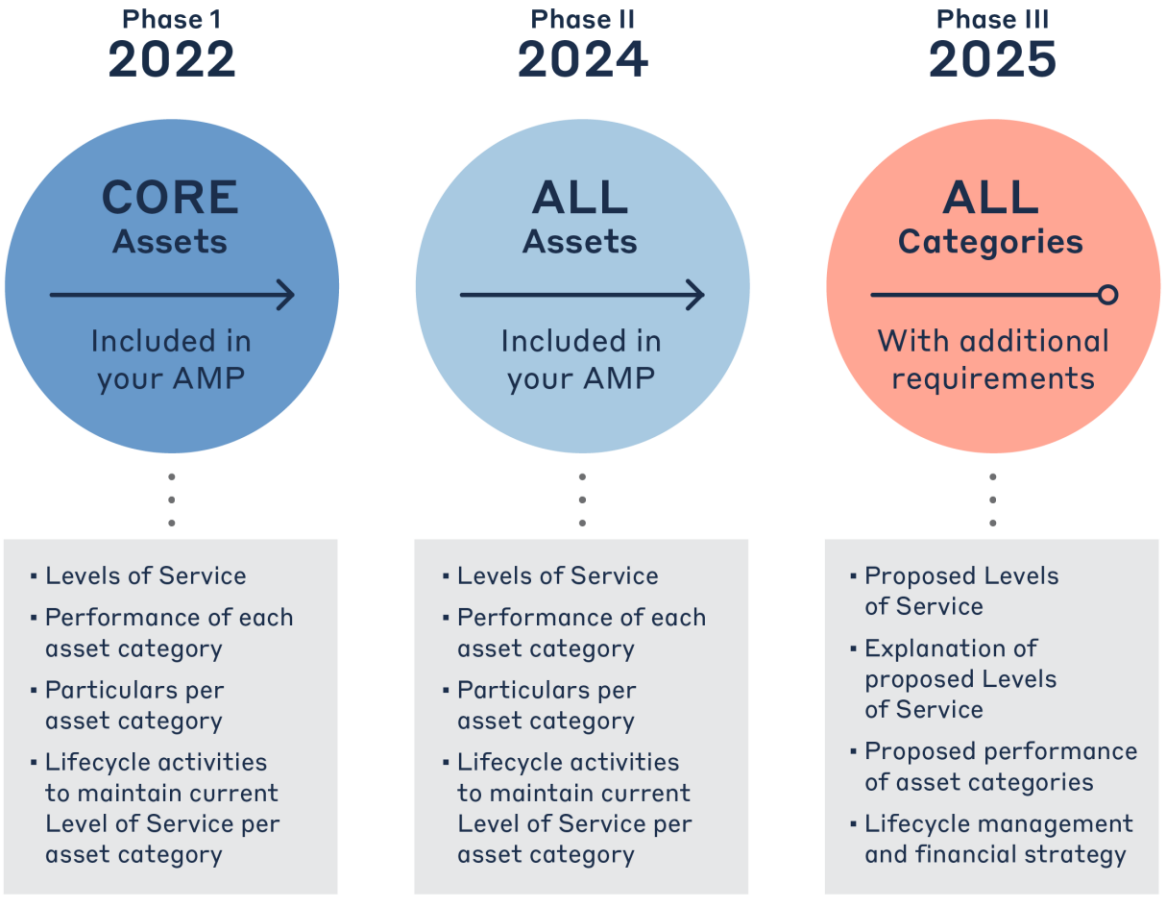


Figure 10 O. Reg. 588/17 Requirements and Reporting Deadlines

[1] O. Reg. 588/17: Asset Management Planning for Municipal Infrastructure https://www.ontario.ca/laws/regulation/170588

2.5.1 O. Reg. 588/17 Compliance Review

Requirement	O. Reg. 588/17 Section	AMP Section Reference	Status
Summary of assets in each category	S.5(2), 3(i)	4.1 – 12.1	Complete
Replacement cost of assets in each category	S.5(2), 3(ii)	4.1 – 12.1	Complete
Average age of assets in each category	S.5(2), 3(iii)	4.3 – 12.3	Complete
Condition of core assets in each category	S.5(2), 3(iv)	4.2 – 12.2	Complete
Description of municipality's approach to assessing the condition of assets in each category	S.5(2), 3(v)	4.4 – 12.4	Complete
Current levels of service in each category	S.5(2), 1(i-ii)	4.7 – 12.7	Complete
Current performance measures in each category	S.5(2), 2	4.7 – 12.7	Complete
Lifecycle activities needed to maintain current levels of service for 10 years	S.5(2), 4	4.4 – 12.4	Complete
Costs of providing lifecycle activities for 10 years	S.5(2), 4	Appendix B	Complete
Growth assumptions	S.5(2), 5(i-ii) S.5(2), 6(i-vi)	13.1 – 13.2	Complete

Table 5 O. Reg. 588/17 Compliance Review

3. Portfolio Overview – State of the Infrastructure

The state of the infrastructure (SOTI) summarizes the inventory, condition, age profiles, and other key performance indicators for the Township's infrastructure portfolio. These details are presented for all core and non-core asset categories.

3.1 Asset Hierarchy & Data Classification

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.

Figure 11 Asset Hierarchy and Data Classification

3.2 Portfolio Overview

3.2.1 Total Replacement Cost of Asset Portfolio

The nine asset categories analyzed in this Asset Management Plan have a total current replacement cost of $269 million. This estimate was calculated

using user-defined costing, as well as inflation of historical or original costs to current date. This estimate reflects replacement of historical assets with similar, not necessarily identical, assets available for procurement today. Figure 12 illustrates the replacement cost of each asset category; at 48% of the total portfolio, the road network forms the largest share of the Township's asset portfolio, followed by the water network at 17%.

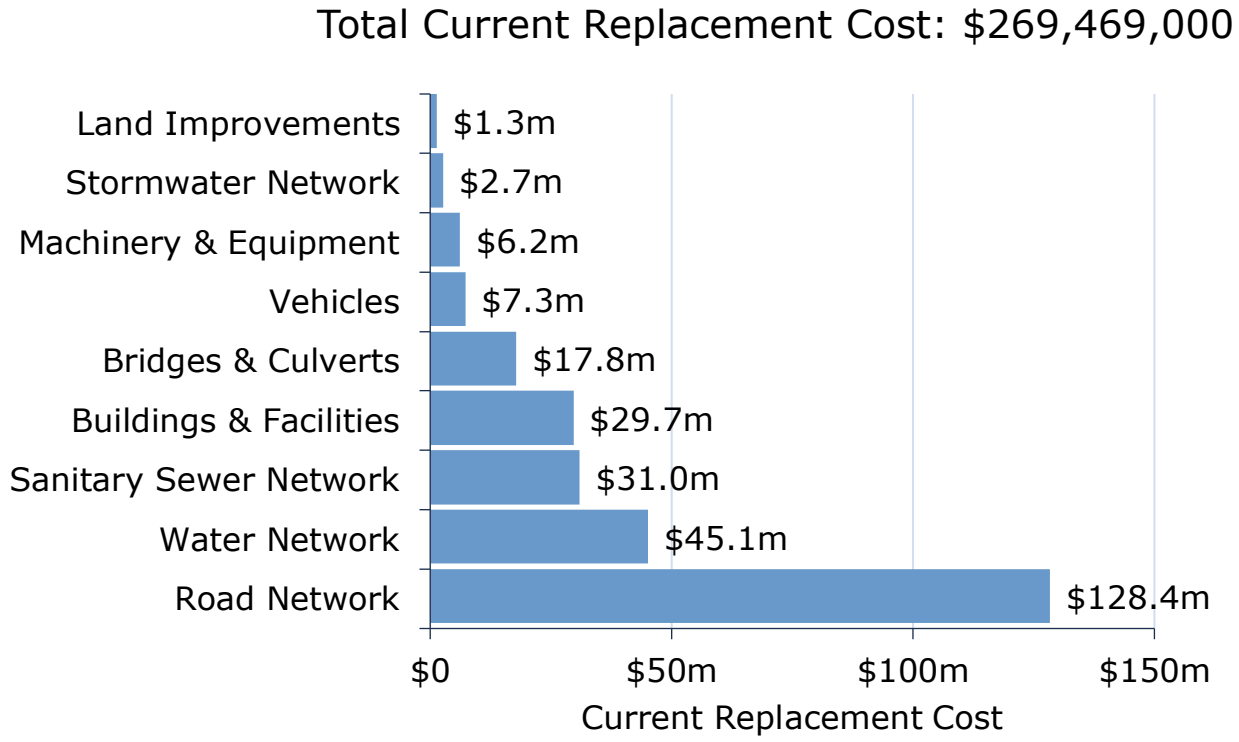


Figure 12 Current Replacement Cost by Asset Category

3.2.2 Target vs. Actual Reinvestment Rate

The graph below depicts funding gaps by comparing the target to the current reinvestment rate. To meet the existing long-term capital requirements, the Township requires an annual capital investment of $7.5 million, for a target portfolio reinvestment rate of 2.8%. Currently, the annual investment from sustainable revenue sources is $3.0 million, for a current portfolio reinvestment rate of 1.1%. Target and current re-investment rates by asset category are detailed below.

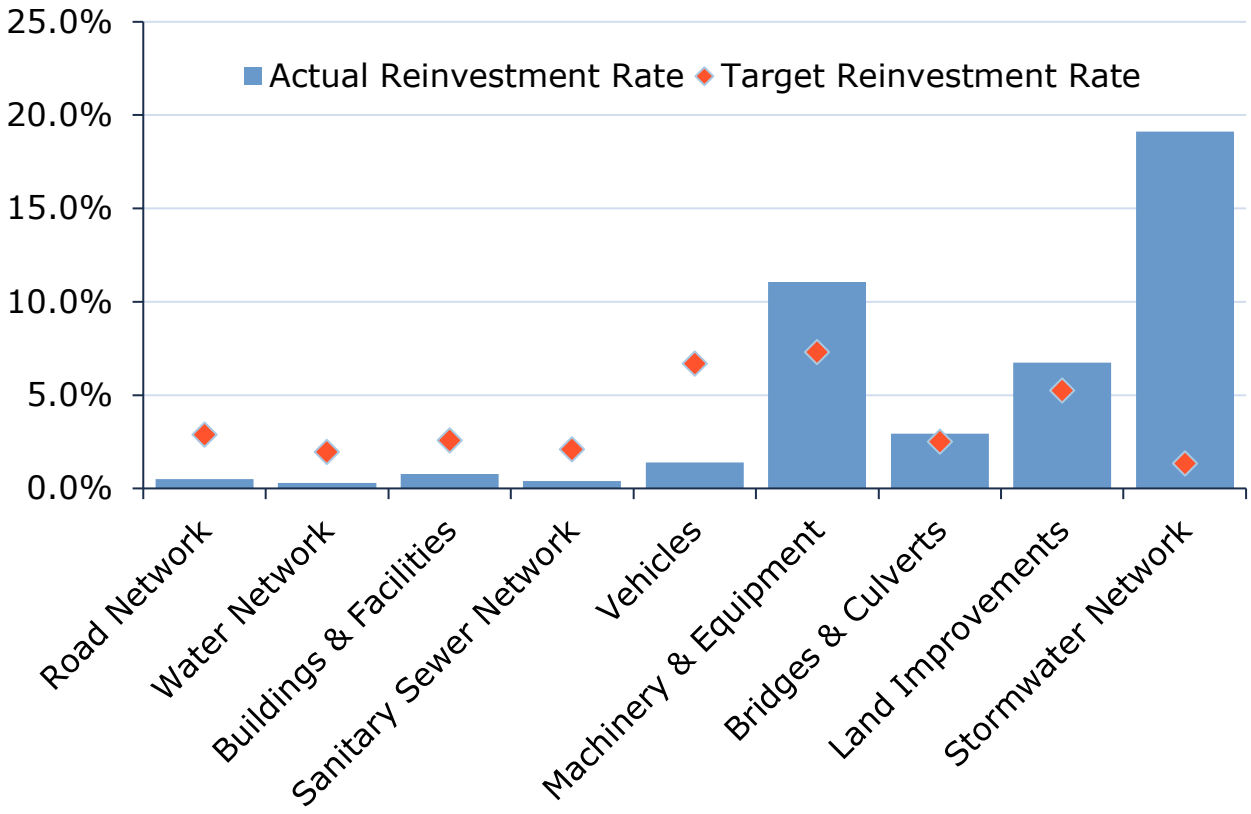


Figure 13 Current Vs. Target Reinvestment Rate

3.2.3 Condition of Asset Portfolio

Figure 14 and Figure 15 summarize asset condition at the portfolio and category levels, respectively. Based on both assessed condition and age-based analysis, 62% of the Township's infrastructure portfolio is in fair or better condition, with the remaining 38% in poor or worse condition. Typically, assets in poor or worse condition may require replacement or major rehabilitation in the immediate or short-term. Targeted condition assessments may help further refine the list of assets that may be candidates for immediate intervention, including potential replacement or reconstruction.

Similarly, assets in fair condition should be monitored for disrepair over the medium term. Keeping assets in fair or better condition is typically more cost-effective than addressing assets needs when they enter the latter stages of their lifecycle or decline to a lower condition rating, e.g., poor or worse.

Condition data was available for majority of the road network and bridges & culverts. For all remaining assets, including major infrastructure such as storm mains and buildings, age was used as an approximation of condition

for most of these assets. Age-based condition estimations can skew data and lead to potential under- or overstatement of asset needs.

Further, when assessed condition data was available, it was projected to current year (2023). This 'projected condition' can generate lower condition ratings than those established at the time of the condition assessment. The rate of this deterioration will also depend on lifecycle curves used to project condition over time.

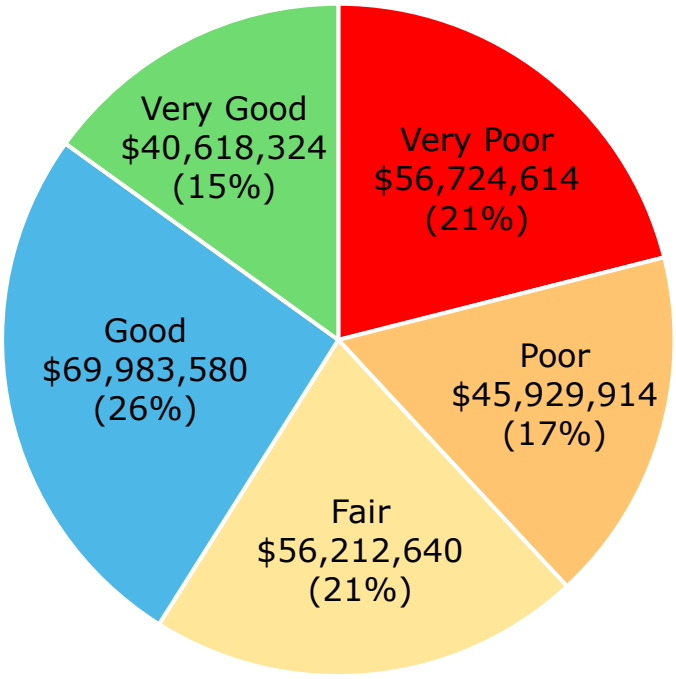


Figure 14 Asset Condition: Portfolio Overview

As further illustrated in Figure 15 at the category level, the majority of major, core infrastructure including roads, bridges, and structural culverts are in fair or better condition, based on in-field condition assessment data and age-based condition projections. See Table 6 for details on how condition data was derived for each asset segment.

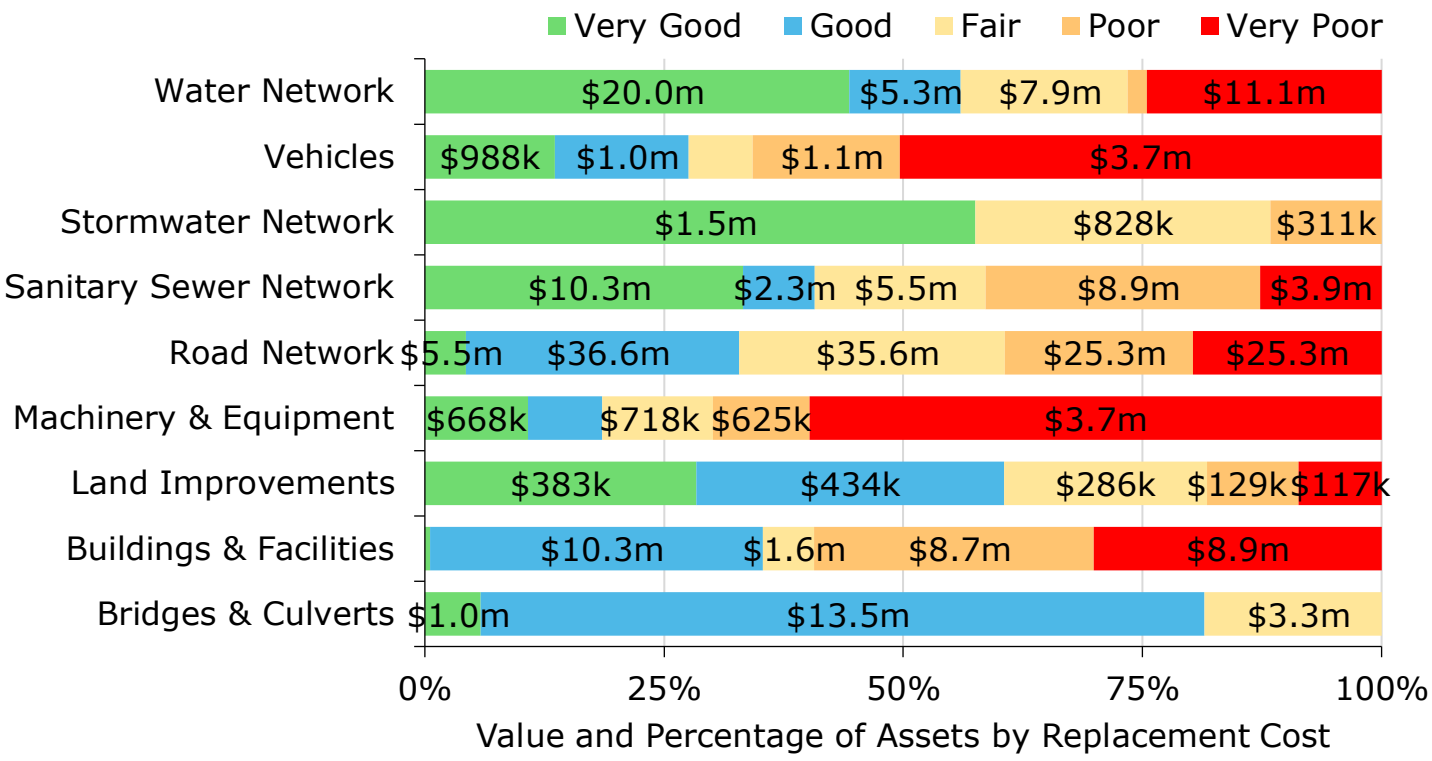


Figure 15 Asset Condition by Asset Category

Buildings and facilities are not componentized into their individual major elements and components. This limits the validity of current condition estimates as they are presented only at the 'parent' asset level, such as 'Fire Station #1', or 'Township Office'.

Source of Condition Data

This AMP relies on assessed condition for 61% of assets, based on and weighted by replacement cost. For the remaining assets, 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	Asset Segment(s)	% of Assets with Assessed Conditions	Source of Condition Data
Road Network	Paved Roads (HCB) Paved Roads (LCB)	100%	2015 Road Needs Study (75%) Staff Assessments (25%)
	Sidewalks	97%	Staff Assessments
Bridges & Culverts	Bridges Structural Culverts	100%	2024 OSIM Report
Water Network	All	6%	Staff Assessments
Sanitary Sewer Network	All	28%	Staff Assessments
Stormwater Network	All	0%	N/A
Buildings & Facilities	All	11%	Staff Assessments
Land Improvements	All	24%	Staff Assessments
Vehicles	All	17%	Staff Assessments
Machinery & Equipment	All	41%	Staff Assessments

Table 6 Source of Condition Data

3.2.4 Service Life Remaining

Based on asset age, available assessed condition data and estimated useful life, 21% of the Township's assets will require replacement within the next 10 years (not accounting for asset replacement backlog). Buildings & Facilities assets were excluded from this analysis due to the nature of the assets. Building and Facilities have multiple components that have a very short service life. However, the buildings themselves are long-lasting. Details of the capital requirements are identified in each asset section.

3.2.5 Risk Matrix

Using the risk equation and preliminary risk models, Figure 16 shows how assets across the different asset categories are stratified within a risk matrix.

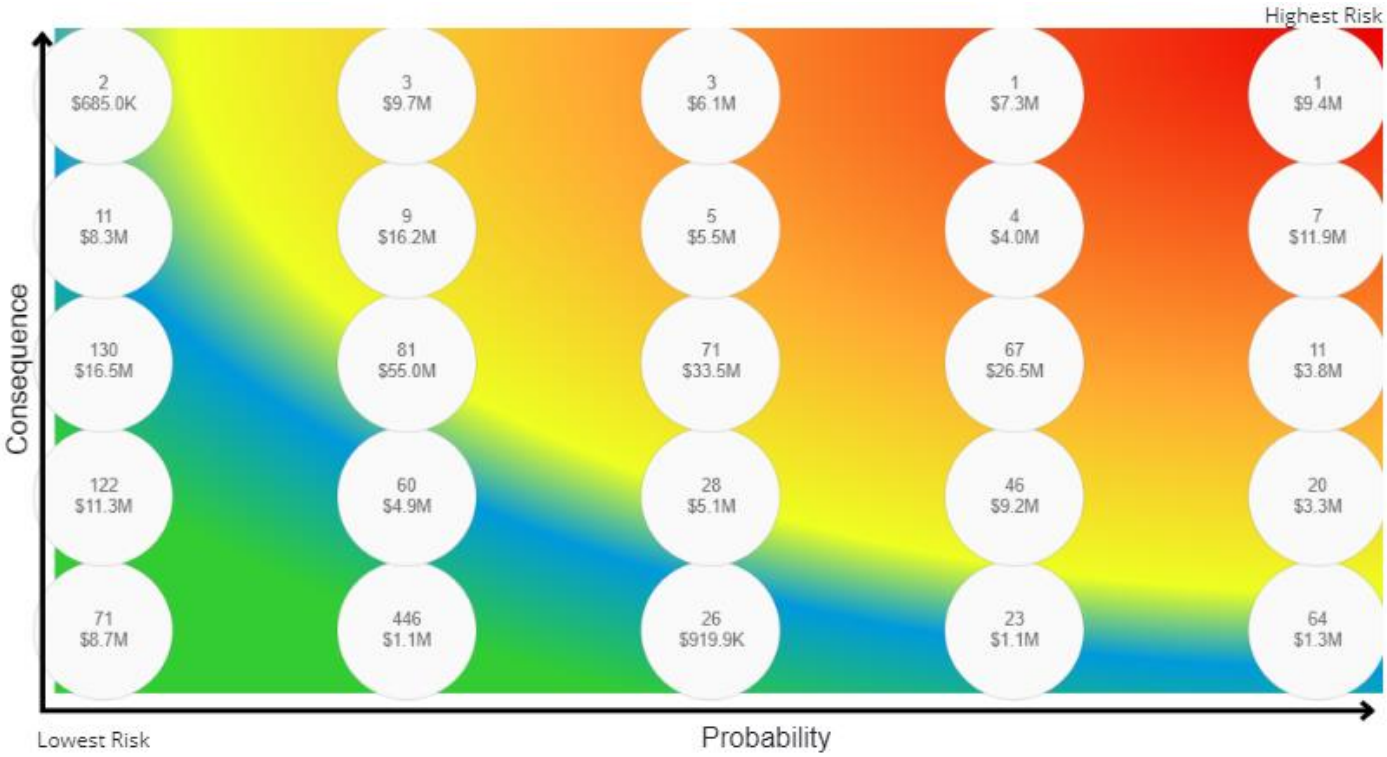


Figure 16 Risk Matrix: All Assets

The analysis shows that based on current risk models, approximately 19% of the Township's assets, with a current replacement cost of approximately $51 million, carry a risk rating of 15 or higher (red) out of 25. Assets in this group may have a high probability of failure based on available condition data and age-based estimates and were considered to be most essential to the Township.

As new asset attribute information and condition assessment data are integrated with the asset register, asset risk ratings will evolve, resulting in a redistribution of assets within the risk matrix. Staff should also continue to calibrate risk models.

We caution that since risk ratings rely on many factors beyond an asset's physical condition or age, assets in a state of disrepair can sometimes be classified as low-risk, despite their poor condition rating. In such cases, although the probability of failure for these assets may be high, their consequence of failure ratings were determined to be low based on the attributes used and the data available.

Similarly, assets with very high condition ratings can receive a moderate to high-risk rating despite a low probability of failure. These assets may be deemed as highly critical to the Township based on their costs, economic importance, social significance, and other factors. Continued calibration of an asset's criticality and regular data updates are needed to ensure these models more accurately reflect an asset's actual risk profile.

3.2.6 Forecasted Capital Requirements

Aging assets require maintenance, rehabilitation, and replacement. Figure 17 below illustrates the cyclical short-, medium- and long-term infrastructure replacement requirements for all asset categories analyzed in this AMP over a 150-year time horizon. On average, $7.5 million is required each year to remain current with capital replacement needs for the Township's asset portfolio ($37.3 million allocated to each 5-year time block), represented by the red dotted line. Although actual spending may fluctuate substantially from year to year, this figure is a useful benchmark for annual capital expenditure targets (or allocations to reserves) to ensure projects are not deferred and replacement needs are met as they arise. This figure relies on age and available condition data.

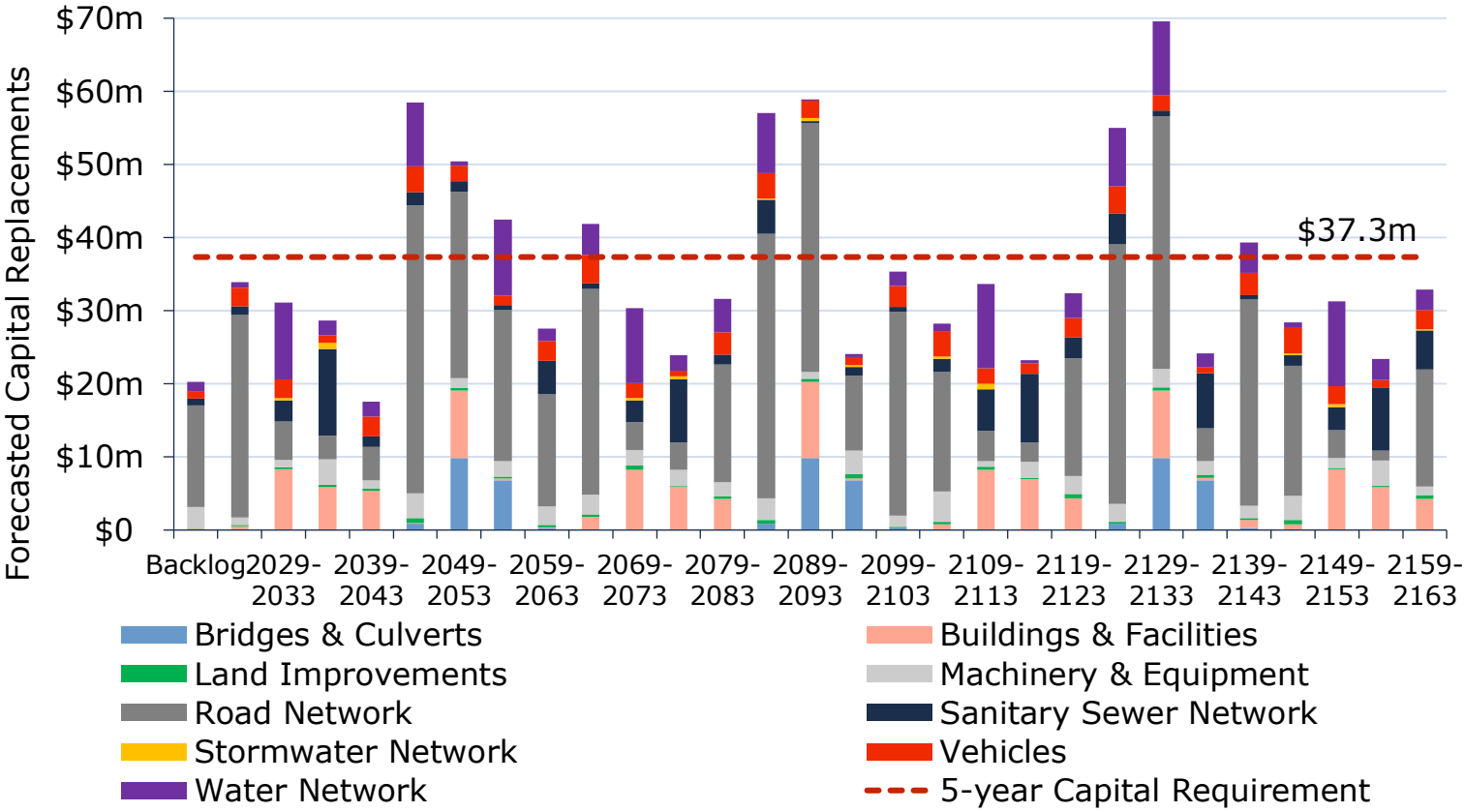


Figure 17 Capital Replacement Needs: Portfolio Overview 2024-2163

The chart also illustrates a backlog of more than $20 million, comprising assets that remain in service beyond their estimated useful life. It is unlikely that all such assets are in a state of disrepair, requiring immediate replacements. This makes continued and expanded targeted and consistent condition assessments integral. Risk frameworks, proactive lifecycle strategies, and levels of service targets can then be used to prioritize projects, continuously refine estimates for both backlogs and ongoing capital needs and help select the right treatment for each asset. In addition, more effective componentization of buildings will improve these projections, including backlog estimates.

Core Assets

Road Network

Replacement Cost	Average Condition	Financial Capacity	
$128.4 m	**Fair**	Annual Requirement:	$3,682,000
		Funding Available:	$637,000
		Annual Deficit:	**$3,045,000**

Bridges & Culverts

Replacement Cost	Average Condition	Financial Capacity	
$17.8 m	**Good**	Annual Requirement:	$446,000
		Funding Available:	$526,000
		Annual Deficit:	**($80,000)**

Water Network

Replacement Cost	Average Condition	Financial Capacity	
$45.1 m	**Fair**	Annual Requirement:	$876,000
		Funding Available:	$135,000
		Annual Deficit:	**$741,000**

Sanitary Sewer Network

Replacement Cost	Average Condition	Financial Capacity	
$31.0 m	**Fair**	Annual Requirement:	$653,000
		Funding Available:	$125,000
		Annual Deficit:	**$528,000**

Stormwater Network

Replacement Cost	Average Condition	Financial Capacity	
$2.7 m	**Good**	Annual Requirement:	$36,000
		Funding Available:	$513,000
		Annual Deficit:	**($477,000)**

4. Road Network

The Township's road network comprises the largest share of its infrastructure portfolio, with a current replacement cost of more than $126 million. The Township also owns and manages other supporting infrastructure and capital assets, including sidewalks, road culverts, and streetlights.

4.1 Inventory & Valuation

Table 7 summarizes the quantity and current replacement cost of the Township's various road network assets as managed in its primary asset management register, Citywide.

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Gravel Roads	104.7	Length (km)	Not Planned for Replacement	
Paved Roads (HCB)	123.1	Length (km)	$123,092,000	Cost per unit
Paved Roads (LCB)	23.5	Length (km)	$3,033,000	Cost per unit
Road Culverts	2	Quantity	$189,000	CPI
Sidewalks	9	Quantity	$1,281,000	CPI
Streetlights	434	Quantity	$761,000	CPI
TOTAL			**$128,356,000**	

Table 7 Detailed Asset Inventory: Road Network

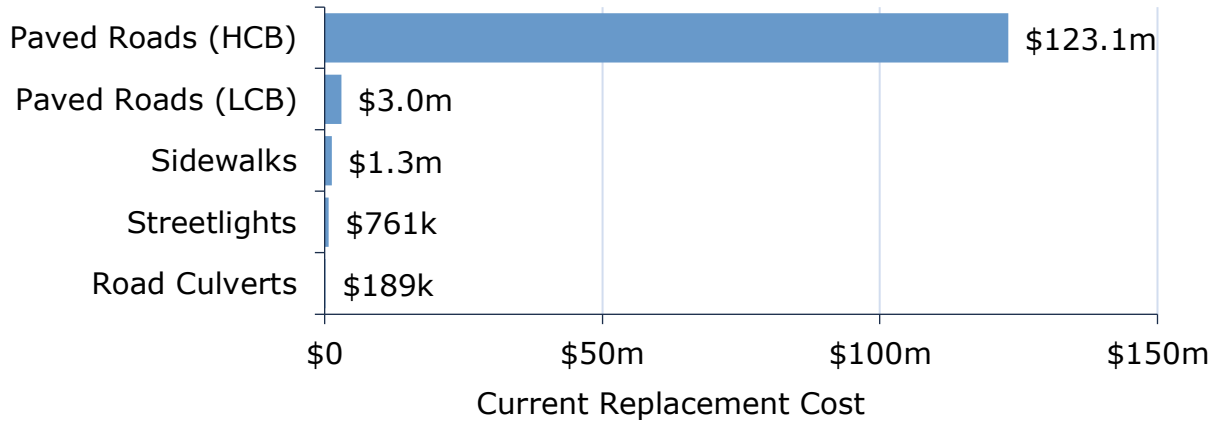


Figure 18 Portfolio Valuation: Road Network

4.2 Asset Condition

Figure 19 summarizes the replacement cost-weighted condition of the Township's road network. Based on a combination of field inspection data and age, 61% of assets are in fair or better condition; the remaining 39% of assets are in poor to very poor condition. Condition assessments were available for 100% of roads and 97% of sidewalks, based on replacement cost. This condition data was projected from inspection date to current year to estimate their condition today. No condition data was available for the remaining asset types.

