Asset Management Plan 2024

Township of Asphodel-Norwood

March 2025

psdcitywide

This Asset Management Plan was prepared by:

psdcitywide

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

Key Statistics

$82.6 m	2023 Replacement Cost of Asset Portfolio
$42 k	Replacement Cost of Infrastructure Per Household
60%	Percentage of Assets in Fair or Better Condition
49%	Percentage of Assets with Assessed Condition Data
$717 k	Annual Capital Infrastructure Deficit
10 Years	Recommended Timeframe for Eliminating Annual Infrastructure Deficit
2.8%	Target Investment Rate
1.9%	Actual Investment 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 of Asphodel-Norwood can ensure that public infrastructure is managed to support the sustainable delivery of municipal services.

This AMP includes the following asset categories:

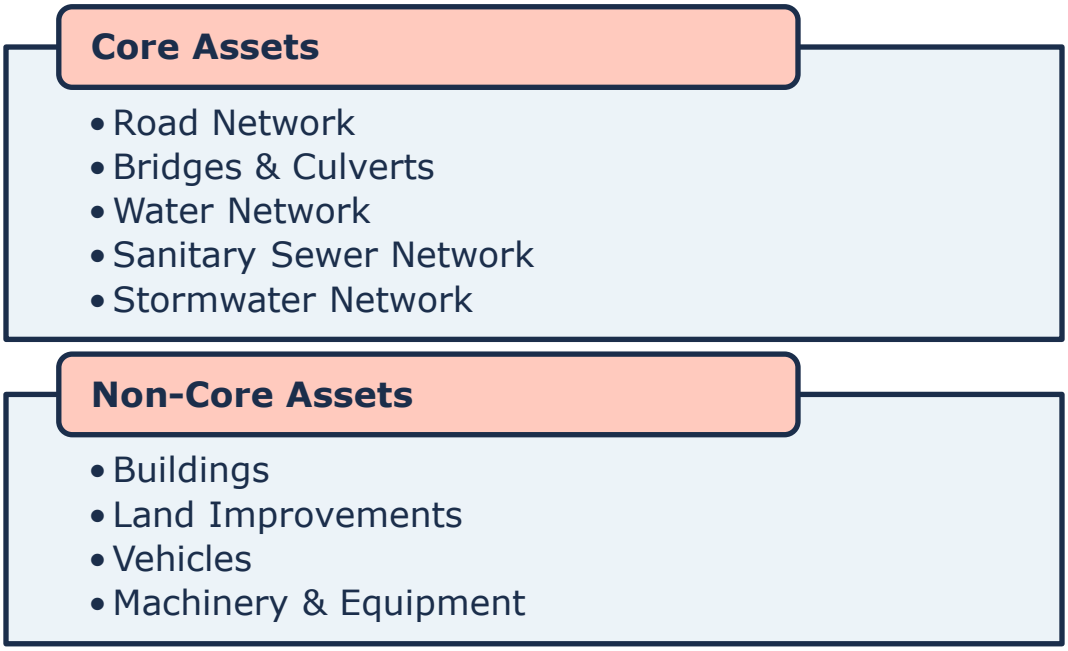

Figure 1 Core and Non-Core Asset Categories

1.2 Compliance

With the development of this AMP the Township of Asphodel-Norwood 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.

1.3 Findings

The overall replacement cost of the asset categories included in this AMP totals $82.6 million. 60% of all assets analyzed in this AMP are in fair or better condition and assessed condition data was available for 49% of assets. For the remaining 51% 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 $2.3 million. Based on a historical analysis of sustainable capital funding sources, the Township is committing approximately $1.6 million towards capital projects or reserves per year. As a result, there is currently an annual funding gap of $717,000.

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 10-year plan:

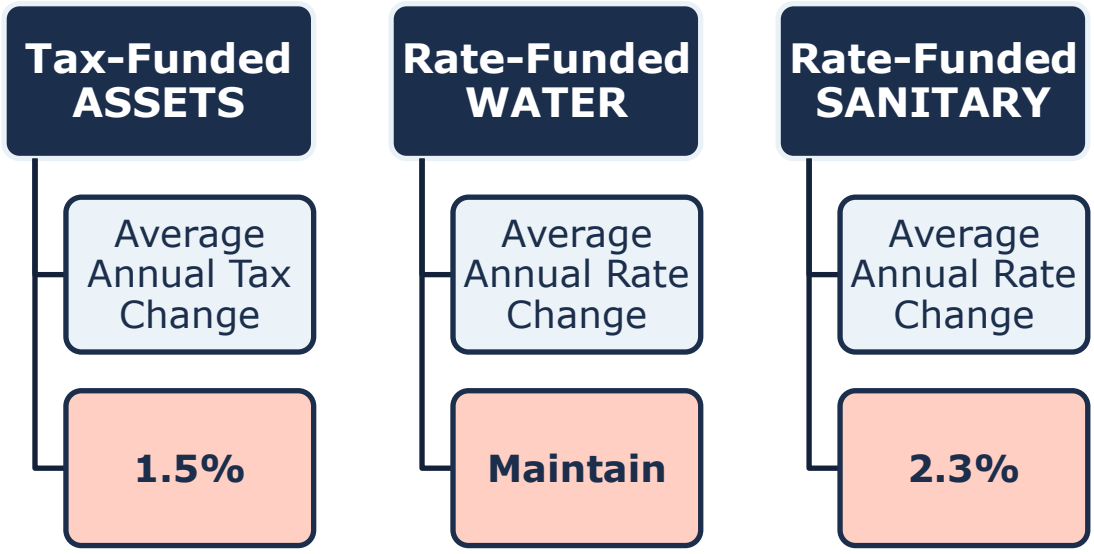

Figure 2 Proposed Tax/Rate Changes

Recommendations to guide continuous refinement of the Township's asset management program. These include:

- Review and refine lifecycle and risk profiles to better reflect actual practices and improve capital projections.
- Update asset replacement costs periodically based on recent projects, condition assessments, and market trends.
- Review and update asset serviceable life estimates to improve long-term forecasting and financial recommendations.
- Utilize risk models to identify high-value assets and inform strategic decisions on repairs, replacements, and capital planning.
- Monitor local, regional, and environmental trends to adjust infrastructure planning and service level targets.

2. Introduction & Context

2.1 Community Profile

Census Characteristic	Township of Asphodel-Norwood	Ontario
Population 2021	4,658	14,223,942
Population Change 2016-2021	13.4%	5.8%
Total Private Dwellings	1,985	5,929,250
Population Density	28.8/km^2	15.9/km^2
Land Area	161.62 km^2	892,411.76 km^2

Table 1 Township of Asphodel-Norwood Community Profile

The Township of Asphodel-Norwood is a lower-tier township municipality in Peterborough County. The Township is comprised of the Village of Norwood and the surrounding Township of Asphodel as well as a number of smaller villages and hamlets, including Birdsall, Birdsall Station, and Westwood. It is located in the southeast corner of Peterborough County with the Trent River and Rice Lake defining the Township's southern boundary.

The Township offers an attractive mixture of rural, village, and cottage living. The Township finds itself within a unique geographical region of drumlins, resulting in a picturesque landscape of hills and river systems. Asphodel-Norwood finds itself home to many farms, bolstering food supplies and revenues in a sustainable way. As a rural township, the community offers access to many recreational activities such as walking trails and parks while also being home to a strong hockey community and NHL sized rink.

The township has experienced consistent year over year population growth. Over the last decade, the township has seen a 13.4% increase in population. The township has a population skewed to an aging population with 24% of the population being 65+, which is above the approximate 19% proportion for the rest of Ontario.

The County generates a total revenue of $3,805,003 from property taxes and has an annual capital and projects budget of $5,461,138.44 as of 2022. The Township's infrastructure priorities include Tourism, economic growth, and public service delivery.

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 Asphodel-Norwood Climate Profile

Asphodel-Norwood is located in Southern Ontario along the Trent River, around 60km north of Lake Ontario. The County 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 Asphodel-Norwood 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 ºC by the end of the century.

Increase in Total Annual Precipitation

- Under a high emissions scenario, Asphodel-Norwood 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 Rice Lake.

Asset management practices aim to deliver sustainable service delivery - the delivery of services to residents today without compromising the services and well-being of future residents. Climate change threatens sustainable service delivery by reducing the useful life of an asset and increasing the risk of asset failure. Desired levels of service can be more difficult to achieve as a

result of climate change impacts such as flooding, high heat, drought, and more frequent and intense storms.

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

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.

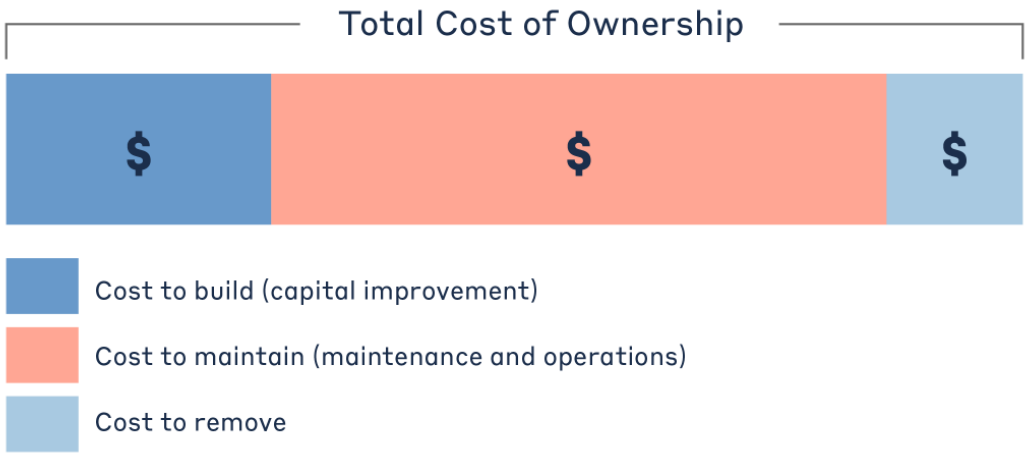

Figure 3 Total Cost of Asset Ownership

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.

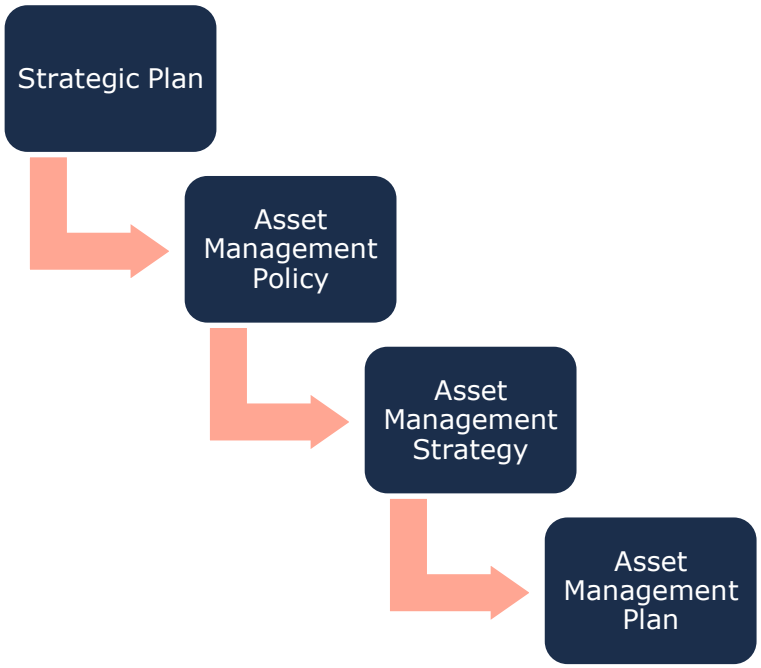

Figure 4 Foundational Asset Management Documents

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 of Asphodel-Norwood adopted their Strategic Asset Management Policy on April 9, 2019, in accordance with Ontario Regulation 588/17. The policy is intended to guide the consistent use of asset management practices across the organization. It also aims to facilitate logical and evidence-based decision-making for the management of municipal infrastructure assets and to support the delivery of sustainable community services now and in the future.

The Township will implement best practices in asset management in the following ways:

- Collecting & managing accurate asset data
- Developing a condition assessment program
- Implementing risk management
- Adopting a whole lifecycle management approach

- Developing a financial strategy, and
- Establishing a level of service framework

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	**$$$**	♦ Useful life may not be extended as expected. ♦ May be costlier in the long run when assessed against full reconstruction or replacement. ♦ Loss or disruption of service, particularly for underground assets.
Replacement/ Reconstruction Asset end-of-life activities that often involve the complete replacement of assets	**$$$$$**	♦ 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.

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, Water, Sanitary, Stormwater) the province, through O. Reg. 588/17, has provided qualitative descriptions that are required to be included in this AMP. For non-core asset categories, community LOS statements are at the discretion of the municipality.

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 the province, through O. Reg. 588/17, has also provided technical metrics that are required to be included in this AMP. For non-core asset categories, technical metrics are at the discretion of the municipality.

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 by consideration of a variety of community expectations, fiscal capacity, regulatory requirements, corporate goals and long-term sustainability. Once proposed levels of service have been established, and prior to July 2025, the Township must identify a lifecycle management and financial strategy which allows these targets to be achieved.

2.4 Scope & Methodology

2.4.1 Asset Categories for this AMP

This asset management plan for the Township of Asphodel-Norwood 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.

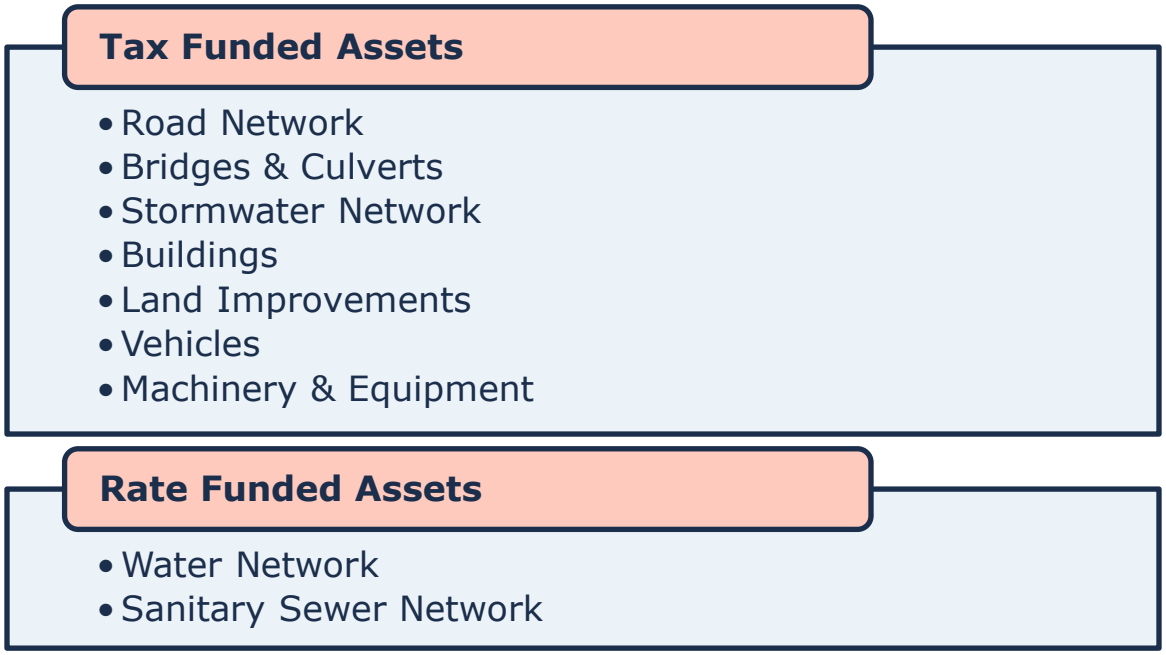

Figure 6 Tax Funded and Rate Funded Asset Categories

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 Township. 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

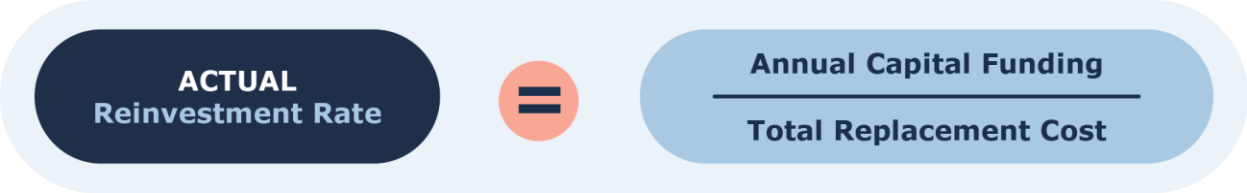

Figure 9 Actual Reinvestment Rate Calculation

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.

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, 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.

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

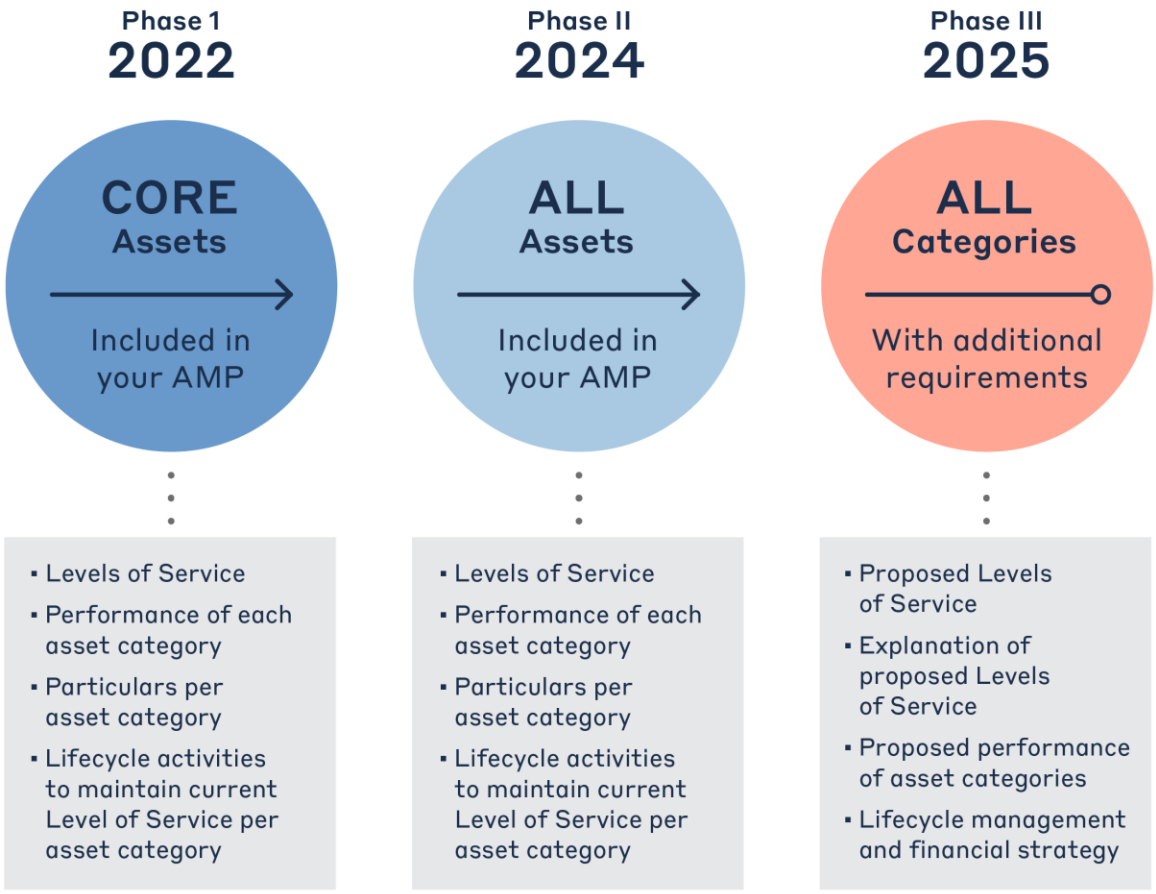

Figure 10 O. Reg. 588/17 Requirements and Reporting Deadlines

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

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.