Assets in poor or worse condition may be candidates for replacement in the short term; similarly, assets in fair condition may require rehabilitation or replacement in the medium term and should be monitored for further degradation in condition. As illustrated in Figure 19, the majority of the Township's road network assets are in fair or better condition.

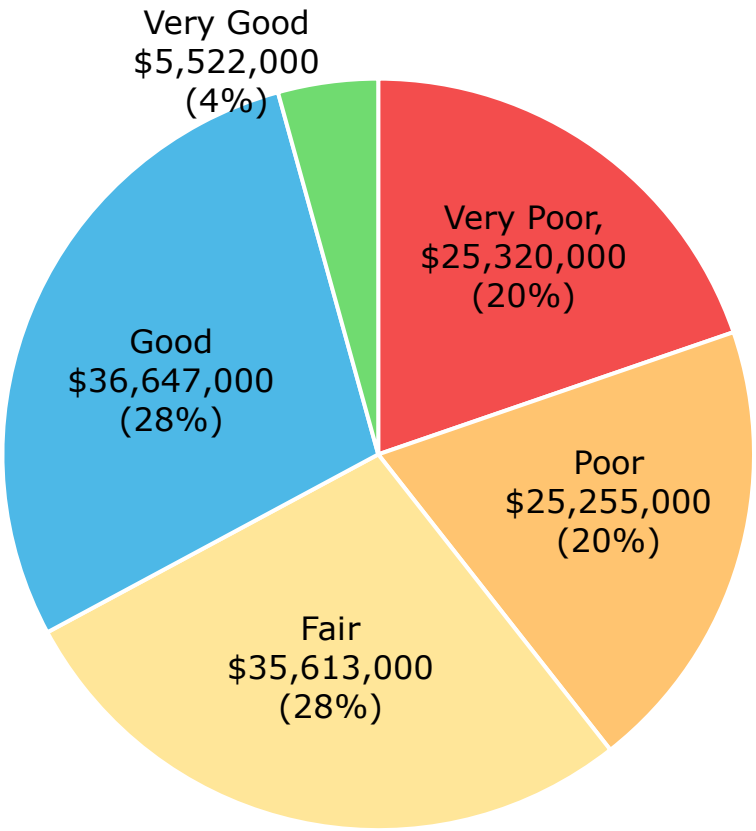


Figure 19 Asset Condition: Road Network Overall

As illustrated in Figure 20, based on condition assessments, the majority of the Township's HCB paved road network is in fair or better condition; however, 90% of LCB roads are in poor or worse condition.

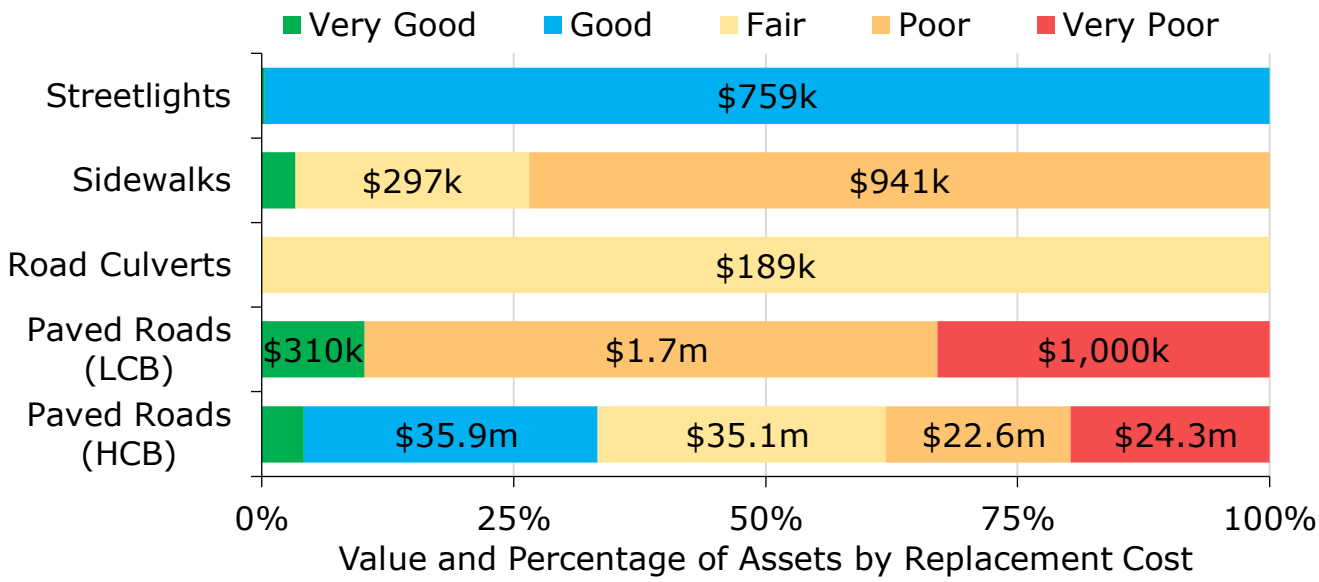


Figure 20 Asset Condition: Road Network by Segment

4.3 Age Profile

An asset's age profile comprises two key values: estimated useful life (EUL), or design life; and the percentage of EUL consumed. The EUL is the serviceable lifespan of an asset during which it can continue to fulfil its intended purpose and provide value to users, safely and efficiently. As assets age, their performance diminishes, often more rapidly as they approach the end of their design life.

In conjunction with condition data, an asset's age profile provides a more complete summary of the state of infrastructure. It can help identify assets that may be candidates for further review through condition assessment programs; inform the selection of optimal lifecycle strategies; and improve planning for potential long-term replacement spikes.

Figure 21 illustrates the average current age of each asset type and its estimated useful life. Both values are weighted by the replacement cost of individual assets.

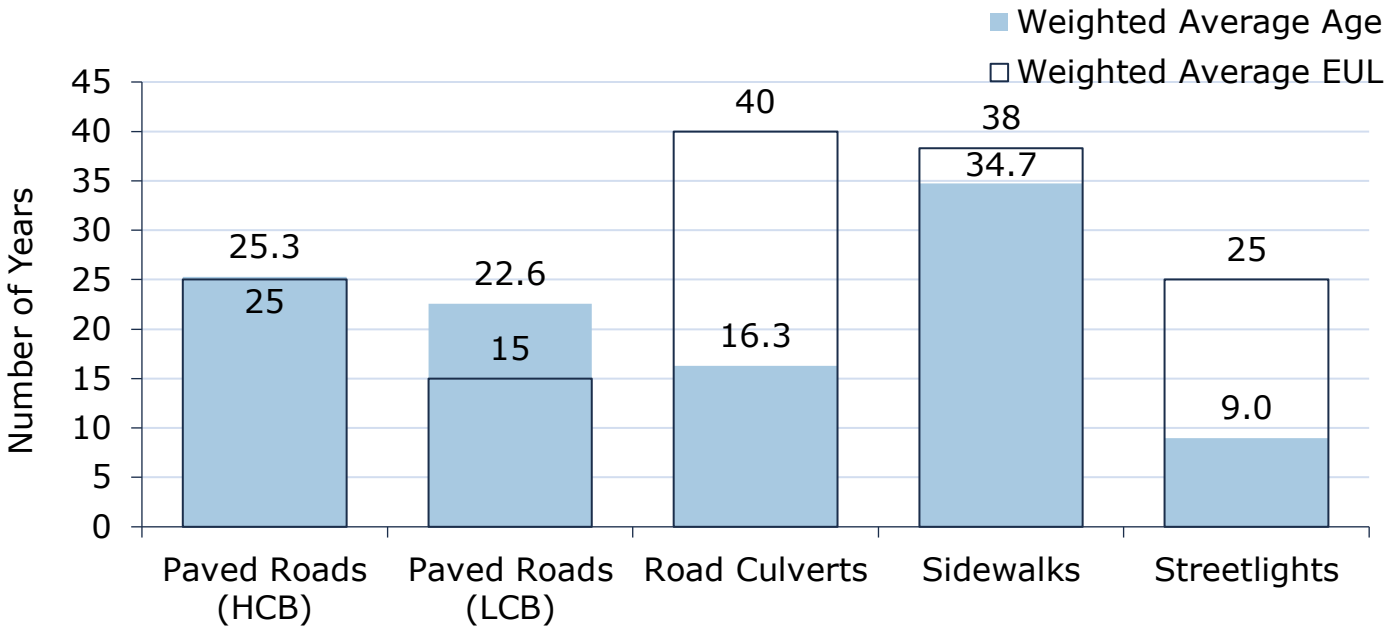


Figure 21 Estimated Useful Life vs. Asset Age: Road Network

Age analysis shows that the majority of paved roads have surpassed their expected useful life, with an average age of 25.3 years against a design life of 25 years (HCB) and 22.6 years against a design life of 15 years (LCB). Road culverts, sidewalks, and streetlights are currently within their expected useful lives, with sidewalks quickly approaching their proposed end of life.

Although asset age is an important measurement for long-term planning, condition assessments provide a more accurate indication of actual asset needs. Further, useful life estimates established as part of the PSAB 3150 implementation may not be accurate and may not reflect in-field asset performance.

4.4 Current Approach to Lifecycle Management

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

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

Paved Roads (HCB)		
Event Name	**Event Class**	**Event Trigger**
Crack Sealing	Maintenance	5 Years (Repeated)
Single Lift Re-surfacing	Rehabilitation	20 Years
Full Reconstruction	Replacement	40 Years

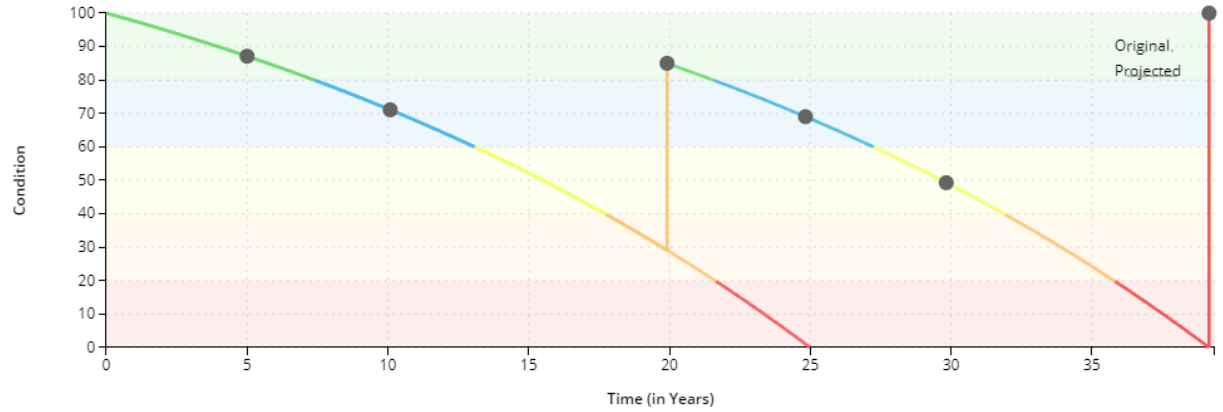


Table 8 Lifecycle Management Strategy: Road Network (HCB Roads)

Paved Roads (LCB)		
Event Name	**Event Class**	**Event Trigger**
Single Surface Treatment	Rehabilitation	8 Years (Repeated)
Full Reconstruction	Replacement	50 Years

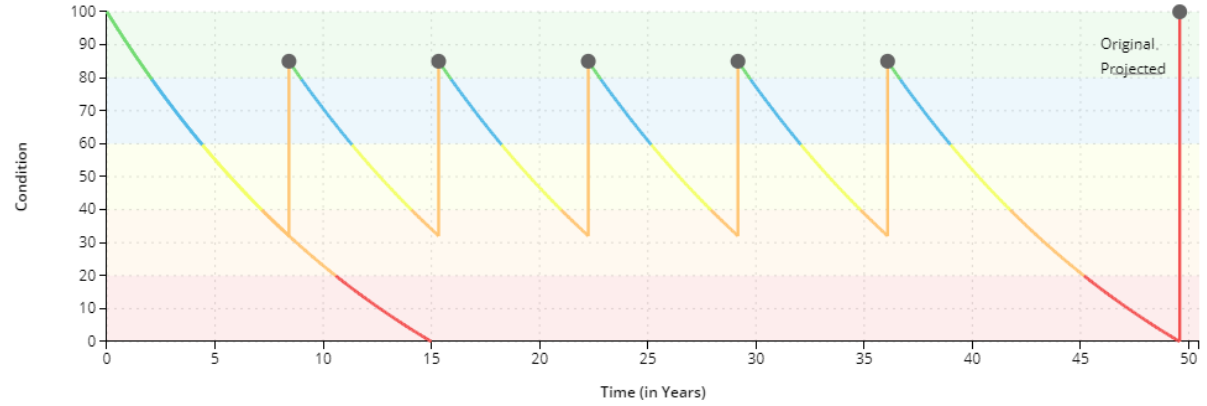


Table 9 Lifecycle Management Strategy: Road Network (LCB Roads)

The following table expands on maintenance and inspection activities for road network assets.

Activity Type	Description of Current Strategy
Maintenance	Pothole repairs are completed annually based on deficiencies identified through routine route patrols and feedback from the public
	Summer maintenance activities include asphalt patching, sidewalk repairs, grading, re-gravelling, vegetation management, road sign installation/maintenance, and line painting
	Winter maintenance activities include snow plowing and snow removal
Inspection	Road inspections are typically conducted monthly by internal staff and during routine route patrols to identify maintenance tasks
	Supporting infrastructure such as sidewalks and streetlights are assessed annually by external contractors

Table 10 Lifecycle Management Strategy: Road Network

4.5 Forecasted Long-Term Replacement Needs

Figure 22 illustrates the cyclical short-, medium- and long-term infrastructure rehabilitation and replacement requirements for the Township's road network. This analysis was run until 2088 to capture at least one iteration of replacement for the longest-lived asset in Citywide Assets, the Township's primary asset management system and asset register. The Township's average annual requirements (red dotted line) total $3.7 million ($18.4 million per 5-year bucket) for all assets in the road network. Although actual spending may fluctuate substantially from year to year, this figure is a useful benchmark value for annual capital expenditure targets (or allocations to reserves) to ensure projects are not deferred and replacement needs are met as they arise.

The chart illustrates substantial capital needs throughout the forecast period. It also shows a backlog $13.9 million, dominated by HCB paved roads. These projections are based on asset replacement costs, age analysis, and

condition data when available, as well as lifecycle modeling (roads only). They are designed to provide a long-term, portfolio-level overview of capital needs and should be used to support improved financial planning over several decades.

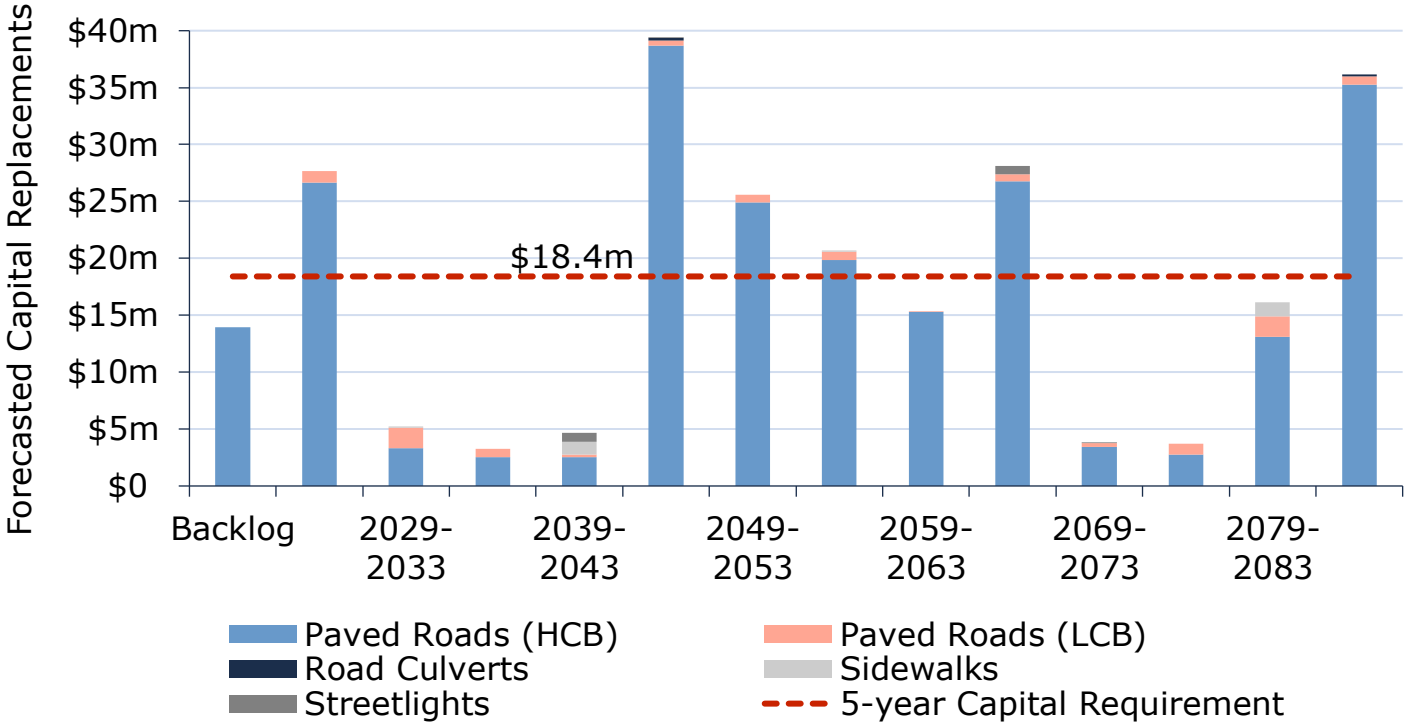


Figure 22 Forecasted Capital Replacement Needs: Road Network 2024-2088

Often, the magnitude of replacement needs is substantially higher than most municipalities can afford to fund. In addition, most assets may not need to be replaced. However, quantifying and monitoring these spikes is essential for long-term financial planning, including establishing dedicated reserves. Regular pavement condition assessments and a robust risk framework will ensure that high-criticality assets receive proper and timely lifecycle intervention, including replacements.

A detailed 10-year capital replacement forecast can be found in Appendix B – 10-Year Capital Requirements.

4.6 Risk Analysis

The risk matrix below is generated using available asset data, including condition, service life remaining, replacement costs, traffic data, and road class. The risk ratings for assets without useful attribute data were calculated using only condition, service life remaining, and their replacement costs.

The matrix stratifies assets based on their individual probability and consequence of failure, each scored from 1 to 5. Their product generates a risk index ranging from 1-25. Assets with the highest criticality and likelihood of failure receive a risk rating of 25; those with lowest probability of failure and lowest criticality carry a risk rating of 1. As new data and information is gathered, the Township may consider integrating relevant information that improves confidence in the criteria used to assess asset risk and criticality.

These risk models have been built into the Township's Asset Management Database (Citywide Assets). See *Risk & Criticality* section for further details on approach used to determine asset risk ratings and classifications.

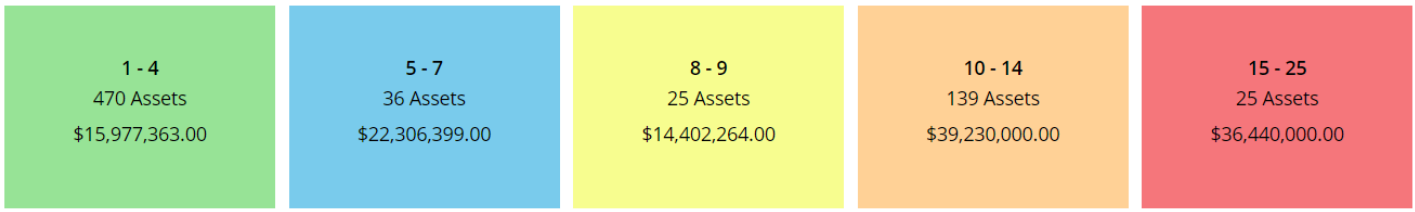


Figure 23 Risk Matrix: Road Network

4.7 Levels of Service

The tables that follow summarize the Municipality's current levels of service with respect to prescribed KPIs under Ontario Regulation 588/17, as well as any additional performance measures that the Township selected for this AMP.

4.7.1 Community Levels of Service

Service Attribute	Qualitative Description	Current LOS (2023)
Scope	Description, which may include maps, of the road network in the municipality and its level of connectivity	An approximately 200 km road network spanning over 310 km² of area. Surface materials include gravel, LCB, and HCB paved roads. Major provincial highways (managed by others) within the Township include Highway 401 running along the southern boundary and Highway 416 running from north to south through the center of the Township. Refer to Appendix C for map references.

Service Attribute	Qualitative Description	Current LOS (2023)
Quality	Description or images that illustrate the different levels of road class pavement condition	The Township completed a Road Management Study in October 2016 in coordination with BRG Project Management & Municipal Specialists. Every road section received a surface condition rating (1-10). (1-5) Road surface exhibits moderate to significant deterioration and requires renewal or full replacement within 1-5 years (6-10) Road surface is in good condition or has been recently re-surfaced. Renewal or reconstruction is not required for 6-10+ years

Table 11 O. Reg. 588/17 Community Levels of Service: Road Network

4.7.2 Technical Levels of Service

Service Attribute	Technical Metric	Current LOS (2023)
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)	0.40 km/km^2
	Lane-km of local roads (MMS classes 5 and 6) per land area (km/km^2)[2]	1.23 km/km^2
Quality	Average pavement condition index for paved roads in the Township	HCB Roads: 44% LCB Roads: 29%
	Average surface condition for unpaved roads in the Township (e.g. excellent, good, fair, poor)	Fair
Performance	Target vs. Actual capital reinvestment rate	2.9% vs. 0.5%

Table 12 O. Reg. 588/17 Technical Levels of Service: Road Network

[2] Includes both paved and gravel roads.

5. Bridges & Culverts

The Township's transportation network also includes bridges and structural culverts, with a current replacement cost of approximately $18 million.

5.1 Inventory & Valuation

Table 13 summarizes the quantity and current replacement cost of bridges and culverts. The Township owns and manages 10 bridges and four structural culverts.

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Bridges	10	Quantity	$15,654,000	User-defined
Structural Culverts	4	Quantity	$2,187,000	User-defined
TOTAL			**$17,841,000**	

Table 13 Detailed Asset Inventory: Bridges & Culverts

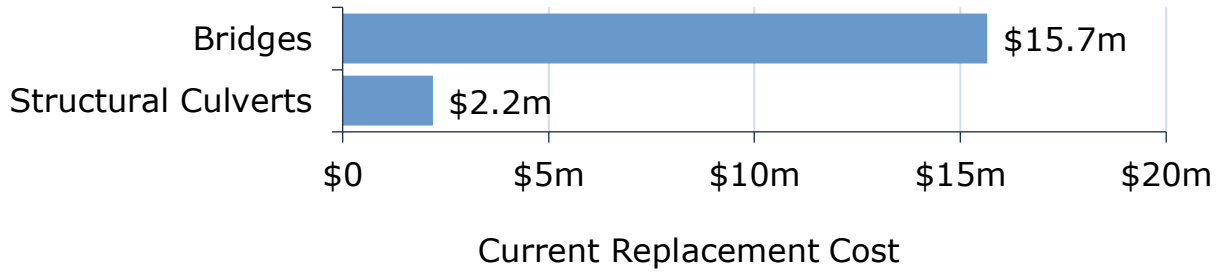


Figure 24 Portfolio Valuation: Bridges & Culverts

5.2 Asset Condition

Figure 25 summarizes the replacement cost-weighted condition of the Township's bridges and culverts. Based on the Township's recent Ontario Structures Inspection Manual (OSIM) assessments, 76% bridges and culverts are in fair or better condition. Some elements or components of these structures may be candidates for replacement or rehabilitation in the medium term and should be monitored for further degradation in condition. At 24% of the total bridges and culverts portfolio, assets in poor or worse condition may require replacement in the immediate or short term.

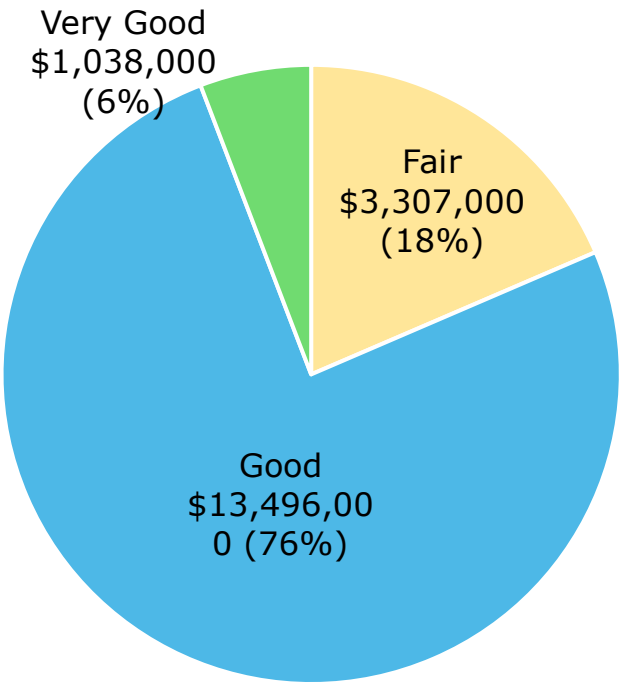


Figure 25 Asset Condition: Bridges & Culverts Overall

As further detailed in Figure 26, based on in-field condition assessments, 100% of bridge and culvert assets were identified in fair of better condition. As bridges and structures reach a poor or worse rating (i.e., a bridge condition index of less than 40), they are not necessarily unsafe for regular use, individual circumstances must be considered. The OSIM ratings are designed to identify repairs needed to elevate condition ratings to a fair or higher.

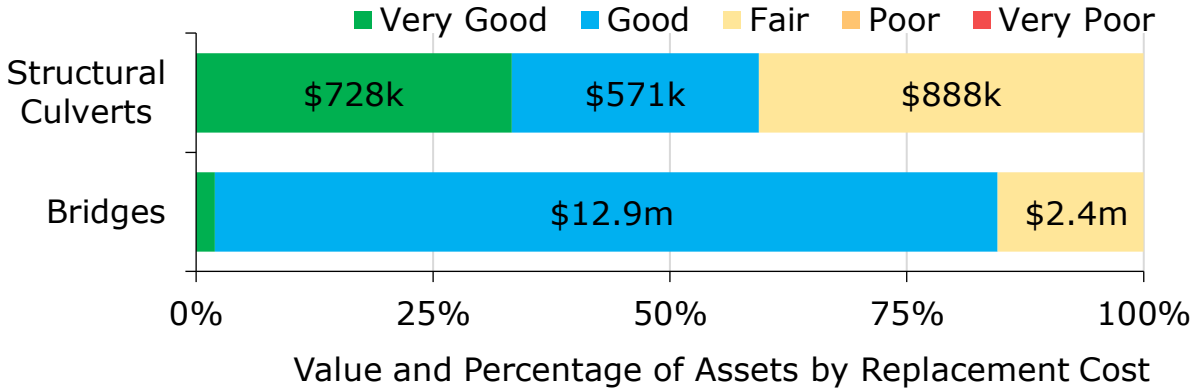


Figure 26 Asset Condition: Bridges & Culverts by Segment

5.3 Age Profile

An asset's age profile comprises two key values: estimated useful life (EUL), or design life; and the percentage of EUL consumed. The EUL is the serviceable lifespan of an asset during which it can continue to fulfil its intended purpose and provide value to users, safely and efficiently. As assets age, their performance diminishes, often more rapidly as they approach the end of their design life.

In conjunction with condition data, an asset's age profile provides a more complete summary of the state of infrastructure. It can help identify assets that may be candidates for further review through condition assessment programs; inform the selection of optimal lifecycle strategies; and improve planning for potential replacement spikes.

Figure 27 illustrates the average current age of each asset type and its estimated useful life. Both values are weighted by the replacement cost of individual assets.

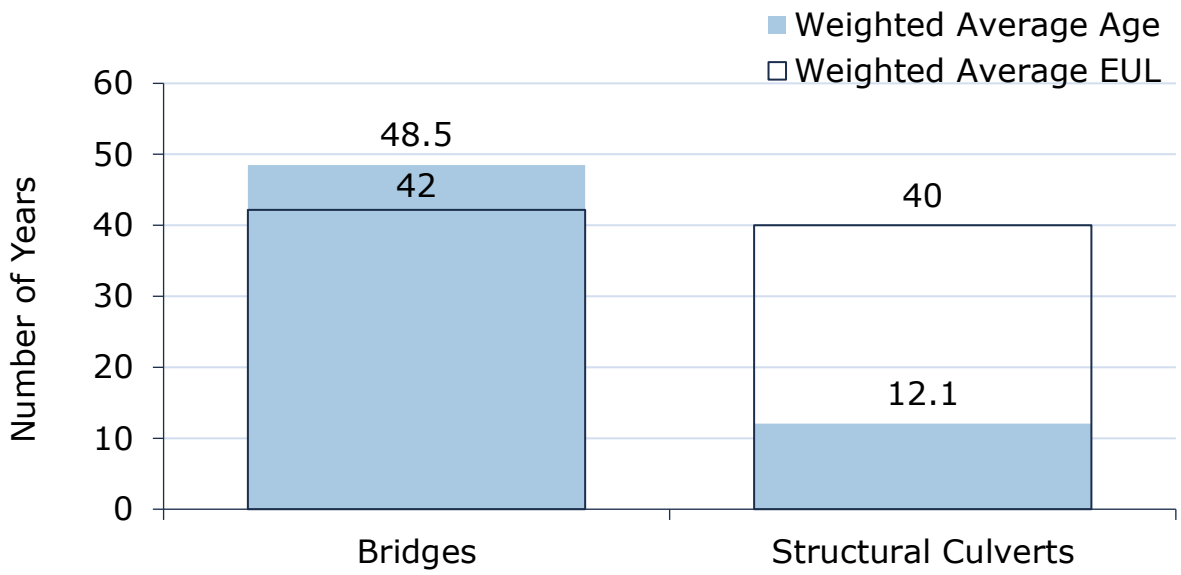


Figure 27 Estimated Useful Life vs. Asset Age: Bridges & Culverts

Age analysis reveals that on average, bridges have consumed virtually all of their estimated useful life, with an average age of 48.5 years against an average EUL of 42 years. On average, culverts are in moderate stages of their lifecycle, with an average age of 12.1 years, against an average EUL of 40 years. OSIM assessments should continue to be used in conjunction with age and asset criticality to prioritize capital and maintenance expenditures.

5.4 Current Approach to Lifecycle Management

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	Typical maintenance includes: • Obstruction removal • Cleaning/sweeping • Erosion control • Brush/tree removal
	Biennial OSIM inspection reports include a list of recommended maintenance activities that the Township considers and completes according to cost and urgency.
Rehabilitation / Replacement	Biennial OSIM inspection reports include a Capital Needs List identifying recommended rehabilitation and replacement activities with estimated costs.
Inspection	The most recent Bridge and Culvert inspection reports were prepared in 2022 and 2024 by Keystone Bridge Management Corp.

Table 14 Lifecycle Management Strategy: Bridges & Culverts

5.5 Forecasted Long-Term Replacement Needs

Figure 28 illustrates the cyclical short-, medium- and long-term infrastructure rehabilitation and replacement requirements for the Township's bridges and culverts. This analysis was run until 2063 to capture at least one iteration of replacement for the longest-lived asset in Citywide Assets, the Township's primary asset management system and asset register. The Township's average annual requirements (red dotted line) for bridges and culverts total $446,000 ($2.2 million per 5-year bucket). Although actual spending may fluctuate substantially from year to year, this figure is a useful benchmark value for annual capital expenditure targets (or

allocations to reserves) to ensure projects are not deferred and replacement needs are met as they arise.