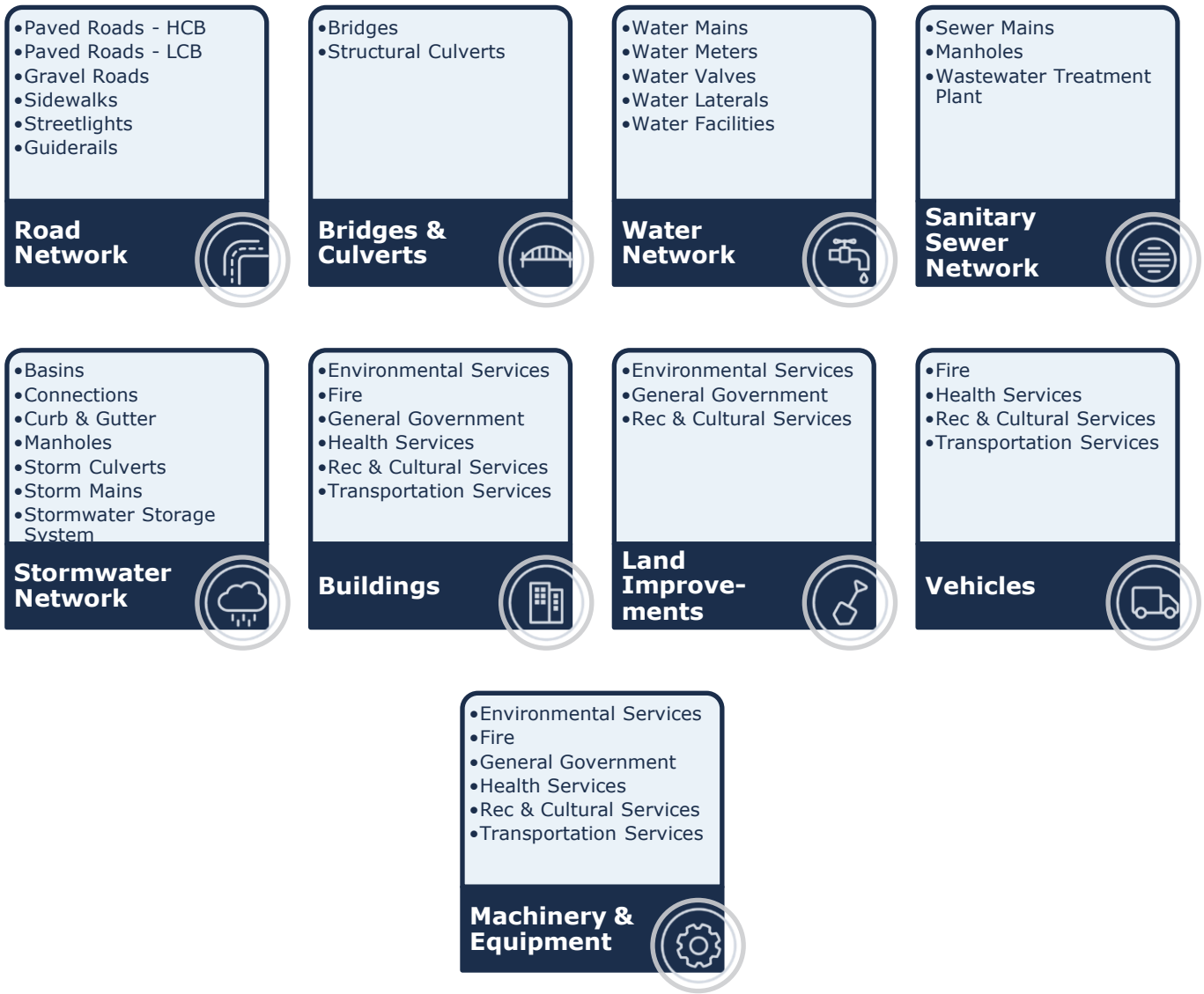

Figure 11 Asset Hierarchy and Data Classification

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 $82.6 million. This estimate was calculated using user-defined costing, as well as inflation of historical or original costs to current date. This estimate reflects the 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 31% of the total portfolio, roads form the largest share of the Township's asset portfolio, followed by buildings at 24%.

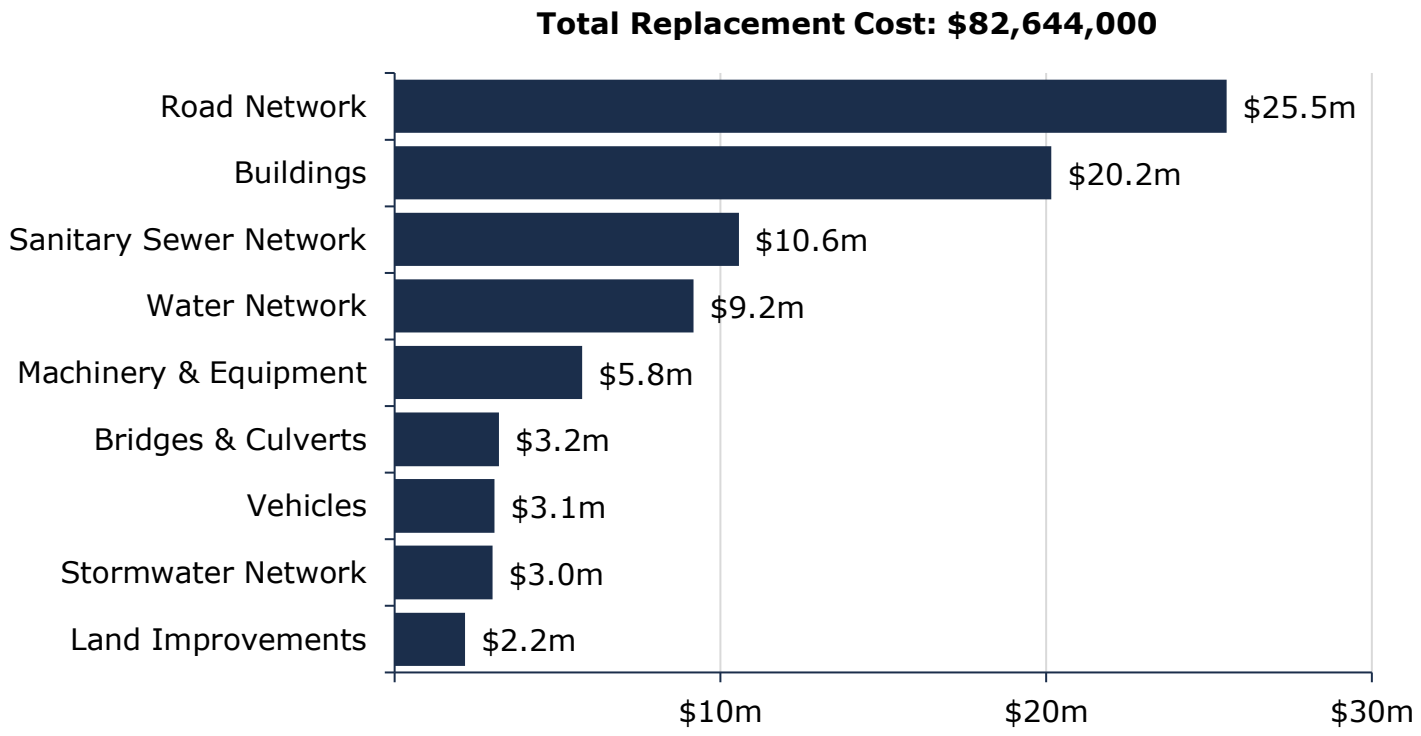

Figure 12 Current Replacement Cost by Asset Category

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 $2.3 million, for a target portfolio reinvestment rate of 2.8%. Currently, annual investment from sustainable revenue sources is $1.6 million, for a current portfolio reinvestment rate of 1.9%. Target and current re-investment rates by asset category are detailed below.

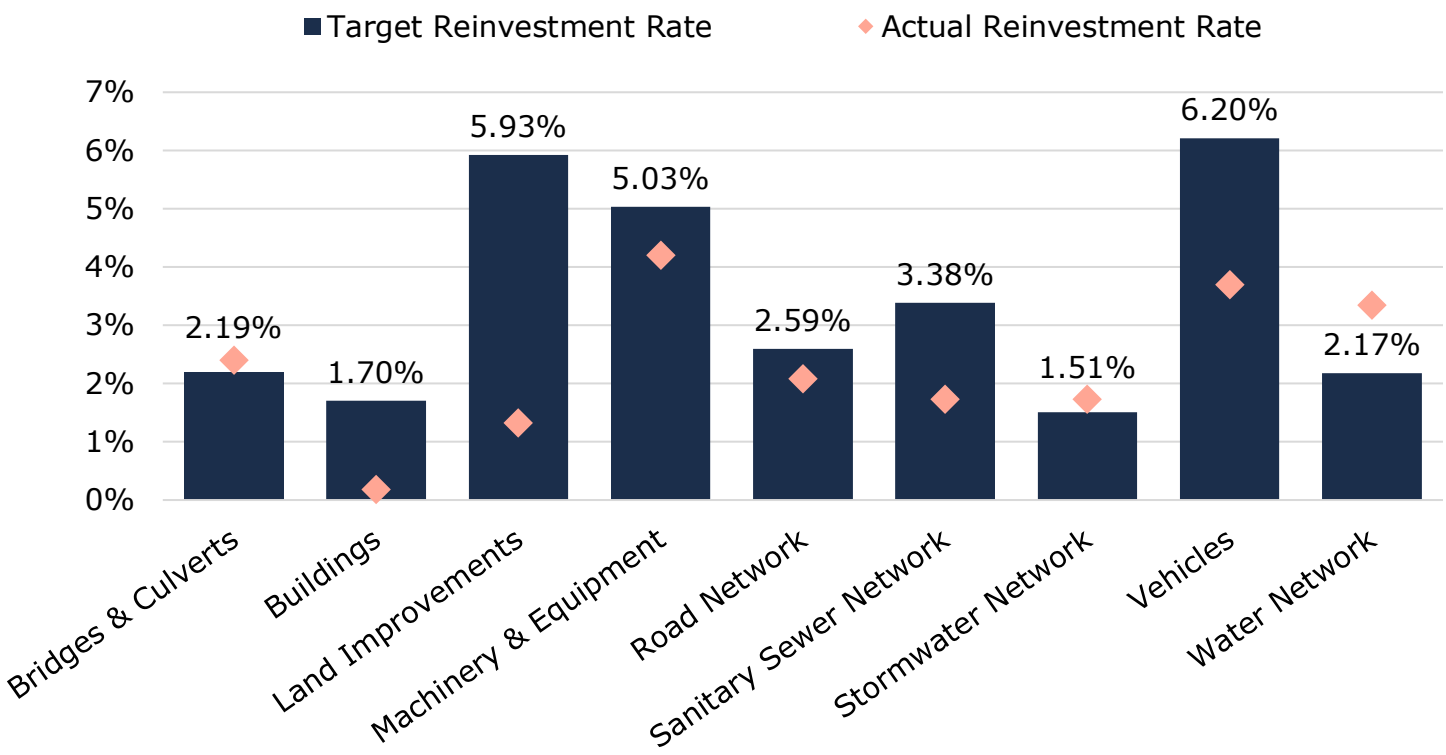

Figure 13 Current Vs. Target Reinvestment Rate

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, 60% of the Township's infrastructure portfolio is in fair or better condition, with the remaining 40% 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 the majority of the road network, all bridges and culverts, and a portion of water and sanitary, land improvement, and vehicle assets. For all remaining assets, age was used as an approximation of condition for 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-end (2023), unless otherwise noted. 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.

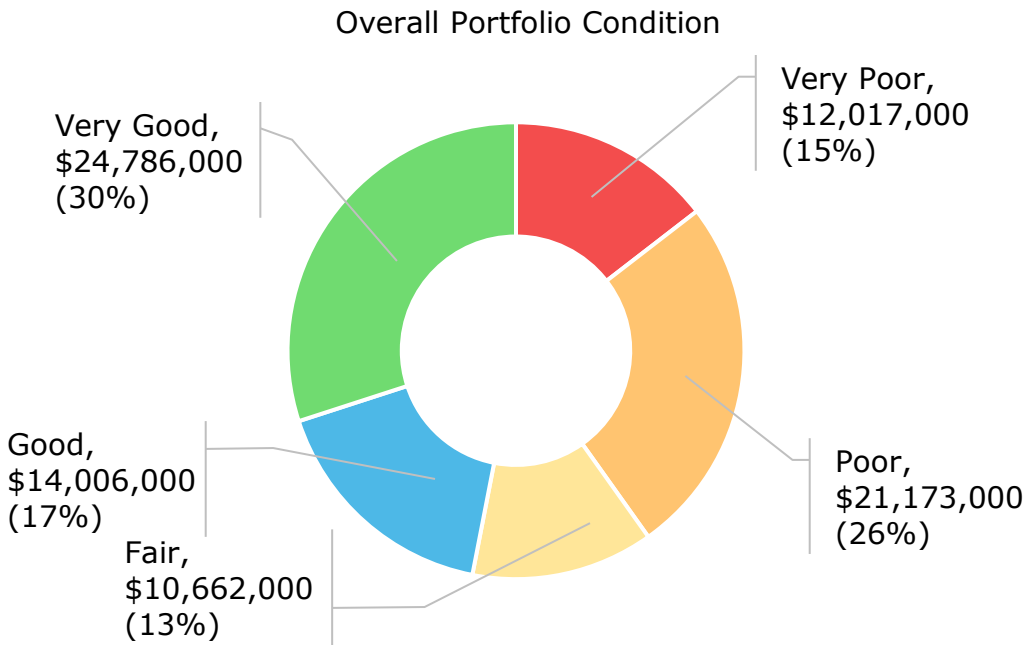

Figure 14 Asset Condition: Portfolio Overview

As further illustrated in Figure 15 at the category level, the majority of water, stormwater, machinery and equipment, buildings, and land improvement assets are in fair or better condition, based on a combination of in-field condition assessment data and projected age data. Refer Table 5 below for details on how condition data was derived for each asset segment.

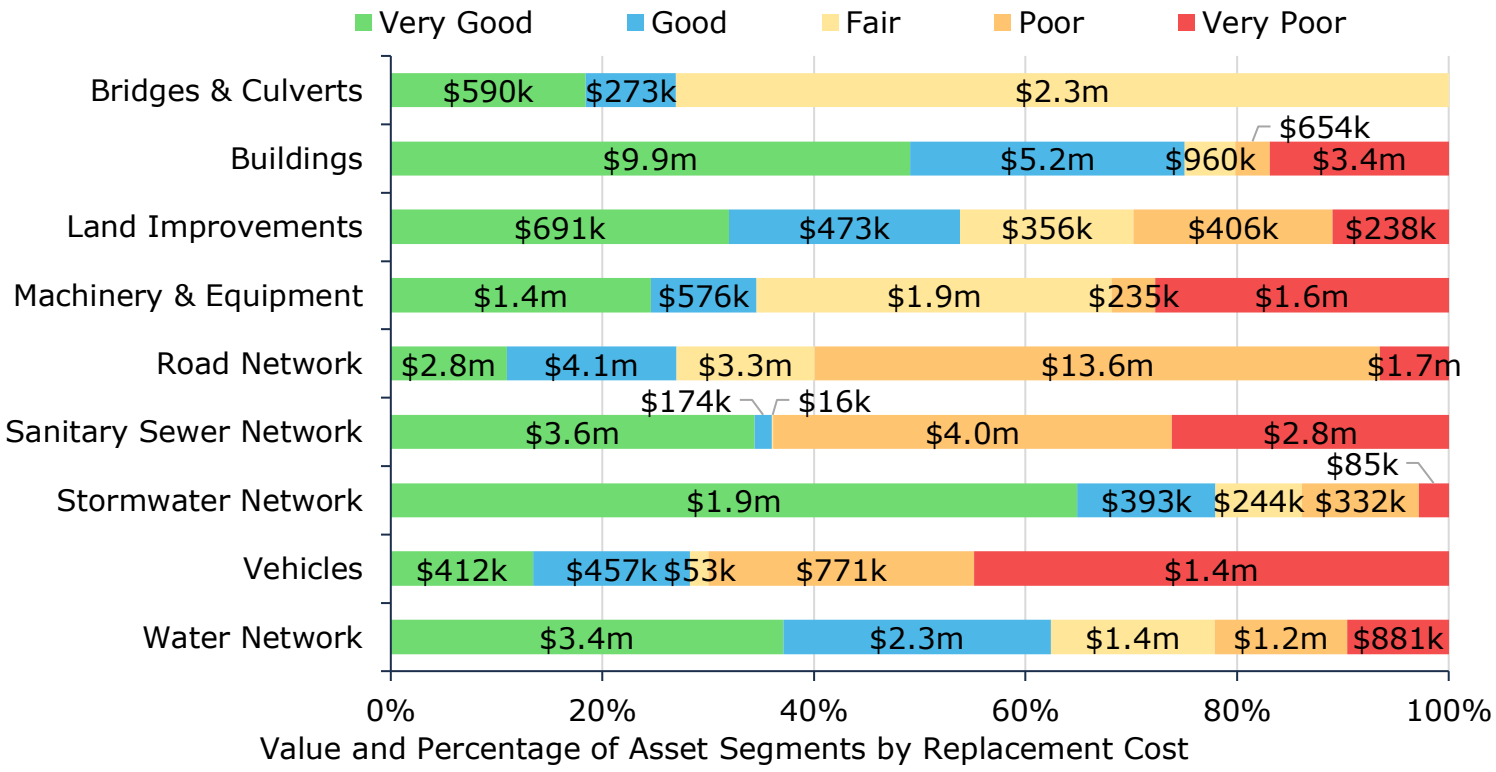

Figure 15 Asset Condition by Asset Category

As outlined previously, 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 'Norwood Fire Hall', or 'Municipal Office'.

Source of Condition Data

This AMP relies on assessed condition for 49% 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. Table 5 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	Road Surfaces & Supporting Infrastructure	100%	Staff Assessments
Bridges & Culverts	Bridges Structural Culverts	100%	2024 OSIM Report
Water Network	All	56%	Staff Assessments
Sanitary Sewer Network	All	27%	Staff Assessments
Stormwater Network	All	9%	Staff Assessments
Buildings	All	6%	Staff Assessments
Land Improvements	All	39%	Staff Assessments
Vehicles	All	42%	Staff Assessments
Machinery & Equipment	All	5%	Staff Assessments

Table 5 Source of Condition Data

3.2.4 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.

1 - 4 Very Low $32,965,746 (40%)	5 - 7 Low $19,511,366 (24%)	8 - 9 Moderate $5,839,847 (7%)	10 - 14 High $14,718,538 (18%)	15 - 25 Very High $9,608,383 (12%)

Figure 16 Risk Matrix: All Assets

The analysis shows that based on current risk models, approximately 12% of the Township's assets, with a current replacement cost of approximately $9.6 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.

3.2.5 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 80-year time horizon. On average, $2.3 million is required each year to remain current with capital replacement needs for the Township's asset portfolio (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.

The chart also illustrates a backlog of more than $5 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.

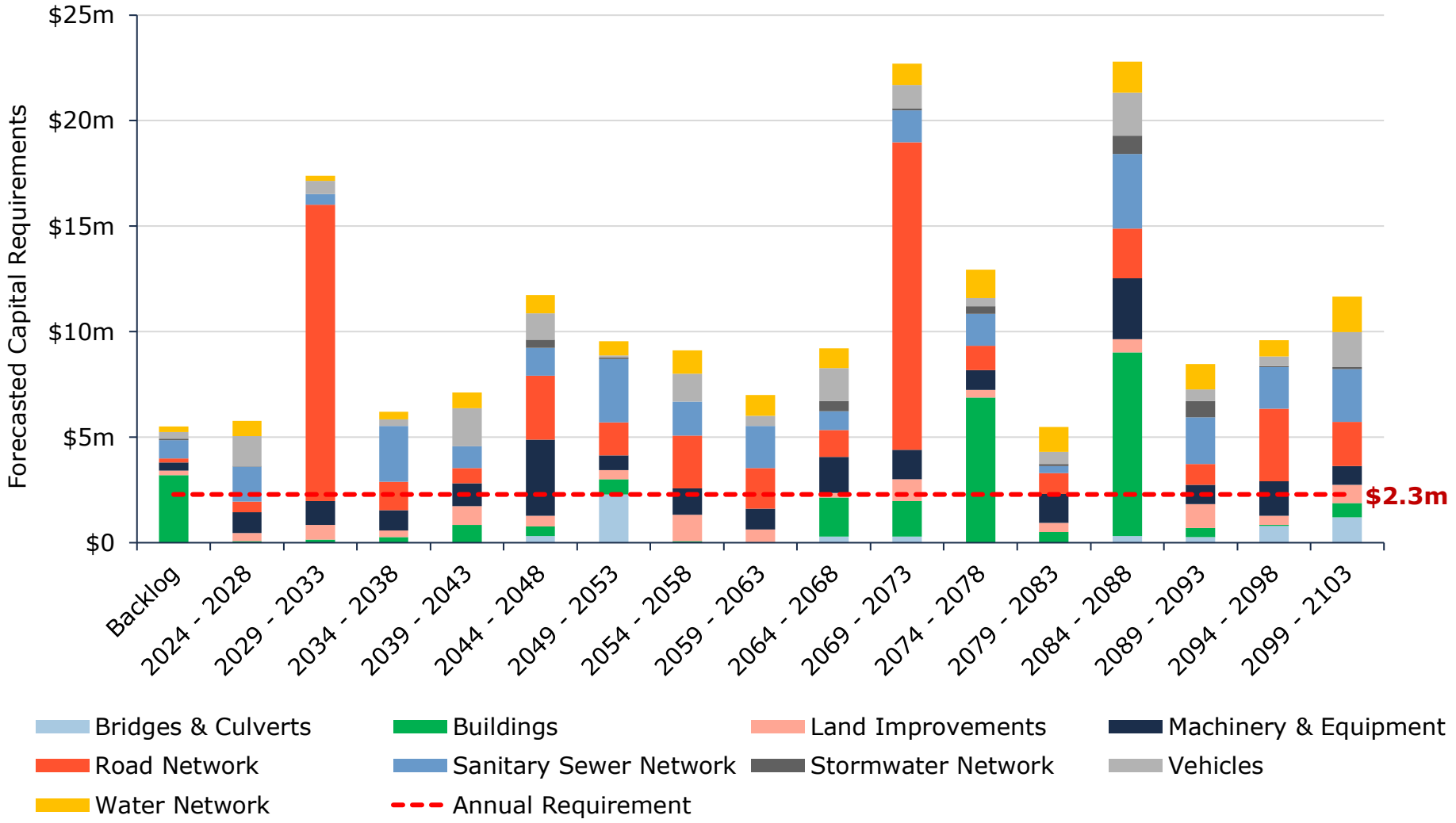

Figure 17 Capital Replacement Needs: Portfolio Overview 2024-2103

Core Assets

4. Road Network

The Township's road network comprises the largest share of its infrastructure portfolio, with a current replacement cost of more than $25.5 million, distributed primarily between paved and gravel roads. The Township also owns and manages other supporting infrastructure including sidewalks, streetlights, and guiderails.