Although no major replacement spikes are anticipated for the next 25 years, capital needs will significantly rise between 2049 and 2058, and peak at $9.9 million between 2049 and 2053 as assets reach the end of their useful life. These projections and estimates are based on asset replacement costs, age analysis, and condition data. They are designed to provide a long-term, portfolio-level overview of capital needs and should be used to support improved financial planning over several decades.

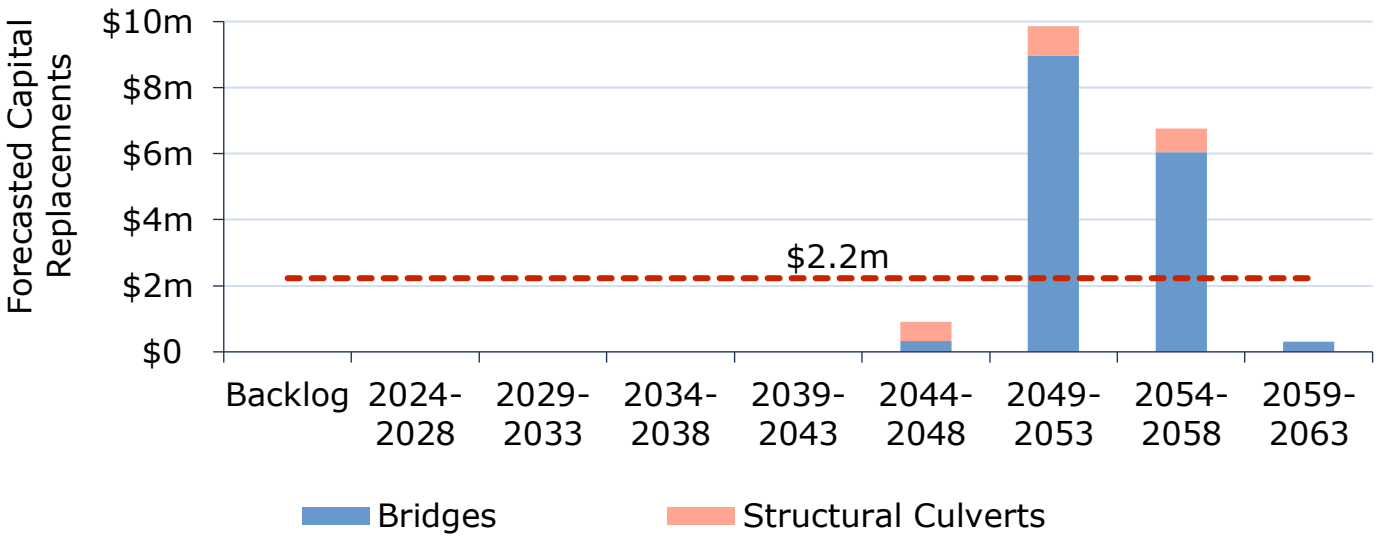


Figure 28 Forecasted Capital Replacement Needs: Bridges & Culverts 2024-2063

Often, the magnitude of replacement needs is substantially higher than most municipalities can afford to fund. In addition, most assets may not need to be replaced. However, quantifying and monitoring these spikes is essential for long-term financial planning, including establishing dedicated reserves. OSIM condition assessments and a robust risk framework will ensure that high-criticality assets receive proper and timely lifecycle intervention, including replacements.

A detailed 10-year capital replacement forecast can be found in Appendix B – 10-Year Capital Requirements.

5.6 Risk Analysis

The risk matrix below is generated using available asset data, including condition and replacement costs.

The matrix stratifies assets based on their individual probability and consequence of failure, each scored from 1 to 5. Their product generates a risk index ranging from 1-25. Assets with the highest criticality and likelihood of failure receive a risk rating of 25; those with lowest probability of failure and lowest criticality carry a risk rating of 1. As new data and information is gathered, the Township may consider integrating relevant information that improves confidence in the criteria used to assess asset risk and criticality.

These risk models have been built into the Township's Asset Management Database (Citywide Assets). See *Risk & Criticality* section for further details on approach used to determine asset risk ratings and classifications.

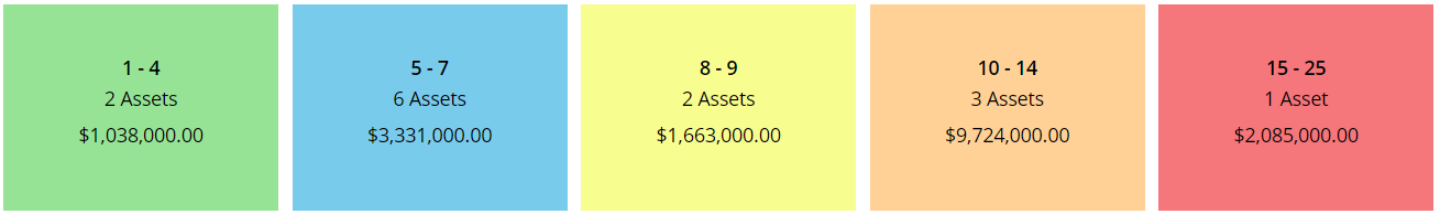


Figure 29 Risk Matrix: Bridges & Culverts

5.7 Levels of Service

The tables that follow summarize the Township's current levels of service with respect to prescribed KPIs under Ontario Regulation 588/17 as well as any additional performance measures that the Township has selected for this AMP.

5.7.1 Community Levels of Service

Service Attribute	Qualitative Description	Current LOS (2023)
Scope	Description of the traffic that is supported by municipal bridges (e.g., heavy transport vehicles, motor vehicles, emergency vehicles, pedestrians, cyclists)	Bridges and structural culverts are a key component of the municipal transportation network. None of the municipality's structures have loading or dimensional restrictions meaning that most types of vehicles, including heavy transport, motor vehicles, emergency vehicles and cyclists can cross them without restriction.

Service Attribute	Qualitative Description	Current LOS (2023)
Quality	Description or images of the condition of bridges & culverts and how this would affect use of the bridges & culverts	See Appendix C

Table 15 O. Reg. 588/17 Community Levels of Service: Bridges & Culverts

5.7.2 Technical Levels of Service

Service Attribute	Technical Metric	Current LOS (2023)
Scope	% of bridges in the Township with loading or dimensional restrictions	0%
Quality	Average bridge condition index value for bridges in the Township	67%
	Average bridge condition index value for structural culverts in the Township	69%
Performance	Target vs. Actual capital reinvestment rate	2.5% vs. 2.9%

Table 16 O. Reg. 588/17 Technical Levels of Service: Bridges & Culverts

6. Water Network

The Environmental Services department is responsible for overseeing the Township's water network with a total current replacement cost of approximately $45 million. The department is responsible for the following:

- Cardinal Water Treatment Plant/Distribution System
- The Edwardsburgh Water Distribution System (to New Wexford and the Industrial Park)
- The Windmill Point low lift pumping station
- Five Small Water Systems under Ontario Regulation 319/08

6.1 Inventory & Valuation

Table 17 summarizes the quantity and current replacement cost of the Township's various water network assets as managed in its primary asset management register, Citywide.

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Water Buildings	4	Quantity	$15,294,000	User-defined
Water Equipment	39	Quantity	$4,697,000	CPI
Water Mains	18,399	Length (m)	$25,110,000	Cost per unit
TOTAL			**$45,101,000**	

Table 17 Detailed Asset Inventory: Water Network

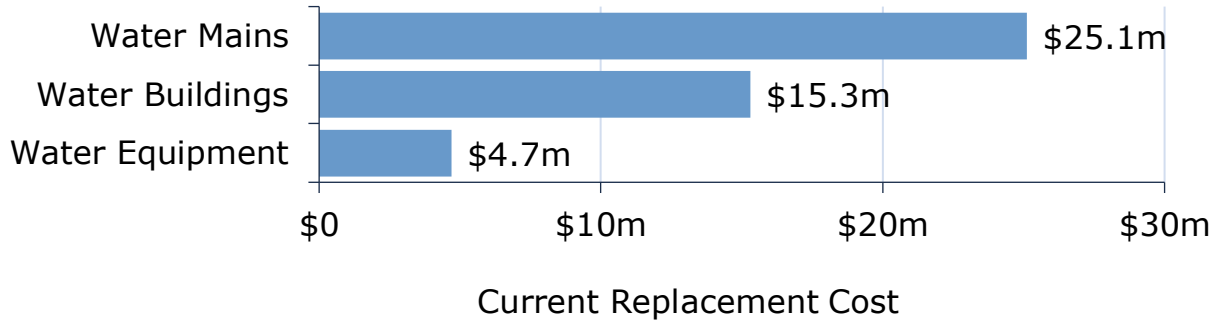


Figure 30 Portfolio Valuation: Water Network

6.2 Asset Condition

Figure 31 summarizes the replacement cost-weighted condition of the Township's water network. Based on a combination of field inspection data and age, 73% of assets are in fair or better condition; the remaining 27% of assets are in poor to very poor condition. Condition assessments were available for 15% of water buildings, and 3% of watermains, based on replacement cost. This condition data was projected from inspection date to current year to estimate their condition today. No condition data was available for water equipment.

Assets in poor or worse condition may be candidates for replacement in the short term; similarly, assets in fair condition may require rehabilitation or replacement in the medium term and should be monitored for further degradation in condition. As illustrated in Figure 31, the majority of the Township's water network assets are in fair or better condition.

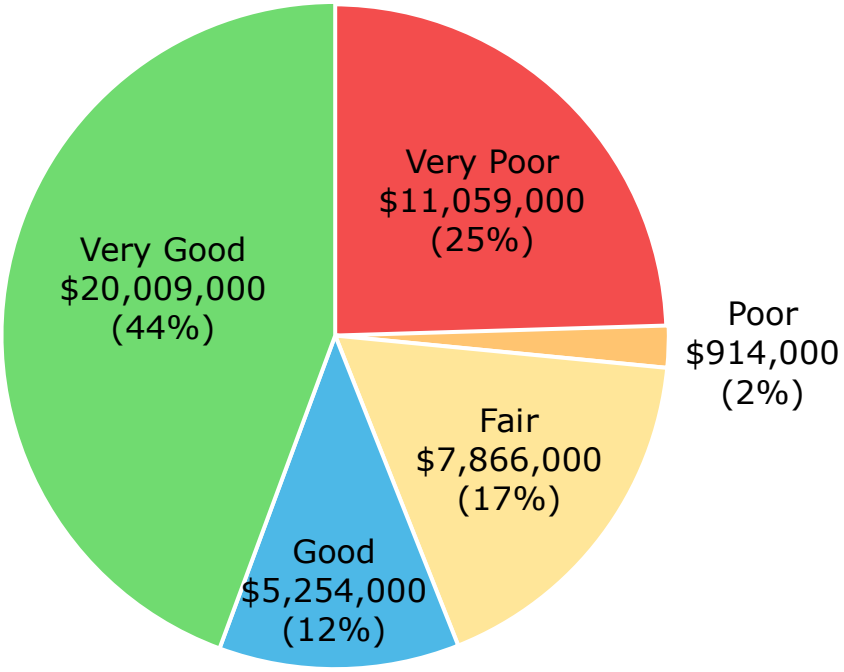


Figure 31 Asset Condition: Water Network Overall

As illustrated in Figure 32, based on condition assessments and age-based conditions, the majority of the Township's water mains is in very good condition; however, 61% of water buildings are in poor or worse condition.

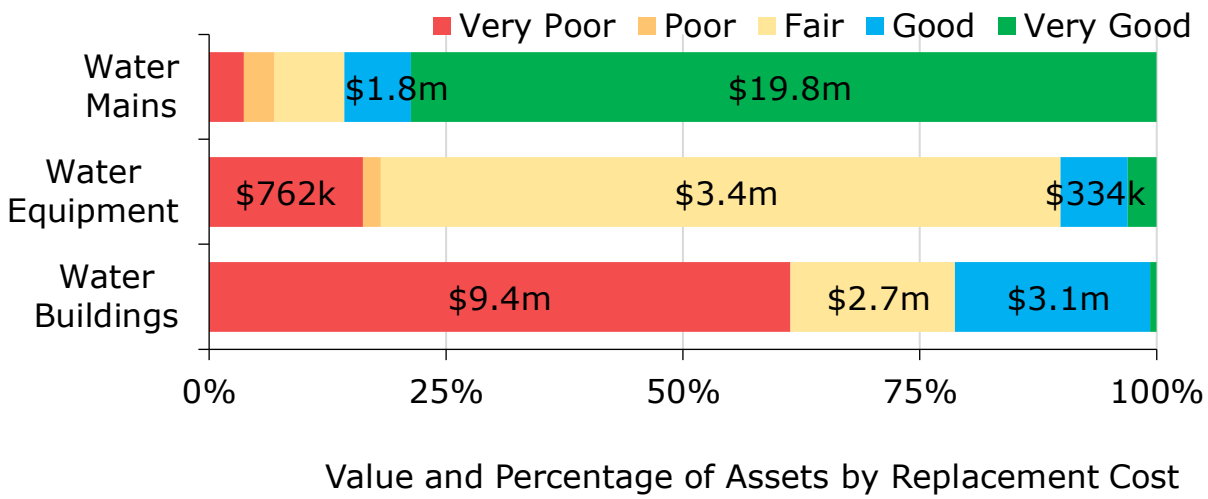


Figure 32 Asset Condition: Water Network by Segment

6.3 Age Profile

An asset's age profile comprises two key values: estimated useful life (EUL), or design life; and the percentage of EUL consumed. The EUL is the serviceable lifespan of an asset during which it can continue to fulfil its intended purpose and provide value to users, safely and efficiently. As assets age, their performance diminishes, often more rapidly as they approach the end of their design life.

In conjunction with condition data, an asset's age profile provides a more complete summary of the state of infrastructure. It can help identify assets that may be candidates for further review through condition assessment programs; inform the selection of optimal lifecycle strategies; and improve planning for potential long-term replacement spikes.

Figure 33 illustrates the average current age of each asset type and its estimated useful life. Both values are weighted by the replacement cost of individual assets.

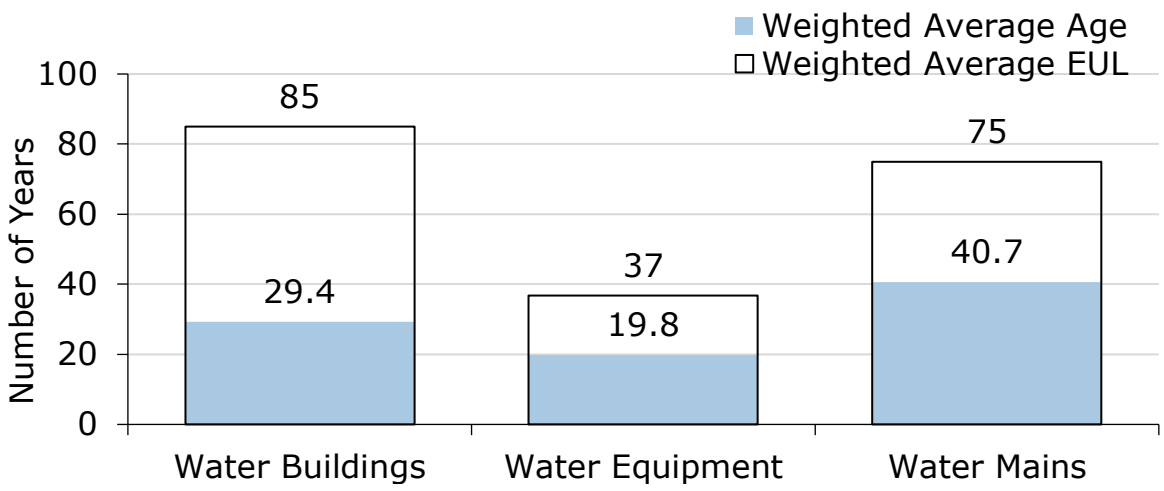


Figure 33 Estimated Useful Life vs. Asset Age: Water Network

6.4 Current Approach to Lifecycle Management

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	Valves are operated annually as part of preventative maintenance to ensure they do not seize
	Periodic pressure testing to identify deficiencies and potential leaks
	The entire network of mains and hydrants are flushed semi-annually
Rehabilitation/ Replacement	Trenchless re-lining of water mains presents significant challenges and is not always a viable option
	In the absence of mid-lifecycle rehabilitative events, most mains are simply maintained with the goal of full replacement once it reaches its end-of-life

Activity Type	Description of Current Strategy
	Other replacement activities are identified based on an analysis of the main break rate, asset functionality and design capacity as well as any issues identified during regular maintenance activities
	Similar to other sub-surface infrastructure, Staff attempt to coordinate water reconstruction projects with road reconstruction project to produce cost efficiencies
Inspection	Hydrants are inspected using a standardized checklist semi-annually by internal Staff

Table 18 Lifecycle Management Strategy: Water Network

6.5 Forecasted Long-Term Replacement Needs

Figure 34 illustrates the cyclical short-, medium- and long-term infrastructure rehabilitation and replacement requirements for the Township's water network. This analysis was run until 2093 to capture at least one iteration of replacement for the longest-lived asset in Citywide Assets, the Township's primary asset management system and asset register. The Township's average annual requirements (red dotted line) total $876,000 ($4.4 million per 5-year bucket) for all assets in the water network. Although actual spending may fluctuate substantially from year to year, this figure is a useful benchmark value for annual capital expenditure targets (or allocations to reserves) to ensure projects are not deferred and replacement needs are met as they arise.

The chart illustrates substantial capital needs throughout the forecast period. It also shows a backlog $1.3 million, dominated by water mains. These projections are based on asset replacement costs, age analysis, and condition data when available. They are designed to provide a long-term, portfolio-level overview of capital needs and should be used to support improved financial planning over several decades.

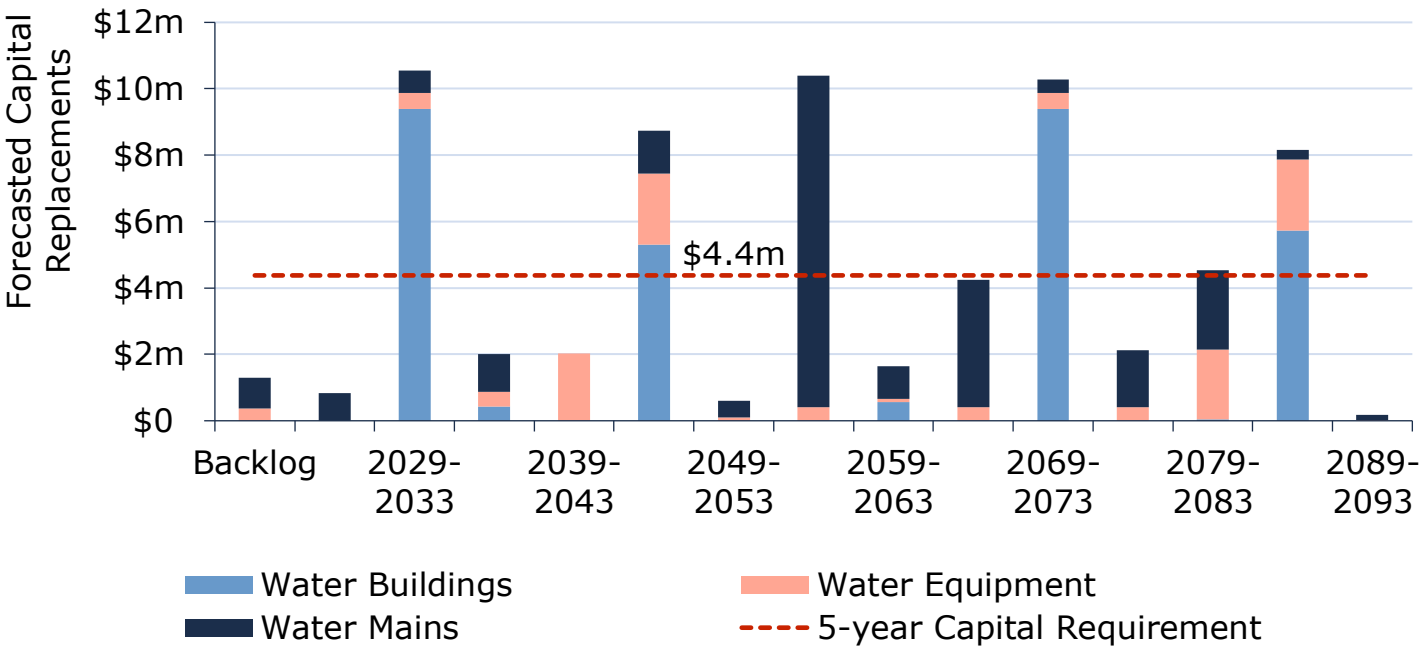


Figure 34 Forecasted Capital Replacement Needs: Water Network 2024-2093

Often, the magnitude of replacement needs is substantially higher than most municipalities can afford to fund. In addition, most assets may not need to be replaced. However, quantifying and monitoring these spikes is essential for long-term financial planning, including establishing dedicated reserves. Regular condition assessments and a robust risk framework will ensure that high-criticality assets receive proper and timely lifecycle intervention, including replacements.

A detailed 10-year capital replacement forecast can be found in Appendix B – 10-Year Capital Requirements.

6.6 Risk Analysis

The risk matrix below is generated using available asset data, including condition, service life remaining, replacement costs, traffic data, and road class. The risk ratings for assets without useful attribute data were calculated using only condition, service life remaining, and their replacement costs.

The matrix stratifies assets based on their individual probability and consequence of failure, each scored from 1 to 5. Their product generates a risk index ranging from 1-25. Assets with the highest criticality and likelihood of failure receive a risk rating of 25; those with lowest probability of failure and lowest criticality carry a risk rating of 1. As new data and information is gathered, the Township may consider integrating relevant

information that improves confidence in the criteria used to assess asset risk and criticality.

These risk models have been built into the Township's Asset Management Database (Citywide Assets). See *Risk & Criticality* section for further details on approach used to determine asset risk ratings and classifications.

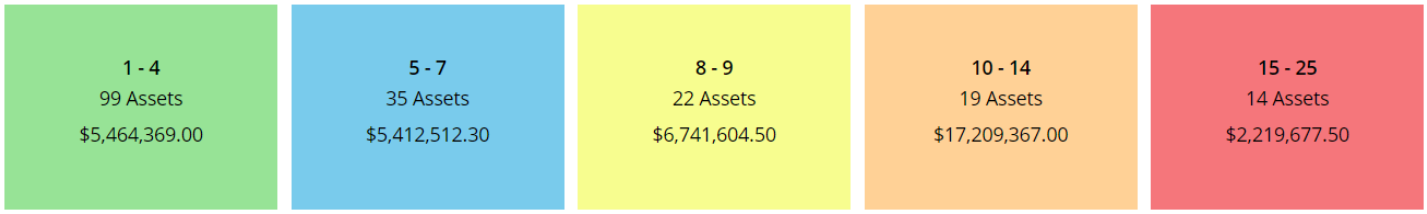


Figure 35 Risk Matrix: Water Network

6.7 Levels of Service

The tables that follow summarize the Township's current levels of service with respect to prescribed KPIs under Ontario Regulation 588/17 as well as any additional performance measures that the Township has selected for this AMP.

6.7.1 Community Levels of Service

Service Attribute	Qualitative Description	Current LOS (2023)
Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal water system	See Appendix C
	Description, which may include maps, of the user groups or areas of the municipality that have fire flow	See Appendix C
Reliability	Description of boil water advisories and service interruptions	No boil water advisories were issued in 2023.

Table 19 O. Reg. 588/17 Community Levels of Service: Water Network

6.7.2 Technical Levels of Service

Service Attribute	Technical Metric	Current LOS (2023)
Scope	% of properties connected to the municipal water system	21%
	% of properties where fire flow is available	21%
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
Performance	Target vs. Actual capital reinvestment rate	1.9% vs. 0.3%

Table 20 O. Reg. 588/17 Technical Levels of Service: Water Network

7. Sanitary Sewer Network

The Environmental Services department is responsible for overseeing the Township's sanitary sewer network with a total current replacement cost of approximately $31 million. The department is responsible for the following:

- The Cardinal Wastewater Treatment Facility/Collection System
- The Spencerville Wastewater Collection System
- The Spencerville Lagoon stabilization ponds
- Seven Sewage Pumping Stations

7.1 Inventory & Valuation

Table 21 summarizes the quantity and current replacement cost of the Township's various sanitary sewer network assets as managed in its primary asset management register, Citywide Assets.

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Sanitary Buildings	14	Quantity	$14,045,000	User-defined
Sanitary Equipment	44	Quantity	$2,112,000	CPI
Sanitary Mains	14,833	Length (m)	$14,815,000	Cost per unit
TOTAL			**$30,973,000**	

Table 21 Detailed Asset Inventory: Sanitary Sewer Network

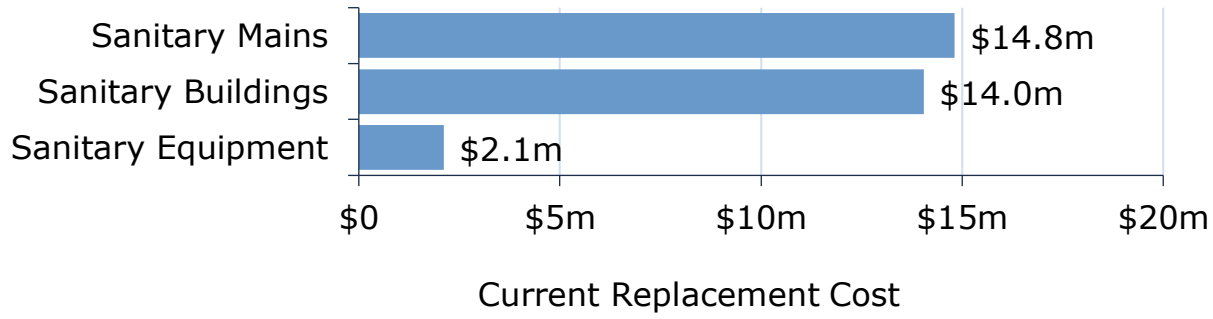


Figure 36 Portfolio Valuation: Sanitary Sewer Network

7.2 Asset Condition

Figure 37 summarizes the replacement cost-weighted condition of the Township's sanitary sewer network. Based on a combination of field inspection data and age, 59% of assets are in fair or better condition; the remaining 41% of assets are in poor to very poor condition. Condition assessments were available for 24% of sanitary buildings, and 35% of sanitary mains, based on replacement cost. This condition data was projected from inspection date to current year to estimate their condition today. No condition data was available for sanitary equipment.

Assets in poor or worse condition may be candidates for replacement in the short term; similarly, assets in fair condition may require rehabilitation or replacement in the medium term and should be monitored for further degradation in condition. As illustrated in Figure 37 the majority of the Township's sanitary sewer network assets are in fair or better condition.

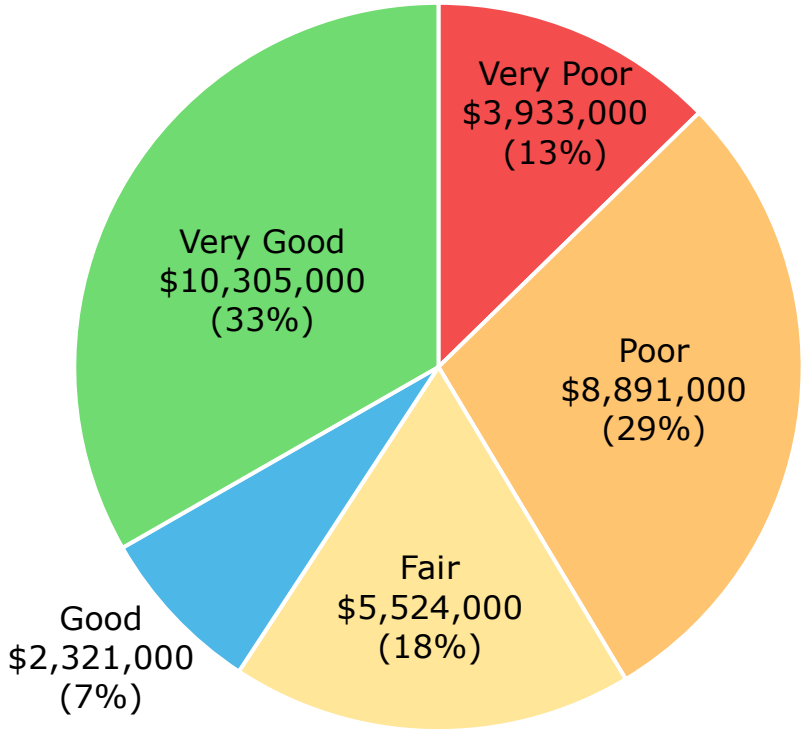


Figure 37 Asset Condition: Sanitary Sewer Network Overall

As illustrated in Figure 38, based on condition assessments and age-based conditions, the majority of the Township's sanitary sewer mains are in very good condition however, 74% of sanitary buildings are in poor or worse condition.

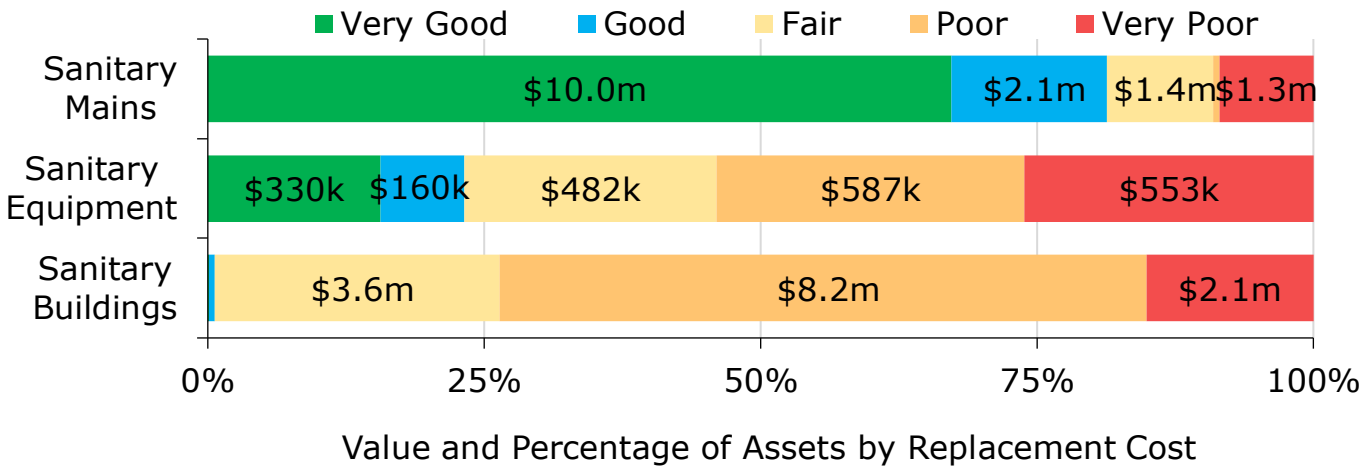


Figure 38 Asset Condition: Sanitary Sewer Network by Segment

7.3 Age Profile

An asset's age profile comprises two key values: estimated useful life (EUL), or design life; and the percentage of EUL consumed. The EUL is the serviceable lifespan of an asset during which it can continue to fulfil its intended purpose and provide value to users, safely and efficiently. As assets age, their performance diminishes, often more rapidly as they approach the end of their design life.

In conjunction with condition data, an asset's age profile provides a more complete summary of the state of infrastructure. It can help identify assets that may be candidates for further review through condition assessment programs; inform the selection of optimal lifecycle strategies; and improve planning for potential long-term replacement spikes.

Figure 39 illustrates the average current age of each asset type and its estimated useful life. Both values are weighted by the replacement cost of individual assets.

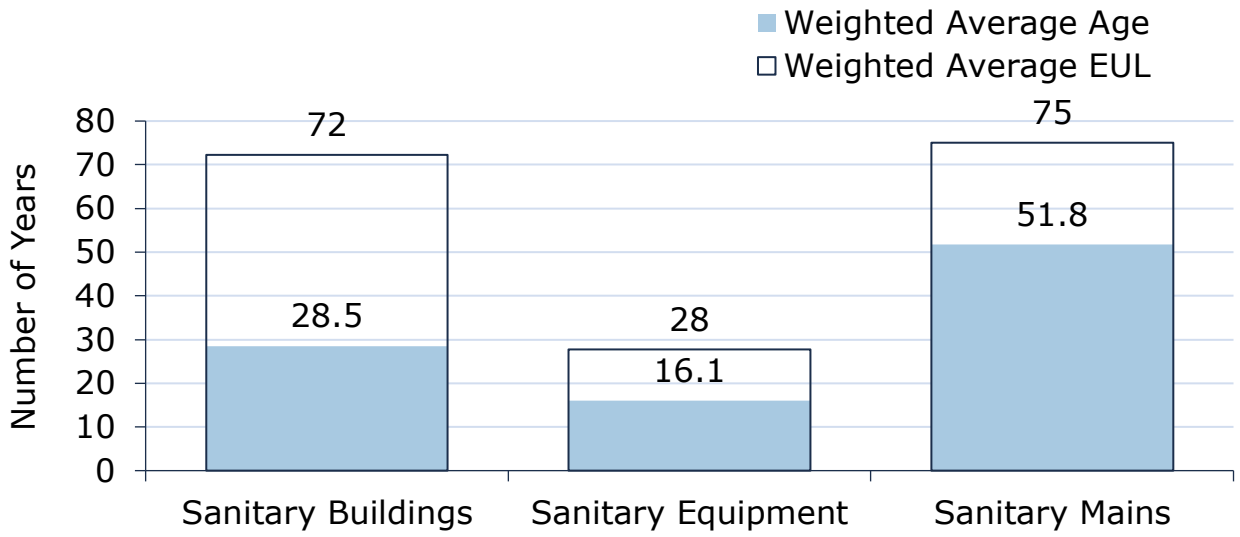


Figure 39 Estimated Useful Life vs. Asset Age: Sanitary Sewer Network

7.4 Current Approach to Lifecycle Management

The condition or performance of most assets will deteriorate over time. This process is affected by a range of factors including an asset's characteristics, location, utilization, maintenance history and environment. The following lifecycle strategy has been developed as a proactive approach to managing the lifecycle of sanitary mains. A trenchless re-lining strategy is expected to extend the service life of sanitary mains at a lower total cost of ownership.

Sanitary Mains		
Event Name	**Event Class**	**Event Trigger**
Cleaning/CCTV Inspection	Maintenance/Inspection	Every 5 Years
Trenchless Re-lining	Rehabilitation	70 Years
Full Reconstruction	Replacement	145 Years

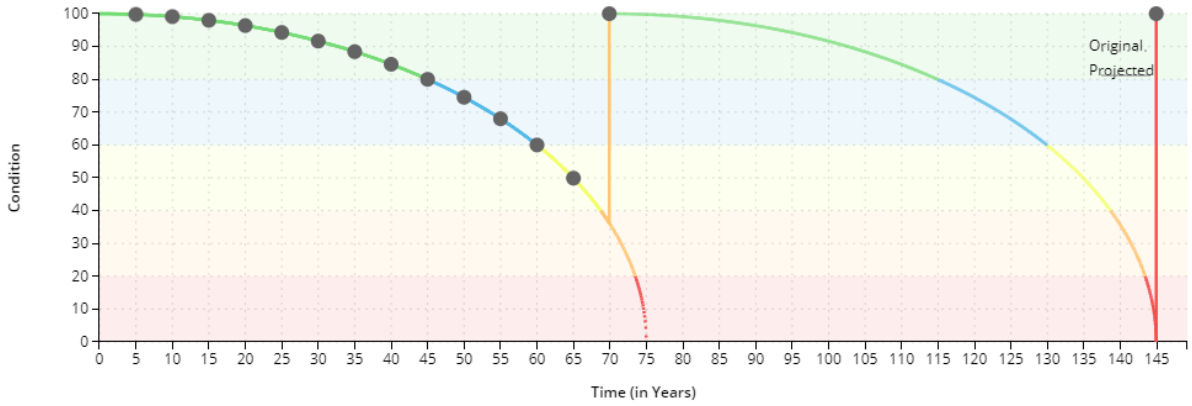


Table 22 Lifecycle Management Strategy: Sanitary Sewer Network (Sanitary Mains)

Activity Type	Description of Current Strategy
Maintenance	Annual maintenance of mains that consists of main flushing, rodding and inspections
	Annual maintenance of manholes that consists of manhole inspection, flushing/cleaning, and grouting
	Annual maintenance of pump stations include inspection and cleaning
Rehabilitation/ Replacement	In the absence of mid-lifecycle rehabilitative events (excluding those mains eligible for CIPP lining), mains are maintained with the goal of full replacement once it reaches its end-of-life
	Project prioritization is based on CCTV inspections, asset age, material, environmental risks, health and safety risks, and social impact. Additional considerations include asset functionality and design capacity.
	When mains are replaced, PVC pipe material is used

Activity Type	Description of Current Strategy
	Similar to other sub-surface infrastructure, Staff coordinate sanitary reconstruction projects with road construction projects to produce cost efficiencies
Inspection	CCTV inspections of sanitary sewers are conducted annually
	Supporting infrastructure such as manholes and pump stations are inspected annually

Table 23 Lifecycle Management Strategy: Sanitary Sewer Network

7.5 Forecasted Long-Term Replacement Needs

Figure 40 illustrates the cyclical short-, medium- and long-term infrastructure rehabilitation and replacement requirements for the Township's sanitary sewer network. This analysis was run until 2168 to capture at least one iteration of replacement for the longest-lived asset in Citywide Assets, the Township's primary asset management system and asset register. The Township's average annual requirements (red dotted line) total $653,000 ($3.3 million per 5-year bucket) for all assets in the sanitary sewer network. Although actual spending may fluctuate substantially from year to year, this figure is a useful benchmark value for annual capital expenditure targets (or allocations to reserves) to ensure projects are not deferred and replacement needs are met as they arise.

The chart illustrates substantial capital needs throughout the forecast period. It also shows a backlog of $858,000 split between sanitary sewer mains and sanitary equipment. These projections are based on asset replacement costs, age analysis, and condition data when available. They are designed to provide a long-term, portfolio-level overview of capital needs and should be used to support improved financial planning over several decades.

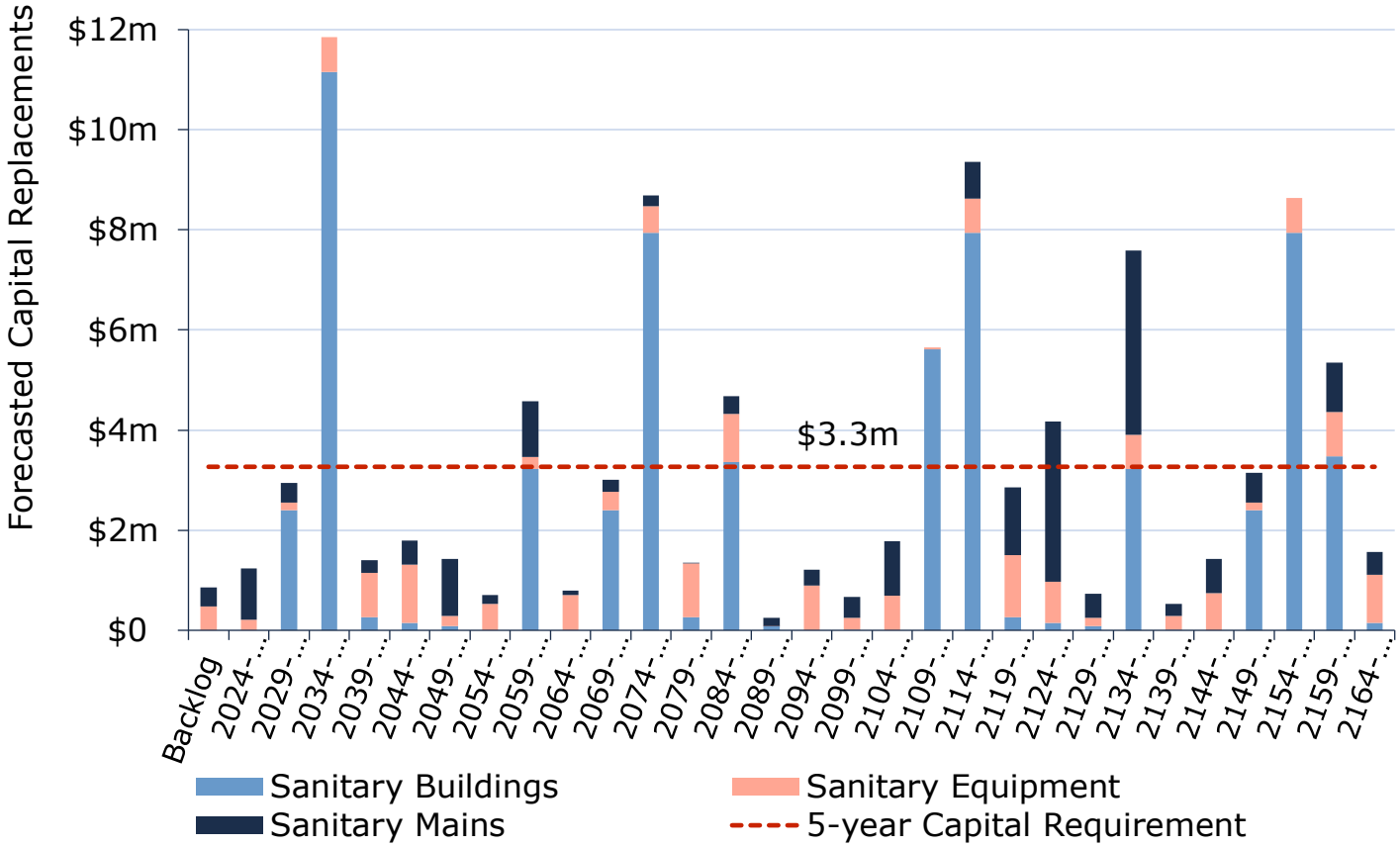


Figure 40 Forecasted Capital Replacement Needs: Sanitary Sewer Network 2024-2168

Often, the magnitude of replacement needs is substantially higher than most municipalities can afford to fund. In addition, most assets may not need to be replaced. However, quantifying and monitoring these spikes is essential for long-term financial planning, including establishing dedicated reserves. Regular condition assessments and a robust risk framework will ensure that high-criticality assets receive proper and timely lifecycle intervention, including replacements.

A detailed 10-year capital replacement forecast can be found in Appendix B – 10-Year Capital Requirements.

7.6 Risk Analysis

The risk matrix below is generated using available asset data, including condition, service life remaining, replacement costs, traffic data, and road class. The risk ratings for assets without useful attribute data were

calculated using only condition, service life remaining, and their replacement costs.

The matrix stratifies assets based on their individual probability and consequence of failure, each scored from 1 to 5. Their product generates a risk index ranging from 1-25. Assets with the highest criticality and likelihood of failure receive a risk rating of 25; those with lowest probability of failure and lowest criticality carry a risk rating of 1. As new data and information is gathered, the Township may consider integrating relevant information that improves confidence in the criteria used to assess asset risk and criticality.

These risk models have been built into the Township's Asset Management Database (Citywide Assets). See *Risk & Criticality* section for further details on approach used to determine asset risk ratings and classifications.

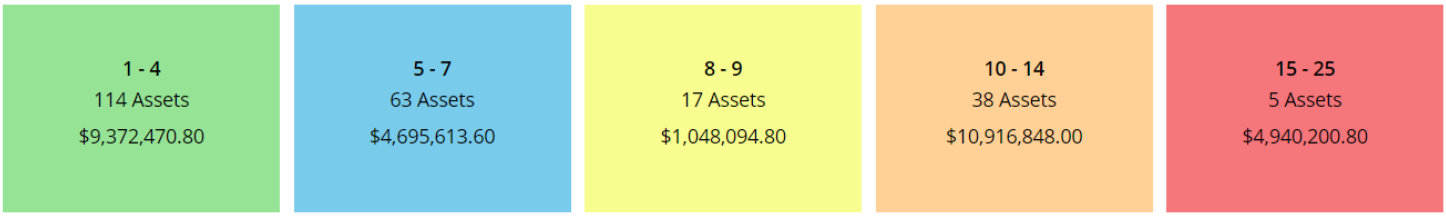


Figure 41 Risk Matrix: Sanitary Sewer Network

7.7 Levels of Service

The tables that follow summarize the Township's current levels of service with respect to prescribed KPIs under Ontario Regulation 588/17 as well as any additional performance measures that the Township has selected for this AMP.

7.7.1 Community Levels of Service

Service Attribute	Qualitative Description	Current LOS (2023)
Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal wastewater system	See Appendix C

Service Attribute	Qualitative Description	Current LOS (2023)
Reliability	Description of how combined sewers in the municipal wastewater system are designed with overflow structures in place which allow overflow during storm events to prevent backups into homes	The Township does not own any combined sewers
	Description of the frequency and volume of overflows in combined sewers in the municipal wastewater system that occur in habitable areas or beaches	The Township does not own any combined sewers
	Description of how stormwater can get into sanitary sewers in the municipal wastewater system, causing sewage to overflow into streets or backup into homes	Stormwater can enter into sanitary sewers due to cracks in sanitary mains or through indirect connections (e.g. weeping tiles). In the case of heavy rainfall events, sanitary sewers may experience a volume of water and sewage that exceeds its designed capacity. In some cases, this can cause water and/or sewage to overflow backup into homes. The disconnection of weeping tiles from sanitary mains and the use of sump pumps and pits directing storm water to the storm drain system can help to reduce the chance of this occurring.

Service Attribute	Qualitative Description	Current LOS (2023)
	Description of how sanitary sewers in the municipal wastewater system are designed to be resilient to stormwater infiltration	The municipality follows a series of design standards that integrate servicing requirements and land use considerations when constructing or replacing sanitary sewers. These standards have been determined with consideration of the minimization of sewage overflows and backups.
	Description of the effluent that is discharged from sewage treatment plants in the municipal wastewater system	Effluent refers to water pollution that is discharged from a wastewater treatment plant, and may include suspended solids, total phosphorous and biological oxygen demand. The Environmental Compliance Approval (ECA) identifies the effluent criteria for municipal wastewater treatment plants.

Table 24 O. Reg. 588/17 Community Levels of Service: Sanitary Sewer Network

7.7.2 Technical Levels of Service

Service Attribute	Technical Metric	Current LOS (2023)
Scope	% of properties connected to the municipal wastewater system	24%
Reliability	# of events per year where combined sewer flow in the municipal wastewater system exceeds system capacity compared to the total number of properties connected to the municipal wastewater system	0

Service Attribute	Technical Metric	Current LOS (2023)
	# of connection-days per year having wastewater backups compared to the total number of properties connected to the municipal wastewater system	0
	# of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system	0
Performance	Target vs. Actual capital reinvestment rate	2.1% vs. 0.4%

Table 25 O. Reg. 588/17 Technical Levels of Service: Sanitary Sewer Network

8. Stormwater Network

The Township is responsible for owning and maintaining a stormwater network of an unknown length of storm sewer mains, catch basins and other supporting infrastructure. Staff are working towards improving the accuracy and reliability of their Stormwater Network inventory to assist with long-term asset management planning.

8.1 Inventory & Valuation

Table 26 summarizes the quantity and current replacement cost of all stormwater management assets available in the Township's asset register.

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Storm Sewer Mains	1,091	Length (m)	$2,683,000	CPI
TOTAL			**$2,683,000**	

Table 26 Detailed Asset Inventory: Stormwater Network

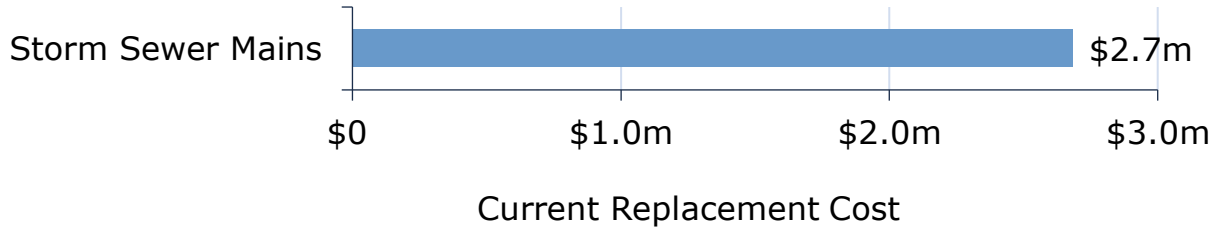


Figure 42 Portfolio Valuation: Stormwater Network

8.2 Asset Condition

Figure 43 summarizes the replacement cost-weighted condition of the Township's stormwater management assets. Based on age data only, approximately 12% of assets are in poor to very poor condition. These assets may be candidates for replacement in the short term; similarly, assets in fair condition may require rehabilitation or replacement in the medium term and should be monitored for further degradation in condition.

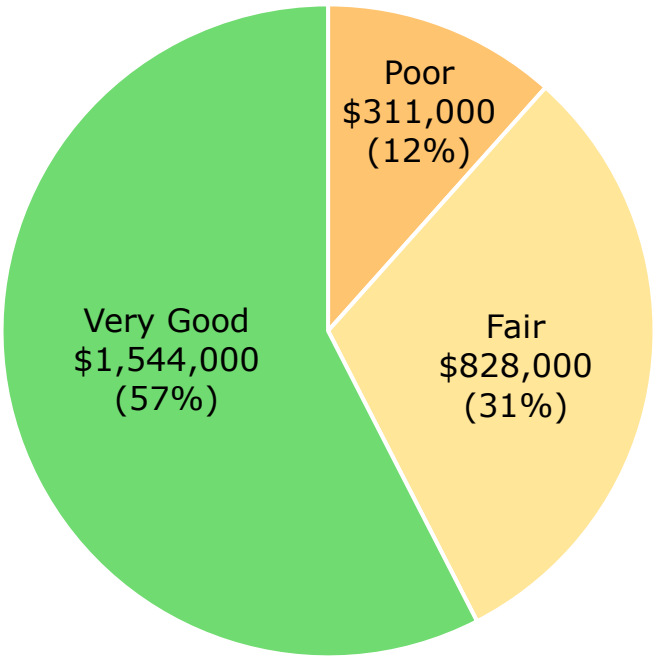


Figure 43 Asset Condition: Stormwater Network Overall

Figure 44 summarizes the age-based condition of stormwater assets. The analysis illustrates that the majority of stormwater mains are in fair or better condition. However, 12% of mains, with a current replacement cost of $311,000, are in poor or worse condition.

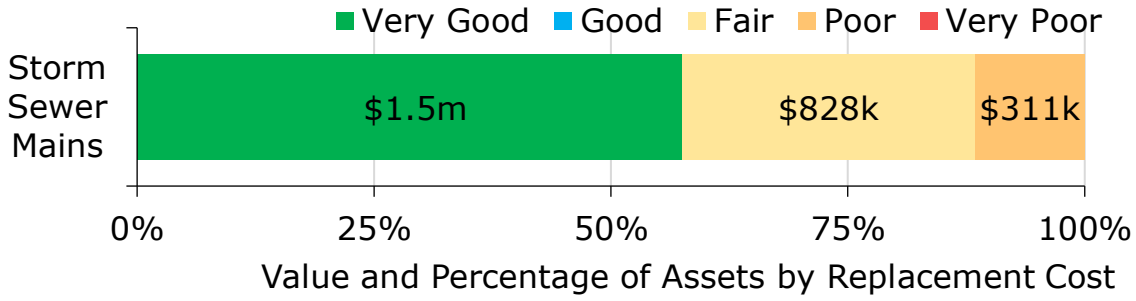


Figure 44 Asset Condition: Stormwater Network by Segment

8.3 Age Profile

An asset's age profile comprises two key values: estimated useful life (EUL), or design life; and the percentage of EUL consumed. The EUL is the serviceable lifespan of an asset during which it can continue to fulfil its intended purpose and provide value to users, safely and efficiently. As assets

age, their performance diminishes, often more rapidly as they approach the end of their design life.

In conjunction with condition data, an asset's age profile provides a more complete summary of the state of infrastructure. It can help identify assets that may be candidates for further review through condition assessment programs; inform the selection of optimal lifecycle strategies; and improve planning for potential replacement spikes.

Figure 45 illustrates the average current age of each asset type and its estimated useful life. Both values are weighted by the replacement cost of individual assets.

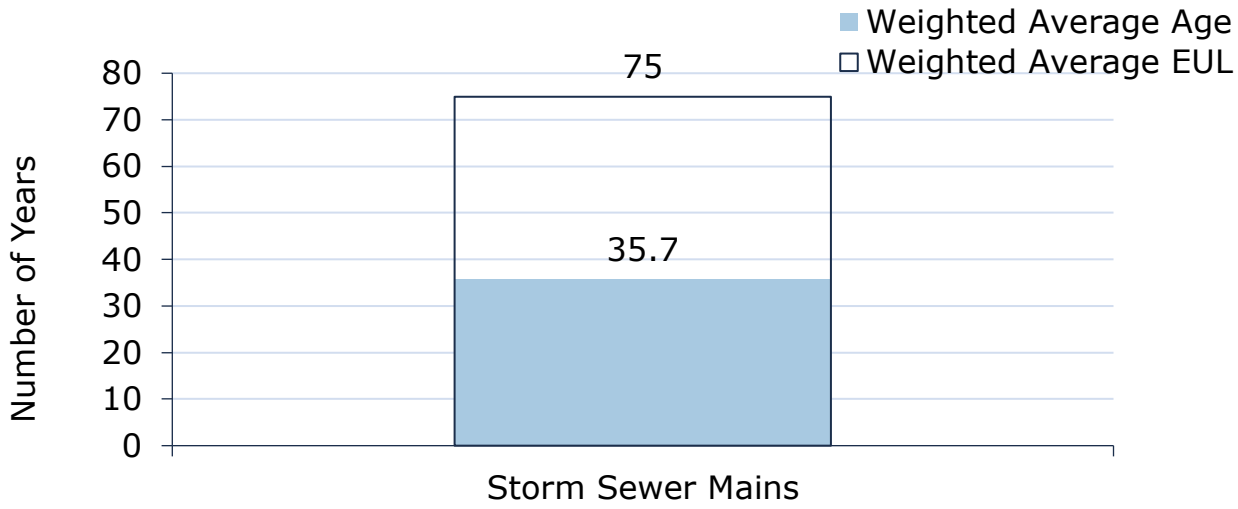


Figure 45 Estimated Useful Life vs. Asset Age: Stormwater Network

Age analysis reveals that on average, storm mains in a moderate stage of their expected lifecycle. Age profiles and CCTV inspections will help to identify mains in need of replacements and/or upgrades. Extensions to EULs for mains may also be considered based on performance history to date.

8.4 Current Approach to Lifecycle Management

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	Primary maintenance activities include catch basin cleaning and storm main flushing, but only a small percentage of the entire network is completed per year
	Flushing activities are usually completed alongside CCTV inspections
	Maintenance activities are completed to a lesser degree compared to other underground linear infrastructure
Rehabilitation	Trenchless re-lining has the potential to reduce total lifecycle costs but would require a formal condition assessment program to determine viability
Replacement	Without the availability of up-to-date condition assessment information replacement activities are purely reactive in nature
Inspection	CCTV inspections and cleaning is completed as budget becomes available and this information will be used to drive forward rehabilitation and replacement plans
	Supporting infrastructure such as catch basins and culverts are inspected internally with checklists to assess factors such as structural adequacy

Table 27 Lifecycle Management Strategy: Stormwater Network

It is worth noting that the Township is considering increasing their inspections to include ditch assessments to ensure comprehensive infrastructure management.

8.5 Forecasted Long-Term Replacement Needs

Figure 46 illustrates the cyclical short-, medium- and long-term infrastructure replacement requirements for the Township's stormwater network assets. This analysis was run until 2098 to capture at least one iteration of replacement for the longest-lived asset in Citywide Assets, the Township's primary asset management system and asset register. The Township's average annual requirements (red dotted line) total $36,000 ($179,000 per 5-year bucket) for all assets in the stormwater network. Although actual spending may fluctuate substantially from year to year, this figure is a useful benchmark value for annual capital expenditure targets (or

allocations to reserves) to ensure projects are not deferred and replacement needs are met as they arise.

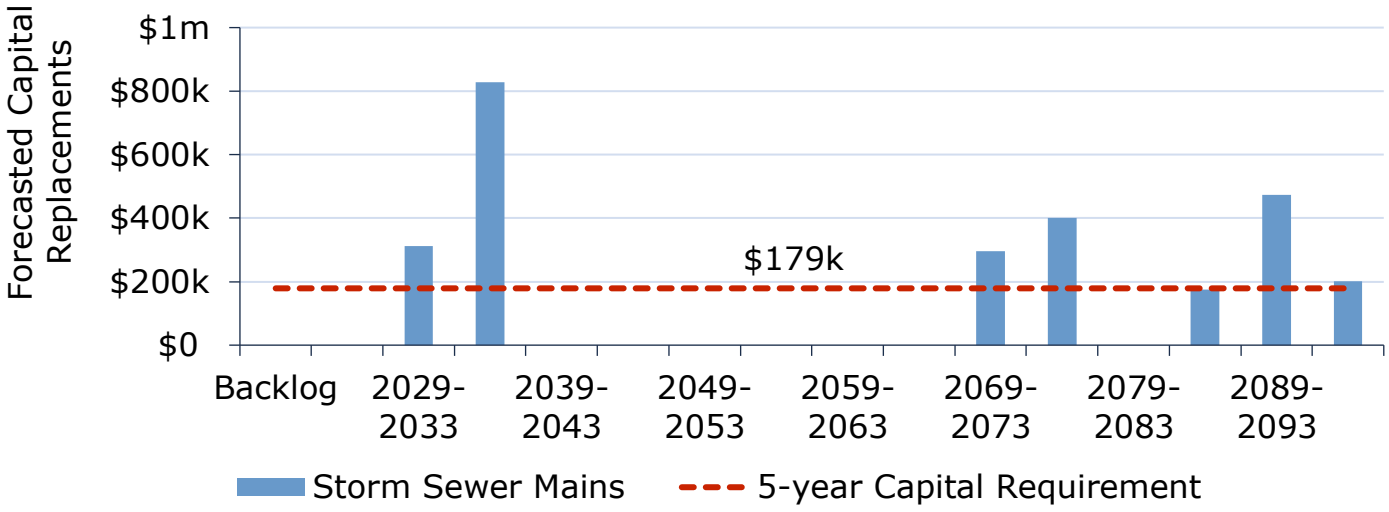


Figure 46 Forecasted Capital Replacement Needs Stormwater Network 2024-2098

The chart illustrates no backlog for stormwater assets. The largest replacement spike is forecasted in 2034-2038 followed by 2069 and beyond as mains reach the end of their expected design life. These projections and estimates are based on asset replacement costs and age analysis. They are designed to provide a long-term, portfolio-level overview of capital needs and should be used to support improved financial planning over several decades.

Often, the magnitude of replacement needs is substantially higher than most municipalities can afford to fund. In addition, most assets may not need to be replaced. However, quantifying and monitoring these spikes is essential for long-term financial planning, including establishing dedicated reserves. Forthcoming CCTV inspections may reveal a higher backlog. The inspections may also help reduce long-term projections by providing more accurate condition data for mains than age. In addition, a robust risk framework will ensure that high-criticality assets receive proper and timely lifecycle intervention, including replacements.

A detailed 10-year capital replacement forecast can be found in Appendix B – 10-Year Capital Requirements.

8.6 Risk Analysis

The risk matrix below is generated using available asset data, including condition, service life remaining, and replacement costs. As no attribute data was available for storm assets, the risk ratings for assets were calculated using only these required, minimum asset fields.

The matrix stratifies assets based on their individual probability and consequence of failure, each scored from 1 to 5. Their product generates a risk index ranging from 1-25. Assets with the highest criticality and likelihood of failure receive a risk rating of 25; those with lowest probability of failure and lowest criticality carry a risk rating of 1. As new data and information is gathered, the Township may consider integrating relevant information that improves confidence in the criteria used to assess asset risk and criticality.

These risk models have been built into the Township's Asset Management Database (Citywide Assets). See *Risk & Criticality* section for further details on approach used to determine asset risk ratings and classifications.

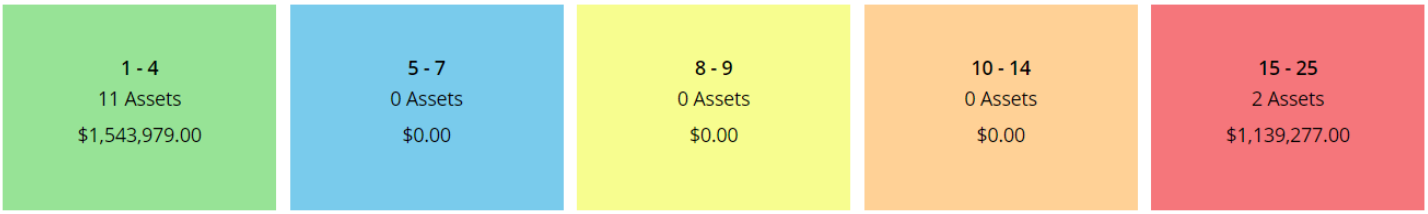


Figure 47 Risk Matrix: Stormwater Network

8.7 Levels of Service

The tables that follow summarize the Township's current levels of service with respect to prescribed KPIs under Ontario Regulation 588/17 as well as any additional performance measures that the Township has selected for this AMP.

8.7.1 Community Levels of Service

Service Attribute	Qualitative Description	Current LOS (2023)
Scope	Description, which may include map, of the user groups or areas of the Township that are protected from flooding, including the extent of protection provided by the municipal storm water network	See Appendix C

Table 28 O. Reg. 588/17 Community Levels of Service: Stormwater Network

8.7.2 Technical Levels of Service

Service Attribute	Technical Metric	Current LOS (2023)
Scope	% of properties in municipality designed to be resilient to a 100-year storm	TBD[3]
	% of the municipal stormwater management system designed to be resilient to a 5-year storm	100%[4]
Performance	Target vs. Actual capital reinvestment rate	1.3% vs. 19.1%

Table 29 O. Reg. 588/17 Technical Levels of Service: Stormwater Network

[3] The Township does not currently have data available to determine this technical metric. The rate of properties that are expected to be resilient to a 100-year storm is expected to be low.
[4] This is based on the observations of municipal staff.

Non-Core Assets

Buildings & Facilities

Replacement Cost	Average Condition	Financial Capacity	
$29.7 m	**Fair**	Annual Requirement:	$764,000
		Funding Available:	$232,000
		Annual Deficit:	**$532,000**

Land Improvements

Replacement Cost	Average Condition	Financial Capacity	
$1.4 m	**Good**	Annual Requirement:	$71,000
		Funding Available:	$91,000
		Annual Deficit:	**($20,000)**

Vehicles

Replacement Cost	Average Condition	Financial Capacity	
$7.3 m	**Poor**	Annual Requirement:	$487,000
		Funding Available:	$100,000
		Annual Deficit:	**$387,000**

Machinery & Equipment

Replacement Cost	Average Condition	Financial Capacity	
$ 6.2 m	**Poor**	Annual Requirement:	$453,000
		Funding Available:	$686,000
		Annual Deficit:	**($233,000)**

9. Buildings & Facilities

The Township's buildings portfolio includes fire stations, various administrative and public works facilities, as well as public libraries and recreational assets. The total current replacement of buildings is estimated at approximately $30 million.

9.1 Inventory & Valuation

Table 30 summarizes the quantity and current replacement cost of all buildings assets available in the Municipality's asset register. Buildings and facilities assets are not componentized. The quantity listed represents the number of asset records currently available for each department.

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Administration	3	Quantity	$2,628,000	User-defined
Fire Department	3	Quantity	$3,858,000	User-defined
Library	2	Quantity	$1,027,000	User-defined
Public Works	5	Quantity	$2,248,000	User-defined
Recreation	13	Quantity	$19,937,000	User-defined
TOTAL			**$29,699,000**	

Table 30 Detailed Asset Inventory: Buildings & Facilities

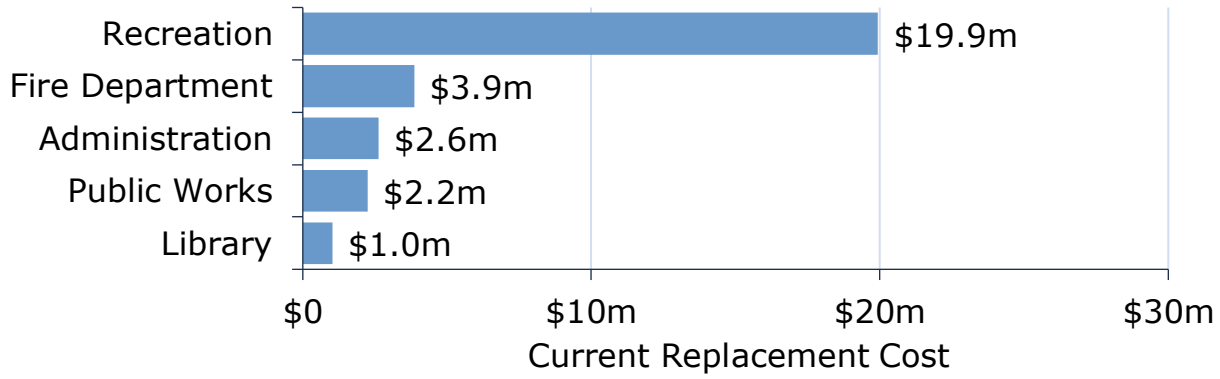


Figure 48 Portfolio Valuation: Buildings & Facilities

9.2 Asset Condition

Figure 49 summarizes the replacement cost-weighted condition of the Township's buildings portfolio. Based mostly on age-based data, 41% of buildings assets are in fair or better condition; however, 59%, with a current replacement cost of more than $17 million are in poor or worse condition. These assets may be candidates for replacement in the short term; similarly, assets in fair condition may require rehabilitation or replacement in the medium term and should be monitored for further degradation in condition. As buildings are not componentized, condition data is presented only at the site level, rather than at the individual element or component level within each building. This drawback is further compounded by the lack of assessed condition data, requiring the use of age-based estimates only.