4.1 Inventory & Valuation

Table 6 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	86	Length (km)	$12,521,590	CPI
Guiderails	800	Length (m)	$130,933	CPI
Paved Roads - HCB	16	Length (km)	$6,455,857	CPI
Paved Roads - LCB	40	Length (km)	$3,957,787	CPI
Sidewalks	14,213	Area (m^2)	$2,314,038	CPI
Streetlights	326	Quantity	$162,388	CPI
TOTAL			**$25,542,593**	

Table 6 Detailed Asset Inventory: Road Network

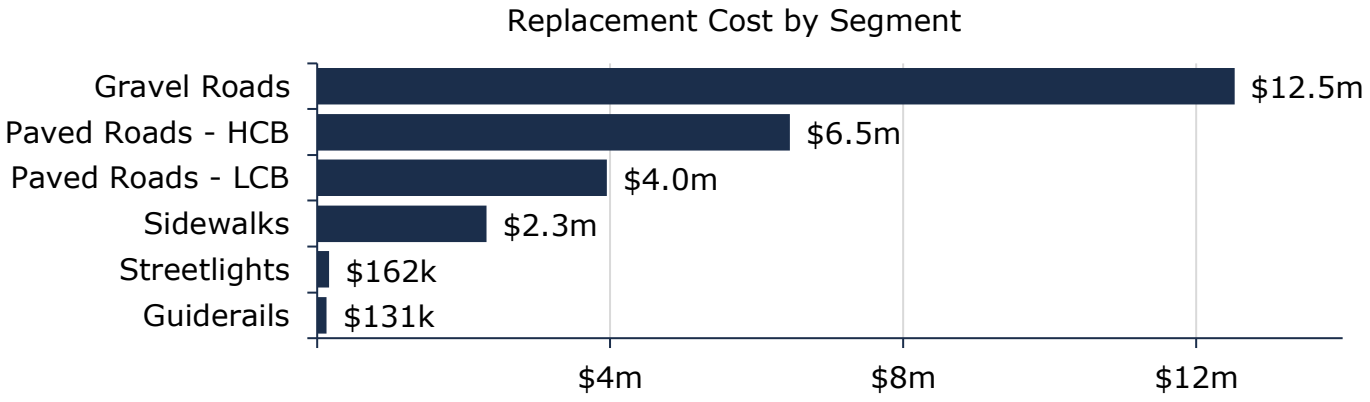

Figure 18 Portfolio Valuation: Road Network

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, 40% of assets are in fair or better

condition; the remaining 60% of assets are in poor to very poor condition. Condition assessments were available for 99% of assets, based on replacement cost. 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.

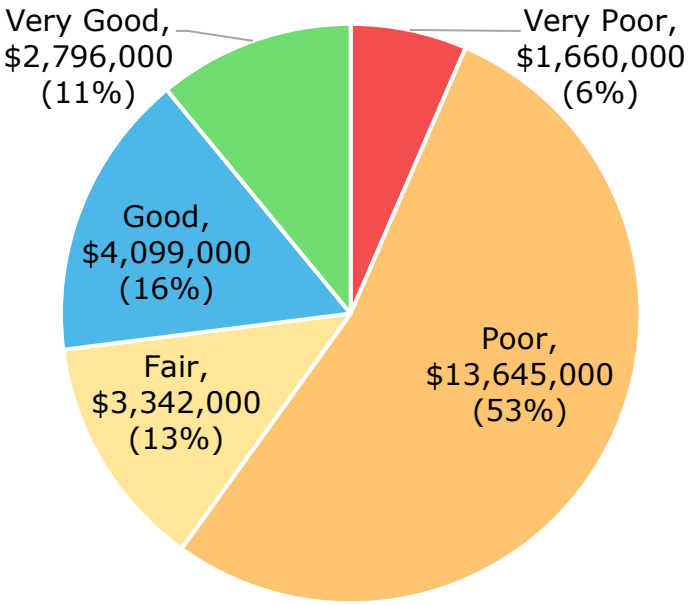

Figure 19 Asset Condition: Road Network Overall

As illustrated in Figure 20, based on condition assessments, the majority of gravel roads are in poor or worse condition, however, HCB and LCB paved roads are in more moderate conditions.

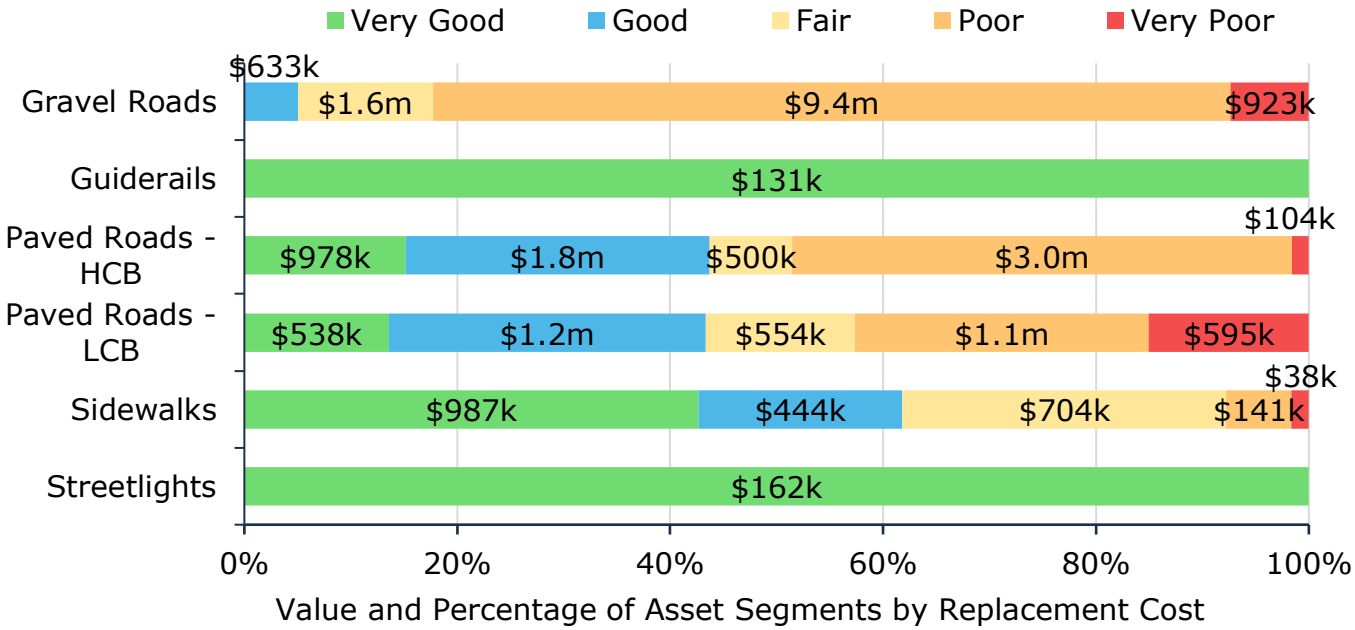

Figure 20 Asset Condition: Road Network by Segment

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.

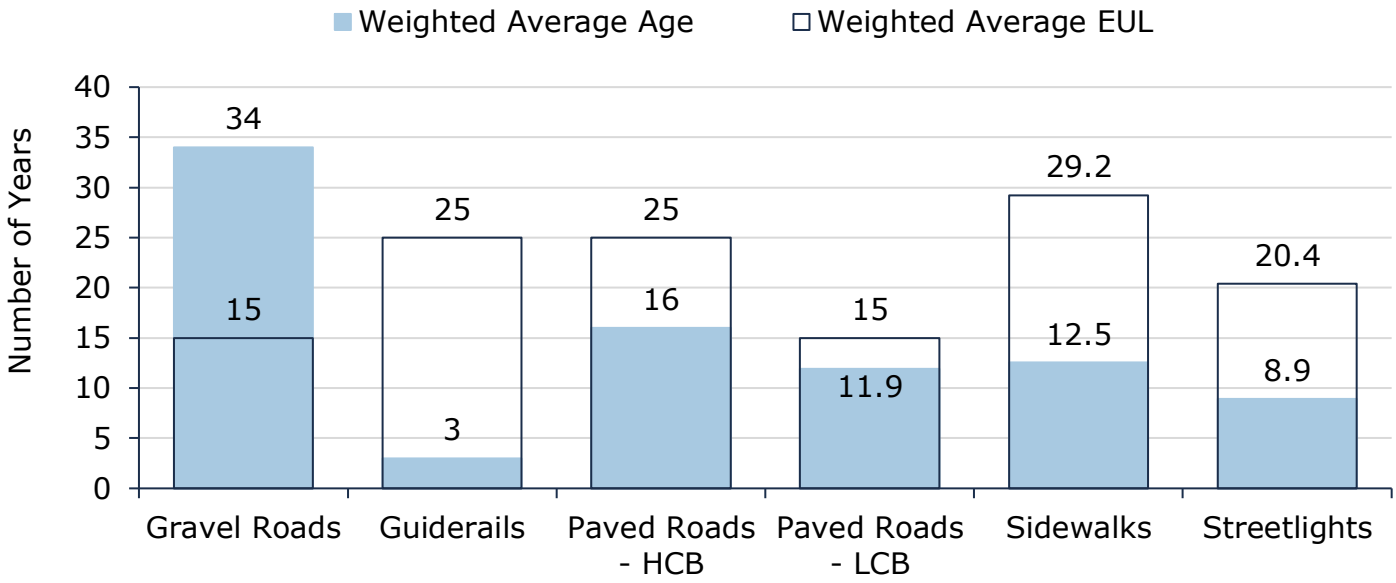

Figure 21 Estimated Useful Life vs. Asset Age: Road Network

Age analysis indicates that paved roads (HCB), streetlights, and sidewalks are approaching the midpoint of their expected useful lives (EULs), while paved roads (LCB) are nearing the end of their useful life. Gravel roads have exceeded their life expectancy, however, this is likely because of perpetual maintenance and rehabilitation, as outline in the lifecycle management approach described in the next section. With current and evolving lifecycle strategies, the expected useful lives of both paved and gravel roads can be significantly extended through rehabilitation efforts.

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 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 asset's characteristics, location, utilization, maintenance history and environment. The Township manages its road network assets through a combination of proactive and reactive lifecycle management strategies. Assessments are conducted annually to monitor road conditions, while maintenance activities and renewals are prioritized based on asset condition, critical needs, and traffic volumes. The township is working towards expanding its asset management capabilities and incorporating more detailed assessments, with a focus on improving decision-making through data-driven budgeting.

The following lifecycle strategies have been developed as a proactive approach to managing the lifecycle of HCB, LCB, and gravel 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**
Resurfacing (Repave with 1 lift of Asphalt)	Rehabilitation	15 Years (Once)
Full Reconstruction	Replacement	40 Years

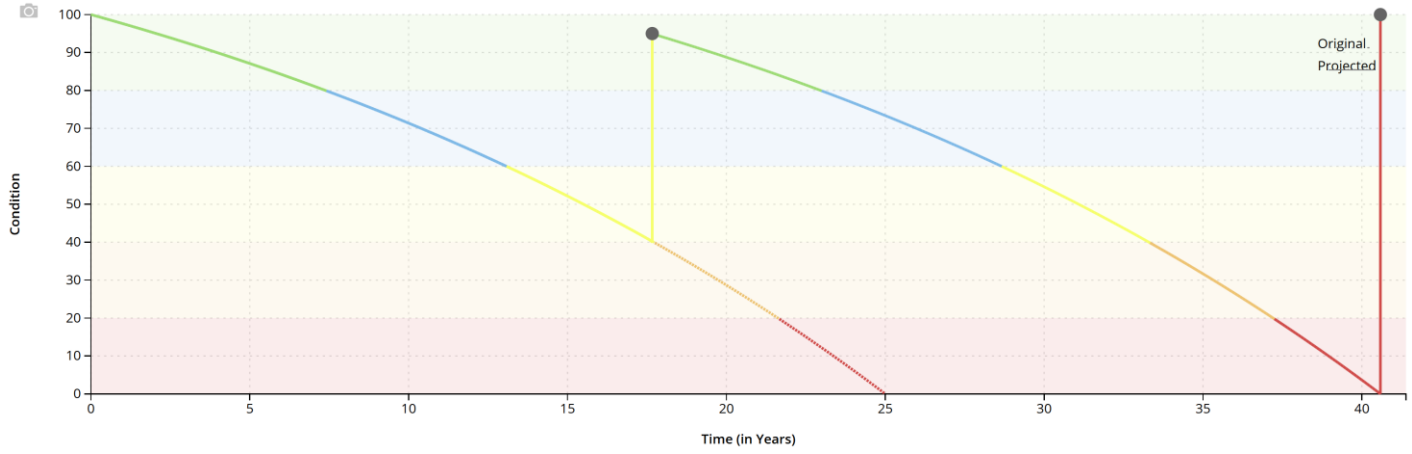

Table 7 Lifecycle Management Strategy: Road Network (HCB Roads)

Paved Roads (LCB)		
Event Name	**Event Class**	**Event Trigger**
Resurfacing	Rehabilitation	7 Years (4 times)
Full Reconstruction	Replacement	40 Years

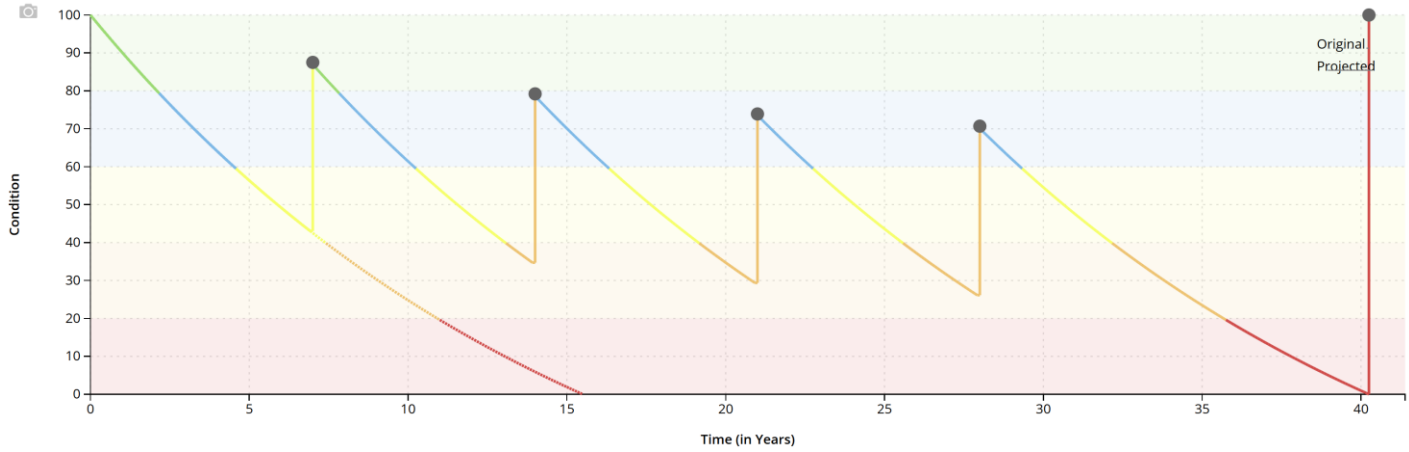

Table 8 Lifecycle Management Strategy: Road Network (LCB Roads)

Gravel Roads		
Event Name	**Event Class**	**Event Trigger**
Resurfacing (Gravel Resurfacing - 3 Year Cycle)	Rehabilitation	3 Years (9 Times)
Full Reconstruction	Replacement	40 Years

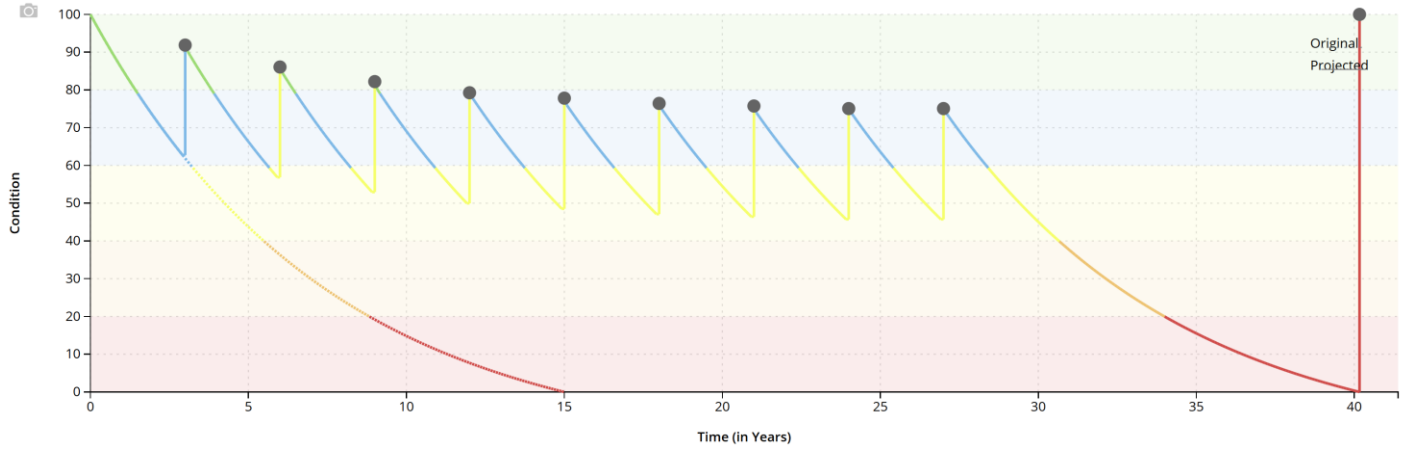

Table 9: Lifecycle Management Strategy: Road Network (Gravel Roads)

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

Activity Type	Description of Current Strategy
Maintenance	Pothole repairs are completed as needed based on road patrols and public feedback.
	Grading, brushing, and sweeping are conducted to maintain road shape and cleanliness.
	Dust control measures and calcium chloride application are used to mitigate dust.
	Gravel roads require more frequent maintenance than surface-treated roads.
Rehabilitation	High-traffic roads are prioritized for rehabilitation. Rehabilitation activities include resurfacing, grading, brushing, salting/sanding, sealant application, dust control, new paving/pavement, ditching, and adding maintenance layers.
Replacement	Road replacement is triggered when maintenance is no longer feasible, considering factors like road type, maintenance history, and the addition of maintenance layers. High-traffic roads are prioritized for replacement.
Inspection	The latest Roads Needs Study was conducted in 2020 by Jewell Engineering. Additionally, Road assets (surface treated: HCB, and LCB) are assessed annually using a Pavement Condition Index (PCI) to identify maintenance needs.

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 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) total $662,000 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 from 2029-2033, dominated by gravel roads, however, since gravel roads are maintained perpetually, this estimate may not be accurate. 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.

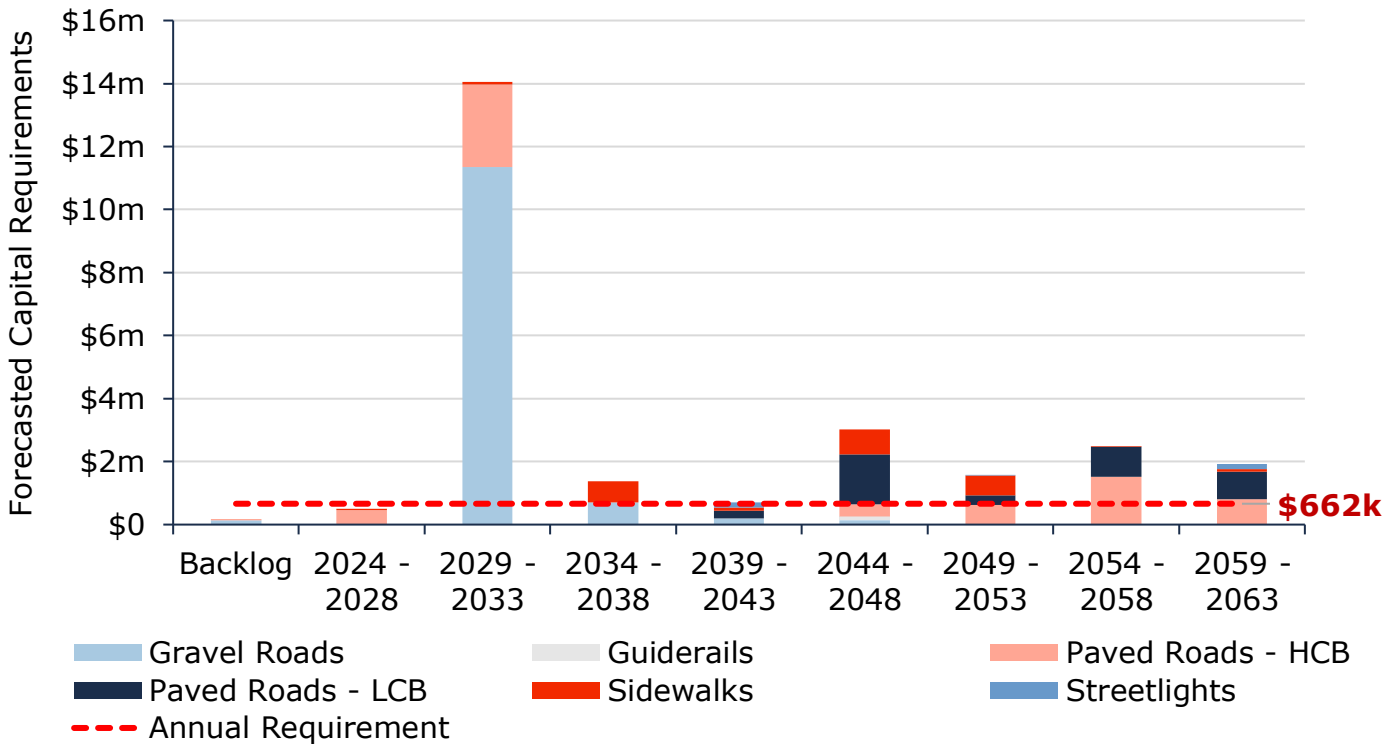

Figure 22 Forecasted Capital Replacement Needs: Road Network 2024-2063

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. Regular pavement condition assessments and a robust risk framework will ensure that high-criticality assets receive proper and timely lifecycle intervention, including replacements.

A summary of the 10-year 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, replacement costs, and speed limit. Breakdowns of the risk criteria used for probability and consequence of failure can be found in Appendix D – Risk Rating Criteria.

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.