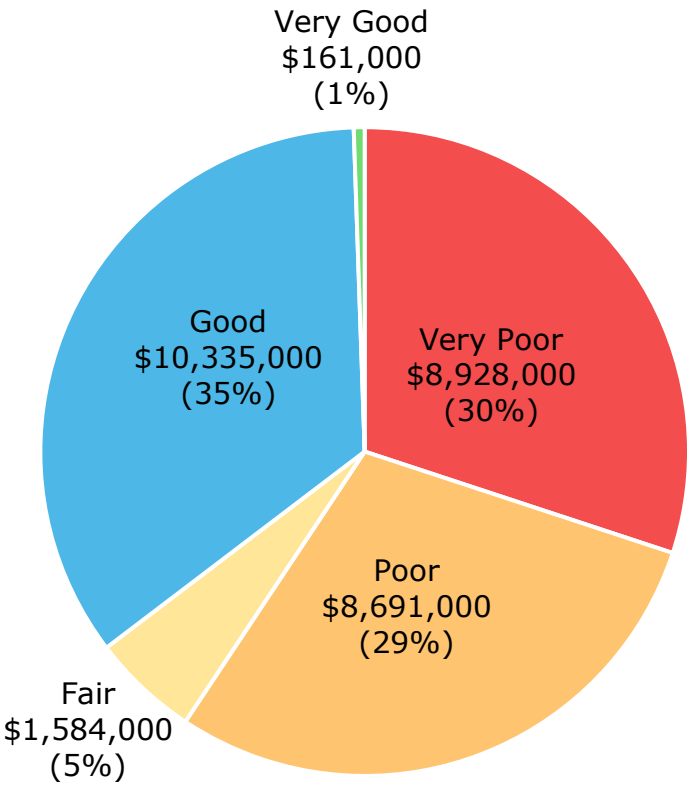


Figure 49 Asset Condition: Buildings & Facilities Overall

Figure 50 summarizes the age-based condition of buildings by each department. A substantial portion of recreation assets and the majority of library, administration, and public works assets are in poor to worse condition. However, in the absence of componentization, this data has

limited value. Componentization of assets and integration of condition assessments will provide a more accurate and reliable estimation of the condition of various facilities.

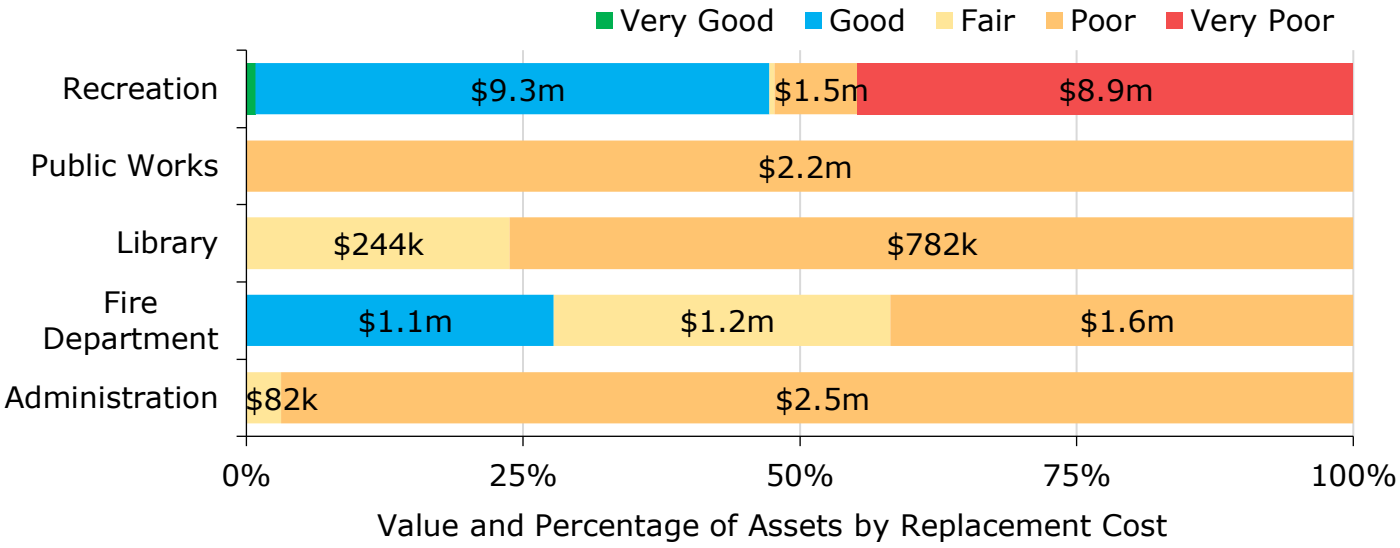


Figure 50 Asset Condition: Buildings & Facilities by Segment

Buildings and facilities assets are unique in that they rarely require the need for replacement based solely on condition. It is typical that, in addition to condition, other factors, such as capacity, will impact the asset's ability to serve the purpose originally intended.

For example, Fire Station 2 should be considered for upgrade or replacement based on the 2016 needs study completed by Eastern Engineering Group. While the overall condition of the facility was rated as fair, further commentary was provided indicating that numerous deficiencies that impact the facility's functionality (including lack of available space) resulted in a recommendation against the ongoing use of the existing facility as a fire station.

9.3 Age Profile

An asset's age profile comprises two key values: estimated useful life (EUL), or design life; and the percentage of EUL consumed. The EUL is the serviceable lifespan of an asset during which it can continue to fulfil its intended purpose and provide value to users, safely and efficiently. As assets age, their performance diminishes, often more rapidly as they approach the end of their design life.

In conjunction with condition data, an asset's age profile provides a more complete summary of the state of infrastructure. It can help identify assets

that may be candidates for further review through condition assessment programs; inform the selection of optimal lifecycle strategies; and improve planning for potential replacement spikes.

Figure 51 illustrates the average current age of each asset type and its estimated useful life. Both values are weighted by the replacement cost of individual assets.

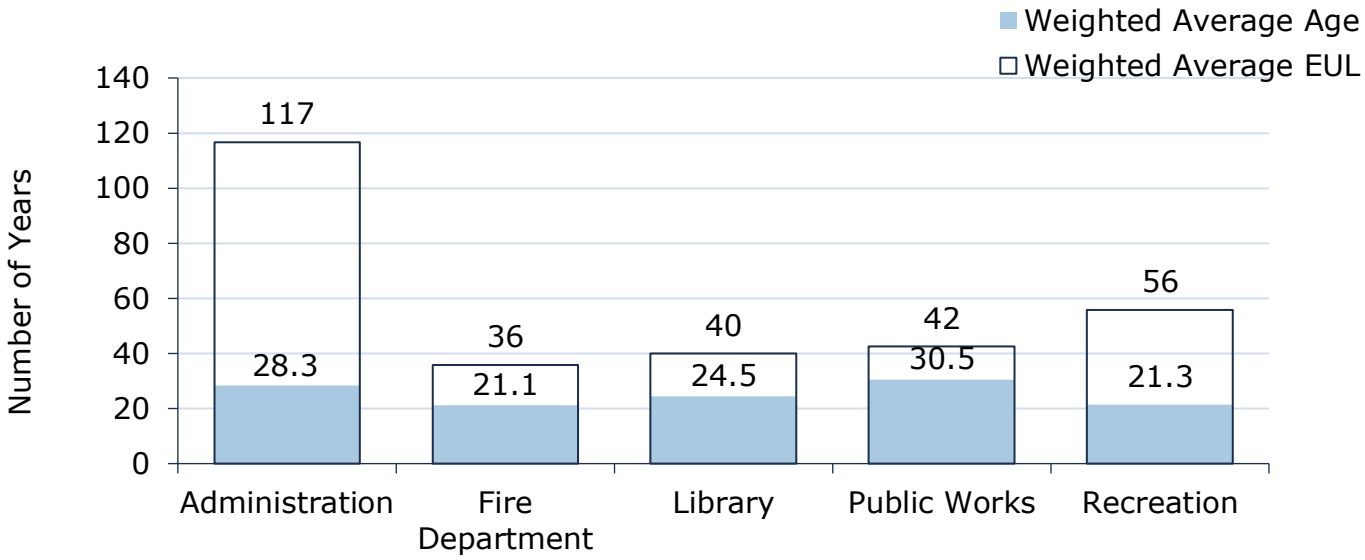


Figure 51 Estimated Useful Life vs. Asset Age: Buildings & Facilities

Age analysis reveals that, on average, buildings assets are in the earlier stages of their serviceable life. However, based on acquisition years, most library and recreation assets have consumed nearly 100% of their established useful life. Once again, this analysis presented only at the site level, rather than at the individual element or component level. Useful and meaningful age analysis for buildings is entirely predicated on effective componentization.

9.4 Current Approach to Lifecycle Management

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.

Table 31 outlines the Township's current lifecycle management strategy.

Activity Type	Description of Current Strategy
Maintenance	Maintenance is triggered by inspections idenfifying safety, accessibility, functionality, and structural issues.
	Critical buildings (Water Treatment Plant, Wastewater Treatment Plant, Fire Stations etc.) have a detailed maintenance and rehabilitation schedules, while the maintenance of other facilities are dealt with on a case-by-case basis
Rehabilitation/ Replacement	Rehabilitations such as roof replacements or HVAC component replacements are considered on an as needed basis
	The primary considerations for asset replacement are asset failure, availability or grant funding, safety issues, volume of use, and recommendations from facility needs assessments
Inspection	Internal inspections are conducted monthly for health and safety requirements, as well as to identify any maintenance concerns
	HVAC systems are inspected bi-annually by an external contractor
	Facility Needs Assessment Studies are conducted by an external contractor approximately every 5 years
	Assessments are completed strategically as buildings approach their end-of-life to determine whether replacement or rehabilitation is appropriate

Table 31 Lifecycle Management Strategy: Buildings & Facilities

9.5 Forecasted Long-Term Replacement Needs

Figure 52 illustrates the cyclical short-, medium- and long-term infrastructure replacement requirements for the Township's buildings portfolio. This analysis was run until 2058 to capture at least one iteration of replacement for the longest-lived asset in Citywide Assets, the Township's primary asset management system and asset register. The Township's average annual requirements (red dotted line) total $764,000 ($3.8 million per 5-year bucket) for all buildings. Although actual spending may fluctuate substantially from year to year, this figure is a useful benchmark value for

annual capital expenditure targets (or allocations to reserves) to ensure projects are not deferred and replacement needs are met as they arise.

Replacement needs are forecasted to rise consistently over the next 20 years, reaching $8.3 million between 2029 and 2033. The chart also illustrates a backlog of more than $214,000 for recreation facilities and comprising assets that have reached the end of their useful life but still remain in operation. These projections and estimates are based on current asset records, their replacement costs, and age analysis. They are designed to provide a long-term, portfolio-level overview of capital needs and should be used to support improved financial planning over several decades.

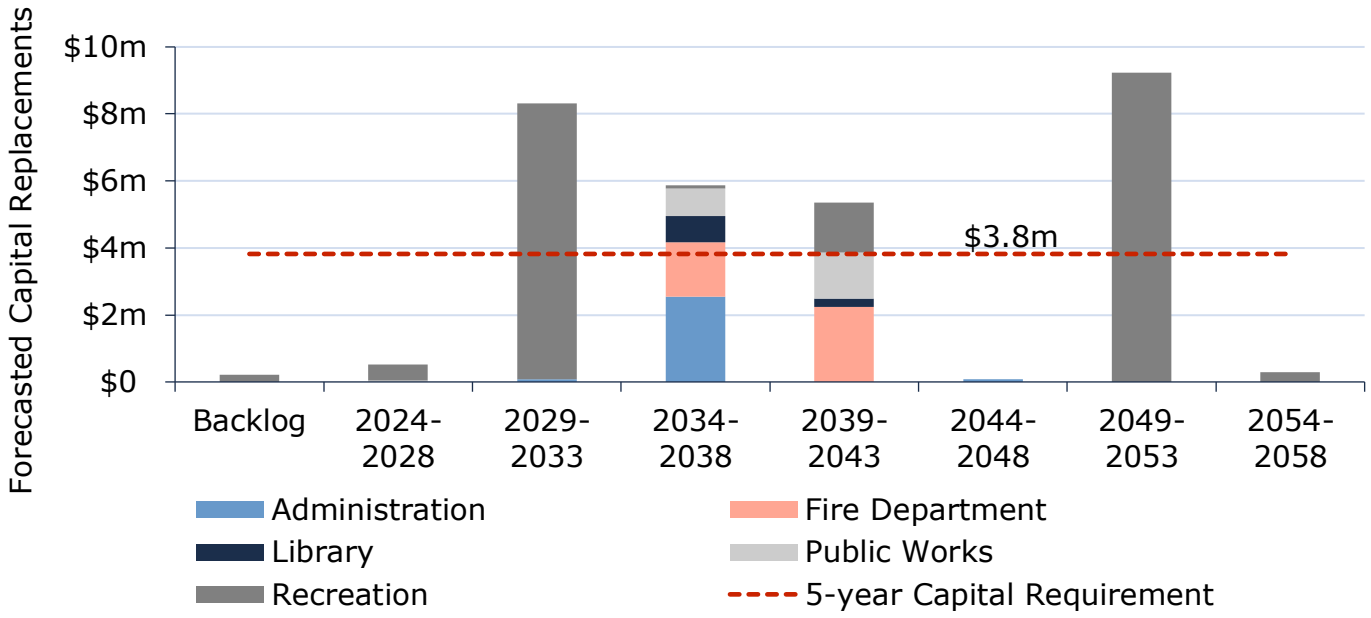


Figure 52 Forecasted Capital Replacement Needs Buildings & Facilities 2024-2058

Often, the magnitude of replacement needs is substantially higher than most municipalities can afford to fund. In addition, most assets may not need to be replaced. However, quantifying and monitoring these spikes is essential for long-term financial planning, including establishing dedicated reserves. In addition, a robust risk framework will ensure that high-criticality assets receive proper and timely lifecycle intervention, including replacements. In the case of buildings and facilities, detailed componentization is necessary to develop more reliable lifecycle forecasts that reflect the needs of individual elements and components.

A detailed 10-year capital replacement forecast can be found in Appendix B – 10-Year Capital Requirements.

9.6 Risk Analysis

The risk matrix below is generated using available asset data, including service life remaining, replacement costs, and building department. The risk ratings for assets without useful attribute data were calculated using only age, service life remaining, and their replacement costs.

The matrix classifies assets based on their individual probability and consequence of failure, each scored from 1 to 5. Their product generates a risk index ranging from 1-25. Assets with the highest criticality and likelihood of failure receive a risk rating of 25; those with lowest probability of failure and lowest criticality carry a risk rating of 1. As new data and information is gathered, the Township may consider integrating relevant information that improves confidence in the criteria used to assess asset risk and criticality.

These risk models have been built into the Township's Asset Management Database (Citywide Assets). See *Risk & Criticality* section for further details on approach used to determine asset risk ratings and classifications.

Figure 53 Risk Matrix: Buildings & Facilities

9.7 Levels of Service

The tables that follow summarize the Township's current levels of service. There are no specifically prescribed KPIs under Ontario Regulation 588/17 for non-core assets, therefore the KPIs below represent performance measures that the Township has selected for this AMP.

9.7.1 Community Levels of Service

Service Attribute	Qualitative Description	Current LOS (2023)
Scope	Description, which may include maps, of the types of facilities that the municipality operates and maintains	Facilities within Edwardsburgh Cardinal include those dedicated to administration, such as Township Hall and Libraries. Fire services are supported by two fire halls and an EMS station. Public works is supported by various equipment garages and salt/sand protection facilities. Recreation provides its services through a variety of facilities such as arenas, pools, and park facilities.
Accessibility	List of facilities that meet accessibility standards and description of any work that has been undertaken to achieve alignment	All publicly accessible buildings meet accessibility standards.

Table 32 Community Levels of Service: Buildings & Facilities

9.7.2 Technical Levels of Service

Service Attribute	Technical Metric	Current LOS (2023)
Quality	Average facility condition index value for facilities in the municipality	42%
Scope	Square metres of indoor recreation facilities per 1,000 households	1,939[5]
Performance	Target vs. Actual capital reinvestment rate	2.6% vs. 0.8%

Table 33 Technical Levels of Service: Buildings & Facilities

[5] Spencerville Arena = 11,194 sq. ft. (1,040 m2); Ingredion Arena = 36,155 sq. ft. (3,359 m2)

10. Land Improvements

The Township's land improvements portfolio includes parking lots, fencing, signage and miscellaneous landscaping and other assets. The total current replacement of land improvements is estimated at approximately $1.4 million.

10.1 Inventory & Valuation

Table 34 summarizes the quantity and current replacement cost of all land improvements assets available in the Township's asset register. Miscellaneous land improvements (such as fishing docks and landscaping) and parking lots account for the majority of land improvement assets.

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Fencing	8	Quantity	$175,000	CPI
Miscellaneous	8	Quantity	$530,000	CPI
Parking Lots	7	Quantity	$498,000	CPI
Signage	47	Quantity	$146,000	CPI
TOTAL			**$1,350,000**	

Table 34 Detailed Asset Inventory: Land Improvements

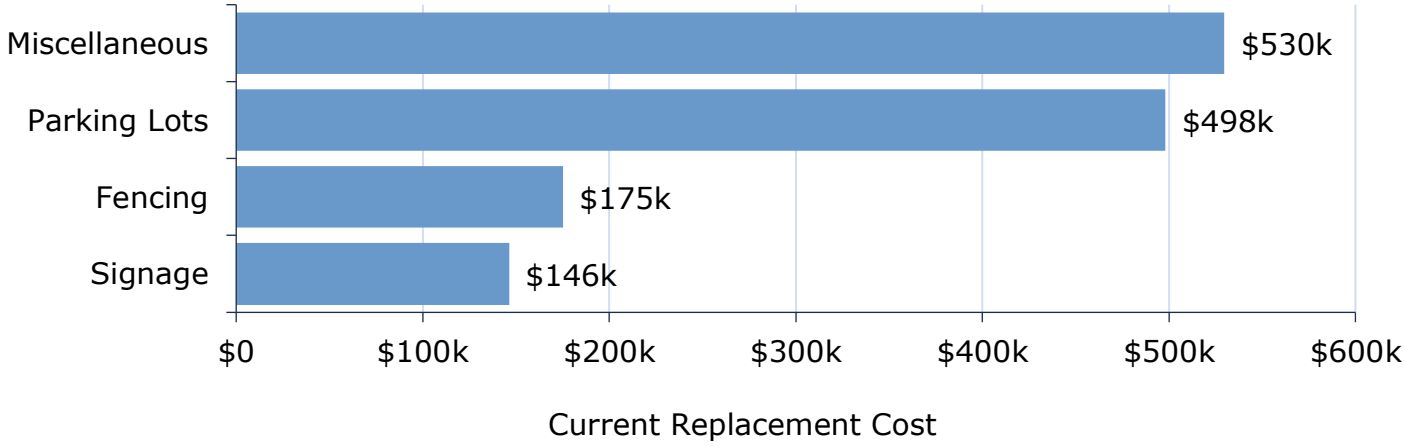


Figure 54 Portfolio Valuation: Land Improvements

10.2 Asset Condition

Figure 55 summarizes the replacement cost-weighted condition of the Municipality's land improvement portfolio. Based mostly on age data, 82% of assets are in fair or better condition, the remaining 18% are in poor or worse condition. These assets may be candidates for replacement in the short term; similarly, assets in fair condition may require rehabilitation or replacement in the medium term and should be monitored for further degradation in condition.

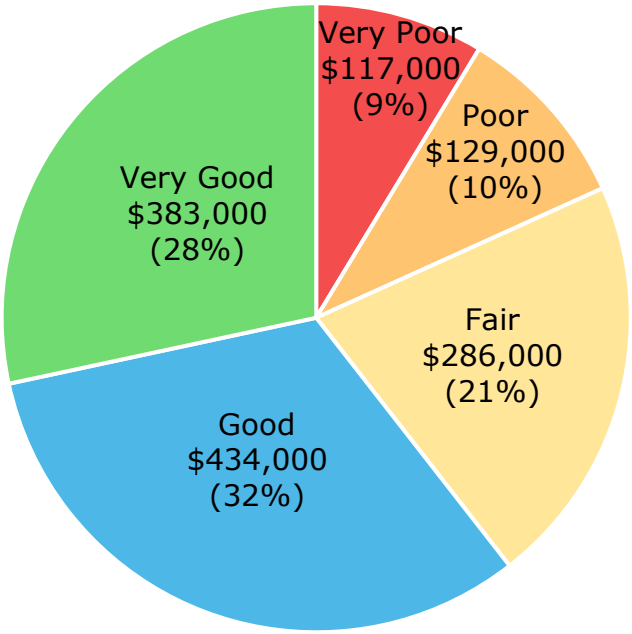


Figure 55 Asset Condition: Land Improvements Overall

Figure 56 summarizes the age-based condition of land improvements by each department. Assets in poor or worse condition are primarily concentrated in signage and fencing.

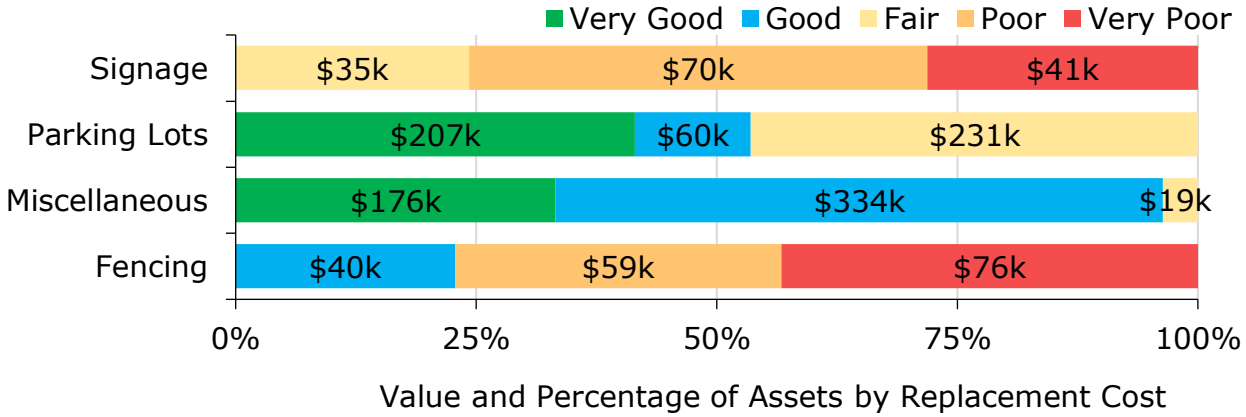


Figure 56 Asset Condition: Land Improvements by Segment

10.3 Age Profile

An asset's age profile comprises two key values: estimated useful life (EUL), or design life; and the percentage of EUL consumed. The EUL is the serviceable lifespan of an asset during which it can continue to fulfil its intended purpose and provide value to users, safely and efficiently. As assets age, their performance diminishes, often more rapidly as they approach the end of their design life.

In conjunction with condition data, an asset's age profile provides a more complete summary of the state of infrastructure. It can help identify assets that may be candidates for further review through condition assessment programs; inform the selection of optimal lifecycle strategies; and improve planning for potential replacement spikes.

Figure 57 illustrates the average current age of each asset type and its estimated useful life. Both values are weighted by the replacement cost of individual assets.

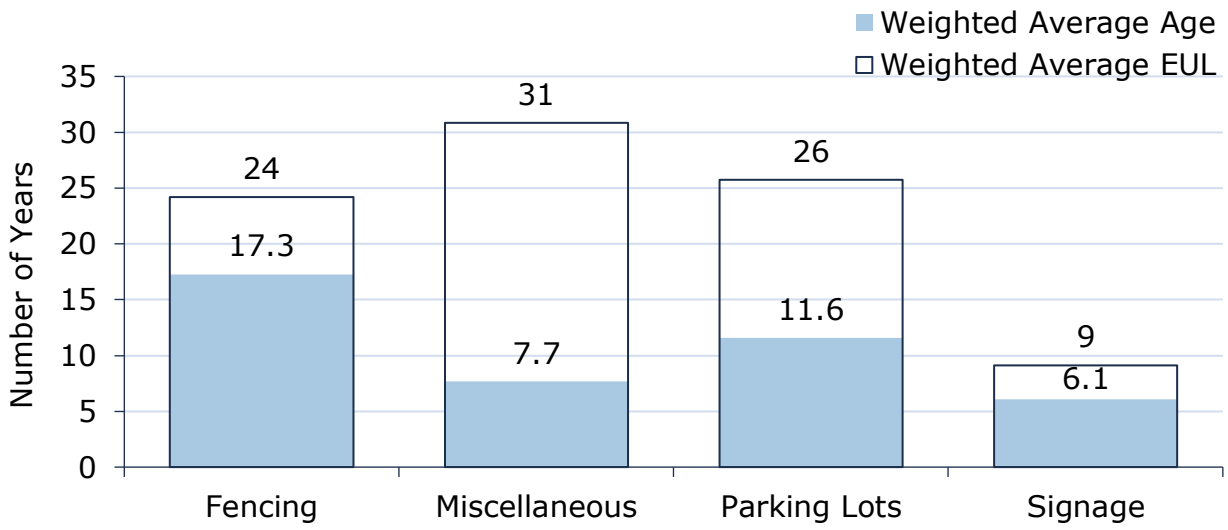


Figure 57 Estimated Useful Life vs. Asset Age: Land Improvements

Age analysis reveals that, on average, most land improvement assets are in the moderate stages of their expected life.

10.4 Current Approach to Lifecycle Management

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.

Table 35 outlines the Township's current lifecycle management strategy.

Activity Type	Description of Current Strategy
Maintenance	Maintenance activities are completed on a reactive basis when operational issues are identified, through complaints, service requests, or ad-hoc inspections
Rehabilitation / Replacement	Without the availability of up-to-date condition assessment information replacement activities are purely reactive in nature
Inspections	Inspections are conducted on an ad-hoc basis

Table 35 Lifecycle Management Strategy: Land Improvements

10.5 Forecasted Long-Term Replacement Needs

Figure 58 illustrates the cyclical short-, medium- and long-term infrastructure replacement requirements for the Township's land improvements portfolio. This analysis was run until 2053 to capture at least one iteration of replacement for the longest-lived asset in Citywide Assets, the Municipality's primary asset management system and asset register. The Township's average annual requirements (red dotted line) total $71,000 ($356,000 per 5-year bucket) for all land improvements. Although actual spending may fluctuate substantially from year to year, this figure is a useful benchmark value for annual capital expenditure targets (or allocations to reserves) to ensure projects are not deferred and replacement needs are met as they arise.

Replacement needs are forecasted to remain relatively consistent over the next 20-year time horizon, peaking at $636,000 between 2044 and 2048 as assets reach the end of their useful life. These projections and estimates are based on asset replacement costs and age analysis. They are designed to provide a long-term, portfolio-level overview of capital needs and should be used to support improved financial planning over several decades.

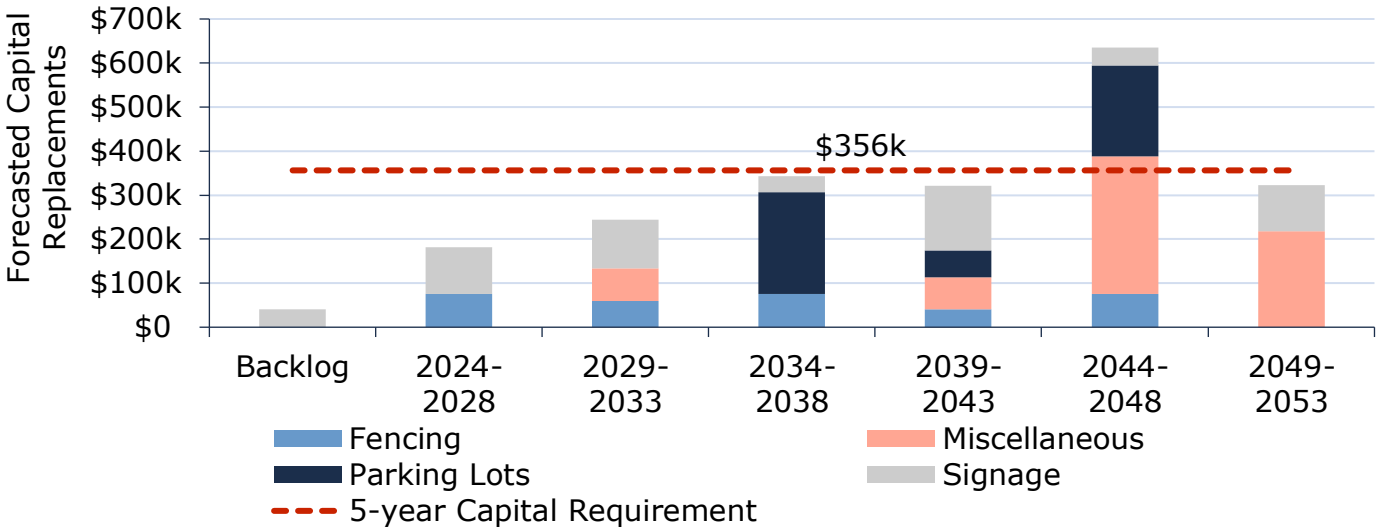


Figure 58 Forecasted Capital Replacement Needs: Land Improvements 2024-2053

Often, the magnitude of replacement needs is substantially higher than most municipalities can afford to fund. In addition, most assets may not need to be replaced. However, quantifying and monitoring these spikes is essential for long-term financial planning, including establishing dedicated reserves. In addition, a robust risk framework will ensure that high-criticality assets receive proper and timely lifecycle intervention, including replacements.

A detailed 10-year capital replacement forecast can be found in Appendix B – 10-Year Capital Requirements.

10.6 Risk Analysis

The risk matrix below is generated using available asset data, including condition, service life remaining, and replacement costs. The risk ratings for assets without useful attribute data were calculated using only condition, service life remaining, and their replacement costs.

The matrix stratifies assets based on their individual probability and consequence of failure, each scored from 1 to 5. Their product generates a risk index ranging from 1-25. Assets with the highest criticality and likelihood of failure receive a risk rating of 25; those with lowest probability of failure and lowest criticality carry a risk rating of 1. As new data and information is gathered, the Township may consider integrating relevant information that improves confidence in the criteria used to assess asset risk and criticality.

These risk models have been built into the Township's Asset Management Database (Citywide Assets). See *Risk & Criticality* section for further details on approach used to determine asset risk ratings and classifications.

Figure 59 Risk Matrix: Land Improvements

10.7 Levels of Service

The tables that follow summarize the Township's current levels of service. There are no specifically prescribed KPIs under Ontario Regulation 588/17 for non-core assets, therefore the KPIs below represent performance measures that the Township has selected for this AMP.

10.7.1 Community Levels of Service

Service Attribute	Qualitative Description	Current LOS (2023)
Scope	Description, which may include maps, of the outdoor recreational facilities that the municipality operates and maintains	The Township operates a variety of outdoor supporting infrastructure such as parking lots, fencing, and recreational infrastructure (i.e. fishing docks).

Table 36 Community Levels of Service: Land Improvements

10.7.2 Technical Levels of Service

Service Attribute	Technical Metric	Current LOS (2023)
Quality	Average condition of outdoor recreation facilities and land improvements in the municipality	Good
Performance	Target vs. Actual capital reinvestment rate	5.3% vs. 6.7%

Table 37 Technical Levels of Service: Land Improvements

11. Vehicles

The Township's vehicles portfolio includes 28 assets that support a variety of general and essential services, including public works, environmental services, the fire department, and recreation. The total current replacement of vehicles is estimated at approximately $7 million.

11.1 Inventory & Valuation

Table 38 summarizes the quantity and current replacement cost of all vehicle assets available in the Township's asset register. Public works and the fire department account for the largest share of the vehicles portfolio.

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Environmental Services	3	Quantity	$175,000	User-defined
Fire Department	10	Quantity	$4,706,000	CPI
Public Works	10	Quantity	$2,093,000	CPI
Recreation	5	Quantity	$292,000	User-defined
TOTAL			**$7,267,000**	

Table 38 Detailed Asset Inventory: Vehicles

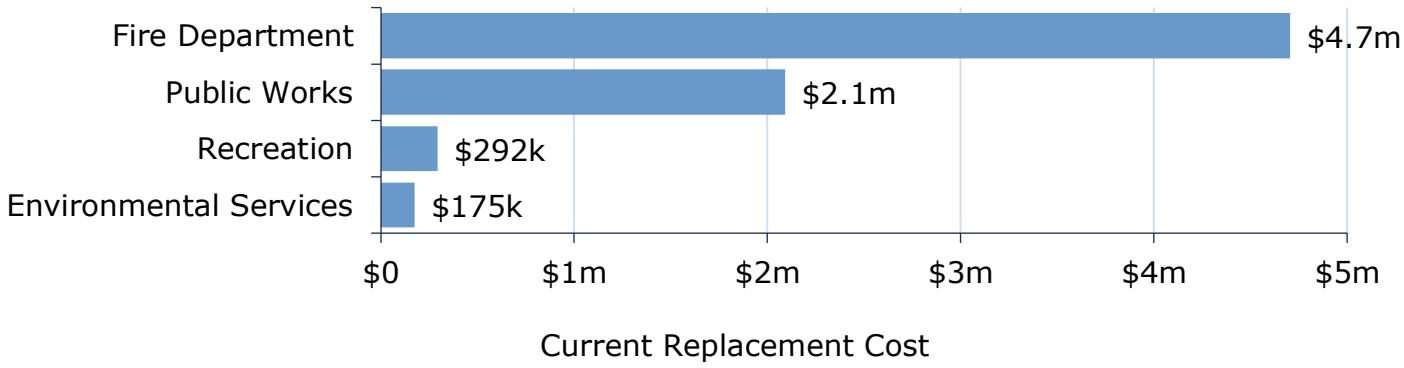


Figure 60 Portfolio Valuation: Vehicles

11.2 Asset Condition

Figure 61 summarizes the replacement cost-weighted condition of the Township's vehicles portfolio. Based primarily on age-based data, 34% of vehicles are in fair or better condition, with the remaining 66% are in poor or worse condition. These assets may be candidates for replacement in the short term; similarly, assets in fair condition may require rehabilitation or replacement in the medium term and should be monitored for further degradation in condition. Condition data was available for 17% of vehicles, based on replacement costs; age was used to estimate condition for the remaining 83% of assets.

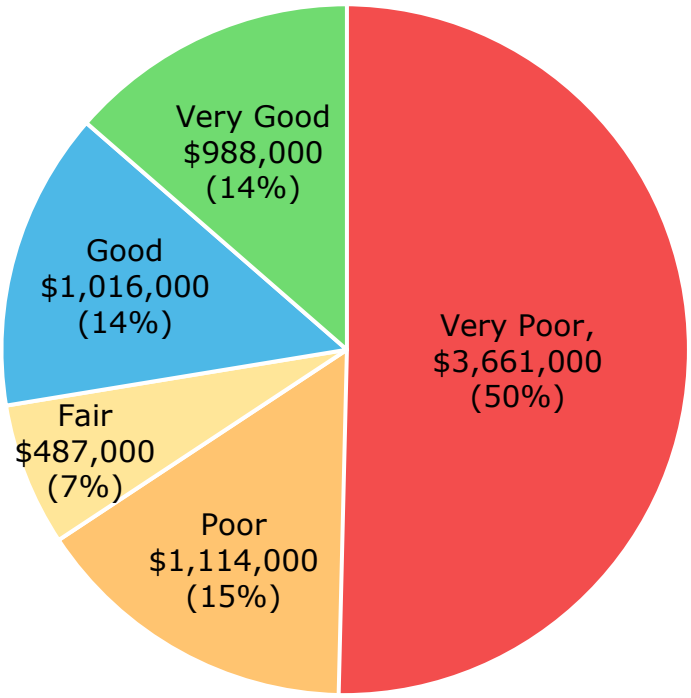


Figure 61 Asset Condition: Vehicles Overall

Figure 62 summarizes the condition of vehicles by each department. The majority of all vehicles across all asset segments are in poor or worse condition.

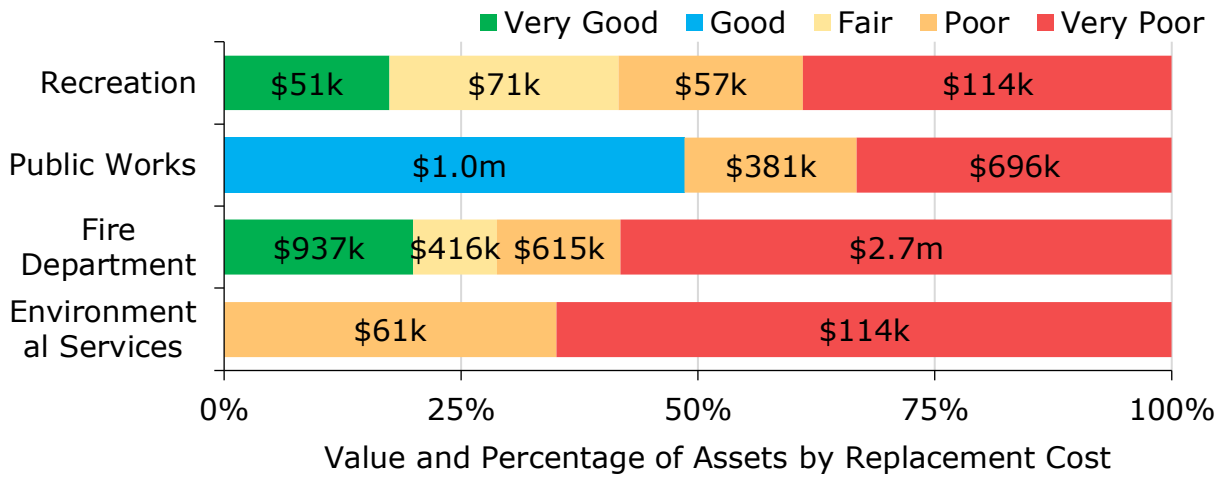


Figure 62 Asset Condition: Vehicles by Segment

11.3 Age Profile

An asset's age profile comprises two key values: estimated useful life (EUL), or design life; and the percentage of EUL consumed. The EUL is the serviceable lifespan of an asset during which it can continue to fulfil its intended purpose and provide value to users, safely and efficiently. As assets age, their performance diminishes, often more rapidly as they approach the end of their design life.

In conjunction with condition data, an asset's age profile provides a more complete summary of the state of infrastructure. It can help identify assets that may be candidates for further review through condition assessment programs; inform the selection of optimal lifecycle strategies; and improve planning for potential replacement spikes.

Figure 63 illustrates the average current age of each asset type and its estimated useful life. Both values are weighted by the replacement cost of individual assets.

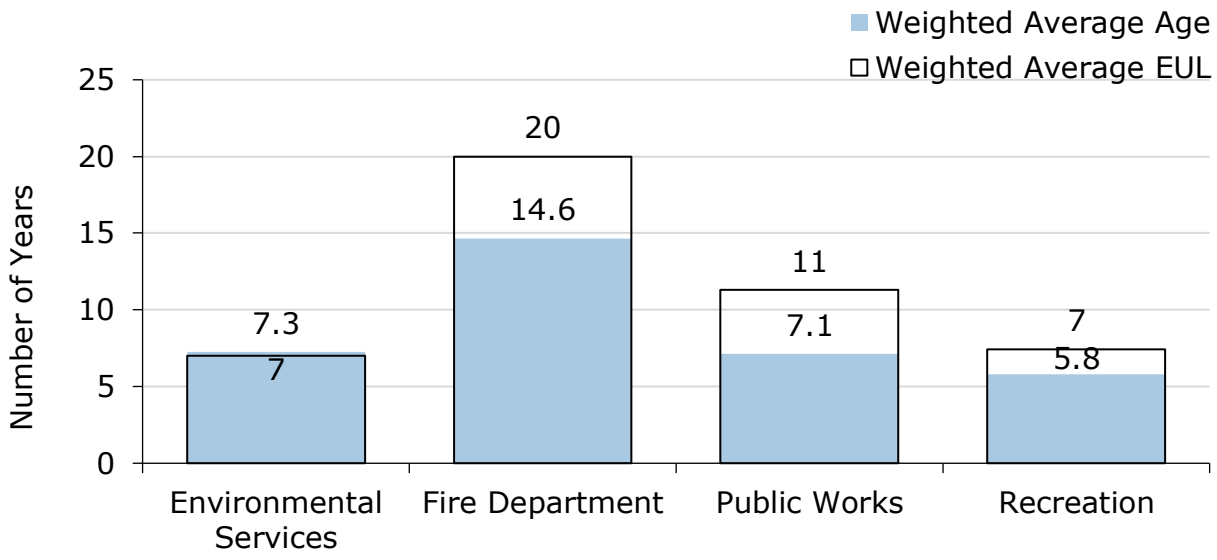


Figure 63 Estimated Useful Life vs. Asset Age: Vehicles

Age analysis reveals that, on average, most vehicles are in moderate stages of their expected life. Vehicles in environmental services remain in service beyond their established useful life.

11.4 Current Approach to Lifecycle Management

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	Oil changes and routine maintenance is completed approximately every 10,000km
	All other maintenance activities are completed on a reactive basis when operational issues are identified (e.g., mechanical breakdown, deficiencies identified during daily inspections)
Replacement	Replacements are considered on an as-needed basis and when maintenance is no longer cost effective, as well as

Activity Type	Description of Current Strategy
	on a predetermined schedule for certain assets (e.g. snowplows are replaced every 12 years)
Inspection	Vehicles are inspected by the operator daily before use, however, these inspections identify deficiencies but do not provide overall condition ratings
	External contractors assess vehicles on a quarterly basis during preventative maintenance

Table 39 Lifecycle Management Strategy: Vehicles

11.5 Forecasted Long-Term Replacement Needs

Figure 64 illustrates the cyclical short-, medium- and long-term infrastructure replacement requirements for the Township's vehicles portfolio. This analysis was run until 2043 to capture at least one iteration of replacement for the longest-lived asset in Citywide Assets, the Township's primary asset management system and asset register. The Township's average annual requirements (red dotted line) total $487,000 ($2.4 million per 5-year bucket) for all vehicles. Although actual spending may fluctuate substantially from year to year, this figure is a useful benchmark value for annual capital expenditure targets (or allocations to reserves) to ensure projects are not deferred and replacement needs are met as they arise.

Replacement needs are forecasted to remain consistent in the current decade, with a slight peak of $2.7 million between 2039 and 2043 as vehicles reach the end of their useful life. These projections and estimates are based on asset replacement costs and age analysis. They are designed to provide a long-term, portfolio-level overview of capital needs and should be used to support improved financial planning over several decades.

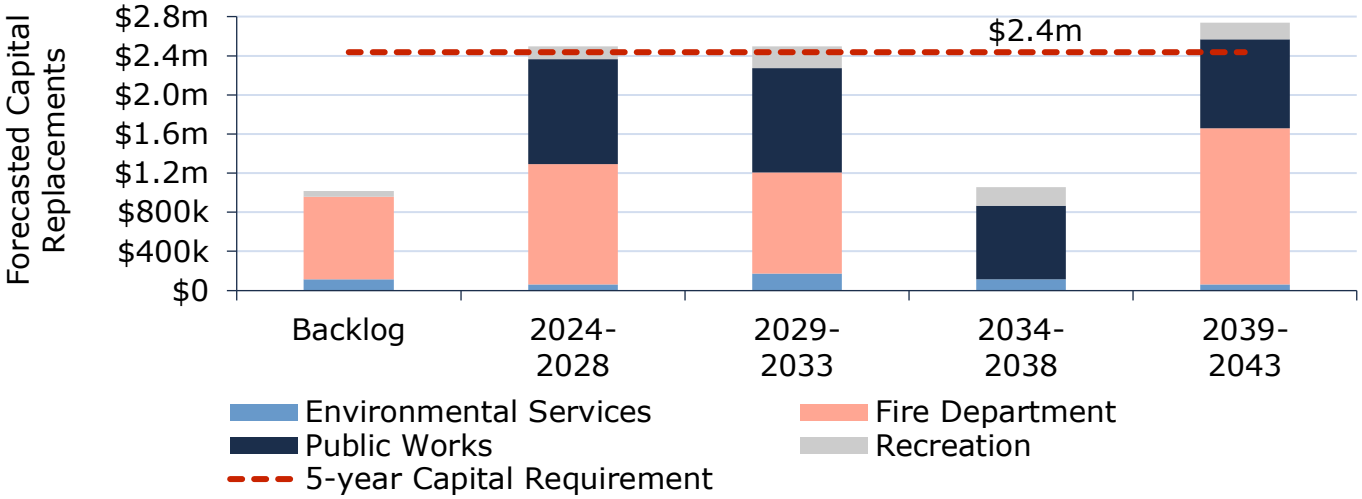


Figure 64 Forecasted Capital Replacement Needs: Vehicles 2024-2043

Often, the magnitude of replacement needs is substantially higher than most municipalities can afford to fund. In addition, most assets may not need to be replaced. However, quantifying and monitoring these spikes is essential for long-term financial planning, including establishing dedicated reserves. In addition, a robust risk framework will ensure that high-criticality assets receive proper and timely lifecycle intervention, including replacements.

A detailed 10-year capital replacement forecast can be found in Appendix B – 10-Year Capital Requirements.

11.6 Risk Analysis

The risk matrix below is generated using available asset data, including condition, service life remaining, replacement costs, and department or service area. The risk ratings for assets without useful attribute data were calculated using only condition, service life remaining, and their replacement costs.

The matrix stratifies assets based on their individual probability and consequence of failure, each scored from 1 to 5. Their product generates a risk index ranging from 1-25. Assets with the highest criticality and likelihood of failure receive a risk rating of 25; those with lowest probability of failure and lowest criticality carry a risk rating of 1. As new data and information is gathered, the Municipality may consider integrating relevant information that improves confidence in the criteria used to assess asset risk and criticality.

These risk models have been built into the Township's Asset Management Database (Citywide Assets). See *Risk & Criticality* section for further details on approach used to determine asset risk ratings and classifications.

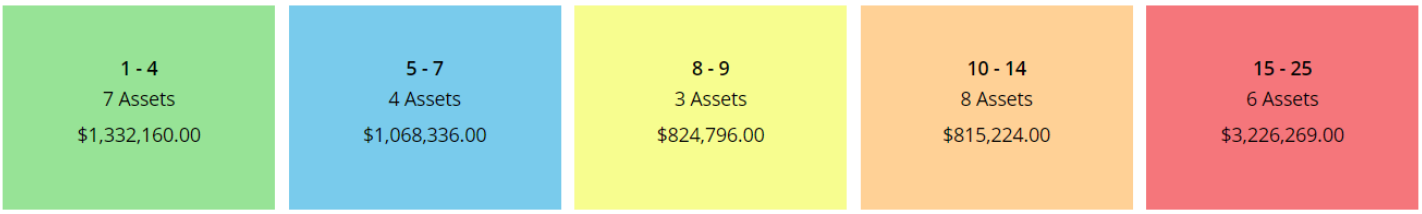


Figure 65 Risk Matrix: Vehicles

11.7 Levels of Service

The tables that follow summarize the Township's current levels of service. There are no specifically prescribed KPIs under Ontario Regulation 588/17 for non-core assets, therefore the KPIs below represent performance measures that the Township has selected for this AMP.

11.7.1 Community Levels of Service

Service Attribute	Qualitative Description	Current LOS (2023)
Scope	Description, which may include images, of the types of vehicles (i.e. light, medium, and heavy duty) that the municipality operates and the services that they help to provide to the community	Fire department vehicles include water tankers, pumpers, service trucks, and rescue trucks, ensuring readiness for emergency response. Recreation vehicles include light duty pick-up trucks for services such as park maintenance. Public Works vehicles include light and heavy duty trucks ranging from pick-up trucks to snow plows to ensure safe road conditions and managing infrastructure during inclement weather and construction projects. Environmental services vehicles include light duty pick-up trucks, to facilitate water and sanitary inspections and maintenance.

Table 40 Community Levels of Service: Vehicles

11.7.2 Technical Levels of Service

Service Attribute	Technical Metric	Current LOS (2023)
Quality	Average condition of vehicles	Poor
Performance	Target vs. Actual capital reinvestment rate	6.7% vs. 1.4%

Table 41 Technical Levels of Service: Vehicles

12. Machinery & Equipment

The Township's machinery and equipment portfolio includes a variety of assets that support a combination of general and essential services, including recreation and fire. The total current replacement of vehicles is estimated at approximately $6 million.

12.1 Inventory & Valuation

Table 42 summarizes the quantity and current replacement cost of all machinery & equipment assets available in the Township's asset register.

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Administration	18	Quantity	$44,000	CPI
Fire Department	55	Quantity	$734,000	CPI
Library	5	Quantity	$218,000	CPI
Public Works	21	Quantity	$2,350,000	CPI
Recreation	37	Quantity	$2,854,000	CPI
TOTAL			**$6,199,000**	

Table 42 Detailed Asset Inventory: Machinery & Equipment

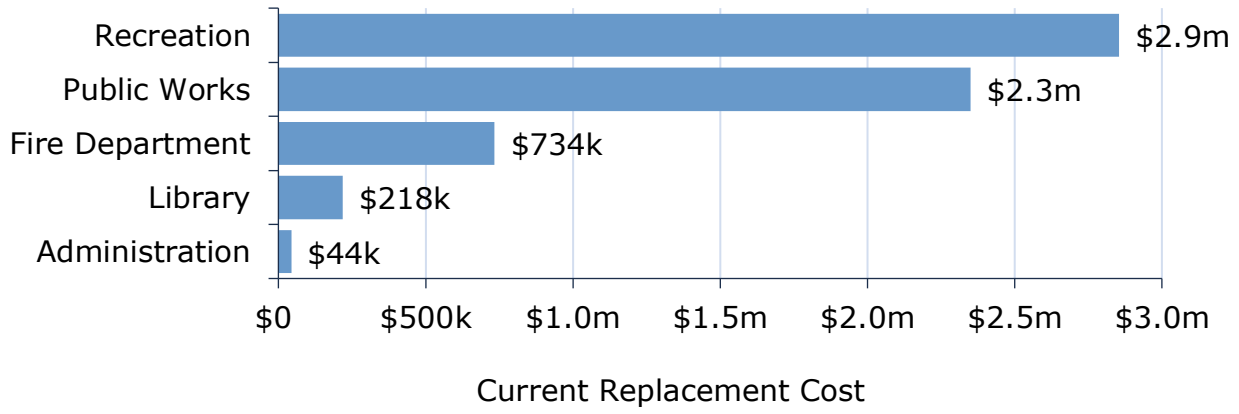


Figure 66 Portfolio Valuation: Machinery & Equipment

12.2 Asset Condition

Figure 67 summarizes the replacement cost-weighted condition of the Township's machinery and equipment portfolio. Based on a combination of assessed conditions and age data, 30% of assets are in fair or better condition; the remaining 70% are in poor or worse condition. These assets may be candidates for replacement in the short term; similarly, assets in fair condition may require rehabilitation or replacement in the medium term and should be monitored for further degradation in condition.

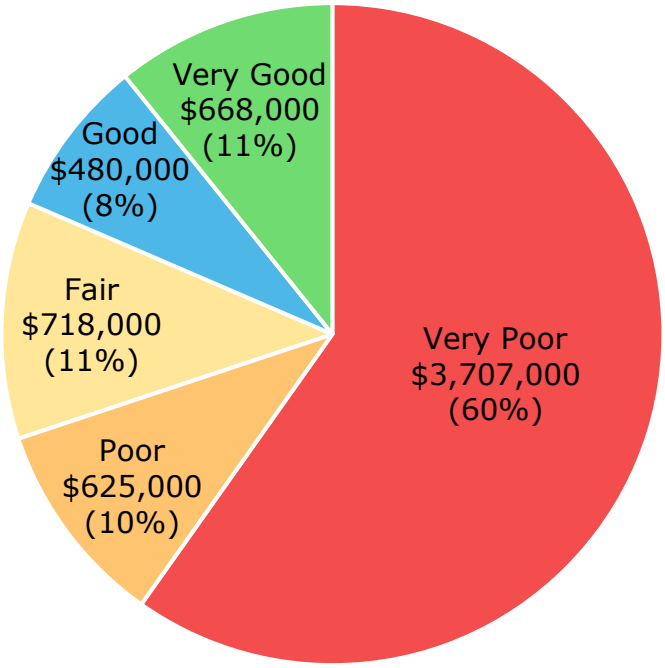


Figure 67 Asset Condition: Machinery & Equipment Overall

Figure 68 summarizes the age-based condition of machinery & equipment by each department. The majority of assets all assets are in poor or worse condition are concentrated primarily administration and the fire department.

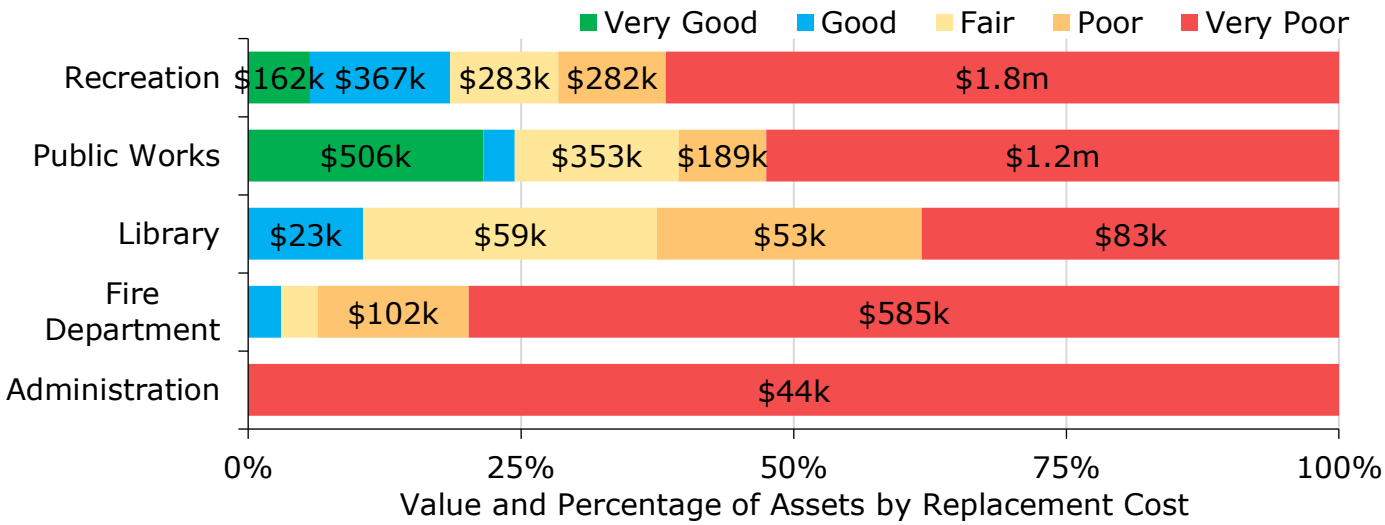


Figure 68 Asset Condition: Machinery & Equipment by Segment

12.3 Age Profile

An asset's age profile comprises two key values: estimated useful life (EUL), or design life; and the percentage of EUL consumed. The EUL is the serviceable lifespan of an asset during which it can continue to fulfil its intended purpose and provide value to users, safely and efficiently. As assets age, their performance diminishes, often more rapidly as they approach the end of their design life.

In conjunction with condition data, an asset's age profile provides a more complete summary of the state of infrastructure. It can help identify assets that may be candidates for further review through condition assessment programs; inform the selection of optimal lifecycle strategies; and improve planning for potential replacement spikes.

Figure 69 illustrates the average current age of each asset type and its estimated useful life. Both values are weighted by the replacement cost of individual assets.

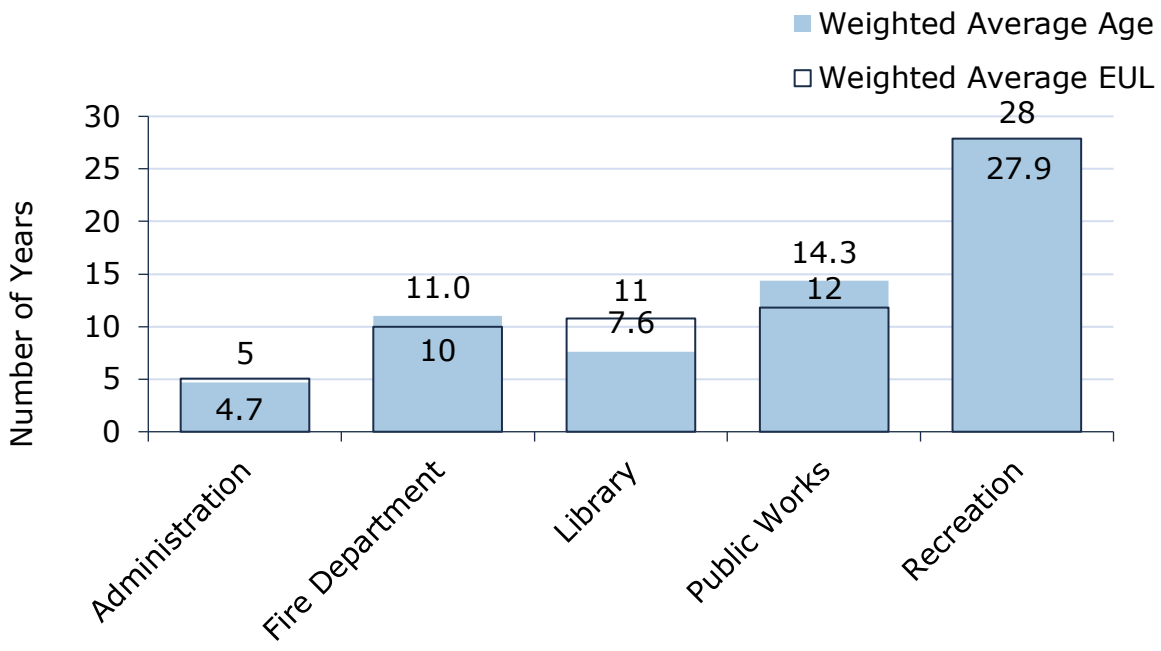


Figure 69 Estimated Useful Life vs. Asset Age: Machinery & Equipment

Age analysis reveals that, on average, with the exception of the library, most machinery and equipment assets are beyond their expected life.

12.4 Current Approach to Lifecycle Management

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 activitied vary by department and are specific to each piece of equipment, but typically as per manufacturer recommendations
	Fire Protection Services equipment is subject to a much more rigorous inspection and maintenance program compared to most other departments

Activity Type	Description of Current Strategy
Replacement	The replacement of machinery & equipment depends on deficiencies identified by operators that may impact their ability to complete required tasks
Inspection	Specific machinery and equipment assets have set inspection schedules (e.g. compressor rooms in the Spencerville Arena and Ingredion Arena are inspected by external contractors semi-annually)

Table 43 Lifecycle Management Strategy: Machinery & Equipment

12.5 Forecasted Long-Term Replacement Needs

Figure 70 illustrates the cyclical short-, medium- and long-term infrastructure replacement requirements for the Township's machinery and equipment portfolio. This analysis was run until 2053 to capture at least one iteration of replacement for the longest-lived asset in Citywide Assets, the Township's primary asset management system and asset register. The Township's average annual requirements (red dotted line) total $453,000 ($2.3 million per 5-year bucket) for all machinery and equipment. Although actual spending may fluctuate substantially from year to year, this figure is a useful benchmark value for annual capital expenditure targets (or allocations to reserves) to ensure projects are not deferred and replacement needs are met as they arise.

Replacement needs are forecasted to fluctuate over the 30-year horizon, peaking at $3.4 million between 2034 and 2038. These projections and estimates are based on asset replacement costs and age analysis. They are designed to provide a long-term, portfolio-level overview of capital needs and should be used to support improved financial planning over several decades.

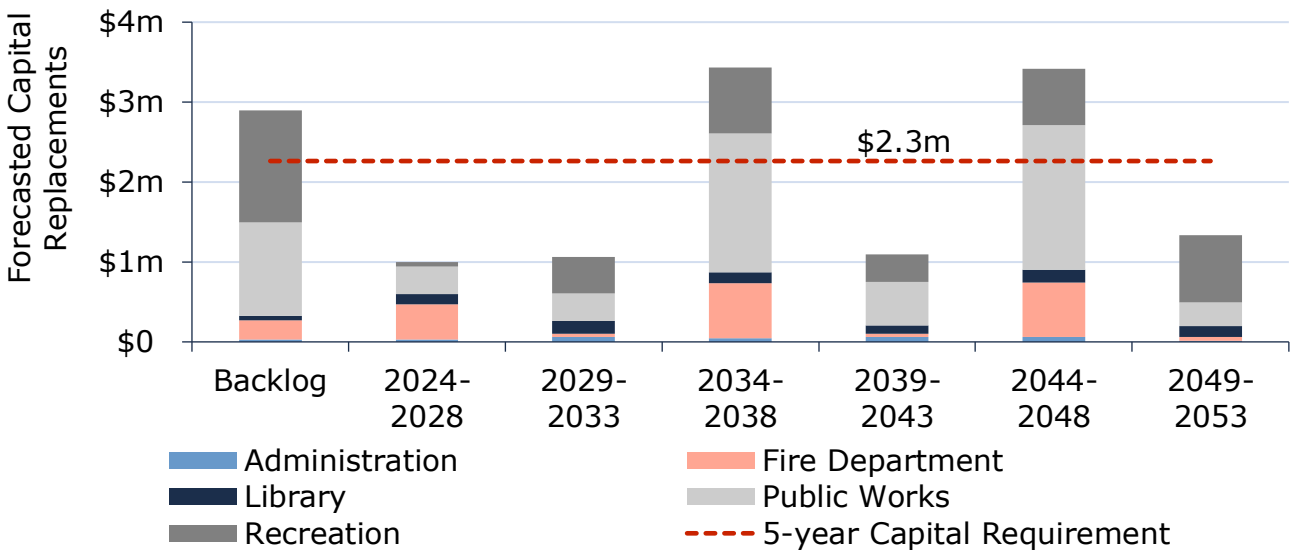


Figure 70 Forecasted Capital Replacement Needs: Machinery & Equipment 2024-2053

Often, the magnitude of replacement needs is substantially higher than most municipalities can afford to fund. In addition, most assets may not need to be replaced. However, quantifying and monitoring these spikes is essential for long-term financial planning, including establishing dedicated reserves. In addition, a robust risk framework will ensure that high-criticality assets receive proper and timely lifecycle intervention, including replacements.

A detailed 10-year capital replacement forecast can be found in Appendix B – 10-Year Capital Requirements.

12.6 Risk Analysis

The risk matrix below is generated using available asset data, including condition, service life remaining, and replacement costs. The risk ratings for assets without useful attribute data were calculated using only condition, service life remaining, and their replacement costs.

The matrix stratifies assets based on their individual probability and consequence of failure, each scored from 1 to 5. Their product generates a risk index ranging from 1-25. Assets with the highest criticality and likelihood of failure receive a risk rating of 25; those with lowest probability of failure and lowest criticality carry a risk rating of 1. As new data and information is gathered, the Township may consider integrating relevant information that improves confidence in the criteria used to assess asset risk and criticality.

These risk models have been built into the Township's Asset Management Database (Citywide Assets). See *Risk & Criticality* section for further details on approach used to determine asset risk ratings and classifications.

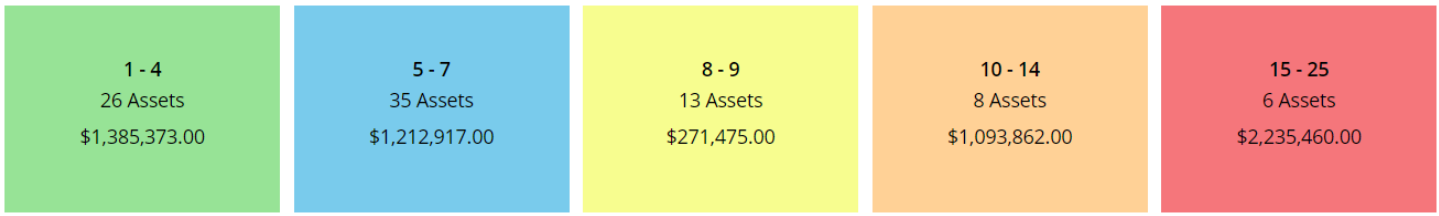


Figure 71 Risk Matrix: Machinery & Equipment

12.7 Levels of Service

The tables that follow summarize the Township's current levels of service. There are no specifically prescribed KPIs under Ontario Regulation 588/17 for non-core assets, therefore the KPIs below represent performance measures that the Township has selected for this AMP.