1 - 4 Very Low $16,371,413 (64%)	5 - 7 Low $1,433,410 (6%)	8 - 9 Moderate $885,649 (3%)	10 - 14 High $2,665,279 (10%)	15 - 25 Very High $4,186,842 (16%)

Figure 23 Risk Matrix: Road Network

4.7 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 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	Residents and visitors use the Township's transportation assets to travel from properties to local amenities and regional county and provincial roads. Residents and visitors count on emergency vehicles having reliable access to their properties. The main industry in the Township is farming. Transportation assets support shipping and receiving of goods and relocation of farming equipment. Roads are used by passenger vehicles, commercial trucks, school buses, cyclists, and pedestrians. There is limited ATV, snowmobile, and horse use.
Quality	Description or images that illustrate the different levels of road class pavement condition	For asphalt roads, the following descriptive scale is used for assessing road surfaces: ♦ **Excellent:** A very smooth ride. Pavement is in excellent condition with few cracks. ♦ **Good:** A smooth ride with just a few bumps or depressions. The pavement is in good condition with frequent very slight or slight cracking. ♦ **Fair:** A comfortable ride with intermittent bumps or depressions. The pavement is in fair condition with intermittent moderate and frequent slight cracking, and with intermittent slight or moderate alligatoring and distortion.

Service Attribute	Qualitative Description	Current LOS (2023)
		♦ **Poor:** An uncomfortable ride with frequent to extensive bumps or depressions. Cannot maintain the posted speed at the lower end of the scale. The pavement is in poor to fair condition with frequent moderate cracking and distortion, and intermittent moderate alligatoring. ♦ **Very Poor:** A very uncomfortable ride with constant jarring bumps and depressions. Cannot maintain the posted speed and must steer constantly to avoid bumps and depressions. The pavement is in very poor condition with moderate alligatoring and extensive severe cracking and distortion. For gravel roads, the following descriptive scale is used for assessing road surfaces: ♦ **Good:** Good drainage, minor potholes present on less than 20% of road surface, gravel thickness of 150mm or more, continue with routine maintenance. ♦ **Fair:** Some drainage improvements needed, potholes present on 20-50% of road surface, additional gravel needed, routine maintenance required. ♦ **Poor:** Major drainage improvements needed, potholes present on more than 50% of road surface, gravel resurfacing required.

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
	Lane-km of collector roads (MMS classes 3 and 4) per land area (km/km^2)	0.10 km/km^2
	Lane-km of local roads (MMS classes 5 and 6) per land area (km/km^2)	1.84 km/km^2
Quality	Average pavement condition index for paved roads in the Township	HCB Roads: 67 LCB Roads: 72
	Average surface condition for unpaved roads in the Township (e.g. excellent, good, fair, poor)	Poor
Performance	Target vs. Actual capital reinvestment rate	2.6% vs. 2.1%

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

5. Bridges & Culverts

The Township's transportation network also includes bridges and structural culverts, with a current replacement cost of $3.2 million.

5.1 Inventory & Valuation

Table 13 summarizes the quantity and current replacement cost of bridges and culverts. The Township owns and manages a total of seven structures: four bridges and three structural culverts.

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Bridges	4	Quantity	$2,316,000	User-Defined
Culverts	3	Quantity	$884,380	CPI
TOTAL			**$3,200,380**	

Table 13 Detailed Asset Inventory: Bridges & Culverts

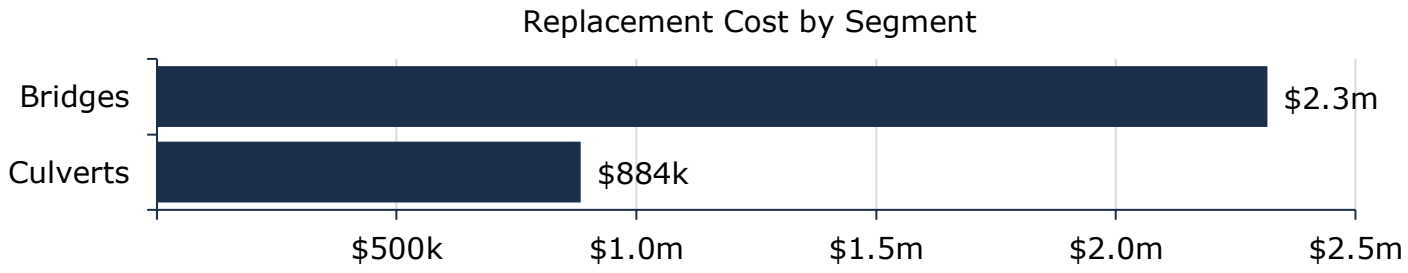

Figure 24 Portfolio Valuation: Bridges & Culverts

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, all 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.

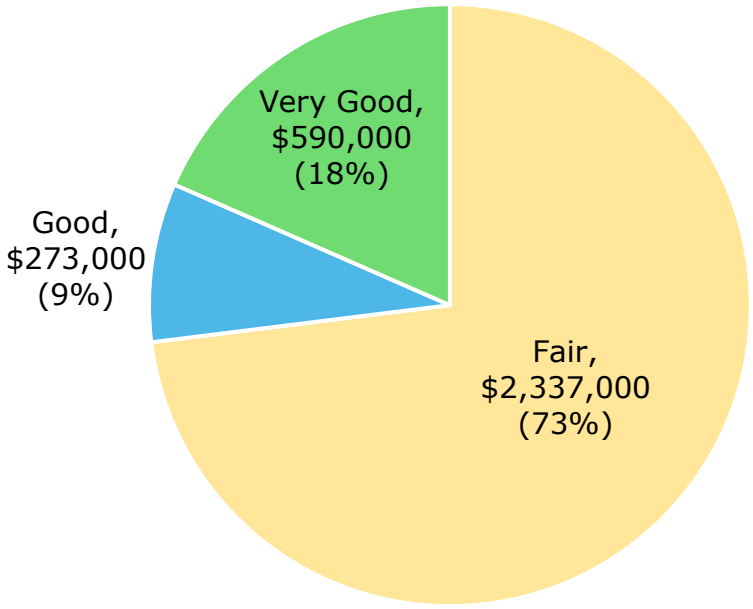

Figure 25 Asset Condition: Bridges & Culverts Overall

As further detailed in Figure 26, based on in-field condition assessments, $2.0 million of bridge assets were assessed as being in fair condition, with the remainder in very good condition. Structural culverts are evenly distributed between very good, good, and fair conditions. The OSIM ratings are designed to identify repairs needed to elevate condition ratings to a fair or higher.

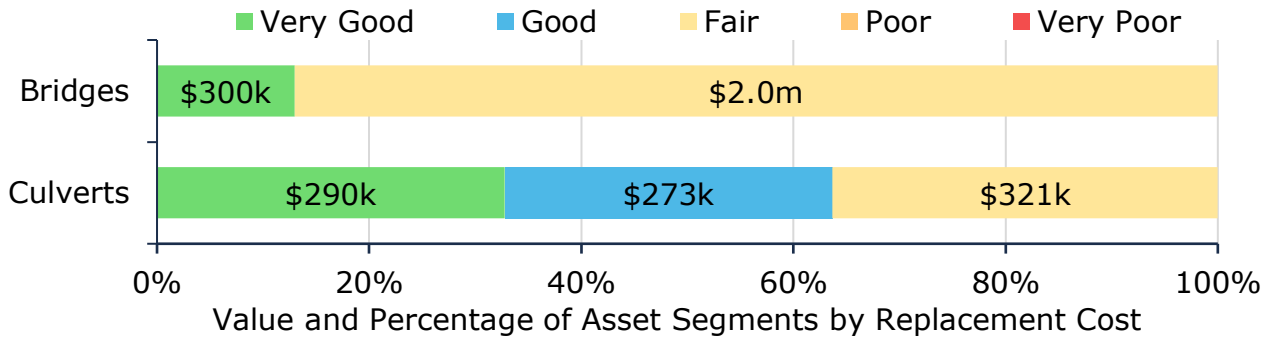

Figure 26 Asset Condition: Bridges & Culverts by Segment

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.

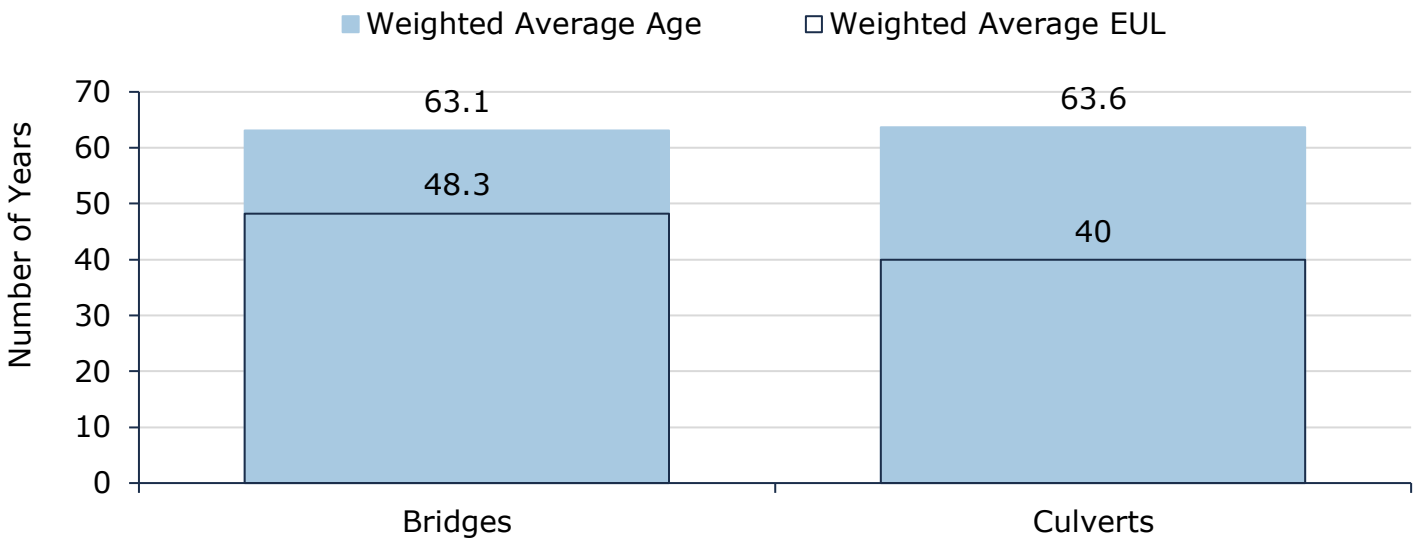

Figure 27 Estimated Useful Life vs. Asset Age: Bridges & Culverts

Age analysis shows that, on average, bridges and culverts have nearly exhausted their estimated useful lives, with average ages of 63.1 and 63.6 years, respectively, compared to their expected lifespans of 48.3 and 40 years. OSIM assessments should continue to be utilized alongside age and asset criticality to effectively 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 ♦ Paving Surface ♦ Ensuring adequate drainage

	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 D.M. Wills Associates Limited .

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 2073 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 $70,000. 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.

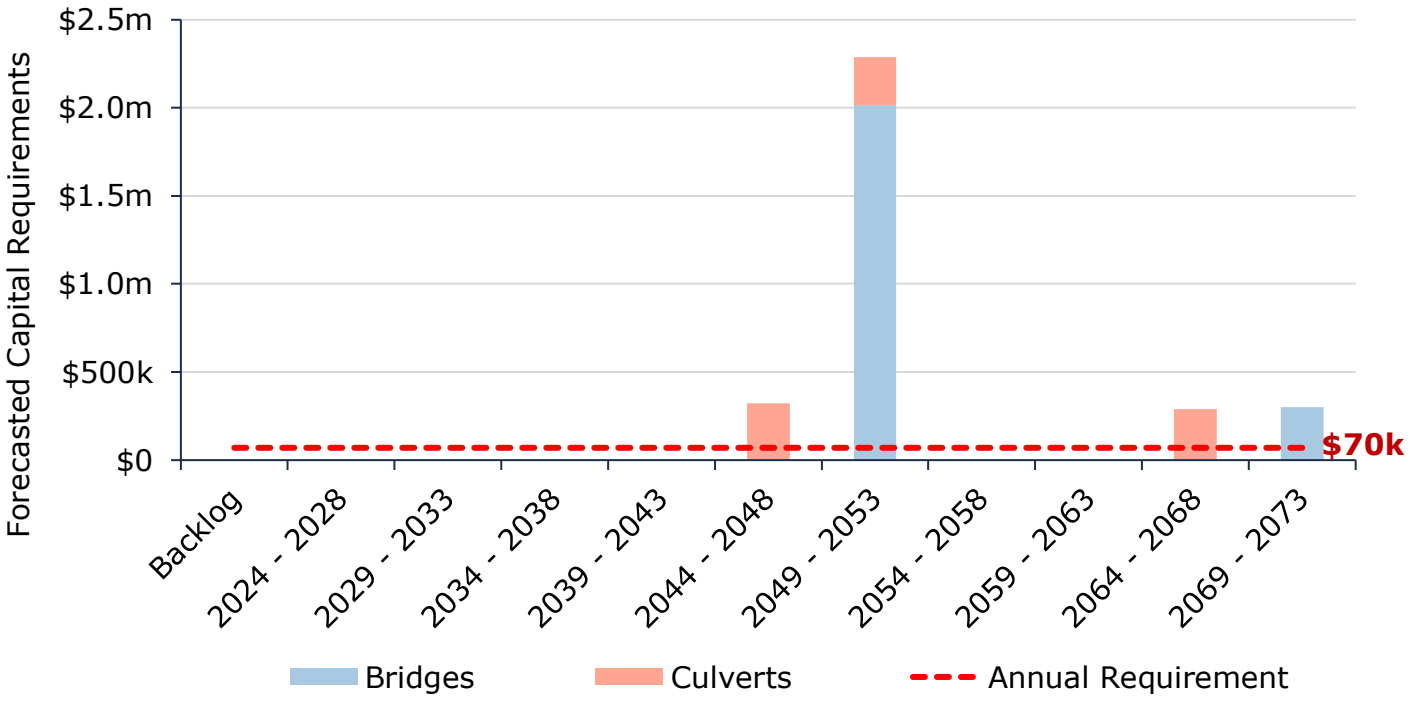

Figure 28 Forecasted Capital Replacement Needs: Bridges & Culverts 2024-2073

Although no major replacement spikes are anticipated for the next 20 years, capital needs will peak at $2.3 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.

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 summary of the 10-year 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. Breakdowns of the risk criteria used for probability and consequence of failure can be found in Appendix D – Risk Rating Criteria.

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.

1 - 4 **Very Low**	5 - 7 **Low**	8 - 9 **Moderate**	10 - 14 **High**	15 - 25 **Very High**
$589,754 (18%)	$273,377 (9%)	$736,249 (23%)	$1,601,000 (50%)	- (0%)

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)	The traffic on bridges and structural culverts is generally light as these are local roads. However, some heavy vehicle traffic, such as agricultural and transport, is common.
Quality	Description or images of the condition of bridges & culverts and how this would affect use of the bridges & culverts	See Appendix C – Level of Service Maps & Photos

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	61%[2]
	Average bridge condition index value for structural culverts in the Township	76%[3]
Performance	Target vs. Actual capital reinvestment rate	2.2% vs. 2.4%

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

[2] Based on 2024 OSIM report
[3] Based on 2024 OSIM report

6. Water Network

The utilities department is responsible for overseeing the Township's water network with a total current replacement cost of approximately $9.2 million. The department is responsible for the following:

- Water Treatment Plants
- Pumping Stations
- Water Towers
- Water distribution network including mains, valves, and hydrants

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 Assets.

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Hydrants	95	Quantity	$714,818	CPI
Water Facilities	64	Quantity	$2,971,966	CPI
Water Laterals	47	Quantity	$316,033	CPI
Water Mains	16,440	Length (m)	$4,785,780	CPI
Water Meters	686	Quantity	$242,123	CPI
Water Valves	92	Quantity	$146,123	CPI
TOTAL			**$9,176,843**	

Table 17 Detailed Asset Inventory: Water Network

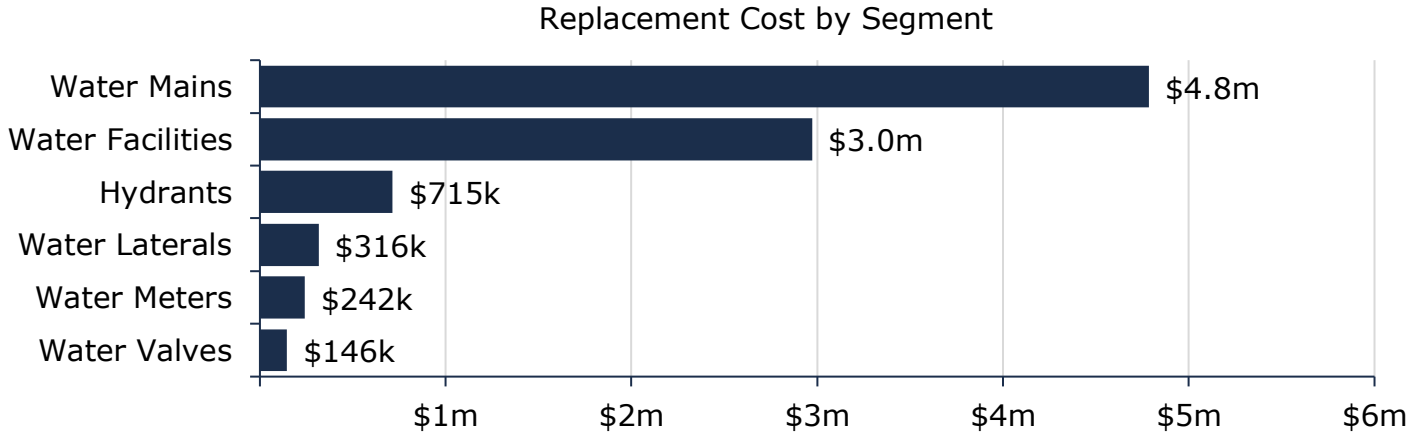

Figure 30 Portfolio Valuation: Water Network

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, 78% of assets are in fair or better condition; the remaining 22% of assets are in poor to very poor condition. Condition assessments were available for assets accounting for 56% of the total water network portfolio by replacement value.

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.

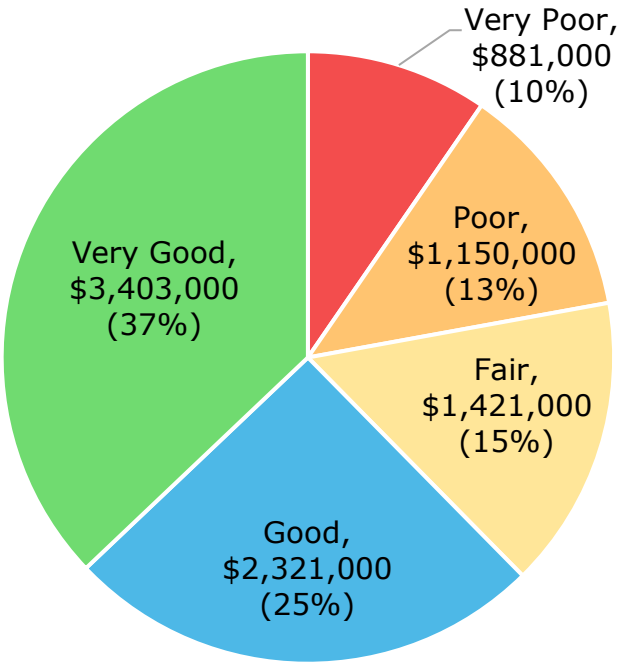

Figure 31 Asset Condition: Water Network Overall

As illustrated in Figure 32, based on condition assessments and age-based conditions, the majority of the Township's water network assets are in good condition. Only about 26% of watermains are in poor or worse condition.

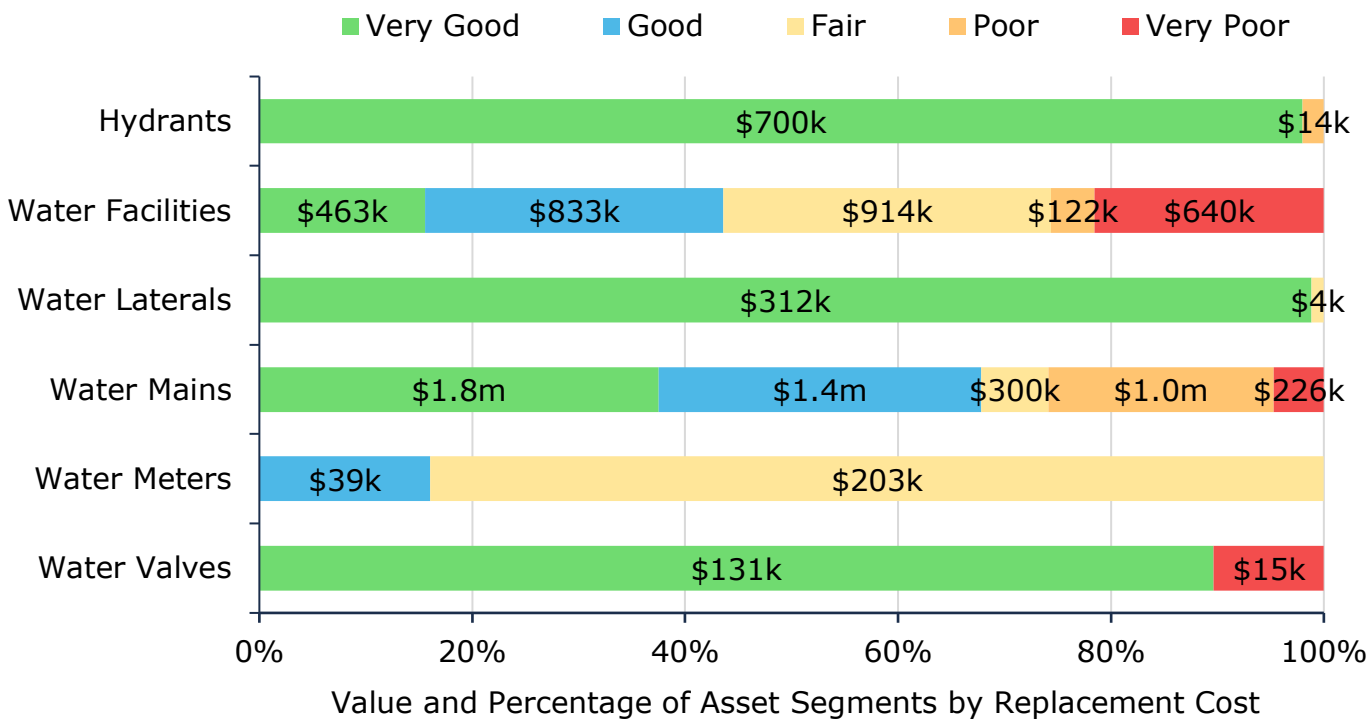

Figure 32 Asset Condition: Water Network by Segment

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.