12.7.1 Community Levels of Service

Service Attribute	Qualitative Description	Current LOS (2023)
Scope	Description, which may include images, of the types of equipment that the municipality operates and the services that they help to provide to the community	Administration is supported by equipment such as phone systems and software. Fire is supported by equipment such as thermal imaging cameras, SCBAs, and defibrillators. The library is supported by books and shelving. Recreation is supported by playground structures, ball diamonds, score clocks, and tractors. Public Works is supported by equipment such as graders, snowplows, trailers, mowers, and heavy equipment.

Table 44 Community Levels of Service: Machinery & Equipment

12.7.2 Technical Levels of Service

Service Attribute	Technical Metric	Current LOS (2023)
Quality	Average condition of equipment	Poor
Performance	Target vs. Actual capital reinvestment rate	7.3% vs. 11.1%

Table 45 Technical Levels of Service: Machinery & Equipment

Strategies

Growth

Financial Strategy

Recommendations

13. Growth

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 plan for new infrastructure more effectively, 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.

13.1 Township of Edwardsburgh Cardinal Official Plan

Within its Official Plan, the Township of Edwardsburgh Cardinal aims to foster community growth and enhance quality of life by encouraging sustainable development and preserving its rural character. The plan emphasizes revitalizing commercial areas in the Village of Cardinal and the historic Village of Spencerville through sustainable practices, improved accessibility, and renovation incentives for building owners. The goal is to attract businesses, residents, and visitors, stimulating economic activity and creating a vibrant, sustainable community. Additionally, the plan seeks to ensure a diverse and affordable housing supply, setting a target for a quarter of new housing units to be affordable, and promoting options for seniors and those with special needs.

Edwardsburgh Cardinal anticipates growth driven by migration from larger urban areas, attracted by affordable housing and a high quality of life. Young homebuyers and older generations, transitioning second homes to permanent residences are key demographic trends expected to contribute to said growth. The Township’s strategic location near major highways and urban centers like Ottawa, Kingston, and Cornwall positions it well to attract new residents. To accommodate this anticipated growth, the plan outlines the development of infrastructure and community services, including recreational facilities, parks, schools, and healthcare services, ensuring the needs of a growing and diverse population are met. Furthermore, the Official Plan stresses the importance of maintaining the Township's rural charm and natural beauty while promoting development, ensuring a balanced approach to growth that enhances the community’s overall well-being.

13.2 United Counties of Leeds and Grenville Official Plan

The Official Plan for the United Counties of Leeds and Grenville is designed to foster the creation of vibrant, complete communities while preserving natural and agricultural resources. A central focus is on directing growth towards existing settlement areas, ensuring they remain healthy and

conducive to quality living. This strategy is complemented by a structured approach to managing growth over the planning horizon, which is closely aligned with local municipal Official Plans. Emphasis is placed on utilizing land, resources, and infrastructure efficiently through the promotion of compact urban forms, mixed-use developments, and appropriate population densities within these settlement areas.

The plan also encourages opportunities for redevelopment, revitalization, and intensification in appropriate locations, balancing economic development goals with the need to maintain community character and environmental integrity. Economic growth is further supported through the protection of designated employment areas and the promotion of water- and tourism-based employment opportunities, such as those associated with the renowned Rideau Canal and other significant waterways in the region. Additionally, the plan strives to meet diverse housing needs by promoting a range of housing types that are affordable for residents, both now and in the future. By integrating these strategies, the plan aims to enhance overall quality of life for all residents while promoting sustainability and resilience in the face of future challenges.

13.3 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.

14. Financial Strategy

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

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

1. The financial requirements for:
    a. Existing assets
    b. Existing service levels
    c. Requirements of contemplated changes in service levels (none identified for this plan)
    d. Requirements of anticipated growth (none identified for this plan)
2. Use of traditional sources of municipal funds:
    a. Tax levies
    b. User fees
    c. Debt
    d. Development charges
3. Use of non-traditional sources of municipal funds:
    a. Reallocated budgets
    b. Partnerships
    c. Procurement methods
4. Use of Senior Government Funds:
    a. Canada Community-Building Fund (CCBF)
    b. Annual grants

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

If the financial plan component results in a funding shortfall, the Province requires the inclusion of a specific plan as to how the impact of the shortfall

will be managed. In determining the legitimacy of a funding shortfall, the Province may evaluate a Township's approach to the following:

1. In order to reduce financial requirements, consideration has been given to revising service levels downward.
2. All asset management and financial strategies have been considered. For example:
    a. If a zero-debt policy is in place, is it warranted? If not the use of debt should be considered.
    b. Do user fees reflect the cost of the applicable service? If not, increased user fees should be considered.

14.1 Annual Requirements & Capital Funding

14.1.1 Annual Requirements

The annual requirements represent the amount the Township should allocate annually to each asset category to meet replacement needs as they arise, prevent infrastructure backlogs and achieve long-term sustainability. In total, the Township must allocate approximately $7.5 million annually to address capital requirements for the assets included in this AMP.

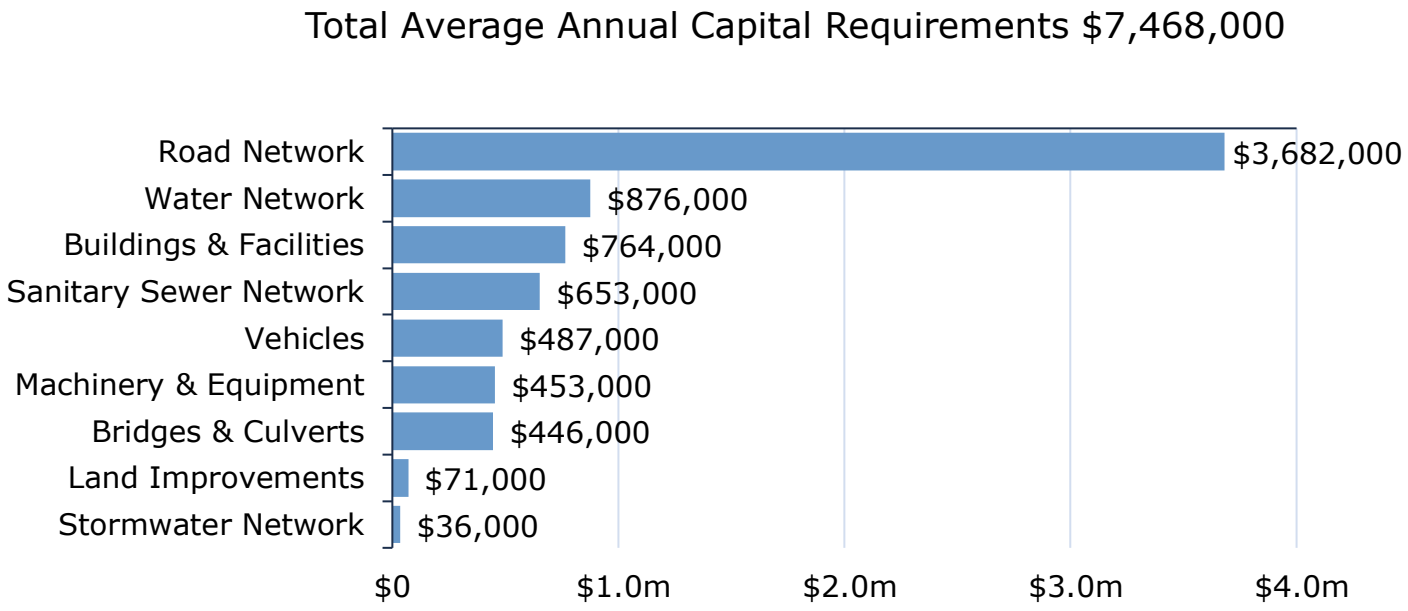


Figure 72 Annual Capital Funding Requirements by Asset Category

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

However, for the Road Network and Sanitary Sewer Network, lifecycle management strategies have been developed to identify capital costs that are realized through strategic rehabilitation and renewal of the Township's roads and sanitary sewer mains respectively. The development of these strategies allows for a comparison of potential cost avoidance if the strategies were to be implemented. The following table compares two scenarios for the Road Network and Sanitary Sewer Network:

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

Asset Category	Annual Requirements (Replacement Only)	Annual Requirements (Lifecycle Strategy)	Difference
Road Network	$5,195,000	$3,682,000	$1,513,000
Sanitary Sewer Network	$714,000	$653,000	$61,000

Table 46 Lifecycle Strategies Annual Savings

The implementation of a proactive lifecycle strategy for roads leads to a potential annual cost avoidance of $1.5 million for the Road Network and $61,000 for the Sanitary Sewer Network. This represents an overall reduction of the annual requirements for each category by 29% and 9% respectively. As the lifecycle strategy scenario represents the lowest cost option available to the Township, we have used these annual requirements in the development of the financial strategy.

14.1.2 Annual Funding Available

Based on a historical analysis of sustainable capital funding sources, the Township is committing approximately $3.04 million towards capital projects per year. Given the annual capital requirement of $7.47 million, there is currently a funding gap of $4.43 million annually.

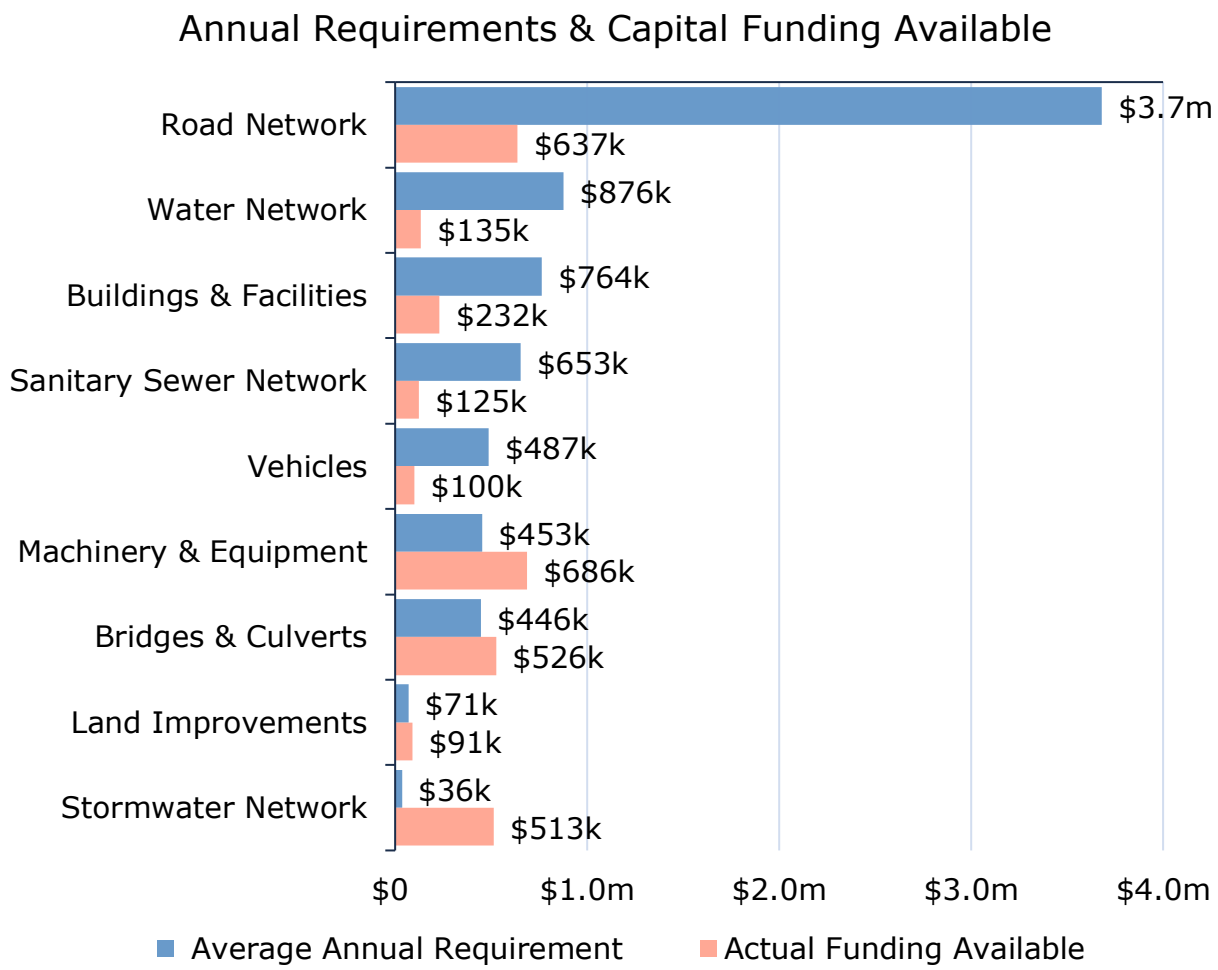


Figure 73 Annual Requirements vs. Capital Funding Available

14.2 Funding Objective

We have developed a scenario that would enable Edwardsburgh Cardinal to achieve full funding within 15 years for the following assets:

1. **Tax Funded Assets:** Road Network, Stormwater Network, Bridges & Culverts, Buildings & Facilities, Machinery & Equipment, Land Improvements, Vehicles

2. **Rate-Funded Assets:** Water Network, Sanitary Sewer Network

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

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

14.3 Financial Profile: Tax Funded Assets

14.3.1 Current Funding Position

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

Asset Category	Avg. Annual Require-ment	Annual Funding Available				Annual Deficit
		Taxes	CCBF	OCIF	Total Available	
Road Network	3,681,853	402,736	234,736	0	637,472	3,044,380
Stormwater Network	35,777	512,795	0	0	512,795	-477,018
Bridges & Culverts	446,025	39,656	0	486,079	525,735	-79,710
Buildings	764,071	231,684	0	0	231,684	532,387
Machinery & Equipment	452,510	685,930	0	0	685,930	-233,420
Land Improve-ments	71,231	90,865	0	0	90,865	-19,635
Vehicles	487,195	100,141	0	0	100,141	387,054
Total	**5,938,661**	**2,063,807**	**234,736**	**486,079**	**2,784,622**	**3,154,039**

Table 47 Annual Available Funding for Tax Funded Assets

The average annual investment requirement for the above categories is $5.939 million. Annual revenue currently allocated to these assets for capital purposes is $2.784 million leaving an annual deficit of $3.154 million. Put differently, these infrastructure categories are currently funded at 23.4% of their long-term requirements.

14.3.2 Full Funding Requirements

In 2023, the Township of Edwardsburgh Cardinal had budgeted annual tax revenues of approximately $6.776 million. As illustrated in the following table, without consideration of any other sources of revenue or cost containment strategies, full funding would require the following tax change over time:

Asset Category	Tax Change Required for Full Funding
Road Network	44.9%
Stormwater Network	-7%
Bridges & Culverts	-1.2%
Buildings	7.9%
Machinery & Equipment	-3.4%
Land Improvements	-0.3%
Vehicles	5.7%
Total	**46.6%**

Table 48 Tax Increase Requirements for Full Funding

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

a) Edwardsburgh Cardinal's debt payments for these asset categories will be decreasing $14,000 by 2024.

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

	5 Years	10 Years	15 Years	20 Years
Infrastructure Deficit	3,154,039	3,154,039	3,154,039	3,154,039
Change in Debt Costs	N/A	N/A	N/A	N/A
Resulting Infrastructure Deficit:	**3,154,039**	**3,154,039**	**3,154,039**	**3,154,039**
Tax Increase Required	46.5%	46.5%	46.5%	46.5%
Annually:	**8.0%**	**3.9%**	**2.6%**	**2.0%**

Table 49 Tax Increase Options 5-20 Years

14.3.3 Financial Strategy Recommendations

Considering all the above information, we recommend the 15-year option. This involves full funding being achieved over 15 years by:

a) increasing tax revenues by 2.6% each year for the next 15 years solely for the purpose of phasing in full funding to the asset categories covered in this section of the AMP.
b) allocating the current CCBF and OCIF revenue as outlined previously.
c) reallocating appropriate revenue from categories in a surplus position to those in a deficit position.
d) increasing existing and future infrastructure budgets by the applicable inflation index on an annual basis in addition to the deficit phase-in.

Notes:

1. As in the past, periodic senior government infrastructure funding will most likely be available during the phase-in period. By Provincial AMP rules, this periodic funding cannot be incorporated into an AMP unless there are firm commitments in place. We have included OCIF formula-based funding, if applicable, since this funding is a multi-year commitment[6].
2. We realize that raising tax revenues by the amounts recommended above for infrastructure purposes will be very difficult to do. However,

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

considering a longer phase-in window may have even greater consequences in terms of infrastructure failure.

Although this option achieves full funding on an annual basis in 15 years and provides financial sustainability over the period modeled, the recommendations do require prioritizing capital projects to fit the resulting annual funding available. Current data shows a pent-up investment demand of $13.9 million for the Road Network, $214,000 for Buildings & Facilities, $41,000 for Land Improvements, $2.9 million for Machinery & Equipment, and $1.0 million for Vehicles.

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

14.4 Financial Profile: Rate Funded Assets

14.4.1 Current Funding Position

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

Asset Category	Avg. Annual Require-ment	Annual Funding Available				Annual Deficit
		Rates	CCBF	OCIF	Total Available	
Water Network	875,609	135,321	0	0	135,321	740,288
Sanitary Sewer Network	653,274	124,549	0	0	124,549	528,725
Total	**1,528,883**	**259,870**	**0**	**0**	**259,870**	**1,269,013**

Table 50 Annual Available Funding for Rate Funded Assets

The average annual investment requirement for the above categories is $1.529 million. Annual revenue currently allocated to these assets for capital purposes is $256, thousand leaving an annual deficit of $1.259 million. Put differently, these infrastructure categories are currently funded at 17% of their long-term requirements.

14.4.2 Full Funding Requirements

Averaging from 2021-2023, Edwardsburgh Cardinal had annual sanitary revenues of $727,000 and annual water revenues of $568,000. As illustrated in the table below, without consideration of any other sources of revenue, full funding would require the following changes over time:

Asset Category	Rate Change Required for Full Funding
Water Network	65.1%
Sanitary Sewer Network	36.7%

Table 51 Rate Increase Requirements for Full Funding

In the following tables, we have expanded the above scenario to present multiple options. Due to the significant increases required, we have provided phase-in options of up to 15 years:

	Water Network			
	5 Years	**10 Years**	**15 Years**	**20 Years**
Infrastructure Deficit	740,288	740,288	740,288	740,288
Rate Increase Required	65.1%	65.1%	65.1%	65.1%
Annually:	**10.6%**	**5.2%**	**3.5%**	**2.6%**

Table 52 Water Rate Increase Options 5-20 Years

	Sanitary Sewer Network			
	5 Years	**10 Years**	**15 Years**	**20 Years**
Infrastructure Deficit	528,725	528,725	528,725	528,725
Rate Increase Required	36.7%	36.7%	36.7%	36.7%
Annually:	**6.5%**	**3.2%**	**2.2%**	**1.6%**

Table 53 Sanitary Rate Increase Options 5-20 Years

14.4.3 Financial Strategy Recommendations

Considering all of the above information, we recommend the 15-year option. This involves full funding being achieved over 15 years by:

a) increasing rate revenues by 3.5% for water services and 2.2% for sanitary sewer services each year for the next 15 years solely for the purpose of phasing in full funding to the asset categories covered in this section of the AMP.
b) increasing existing and future infrastructure budgets by the applicable inflation index on an annual basis in addition to the deficit phase-in.

Notes:

1. As in the past, periodic senior government infrastructure funding will most likely be available during the phase-in period. This periodic funding should not be incorporated into an AMP unless there are firm commitments in place.
2. We realize that raising rate revenues for infrastructure purposes will be very difficult to do. However, considering a longer phase-in window may have even greater consequences in terms of infrastructure failure.
3. Any increase in rates required for operations would be in addition to the above recommendations.

Although this option achieves full funding on an annual basis in 15 years and provides financial sustainability over the period modeled, the recommendations do require prioritizing capital projects to fit the resulting annual funding available. Current data shows a pent-up investment demand of $1.3 million for the Water Network and $858 thousand for the Sanitary Sewer Network.

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

14.5 Use of Debt

Debt can be strategically utilized as a funding source with in the long-term financial plan. The benefits of leveraging debt for infrastructure planning include:

a) the ability to stabilize tax & user rates when dealing with variable and sometimes uncontrollable factors

b) equitable distribution of the cost/benefits of infrastructure over its useful life
c) a secure source of funding
d) flexibility in cash flow management

Debt management policies and procedures with limitations and monitoring practices should be considered when reviewing debt as a funding option. In efforts to mitigate increasing commodity prices and inflation, interest rates have been rising. Sustainable funding models that include debt need to incorporate the now current realized risk of rising interest rates. The following graph shows the historical changes to the lending rates:

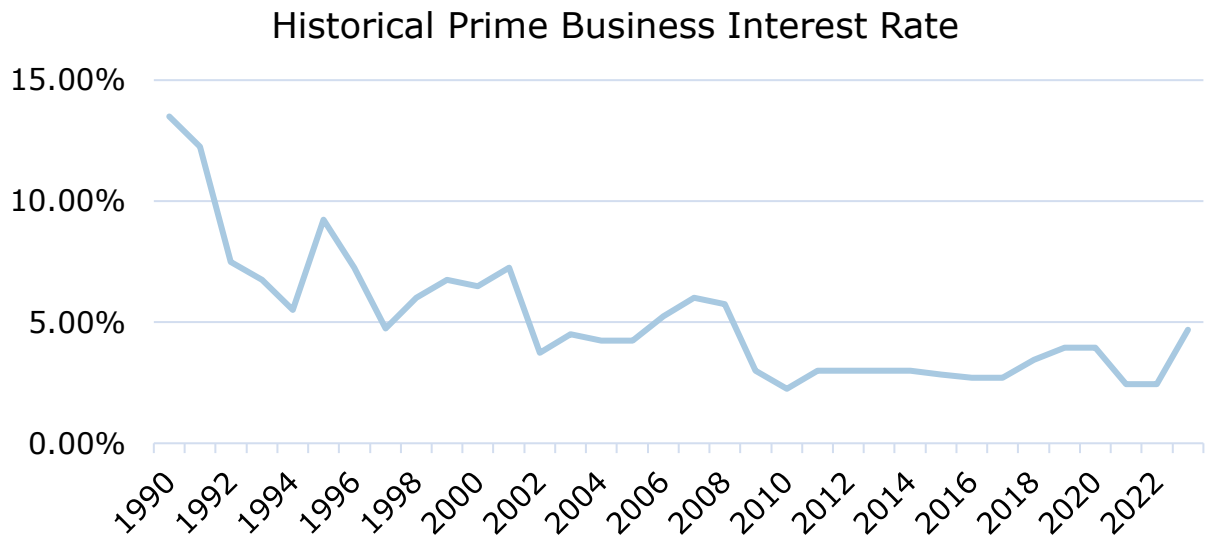


Figure 74 Historical Prime Rate

A change in 15-year rates from 5% to 7% would change the premium from 45% to 65%. Such a change would have a significant impact on a financial plan.

For reference purposes, the following table outlines the premium paid on a project if financed by debt. For example, a $1 million project financed at 3.0%[7] over 15 years would result in a 26% premium or $260 thousand of increased costs due to interest payments. For simplicity, the table does not consider the time value of money or the effect of inflation on delayed projects.

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

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

Table 54 Interest Premiums Paid

The following tables outline how Edwardsburgh Cardinal has historically used debt for investing in the asset categories as listed. As of year-end 2023, there is currently $5.6 million of debt outstanding for the assets covered by this AMP with corresponding principal and interest payments of $357,000, well within its provincially prescribed maximum of $3.6 million.

Asset Category	Current Debt Outstanding	Use of Debt in the Last Five Years				
		2019	2020	2021	2022	2023
Road Network	0	0	0	0	0	0
Stormwater Network	1,060,980	0	0	0	0	1,060,980
Bridges & Culverts	0	0	0	0	0	0
Buildings	4,488,802	0	0	0	0	0
Machinery & Equipment	13,805	0	0	0	0	0
Land Improvements	0	0	0	0	0	0
Vehicles	0	0	0	0	0	0
Total Tax Funded	**5,563,587**	**0**	**0**	**0**	**0**	**1,060,980**
Water Network	0	0	0	0	0	0
Sanitary Sewer Network	0	0	0	0	0	0
Total Rate Funded	**0**	**0**	**0**	**0**	**0**	**0**

Table 55 Edwardsburgh Cardinal Use of Debt 2019-2023

Asset Category	Principal & Interest Payments in the Next Ten Years						
	2023	2024	2025	2026	2027	2028	2033
Road Network	0	0	0	0	0	0	0
Stormwater Network	0	83,254	83,254	83,254	83,254	83,254	83,254
Bridges & Culverts	0	0	0	0	0	0	0
Buildings	303,698	303,698	303,698	303,698	303,698	303,698	303,698
Machinery & Equipment	14,104	14,104	0	0	0	0	0
Land Improvements	0	0	0	0	0	0	0
Vehicles	0	0	0	0	0	0	0
Total Tax Funded	**317,802**	**401,056**	**386,952**	**386,952**	**386,952**	**386,952**	**386,952**
Water Network	0	0	0	0	0	0	0
Sanitary Sewer Network	38,890	77,780	77,780	77,780	77,780	77,780	77,780
Total Rate Funded	**38,890**	**77,780**	**77,780**	**77,780**	**77,780**	**77,780**	**77,780**

Table 56 Edwardsburgh Cardinal Principal and Interest Payments

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

14.6 Use of Reserves

14.6.1 Available Reserves

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

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

d) managing the use of debt
e) normalizing infrastructure funding requirement

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

Asset Category	Balance at December 31, 2023
Road Network	1,046,253
Stormwater Network	432,040
Bridges & Culverts	0
Buildings	432,512
Machinery & Equipment	840,164
Land Improvements	2,701,611
Vehicles	340,162
Total Tax Funded:	**5,792,742**
Water Network	1,666,635
Sanitary Sewer Network	689,725
Total Rate Funded:	**2,356,360**

Table 57 Edwardsburgh Cardinal Reserve Balances

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

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

These reserves are available for use by applicable asset categories during the phase-in period to full funding. This coupled with Edwardsburgh Cardinal's judicious use of debt in the past, allows the scenarios to assume

that, if required, available reserves and debt capacity can be used for high priority and emergency infrastructure investments in the short- to medium-term.

14.6.2 Recommendation

In 2025, Ontario Regulation 588/17 will require Edwardsburgh Cardinal to integrate proposed levels of service for all asset categories in its asset management plan update. We recommend that future planning should reflect adjustments to service levels and their impacts on reserve balances.

15. Recommendations & Key Considerations

15.1 Financial Strategies

1. Review the feasibility of adopting a full-funding scenario to achieve 100% of average annual funding requirement for the asset categories analyzed. This includes:
    a. Increasing taxes by 2.6% per year over a period of 15 years;
    b. Increasing water rates by 3.5% per year over a period of 15 years; and
    c. Increasing sanitary rates by 2.2% per year over a period of 15 years.

2. Continued allocation of OCIF and CCBF funding as previously outlined.

3. Reallocating appropriate revenue from categories in a surplus position to those in a deficit position.

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

5. Continue to apply for project specific grant funding to supplement sustainable funding sources.

15.2 Asset Data

1. Continuously review, refine, and calibrate lifecycle and risk profiles to better reflect actual practices and improve capital projections. In particular:
    a. the timing of various lifecycle events, the triggers for treatment, anticipated impacts of each treatment, and costs
    b. the various attributes used to estimate the likelihood and consequence of asset failures, and their respective weightings

2. Asset management planning is highly sensitive to replacement costs. Periodically update replacement costs based on recent projects, invoices, or estimates, as well as condition assessments, or any other technical reports and studies. Material and labour costs can fluctuate due to local, regional, and broader market trends, and substantially so during major world events. Accurately estimating the replacement cost of like-for-like assets can be challenging. Ideally, several recent projects over multiple years should be used. Staff judgement and

historical data can help attenuate extreme and temporary fluctuations in cost estimates and keep them realistic.

3. Like replacement costs, an asset's established serviceable life can have dramatic impacts on all projections and analyses, including condition, long-range forecasting, and financial recommendations. Periodically reviewing and updating these values to better reflect in-field performance and staff judgement is recommended.

15.3 Risk & Levels of Service

1. Risk models and matrices can play an important role in identifying high-value assets, and developing an action plan which may include repair, rehabilitation, replacement, or further evaluation through condition assessments. As a result, project selection and the development of multi-year capital plans can become more strategic and objective. Initial models have been built into Citywide for all asset groups. These models reflect current data, which was limited. As the data evolves and new attribute information is obtained, these models should also be refined and updated.

2. Available data on current performance should be centralized and tracked to support any calibration of service levels ahead of O. Reg. 588's 2025 requirements on proposed levels of service.

3. Staff should monitor evolving local, regional, and environmental trends to identify factors that may shape the demand and delivery of infrastructure programs. These can include population growth, and the nature of population growth; climate change and extreme weather events; and economic conditions and the local tax base. This data can also be used to review service level targets.

Appendices

Appendix A – Infrastructure Report Card

Appendix B – 10-Year Capital Requirements

Appendix C – Level of Service Maps

Appendix D – Risk Rating Criteria

Appendix A – Infrastructure Report Card

Asset Category	Replacement Cost	Average Condition	Financial Capacity	
Road Network	**$128.4 m**	**Fair**	Annual Requirement:	$3,682,000
			Funding Available:	$637,000
			Annual Deficit:	**$3,045,000**
Bridges & Culverts	**$17.8 m**	**Good**	Annual Requirement:	$446,000
			Funding Available:	$526,000
			Annual Deficit:	**($80,000)**
Water Network	**$45.1 m**	**Fair**	Annual Requirement:	$876,000
			Funding Available:	$135,000
			Annual Deficit:	**$741,000**
Sanitary Sewer Network	**$31.0 m**	**Fair**	Annual Requirement:	$653,000
			Funding Available:	$125,000
			Annual Deficit:	**$528,000**
Stormwater Network	**$2.7 m**	**Good**	Annual Requirement:	$36,000
			Funding Available:	$513,000
			Annual Deficit:	**($477,000)**
Buildings & Facilities	**$29.7 m**	**Fair**	Annual Requirement:	$764,000
			Funding Available:	$232,000
			Annual Deficit:	**$532,000**
Land Improvements	**$1.4 m**	**Good**	Annual Requirement:	$71,000
			Funding Available:	$91,000
			Annual Deficit:	**($20,000)**
Vehicles	**$7.3 m**	**Poor**	Annual Requirement:	$487,000
			Funding Available:	$100,000
			Annual Deficit:	**$387,000**
Machinery & Equipment	**$ 6.2 m**	**Poor**	Annual Requirement:	$453,000
			Funding Available:	$686,000
			Annual Deficit:	**($233,000)**

Appendix B – 10-Year Capital Requirements

The tables below summarize the projected cost of lifecycle activities (rehabilitation and replacements) that may be undertaken over the next 10 years to support current levels of service.

These projections are generated in Citywide and rely on the data available in the asset register. Assessed condition data and replacement costs were used to assist in forecasting replacement needs for roads. For all remaining assets, only age was used to determine forthcoming replacement needs.

The projections can be different from actual capital forecasts. Consistent data updates, particularly condition, replacement costs, and regular upkeep of lifecycle models, will improve the alignment between the system generated expenditure requirements, and the Township's capital expenditure forecasts.