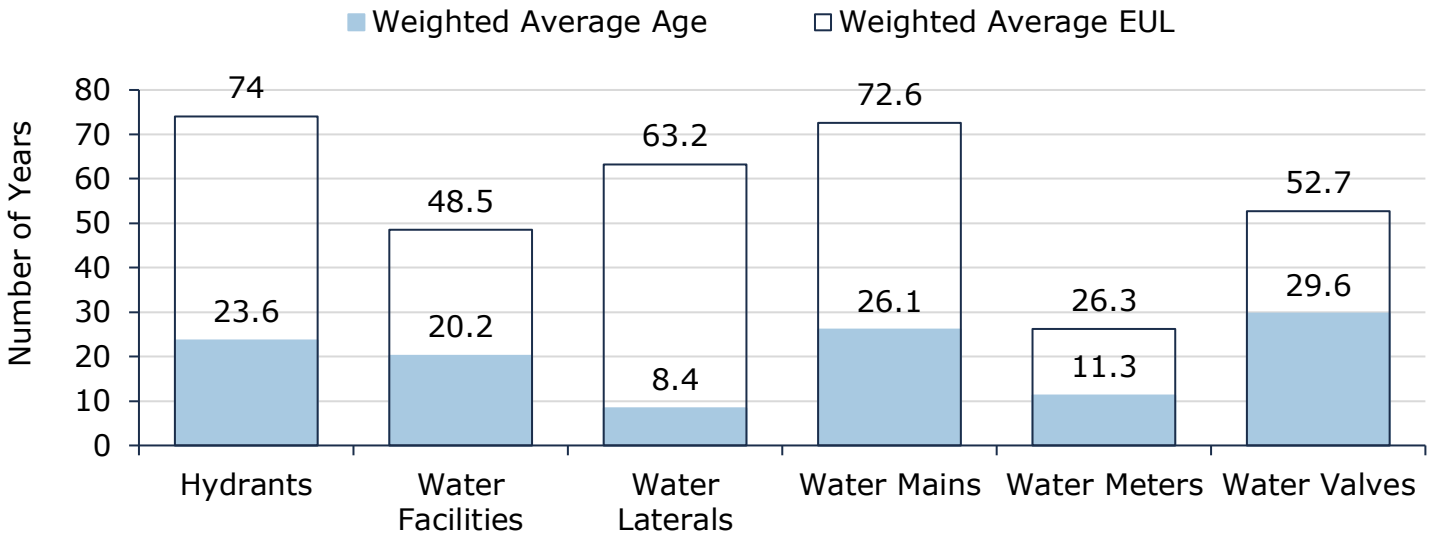

Figure 33 Estimated Useful Life vs. Asset Age: Water Network

Age analysis reveals that all the water network assets are in the early stages of their useful lives.

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
Inspections	All water network assets are monitored by SCADA. Water network assets are assessed annually during the review of the TCA subledger.
	Fire Hydrants are assessed as per the NFPA standards.
Maintenance	Maintenance activities include bi-annual flushing, bi-annual pump maintenance, and monthly activities for certain assets.
	Maintenance is primarily triggered by break reports and complaints.
Rehabilitation/ Replacement	Rehabilitation is primarily driven by growth and expansion, with infrastructure often being replaced rather than rehabilitated.
	Replacement is often tied to growth-driven expansion projects. Funding for replacement is considered in conjunction with road replacement and watermain replacement funding programs.

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 2103 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 $200,000 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 moderate needs throughout the forecast period. It also shows a backlog of $266,000 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.

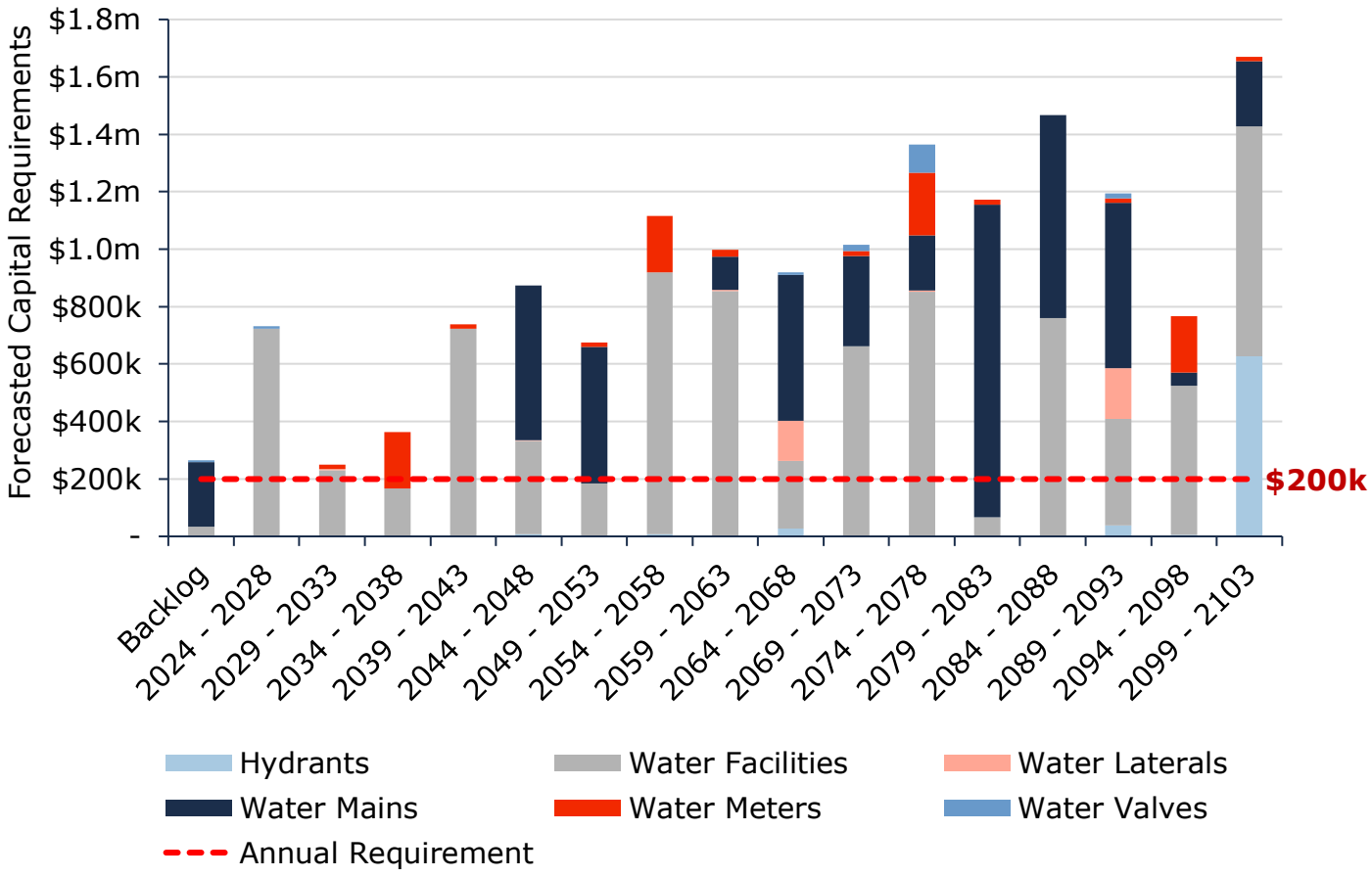

Figure 34 Forecasted Capital Replacement Needs: Water Network 2024-2103

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 critical assets receive proper and timely lifecycle intervention, including replacements.

A summary of the 10-year 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, replacement costs, pipe material, and pipe diameter. The risk ratings for assets without useful attribute data were calculated using only condition, service life remaining, and their replacement costs. Breakdowns of the risk criteria used for probability and consequence of failure can be found in Appendix D – Risk Rating Criteria.

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.

1 - 4 **Very Low** $4,337,617 (47%)	5 - 7 **Low** $2,877,718 (31%)	8 - 9 **Moderate** $1,339,629 (15%)	10 - 14 **High** $232,367 (3%)	15 - 25 **Very High** $389,512 (4%)

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	The water system provides potable water for residential, business, and institutional consumption, as well as maintenance operations, and firefighting in the urban areas of the Village of Norwood, and Trentview Estates.

Service Attribute	Qualitative Description	Current LOS (2023)
	Description, which may include maps of the user groups or areas of the municipality that have fire flow	Both systems have hydrants and firefighting capabilities. Some system ends have been extended with smaller size pipes which do not provide firefighting capacities. Also refer to Appendix C – Level of Service Maps & Photos
Reliability	Description of boil water advisories and service interruptions	The water system is managed with the goal of providing safe and reliable delivery of water, minimizing service interruptions and occurrences of adverse water quality events (measured by occurrences of boil water advisories). Boil water advisories can be triggered by adverse water quality test results or other problems in the water distribution system. Service interruptions can occur as a result of routine water system maintenance or asset failure. Emergency procedures are specified in the "Drinking Water Quality Management Standard – Element 18 SOP-11 Emergency Preparedness and Response Municipal Emergency Plan."

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	33%
	% of properties where fire flow is available	33%
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
Quality	Average condition of water network assets	64%
Performance	Target vs. Actual capital reinvestment rate	2.2% vs. 3.3%

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

7. Sanitary Sewer Network

The sanitary sewer network provides the essential service of wastewater collection, disposal, and treatment for the community, and has a current replacement value of over $10.5 million.

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
Manholes	139	Quantity	$702,514	CPI
Sewer Mains	11,355	Length (m)	$5,063,434	CPI
Wastewater Treatment Plant	153	Quantity	$4,798,251	CPI
TOTAL			**$10,564,199**	

Table 21 Detailed Asset Inventory: Sanitary Sewer Network

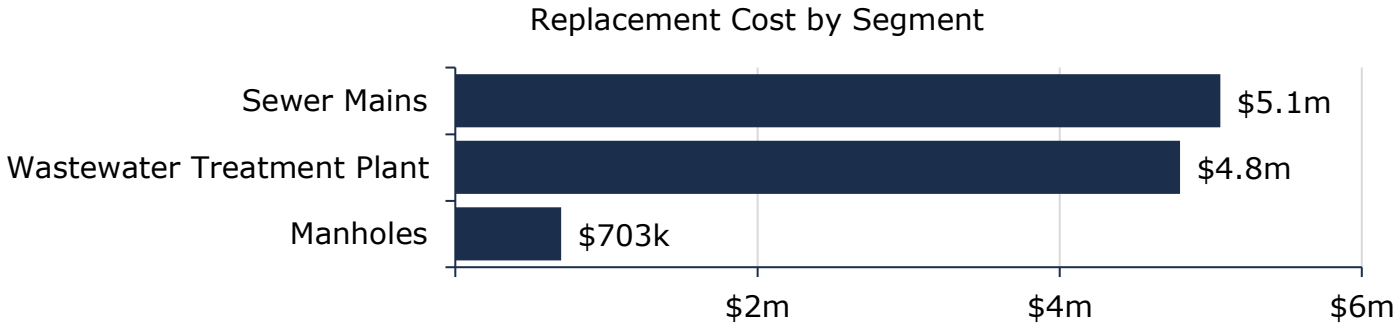

Figure 36 Portfolio Valuation: Sanitary Sewer Network

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, 36% of assets are in fair or better condition; the remaining 64% of assets are in poor to very poor condition. Condition assessments were available for 57% of sanitary mains, based on replacement cost, 2% of manholes, and no available assessments for wastewater treatment assets.

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.

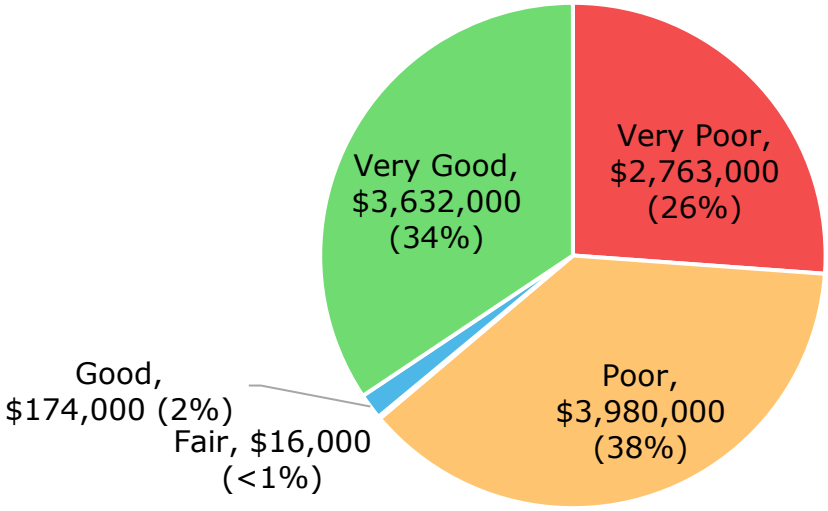

Figure 37 Asset Condition: Sanitary Sewer Network Overall

As illustrated in Figure 38, based on condition assessments and age-based conditions, the majority of the Township's wastewater treatment plant assets and manholes are in poor or worse conditions, while the majority of sewer mains were assessed to be in very good condition.

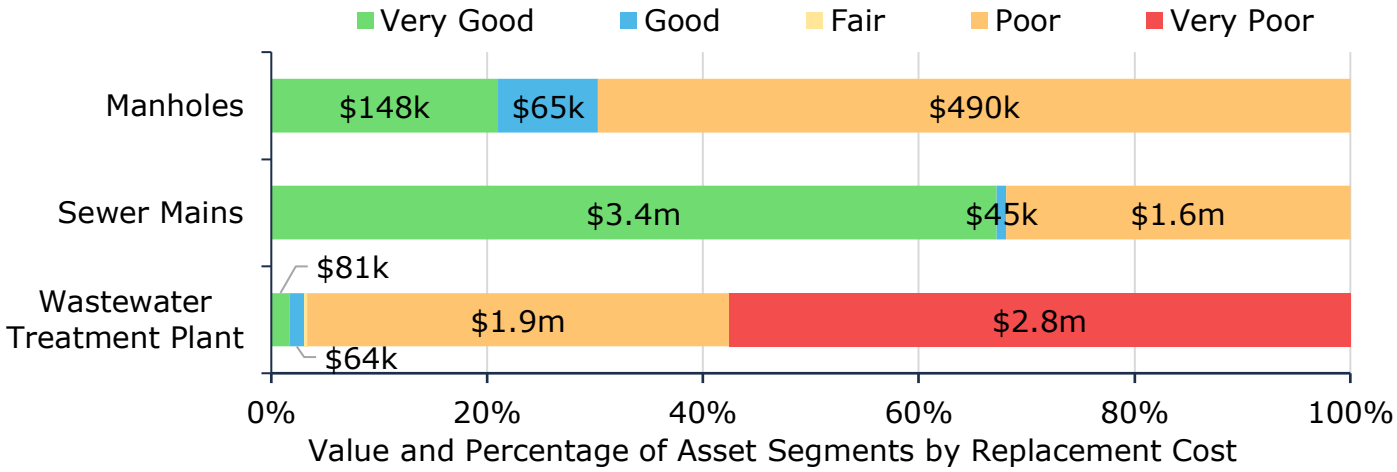

Figure 38 Asset Condition: Sanitary Sewer Network by Segment

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.

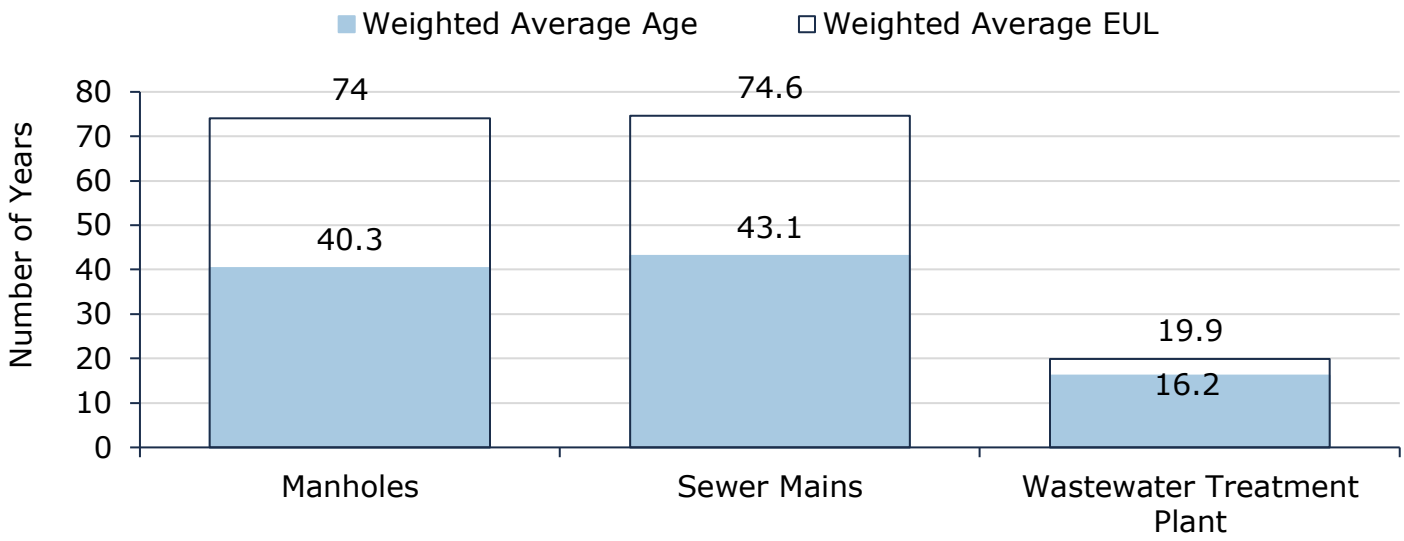

Figure 39 Estimated Useful Life vs. Asset Age: Sanitary Sewer Network

Age analysis reveals that manholes, and sewer mains are midway through their estimated useful lives. Wastewater treatment plant assets are approaching the end of their useful lives, however, assets should be reviewed to determine if the original useful lives are still applicable, or if assets are lasting longer than originally projected. This review will help refine the Township's asset registry and long-term capital needs projections.

7.4 Current Approach to Lifecycle Management

Assets generally deteriorate over time, and to ensure municipal assets continue to perform as expected and meet customer needs, a proactive lifecycle management strategy is essential. Reliable condition data helps staff determine the remaining service life of assets and identify the most cost-effective management approach.

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

Activity Type	Description of Current Strategy
Maintenance	Routine maintenance tasks include inspections, cleaning, minor repairs, CCTV inspections, and flushing, which are conducted by both internal staff and external contractors.
	Sanitary mains undergo flushing and CCTV inspections on a 4-year cycle (25% of the network each year).
	Manholes follow the same 4-year inspection cycle as sanitary mains.
Rehabilitation/ Replacement	Rehabilitation activities, which vary based on the area and burial depth, encompass either open cut replacement or relining techniques.
	Assets nearing the end of their expected service life or requiring frequent and costly repairs are given priority for replacement.

Table 22 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 2103 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 $357,000 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 shows a backlog of $869,000 for wastewater treatment plant assets. 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.

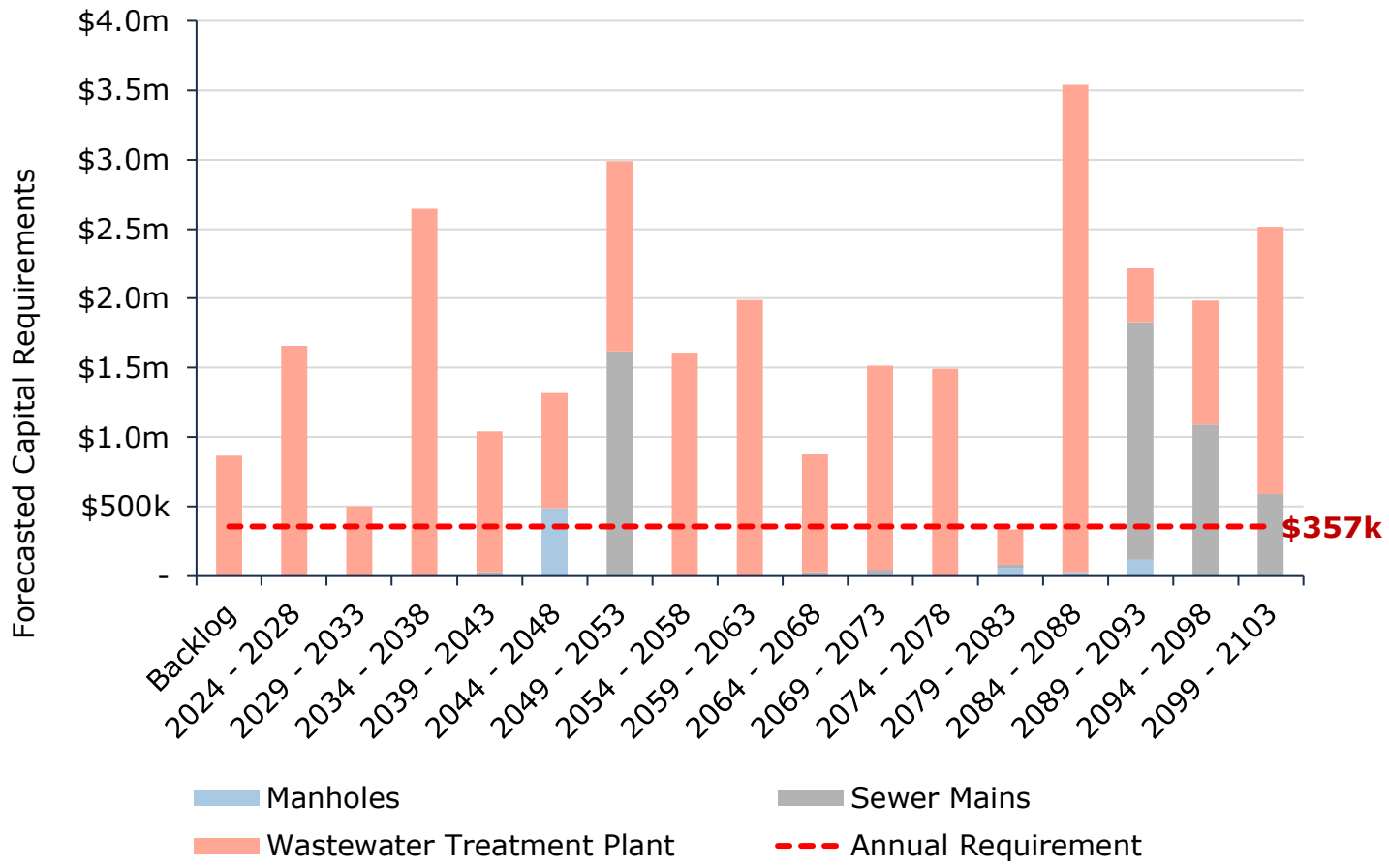

Figure 40 Forecasted Capital Replacement Needs: Sanitary Sewer Network 2024-2103

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 critical assets receive proper and timely lifecycle intervention, including replacements.