Road Network

Segment	Back-log	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Paved Roads (HCB)	$13.9m	$10.4m	$1.5m	$0	$11.8m	$2.9m	$88k	$697k	$2.3m	$0	$262k
Paved Roads (LCB)	$0	$0	$0	$84k	$26k	$890k	$1.7m	$72k	$0	$0	$0
Road Culverts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sidewalks	$0	$0	$0	$0	$0	$0	$0	$0	$0	$100k	$0
Streetlights	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$13.9m**	**$10.4m**	**$1.5m**	**$84k**	**$11.9m**	**$3.8m**	**$1.8m**	**$769k**	**$2.3m**	**$100k**	**$262k**

Table 58 System Generated 10-Year Capital Replacement Forecast: Road Network

Bridges & Culverts

Segment	Back-log	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Bridges	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Structural Culverts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

Table 59 System Generated 10-Year Capital Replacement Forecast: Bridges & Culverts

Water Network

Segment	Back-log	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Water Buildings	$0	$0	$0	$0	$0	$0	$9.4m	$0	$0	$0	$0
Water Equipment	$379k	$0	$0	$0	$0	$0	$0	$0	$41k	$383k	$62k
Water Mains	$914k	$0	$0	$0	$0	$825k	$0	$0	$254k	$0	$434k
Total	**$1.3m**	**$0**	**$0**	**$0**	**$0**	**$825k**	**$9.4m**	**$0**	**$296k**	**$383k**	**$496k**

Table 60 System Generated 10-Year Capital Replacement Forecast: Water Network

Sanitary Sewer Network

Segment	Back-log	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Sanitary Buildings	$0	$0	$0	$0	$0	$0	$34k	$2.1m	$0	$0	$276k
Sanitary Equipment	$471k	$82k	$0	$0	$0	$135k	$0	$0	$157k	$0	$0
Sanitary Mains	$387k	$30k	$991k	$0	$0	$0	$386k	$0	$0	$0	$0
Total	**$858k**	**$112k**	**$991k**	**$0**	**$0**	**$135k**	**$420k**	**$2.1m**	**$157k**	**$0**	**$276k**

Table 61 System Generated 10-Year Capital Replacement Forecast: Sanitary Sewer Network

Stormwater Network

Segment	Back-log	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Storm Sewer Mains	$0	$0	$0	$0	$0	$0	$0	$311k	$0	$0	$0
Total	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$311k**	**$0**	**$0**	**$0**

Table 62 System Generated 10-Year Capital Replacement Forecast: Stormwater Network

Buildings & Facilities

Segment	Back-log	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Administration	$0	$0	$0	$0	$0	$0	$0	$0	$82k	$0	$0
Fire Department	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Library	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Public Works	$0	$0	$0	$39k	$0	$0	$0	$0	$0	$0	$0
Recreation	$214k	$489k	$0	$0	$0	$0	$0	$0	$8.2m	$0	$0
Total	**$214k**	**$489k**	**$0**	**$39k**	**$0**	**$0**	**$0**	**$0**	**$8.3m**	**$0**	**$0**

Table 63 System Generated 10-Year Capital Replacement Forecast: Buildings & Facilities

Note: These projections are generated in Citywide and rely on the data available in the asset register. As assessed condition data was not available for many buildings assets, age was used to determine forthcoming replacement needs. Buildings and facilities often contain thousands of assets, each with its own estimated useful life. Currently, however, as the Township's buildings are not fully componentized, there are only 26 assets in the register. Over time, with improved and effective componentization, the alignment between the system generated expenditure requirements, and the Township's capital expenditure forecasts will also increase.

Land Improvements

Segment	Back-log	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Fencing	$0	$17k	$59k	$0	$0	$0	$0	$0	$59k	$0	$0
Miscellaneous	$0	$0	$0	$0	$0	$0	$19k	$55k	$0	$0	$0
Parking Lots	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Signage	$41k	$0	$70k	$0	$35k	$0	$0	$0	$0	$41k	$70k
Total	**$41k**	**$17k**	**$129k**	**$0**	**$35k**	**$0**	**$19k**	**$55k**	**$59k**	**$41k**	**$70k**

Table 64 System Generated 10-Year Capital Replacement Forecast: Land Improvements

Vehicles

Segment	Back-log	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Environmental Services	$114k	$0	$61k	$0	$0	$0	$0	$0	$114k	$61k	$0
Fire Department	$846k	$576k	$0	$0	$654k	$0	$0	$615k	$0	$0	$416k
Public Works	$0	$328k	$265k	$53k	$103k	$328k	$60k	$0	$365k	$592k	$53k
Recreation	$57k	$0	$57k	$0	$0	$71k	$57k	$0	$108k	$57k	$0
Total	**$1.0m**	**$904k**	**$383k**	**$53k**	**$757k**	**$398k**	**$117k**	**$615k**	**$587k**	**$710k**	**$469k**

Table 65 System Generated 10-Year Capital Replacement Forecast: Vehicles

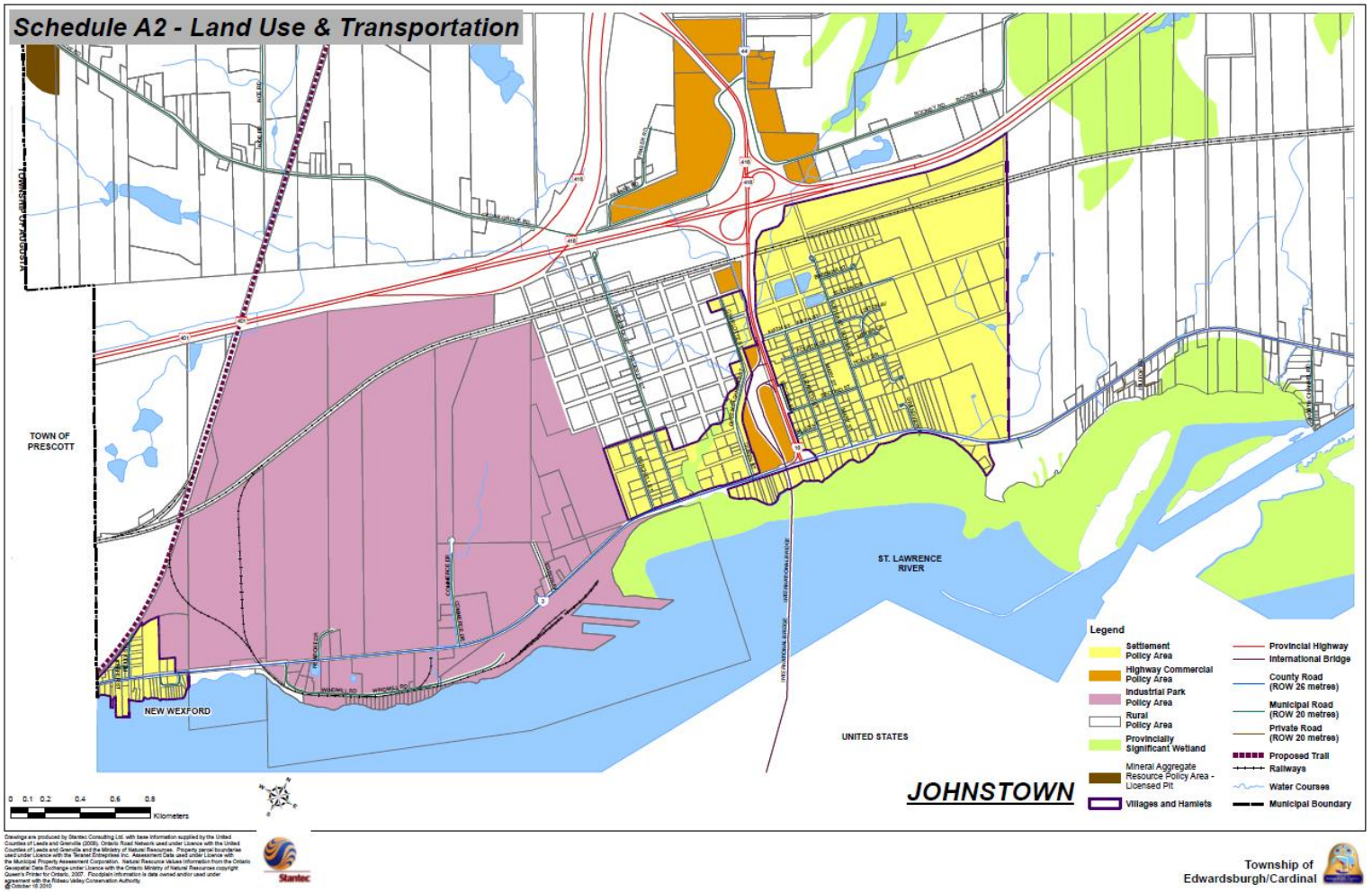
Machinery & Equipment

Segment	Back-log	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Administration	$30k	$14k	$0	$0	$14k	$0	$0	$44k	$0	$0	$14k
Fire Department	$242k	$0	$343k	$78k	$24k	$0	$24k	$22k	$0	$0	$0
Library	$55k	$28k	$28k	$25k	$23k	$23k	$0	$0	$108k	$28k	$25k
Public Works	$1.2m	$35k	$26k	$0	$189k	$93k	$0	$0	$275k	$21k	$48k
Recreation	$1.4m	$19k	$0	$0	$23k	$14k	$48k	$190k	$22k	$148k	$44k
Total	**$2.9m**	**$97k**	**$398k**	**$103k**	**$273k**	**$130k**	**$72k**	**$256k**	**$405k**	**$196k**	**$130k**

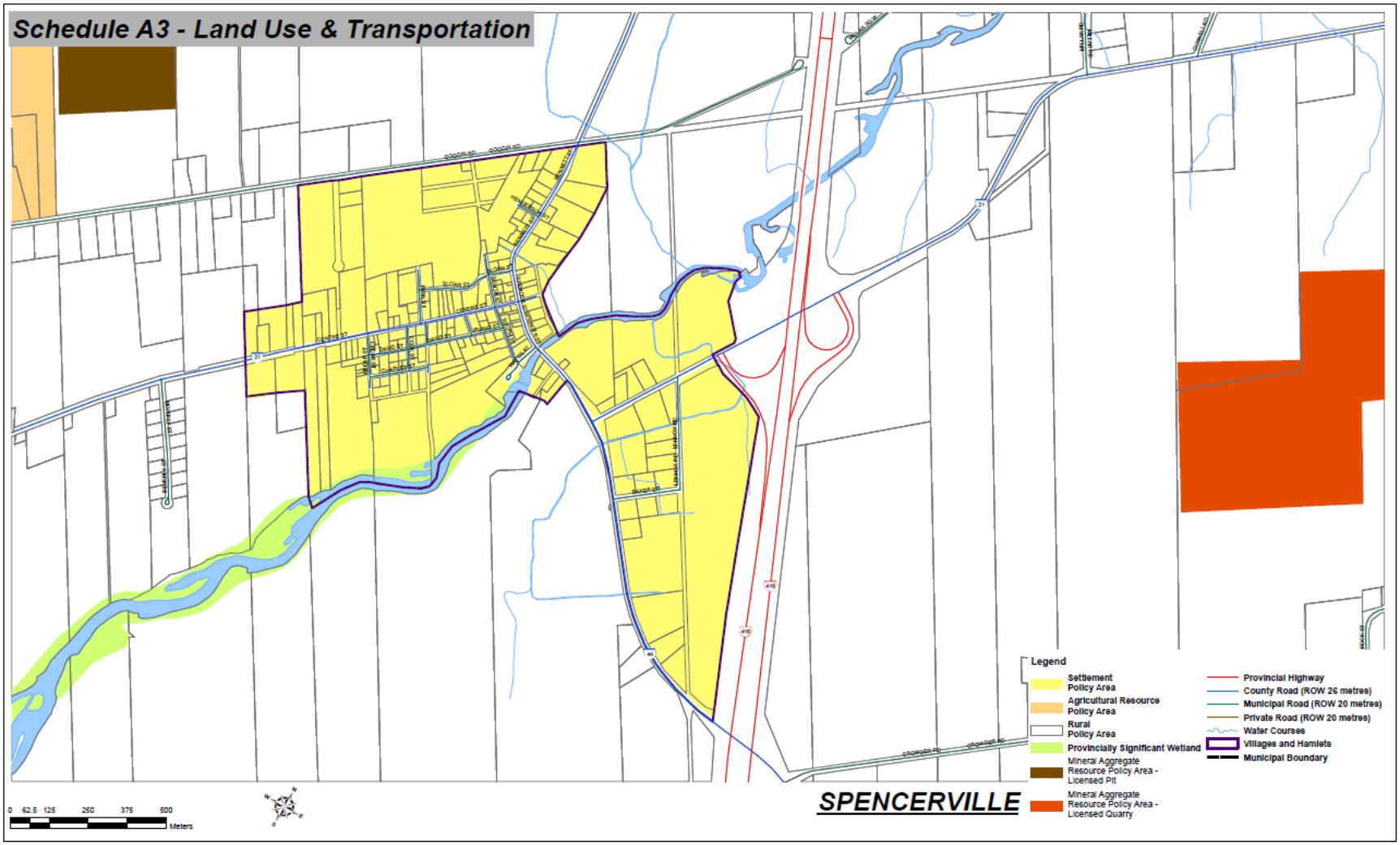
Table 66 System Generated 10-Year Capital Replacement Forecast: Machinery & Equipment

Appendix C – Level of Service Maps & Photos

Road Network Map - Johnstown



Road Network Map – Spencerville



Images of Bridge in Good Condition

Frederick Street Bridge

Inspected: May 15th, 2024

SW elevation

South approach

Downstream channel east

Upstream channel west

North wall taken from east vantage

South wall taken from east vantage

Images of Bridge in Fair Condition

Tuttle Point Culvert

Inspected: May 9th, 2024

North elevation

West approach

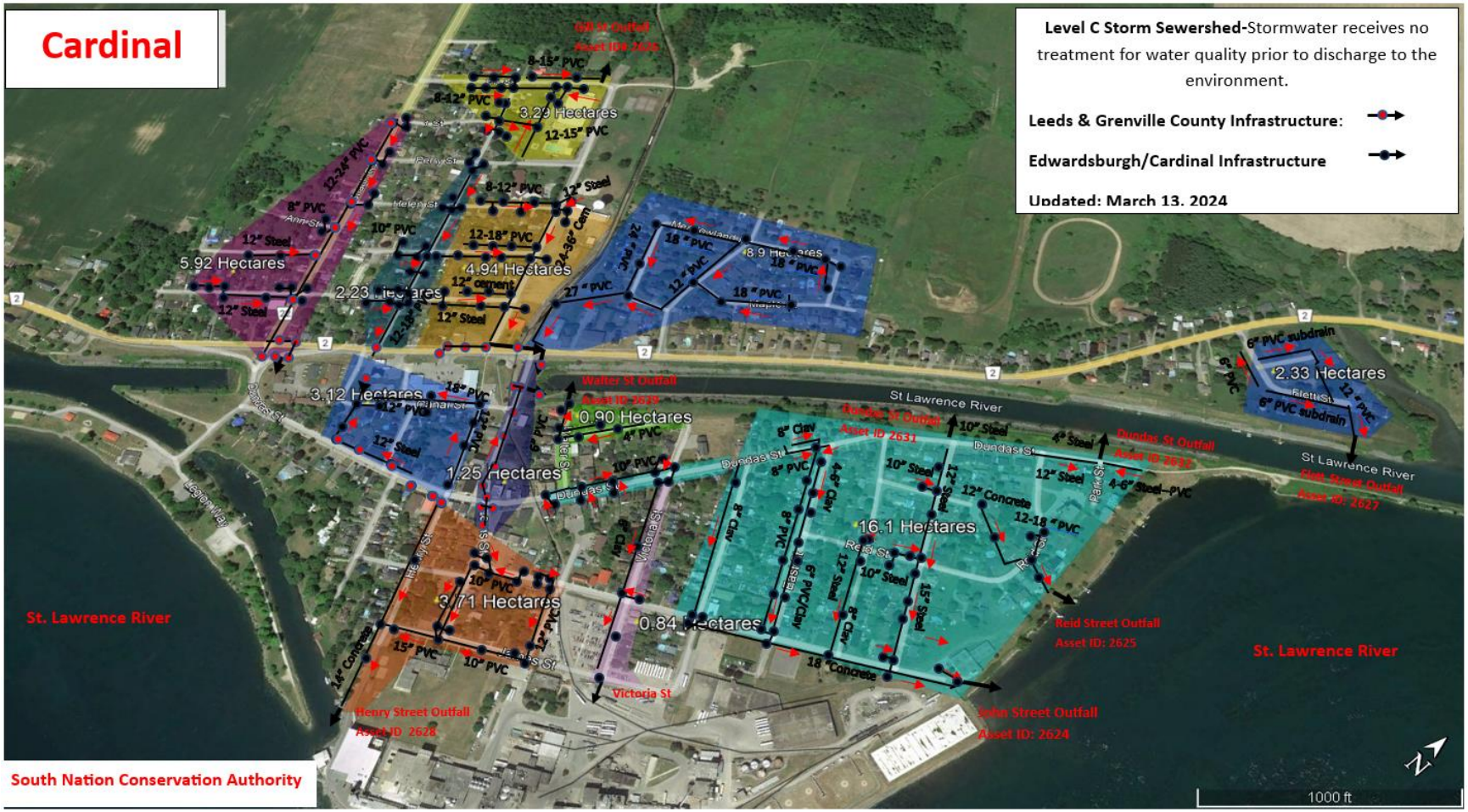
East approach

Upstream channel north

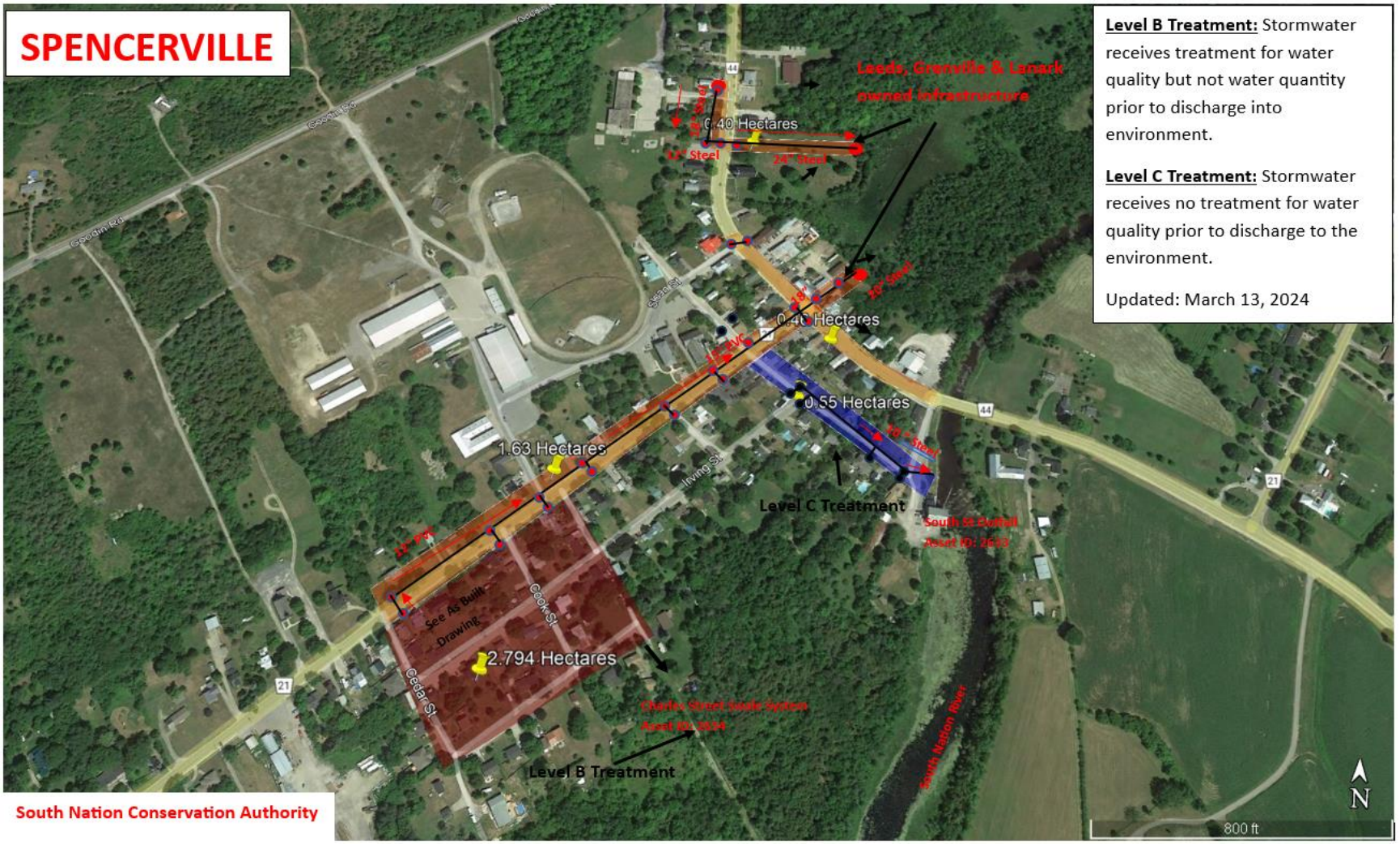
Downstream channel south

Through the east barrel from the north

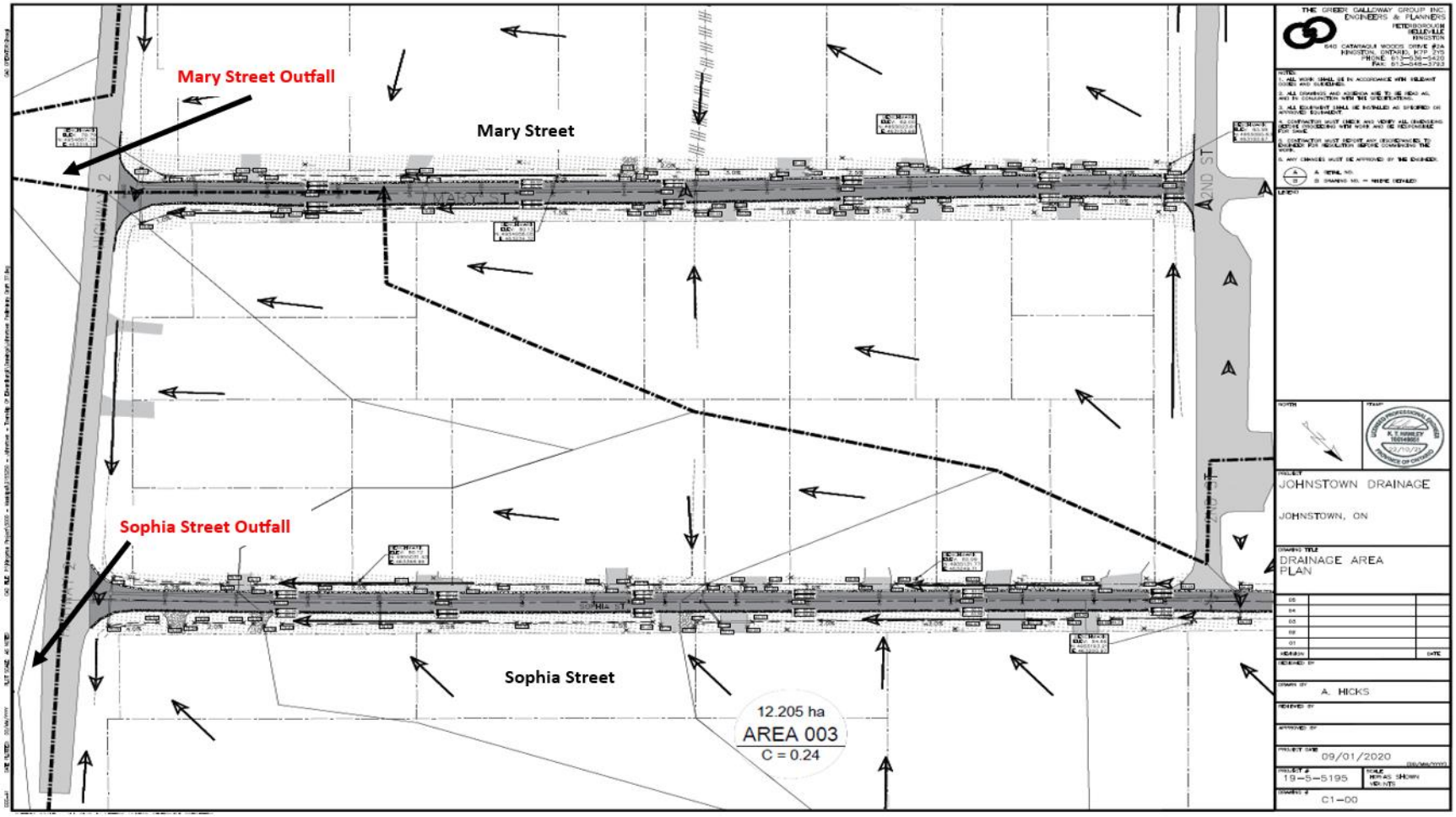
Stormwater Network Map (Cardinal)



Stormwater Network Map (Spencerville)



Stormwater Network Map (Johnstown)

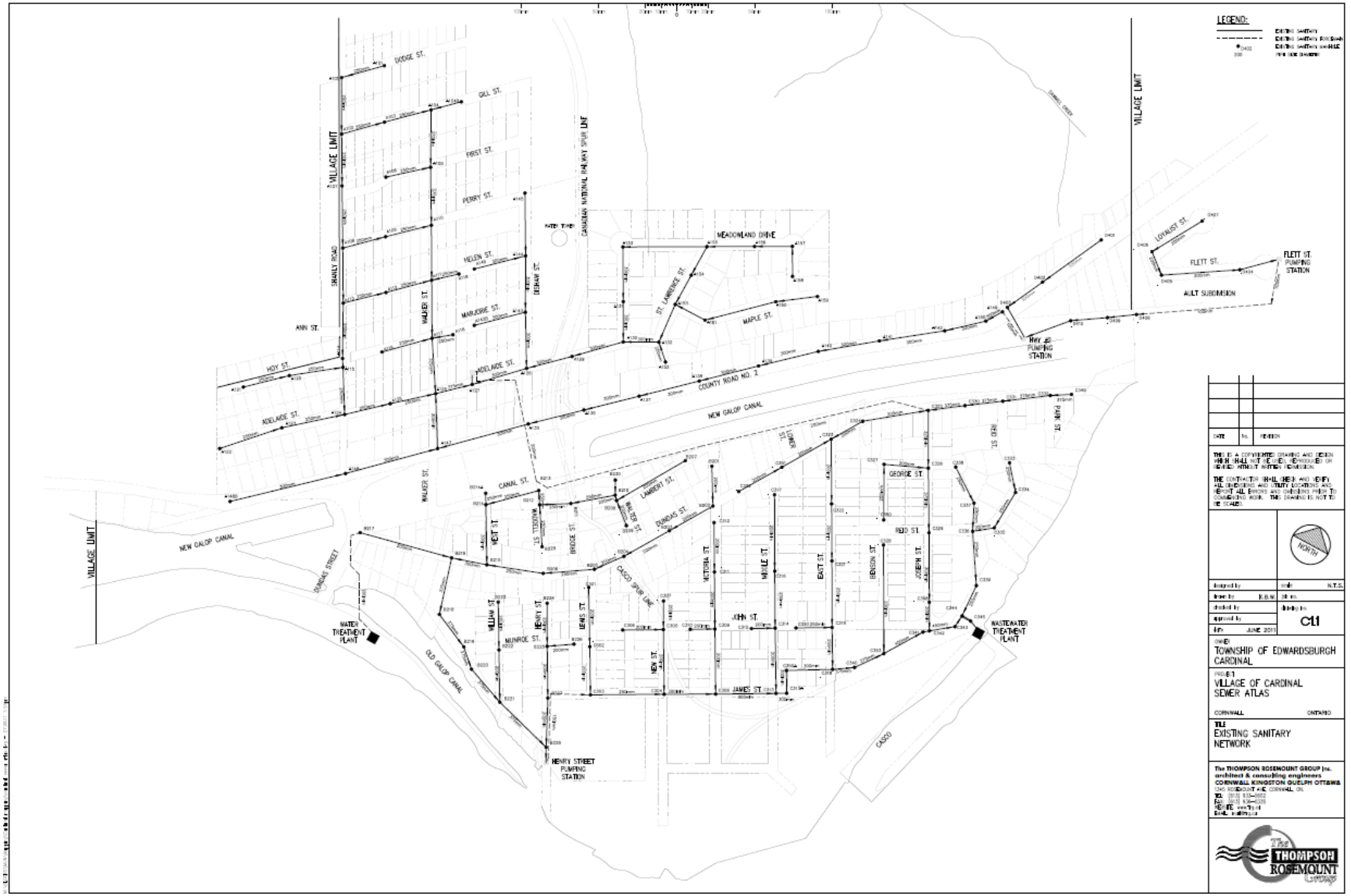


Water Network Map – Part 1 (Cardinal)

Water Network Map – Part 2 (New Wexford)

Legend	Symbol
18 inch Water Main	
6 inch Water Main	
2 inch Water Main	
Sewage Force Main	
Properties connected to water mains	
Properties connected to wells	
Water Sample Station	

Sanitary Sewer Network (Cardinal)



Appendix D – Risk Rating Criteria

Probability of Failure

Asset Category	Risk Criteria	Criteria Weighting	Value/Range	Probability of Failure Score
Road Network (Roads)	Condition	75%	80-100	1
			60-79	2
			40-59	3
			20-39	4
			0-19	5
	Section AADT	15%	0-99	1
			100-299	2
			300-399	3
			400-699	4
			700+	5
	Surface Material	10%	HCB - Asphalt	2
			LCB - Surface Treatment	3
Bridges & Culverts Stormwater Network Buildings & Facilities Machinery & Equipment Vehicles Land Improvements	Condition	100%	80-100	1
			60-79	2
			40-59	3
			20-39	4
			0-19	5

Asset Category	Risk Criteria	Criteria Weighting	Value/Range	Probability of Failure Score
Sanitary Sewer Network (Mains)	Condition	70%	80-100	1
			60-79	2
			40-59	3
			20-39	4
			0-19	5
	Pipe Material	30%	Cast Iron	4
			Vitrified Clay	3
			PVC	2
Water Network (Mains)	Condition	70%	80-100	1
			60-79	2
			40-59	3
			20-39	4
			0-19	5
	Pipe Material	30%	Cast Iron	4
			Ductile Iron	4
			Asbestos Cement	3
			Copper	3
			Riveted Steel	3
			HDPE	2
			PVC	2

Consequence of Failure

Asset Category	Risk Classification	Risk Criteria	Value/Range	Consequence of Failure Score
Road Network (Roads)	Economic (70%)	Surface Material (100%)	HCB	4
			LCB	2
	Social (30%)	Road Design Class (20%)	Collector	3
			Local	2
		Section AADT (40%)	0-99	1
			100-299	2
			300-399	3
			400-699	4
			700+	5
		MMS Class (40%)	4	4
			5	3
			6	2
Bridges & Culverts	Economic (100%)	Replacement Cost (100%)	$0-$50,000	1
			$50,000-$350,000	2
			$350,000-$1,000,000	3
			$1,000,000-$2,000,000	4
			$2,000,000+	5
Stormwater Network	Economic (100%)	Replacement Cost (100%)	$0-$50,000	1
			$50,000-$150,000	2
			$150,000-$250,000	3

Asset Category	Risk Classification	Risk Criteria	Value/Range	Consequence of Failure Score
			$250,000-$500,000	4
			$500,000+	5
Buildings & Facilities	Economic (70%)	Replacement Cost (100%)	$0-$200,000	1
			$200,000-$900,000	2
			$900,000-$1,750,000	3
			$1,750,000-$4,000,000	4
			$4,000,000+	5
	Operational (30%)	Department (100%)	Libraries	2
			Public Works	3
			Recreation/ Facilities	3
			Protective Services	4
			Administration	4
			Fire	5
Machinery & Equipment	Economic (70%)	Replacement Cost (100%)	$0-$50,000	1
			$50,000-$100,000	2
			$100,000-$200,000	3
			$200,000-$500,000	4
			$500,000+	5
	Operational (30%)	Equipment Type (100%)	Signage	1
			Books & Periodicals	2

Asset Category	Risk Classification	Risk Criteria	Value/Range	Consequence of Failure Score
			Library Equipment	2
			Recreation Department Equipment	2
			Recreation Tractors	2
			Administration Equipment	3
			Environmental Services Equipment	3
			Public Works Equipment	3
			Computers	4
			Fire Department Equipment	4
Vehicles	Economic (70%)	Replacement Cost (100%)	$0-$25,000	1
			$25,000-$50,000	2
			$50,000-$150,000	3
			$150,000-$300,000	4
			$300,000+	5
	Operational (30%)	Vehicles Type (100%)	Environmental Services Vehicles	2
			Recreation Department Vehicles	2

Asset Category	Risk Classification	Risk Criteria	Value/Range	Consequence of Failure Score
			Public Works Vehicles	3
			Fire Department Vehicles	4
Land Improvements	Economic (100%)	Replacement Cost (100%)	$0-$25,000	1
			$25,000-$50,000	2
			$50,000-$100,000	3
			$100,000-$150,000	4
			$150,000+	5
Water Network (Water Mains)	Economic (70%)	Pipe Diameter (100%)	0-25mm	1
			25-100mm	2
			100-150mm	3
			150-250mm	4
			250mm+	5
	Operational (20%)	Pipe Material (100%)	Cast Iron	2
			Copper	2
			Ductile Iron	2
			HDPE	2
			PVC	2
			Riveted Steel	3
			Asbestos Cement	4
	Social (10%)	# of Service Connections	0-1	1
			1-5	2

Asset Category	Risk Classification	Risk Criteria	Value/Range	Consequence of Failure Score
		(100%)	5-15	3
			15-50	4
			50+	5
Sanitary Sewer Network (Sanitary Mains)	Economic (70%)	Pipe Diameter (100%)	0-100mm	1
			100-250mm	2
			250-375mm	3
			375-450mm	4
			450mm+	5
	Operational (20%)	Asset Segment (50%)	Cardinal Sanitary Mains	3
			Industrial Park Sanitary Mains	4
		Pipe Material (50%)	PVC	2
			Cast Iron	3
			CIPP	3
			Vitirifed Clay	4
	Social (10%)	# of Service Connections (100%)	0-1	1
			1-5	2
			5-10	3
			10-25	4
			25+	5