A summary of the 10-year 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, pipe diameter, and replacement costs. The risk ratings for assets without useful attribute data were calculated using only condition, service life remaining, and their replacement costs. Breakdowns of the risk criteria used for probability and consequence of failure can be found in Appendix D – Risk Rating Criteria.

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.

1 - 4 Very Low	5 - 7 Low	8 - 9 Moderate	10 - 14 High	15 - 25 Very High
$4,539,033 (43%)	$1,663,161 (16%)	$1,622,229 (15%)	$2,739,776 (26%)	- (0%)

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	The Township provides wastewater services to residential, business, and institutional customers in the urban areas of the Village of Norwood.
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	N/A
	Description of the frequency and volume of overflows in combined sewers in the municipal wastewater system that occur in habitable areas or beaches	N/A

Service Attribute	Qualitative Description	Current LOS (2023)
	Description of how stormwater can get into sanitary sewers in the municipal wastewater system, causing sewage to overflow into streets or backup into homes	The wastewater system is separated, meaning that sanitary and stormwater flows are carried in different pipes with different destinations. Despite this, stormwater can enter the wastewater system through numerous sources (e.g., openings on maintenance hole covers, cracks, holes, failed joints, and incorrect or faulty connections).
	Description of how sanitary sewers in the municipal wastewater system are designed to be resilient to stormwater infiltration	The sanitary sewer collection system is monitored for infiltration through the *Sewer Maintenance Plan*. The Plan includes flushing, camera inspections and repairs.
	Description of the effluent that is discharged from sewage treatment plants in the municipal wastewater system	The goal of the Wastewater Operations and Maintenance Division is to provide an efficient and effective system of sanitary sewers and sewage pumping stations to allow for the transmission of untreated wastewater to the Township's class 3 wastewater treatment facility located at 34 Industrial Drive in the village of Norwood. The Township uses a sequential batch reactor activated sludge sewage treatment system which allows it to meet strict provincial and federal effluent requirements before treated water is discharged into the Ouse River. The final effluent design objectives are identified in the facility's Environmental Compliance Approval (4097-9U8LQE).

Table 23 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	39%
Reliability	# of events per year where combined sewer flow in the municipal wastewater system exceeds system capacity compared to the total number of properties connected to the municipal wastewater system	N/A
	# of connection-days per year having wastewater backups compared to the total number of properties connected to the municipal wastewater system	0
	# of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system	1 violation
Quality	Average condition of sanitary sewer assets	47%
Performance	Target vs. Actual capital reinvestment rate	3.4% vs. 1.7%

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

8. Stormwater Network

The Township's stormwater network comprises sewer mains and other critical supporting capital assets with a total current replacement cost of approximately $3 million. The Township is responsible for 11 kilometers of storm mains.

8.1 Inventory & Valuation

Table 25 summarizes the quantity and current replacement cost of all stormwater network assets available in the Township's asset register.

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Basins	165	Quantity	$485,166	CPI
Connections	13	Quantity	$86,858	CPI
Curb & Gutter	1,797	Length (m)	$204,436	CPI
Manholes	49	Quantity	$258,362	CPI
Storm Culverts	346	Quantity	$85,407	CPI
Storm Mains	11,294	Length (m)	$1,752,909	CPI
Stormwater Storage System	1	Quantity	$130,072	CPI
TOTAL			**$3,003,210**	

Table 25 Detailed Asset Inventory: Stormwater Network

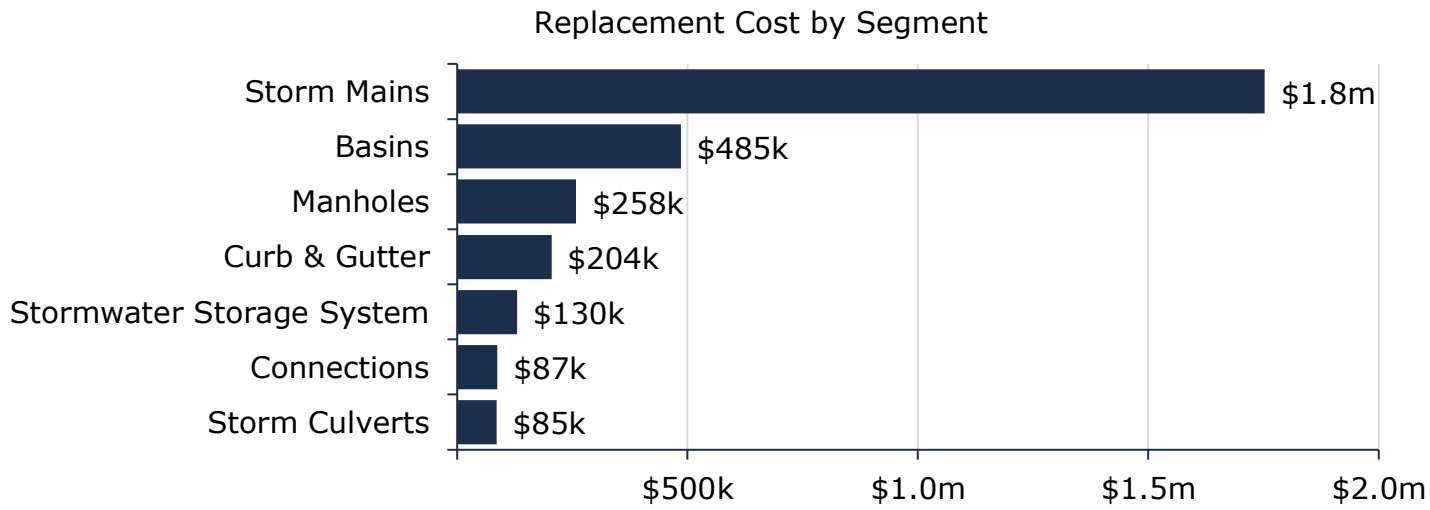

Figure 42 Portfolio Valuation: Stormwater Network

8.2 Asset Condition

Figure 43 summarizes the replacement cost-weighted condition of the Township's stormwater network assets. Based on age data only, approximately 14% 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.

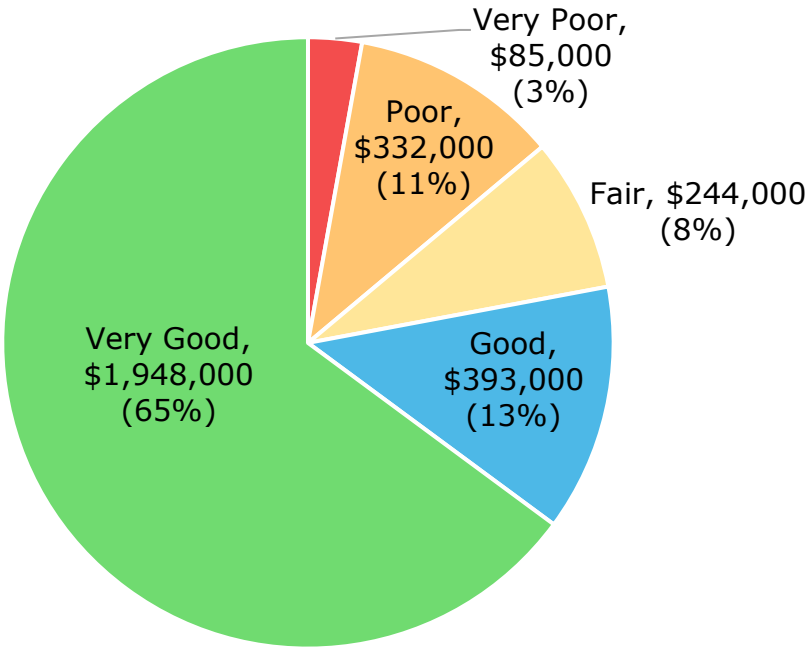

Figure 43 Asset Condition: Stormwater Network Overall

Figure 44 summarizes the condition of stormwater network assets by segments. The analysis illustrates that the majority of stormwater mains are in fair or better condition. However, only 20% of mains, with a current replacement cost of $252,000, are in poor or worse condition.

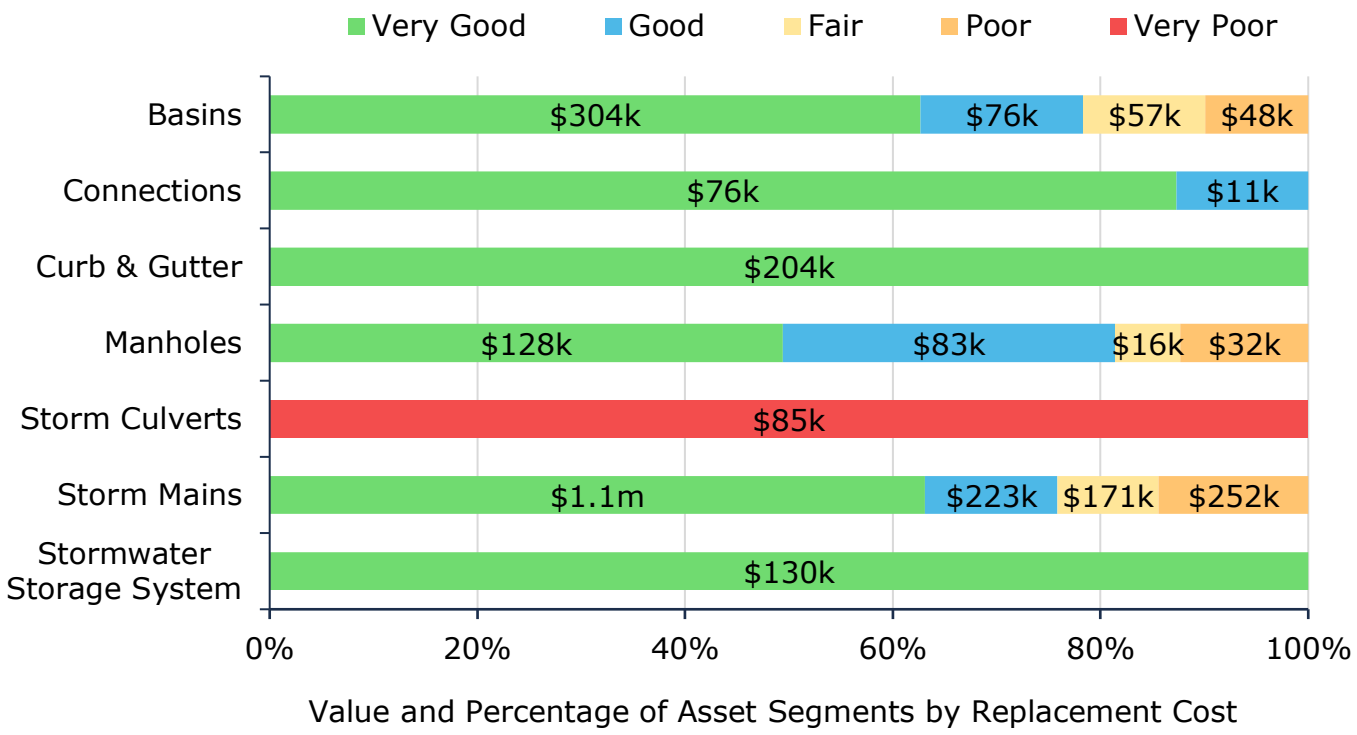

Figure 44 Asset Condition: Stormwater Network by Segment

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.

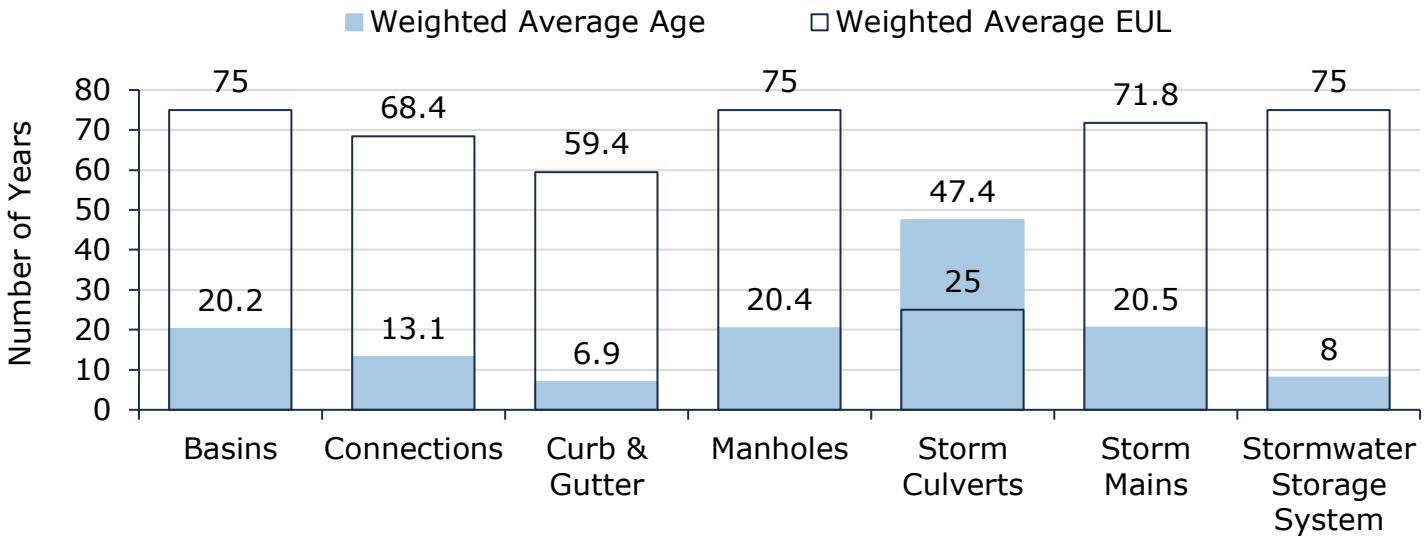

Figure 45 Estimated Useful Life vs. Asset Age: Stormwater Network

Age analysis reveals that most storm assets are in the early stages of their expected life. However, storm culverts have already exceeded their useful lives by almost 23 years. 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	Catch basins are inspected and cleaned annually and outlets are inspected regularly to ensure unobstructed flow
	All other maintenance activities are completed on a reactive basis when operational issues are identified (e.g., blockages, backups), through complaints and service requests
Replacement	Replacement is considered based on the estimated useful life of the asset and development-driven needs.

Table 26 Lifecycle Management Strategy: Stormwater Network

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 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 $45,000 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.

The chart illustrates an age-based backlog of $78,000, dominated by storm culverts. The largest replacement spike is forecasted in the latter part of the century 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.

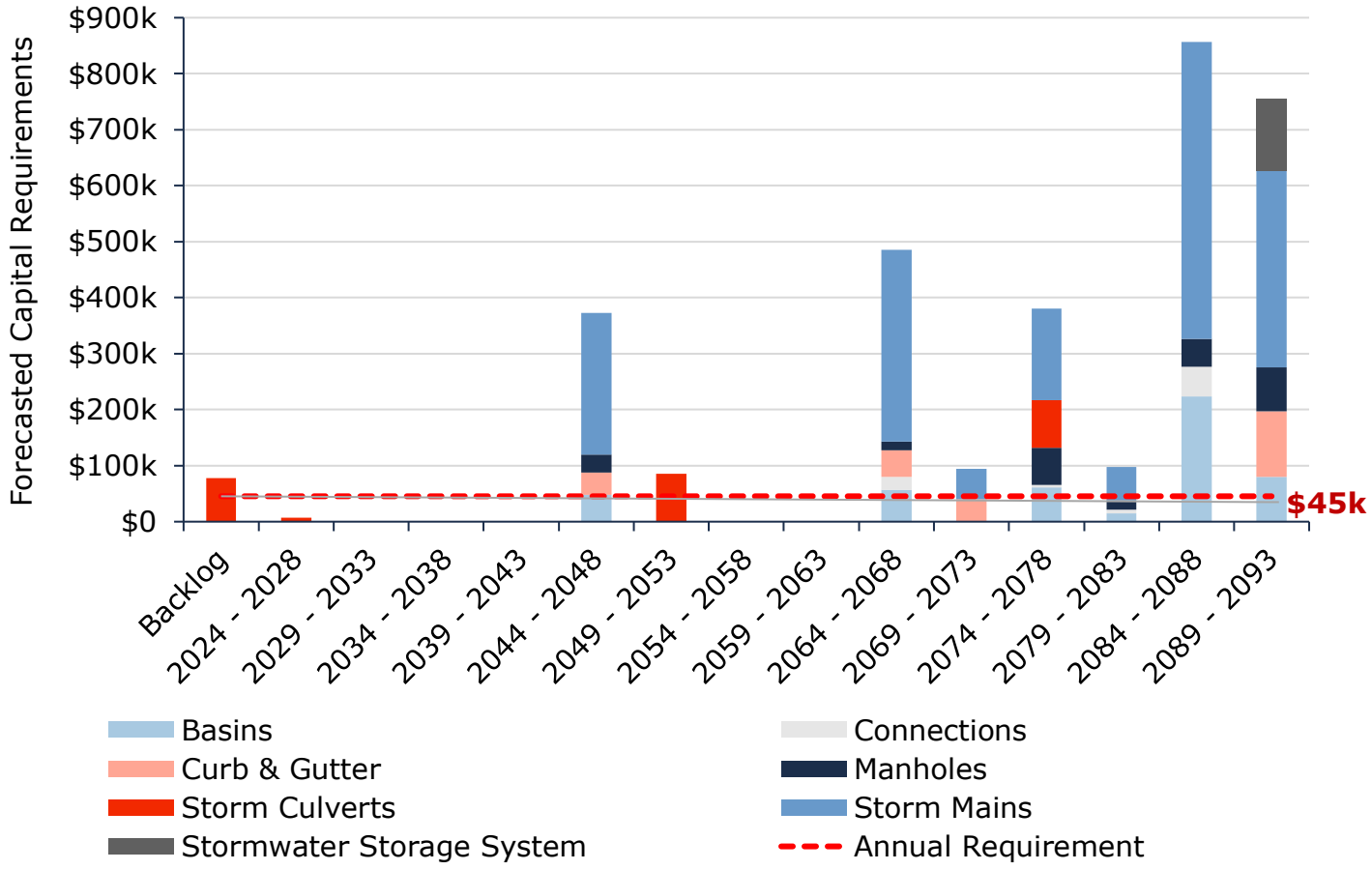

Figure 46 Forecasted Capital Replacement Needs Stormwater Network 2024-2093

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. CCTV inspections may reveal a higher or lower 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 summary of the 10-year 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, pipe material, pipe diameter, and replacement costs. Breakdowns of the risk criteria used for probability and consequence of failure can be found in Appendix D – Risk Rating Criteria.

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.

1 - 4 **Very Low**	5 - 7 **Low**	8 - 9 **Moderate**	10 - 14 **High**	15 - 25 **Very High**
$2,379,675 (79%)	$208,772 (7%)	$51,652 (2%)	$132,614 (4%)	$230,497 (8%)

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	The stormwater management system provides for the collection of stormwater in order to protect properties and roads from flooding. The stormwater system serves the urban areas of the Village of Norwood. The Township strives to ensure that the stormwater management system is resilient to 5-year storms and most properties in serviced areas are resilient to 100-year storms.

Table 27 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	30%
	% of the municipal stormwater management system designed to be resilient to a 5-year storm	100%
Quality	Average condition of stormwater assets	74%
Performance	Target vs. Actual capital reinvestment rate	1.5% vs. 1.7%

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

Non-Core Assets

9. Buildings

The Township's buildings portfolio includes fire stations, various administrative and public works facilities, a public library, and recreational assets. The total current replacement of buildings is estimated at more than $20 million.

9.1 Inventory & Valuation

Table 29 summarizes the quantity and current replacement cost of all buildings assets available in the Township's asset register. The majority of the buildings 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
Environmental Services	4	Quantity	$5,897,274	CPI
Fire	14	Quantity	$953,137	CPI
General Government	10	Quantity	$1,833,159	CPI
Health Services	3	Quantity	$455,112	CPI
Rec & Cultural Services	6	Quantity	$7,622,368	CPI
Transportation Services	8	Quantity	$3,405,246	CPI
TOTAL			**$20,166,296**	

Table 29 Detailed Asset Inventory: Buildings

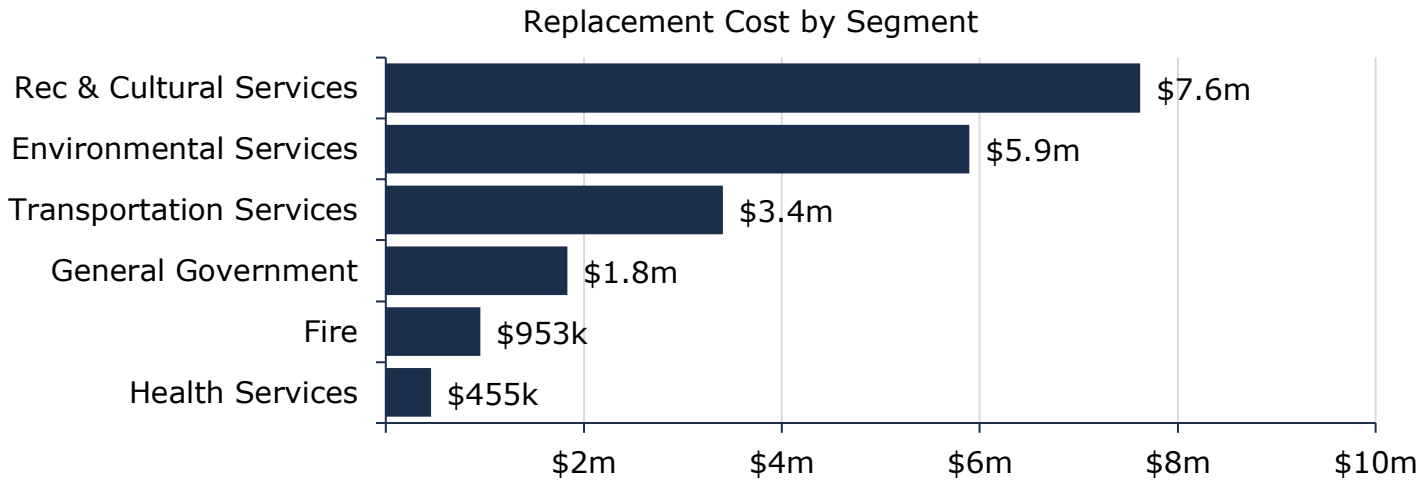

Figure 48 Portfolio Valuation: Buildings

9.2 Asset Condition

Figure 49 summarizes the replacement cost-weighted condition of the Township's buildings portfolio. Based on mostly age data, 80% of buildings assets are in fair or better condition; however, 20%, with a current replacement cost of more than $4 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.

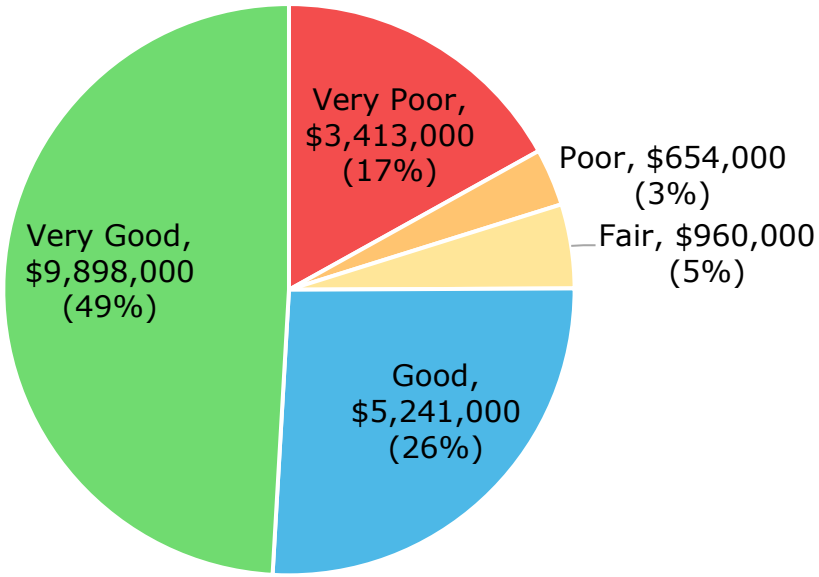

Figure 49 Asset Condition: Buildings Overall

Figure 50 summarizes the age-based condition of buildings by each department. A substantial portion of general government, administrative, and fire 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.

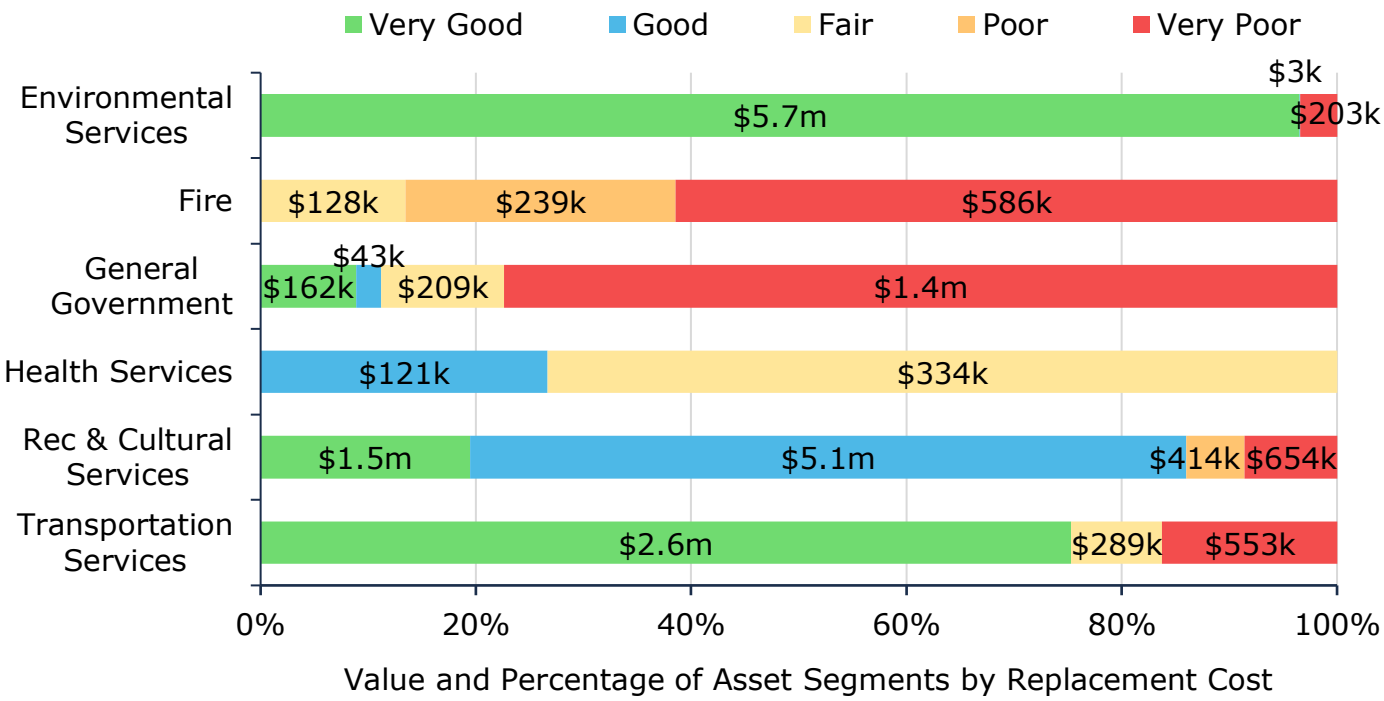

Figure 50 Asset Condition: Buildings by Segment

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.

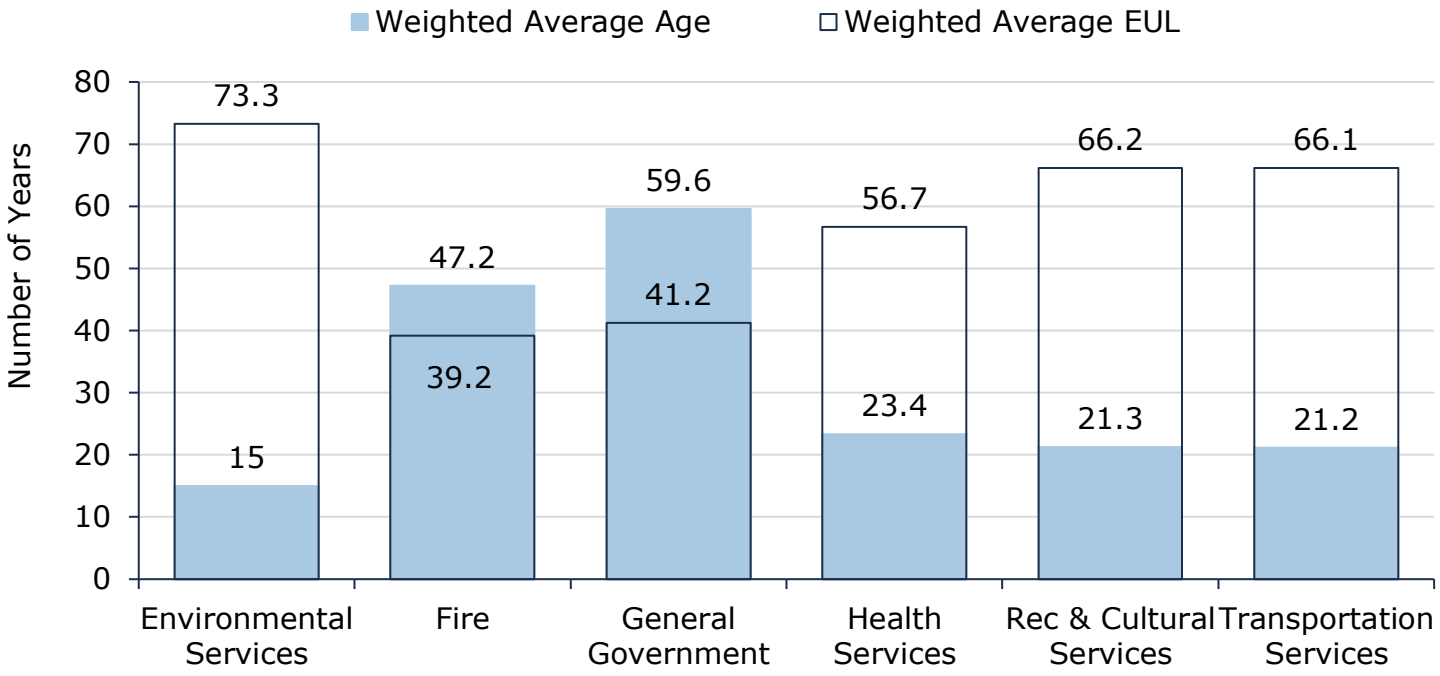

Figure 51 Estimated Useful Life vs. Asset Age: Buildings

Age analysis reveals that, on average, buildings assets are in the earlier stages of their serviceable life. However, based on acquisition years, fire and general government assets have surpassed 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 30 outlines the Township's current lifecycle management strategy.

Activity Type	Description of Current Strategy
Maintenance	Maintenance is triggered by various factors, including fire and life safety concerns, and HVAC/heating system upgrades.
	Maintenance activities are performed both in-house and by contractors depending on the specific task.
	All other maintenance activities are completed on a reactive basis when operational issues are identified through complaints and service requests.
Rehabilitation/ Replacement	Rehabilitations such as roof replacements or HVAC component replacements are considered on an as needed basis.

Activity Type	Description of Current Strategy
	The primary considerations for asset replacement are asset failure, availability or grant funding, safety issues, and volume of use.
Inspection	Fire Stations are assessed as per NFPA standards.

Table 30 Lifecycle Management Strategy: Buildings

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 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 $343,000 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.

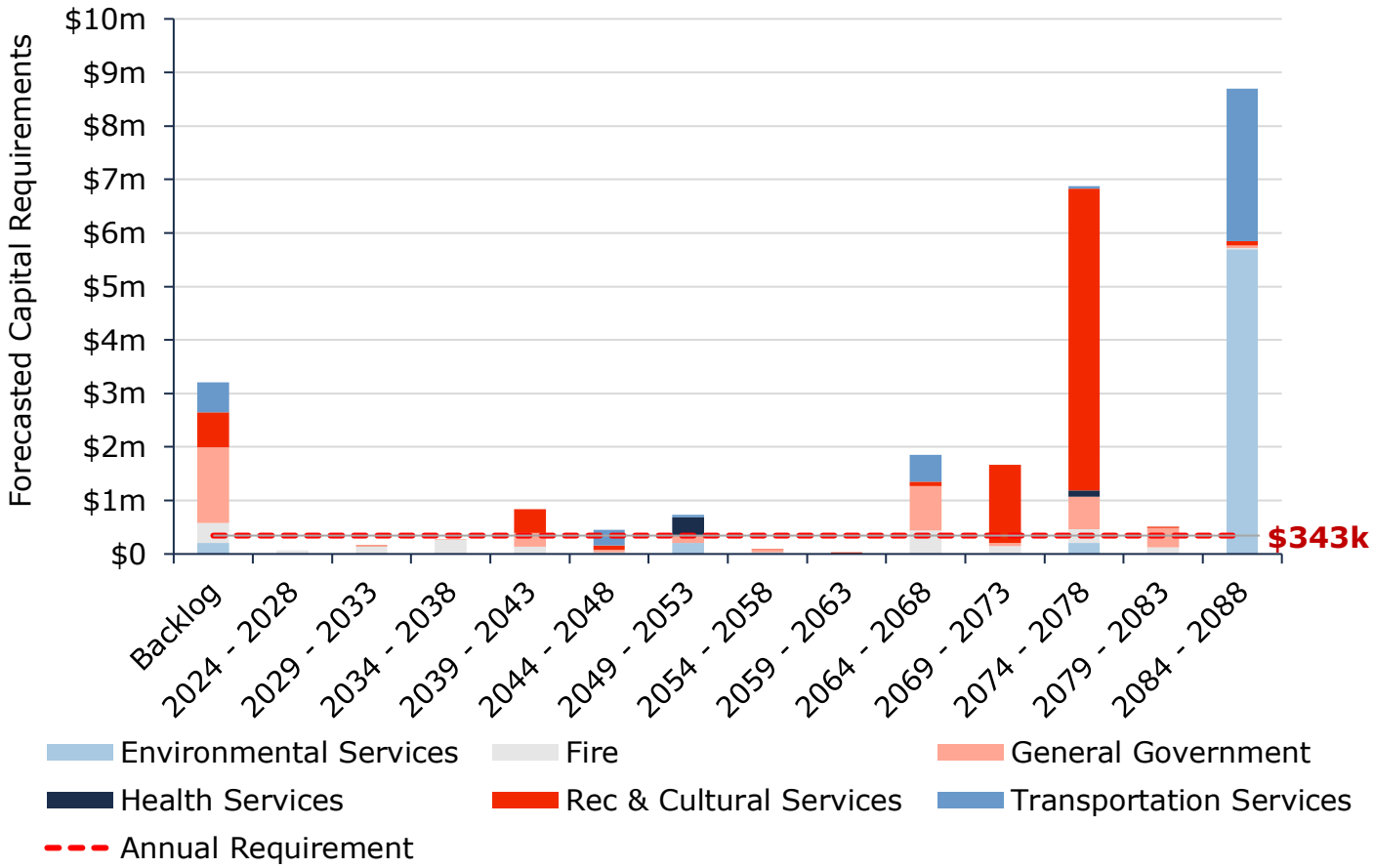

Figure 52 Forecasted Capital Replacement Needs Buildings 2024-2088

Replacement needs are forecasted to significantly increase by the latter half of the century. The chart also illustrates a backlog of $3.2 million, dominated by general government 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.

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 summary of the 10-year 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, age-based condition and replacement costs. Breakdowns of the risk criteria used for probability and consequence of failure can be found in Appendix D – Risk Rating Criteria.

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.

1 - 4 **Very Low** $693,119 (3%)	5 - 7 **Low** $10,647,378 (53%)	8 - 9 **Moderate** $425,351 (2%)	10 - 14 **High** $5,950,384 (30%)	15 - 25 **Very High** $2,450,064 (12%)

Figure 53 Risk Matrix: Buildings

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	The township operates and maintains following types of facilities: ♦ Library ♦ Municipal Office/ Townhall ♦ Recreation & Community Centers ♦ Fire Halls ♦ Public works buildings ♦ Medical Centers

Table 31 Community Levels of Service: Buildings

9.7.2 Technical Levels of Service

Service Attribute	Technical Metric	Current LOS (2023)
Quality	Average condition of facilities assets	65%
Performance	Target vs. Actual capital reinvestment rate	1.7% vs. 0.2%

Table 32 Technical Levels of Service: Buildings

10. Land Improvements

The Township's land improvements portfolio includes parking lots, landfill, parks, courts, and a wharf. The total current replacement of land improvements is estimated at approximately $2 million.

10.1 Inventory & Valuation

Table 33 summarizes the quantity and current replacement cost of all land improvements assets available in the Township's asset register. Recreation and cultural services account for the largest share of the land improvements asset category.

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Environmental Services	3	Quantity	$371,627	CPI
General Government	4	Quantity	$105,536	CPI
Rec & Cultural Services	13	Quantity	$1,686,880	CPI
TOTAL			**$2,164,043**	

Table 33 Detailed Asset Inventory: Land Improvements

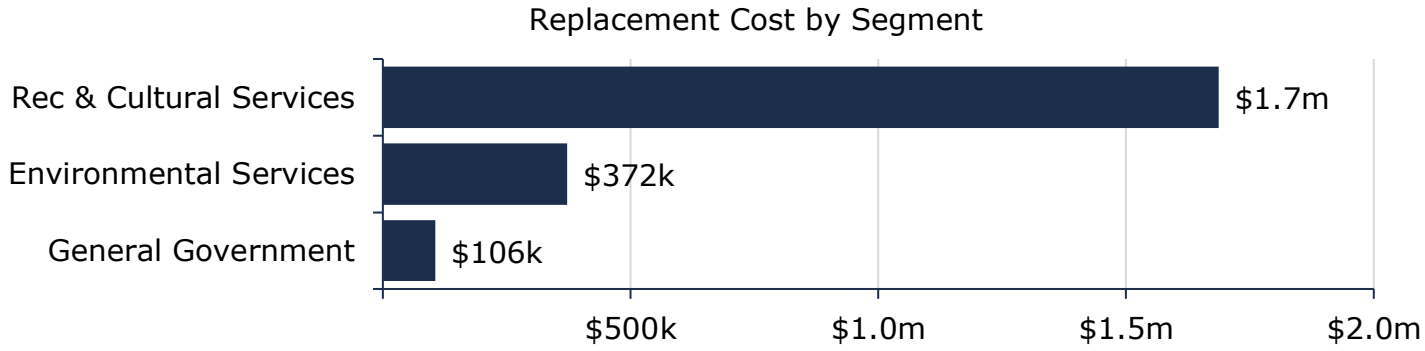

Figure 54 Portfolio Valuation: Land Improvements

10.2 Asset Condition

Figure 55 summarizes the replacement cost-weighted condition of the Township's land improvements portfolio. 70% of assets are in fair or better condition, the remaining 30% 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.

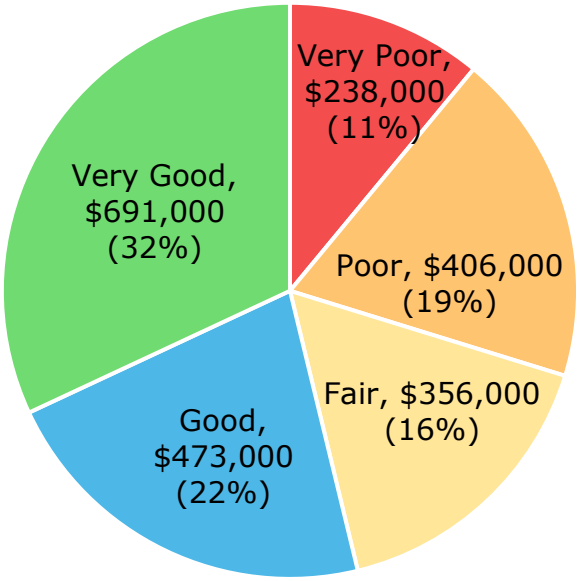

Figure 55 Asset Condition: Land Improvements Overall

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

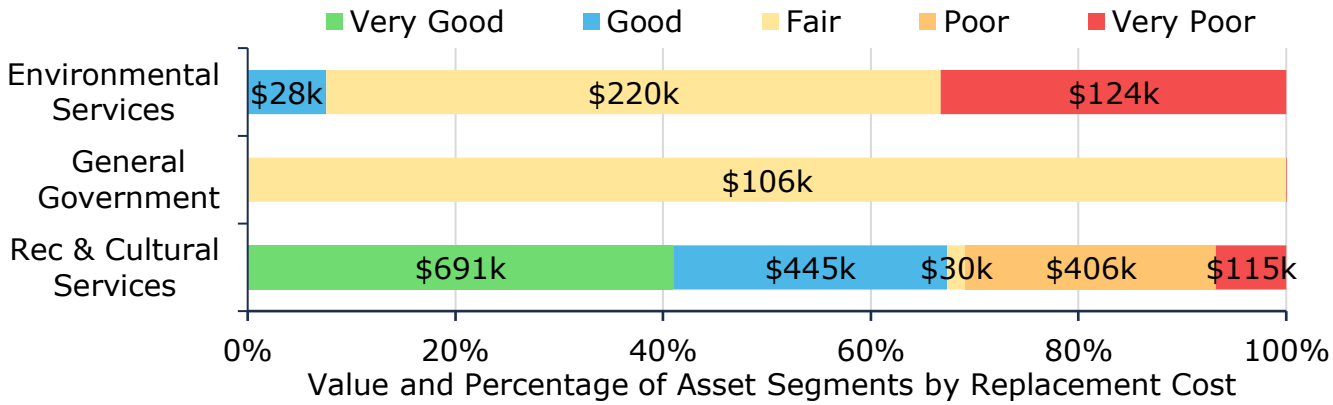

Figure 56 Asset Condition: Land Improvements by Segment

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.

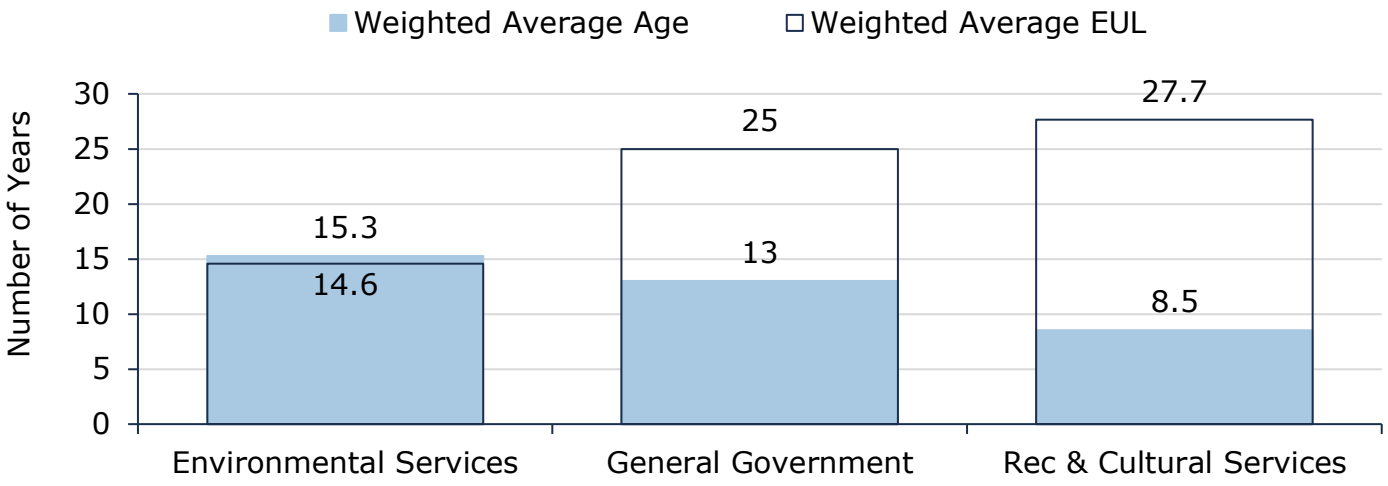

Figure 57 Estimated Useful Life vs. Asset Age: Land Improvements

Age analysis reveals that environmental services assets have exhausted their estimated useful lives. On the contrary, general government and recreation assets are in the early stages of their useful lives.

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 34 outlines the Township's current lifecycle management strategy.

Activity Type	Description of Current Strategy
Maintenance	Maintenance activities include mulching (every summer or every other summer) and other tasks performed on a case-by-case basis.
	Maintenance is triggered by factors such as weather events, seasonal changes, and the condition of heavily used parks like Norwood and Asphodel.
Replacement	Replacement is considered based on health and safety concerns, particularly for rotting wooden equipment and playground structures.
Inspections	Assets are cleaned and inspected on a varied schedule by internal staff

Table 34 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 2073 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 $128,000 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 fluctuate over the 50-year time horizon, peaking at $1.2 million between 2054 and 2058 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.

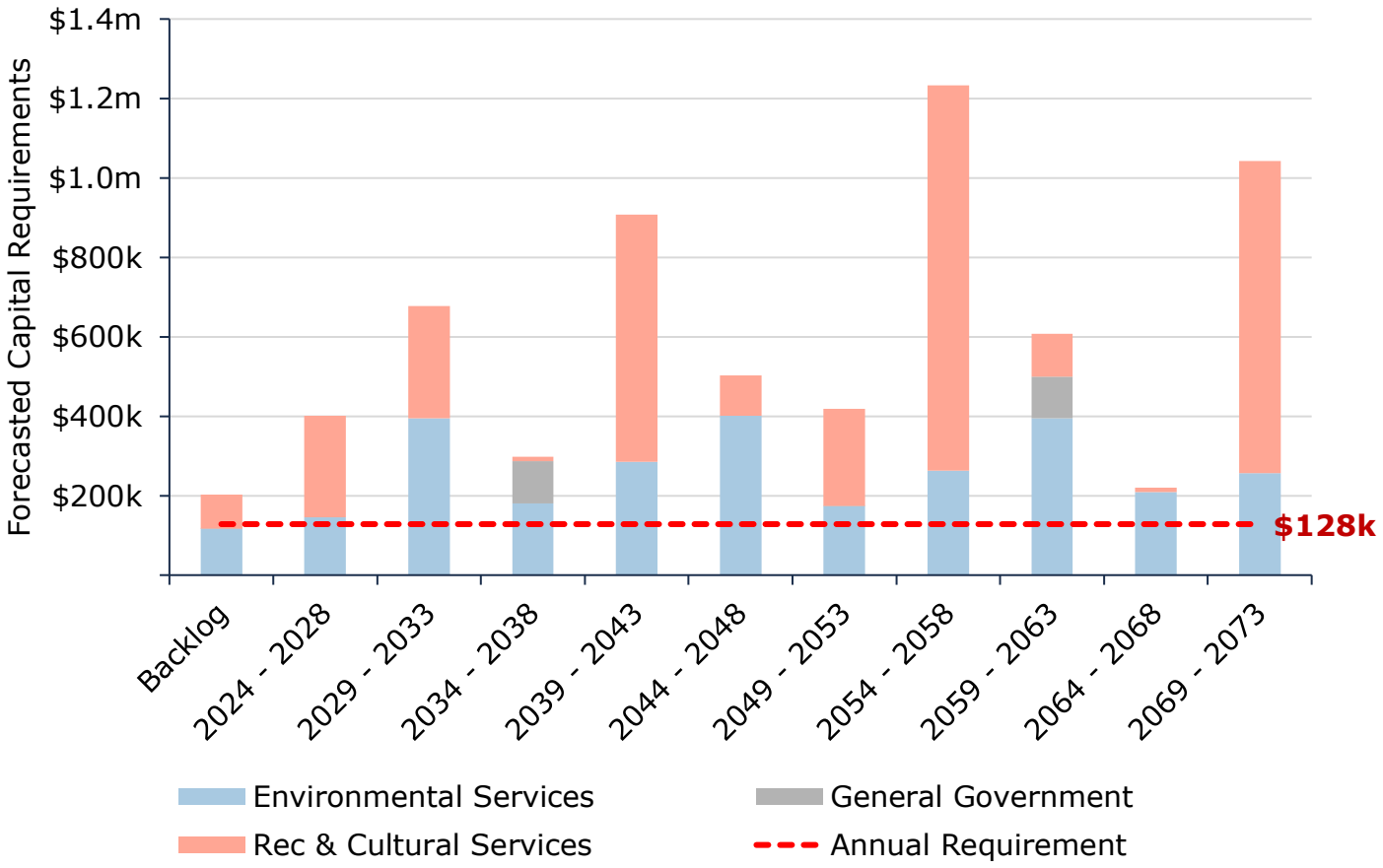

Figure 58 Forecasted Capital Replacement Needs: Land Improvements 2024-2073

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 summary of the 10-year 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, and replacement costs. Breakdowns of the risk criteria used for probability and consequence of failure can be found in Appendix D – Risk Rating Criteria.

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.

1 - 4 **Very Low**	5 - 7 **Low**	8 - 9 **Moderate**	10 - 14 **High**	15 - 25 **Very High**
$968,409 (45%)	$817,615 (38%)	$378,019 (17%)	- (0%)	- (0%)

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 and land improvements that the municipality operates and maintains	The Township operates and maintains parking lots, a landfill, parks, courts, and a wharf.

Table 35 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	60%
Performance	Target vs. Actual capital reinvestment rate	5.9% vs. 1.3%

Table 36 Technical Levels of Service: Land Improvements

11. Vehicles

The Township's vehicles portfolio includes 20 assets that support a variety of general and essential services, including fire, health, recreation/culture, and transportation services. The total current replacement of vehicles is estimated at approximately $3 million.

11.1 Inventory & Valuation

Table 37 summarizes the quantity and current replacement cost of all vehicles assets available in the Township's asset register. Transportation and fire services account for the largest share of the vehicles portfolio.

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Fire	8	Quantity	$1,355,161	CPI
Health Services	2	Quantity	$76,643	CPI
Rec & Cultural Services	1	Quantity	$35,070	CPI
Transportation Services	9	Quantity	$1,604,933	CPI
TOTAL			**$3,071,807**	

Table 37 Detailed Asset Inventory: Vehicles

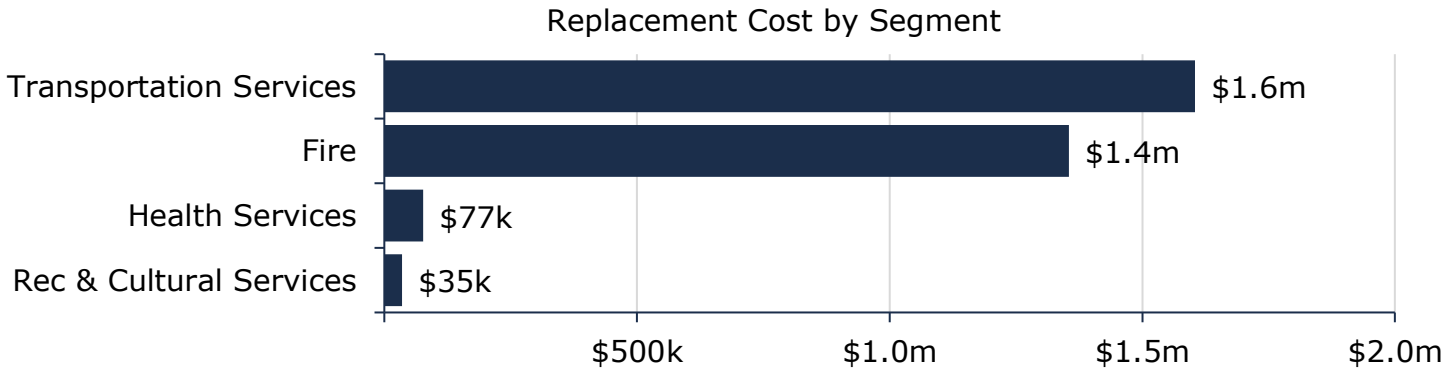

Figure 60 Portfolio Valuation: Vehicles

11.2 Asset Condition

Figure 61 summarizes the replacement cost-weighted condition of the Township's vehicles portfolio. 30% of vehicles are in fair or better condition, with the remaining 70% 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 42% of fire

services vehicles, based on replacement costs; age was used to estimate condition for the remaining assets.

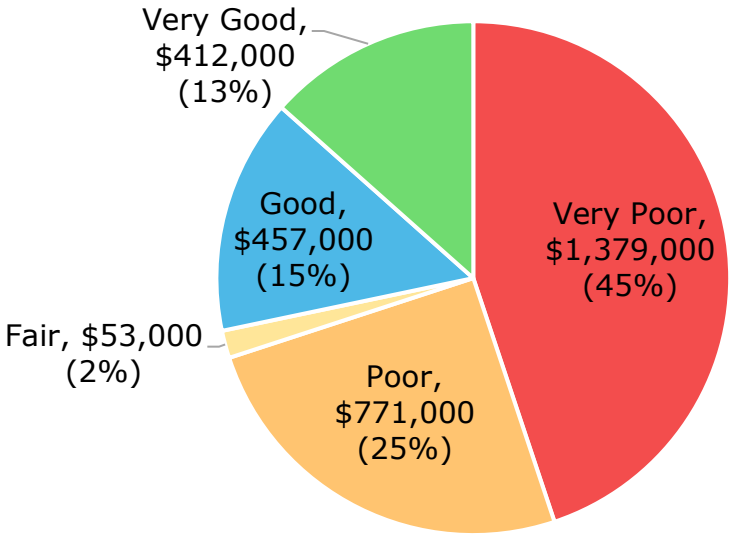

Figure 61 Asset Condition: Vehicles Overall

Figure 62 summarizes the condition of vehicles by each department. The vast majority of vehicles that support critical services such as transportation and fire are in poor or worse condition.

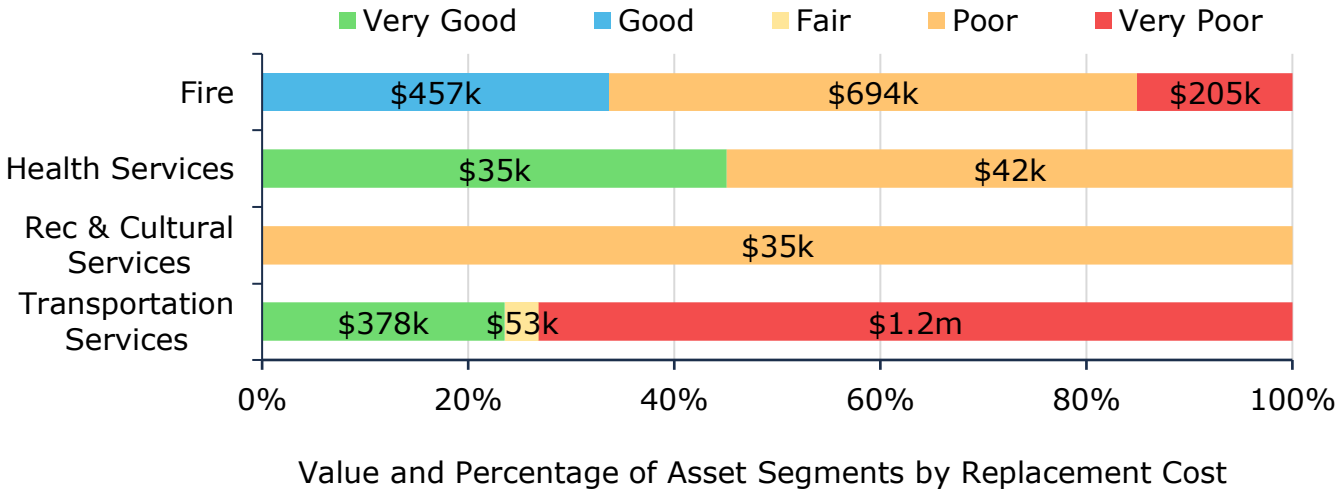

Figure 62 Asset Condition: Vehicles by Segment

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.

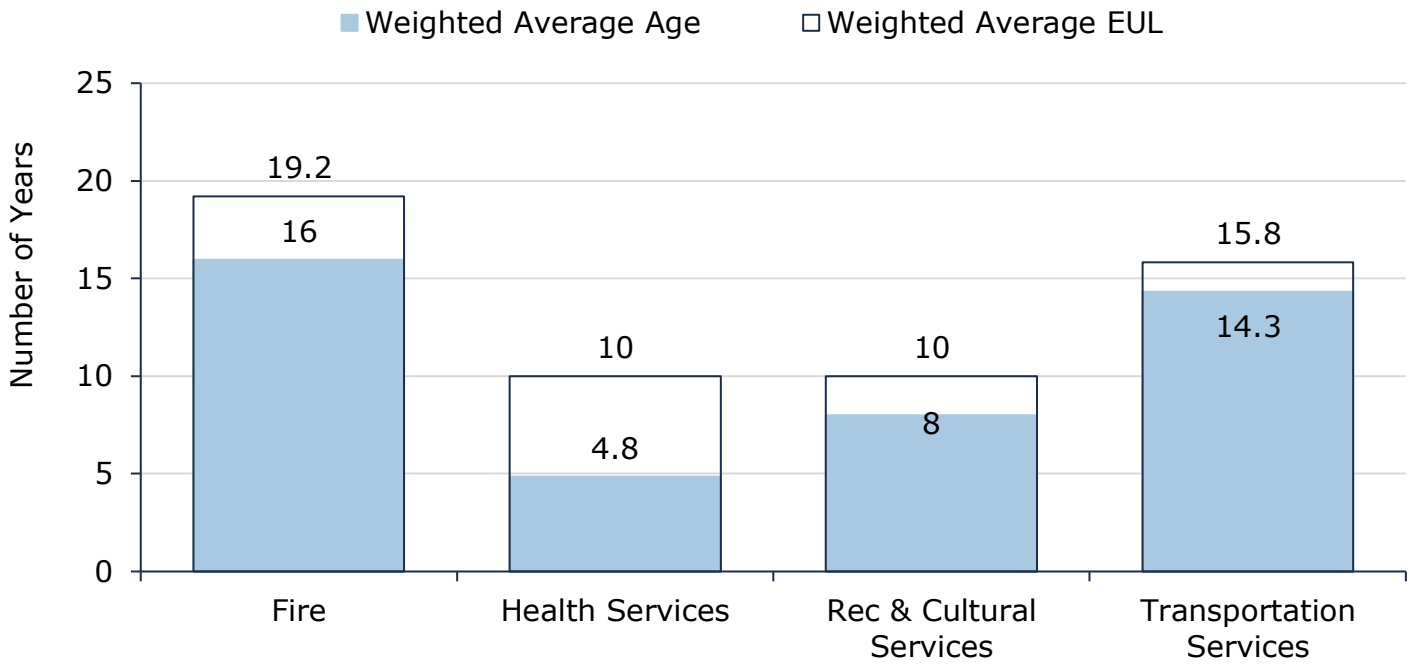

Figure 63 Estimated Useful Life vs. Asset Age: Vehicles

Age analysis reveals that, on average, most vehicles are in the latter stages of their expected life. Assets in health services are approaching a midpoint in 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	Maintenance is triggered based on hours/kilometers driven.Maintenance activities include routine tasks like oil changes (performed in-house) and specialized repairs conducted by external contractors.
Rehabilitation	Rehabilitation activities involve replacing major components like engines and other maintenance parts. Without the availability of up-to-date condition assessment information, replacement activities are purely reactive in nature.
Replacement	A replacement schedule is in place, with pickup trucks being replaced after 10 years and larger vehicles after 15-20 years. Assets nearing the end of their service life are prioritized for replacement.
Inspections	Vehicles and equipment undergo daily safety checks before use. Larger fleet vehicles receive a thorough annual inspection by external contractors. Condition data informs the replacement schedule.
	Fire Assets are assessed as per NFPA standards.

Table 38 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 $191,000 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 rise considerably in the current decade, peaking at $1.9 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.

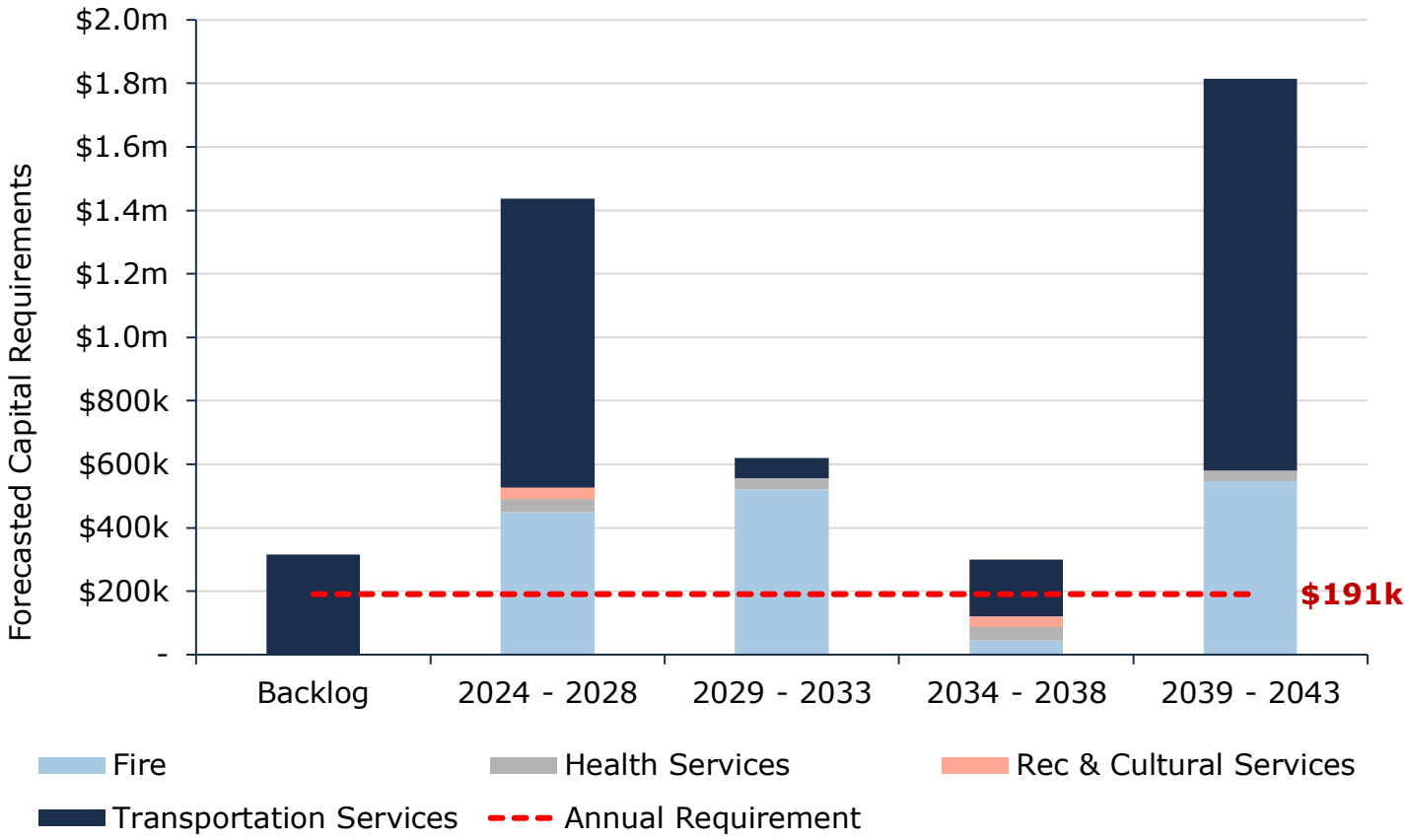

Figure 64 Forecasted Capital Replacement Needs: Vehicles 2024-2043

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 summary of the 10-year 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, and replacement costs. Breakdowns of the risk criteria used for probability and consequence of failure can be found in Appendix D – Risk Rating Criteria.

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.

1 - 4 Very Low $614,408 (20%)	5 - 7 Low $669,862 (22%)	8 - 9 Moderate $401,069 (13%)	10 - 14 High $837,840 (27%)	15 - 25 Very High $548,628 (18%)

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 vehicles include water tankers, pumpers, service trucks, and rescue vans, ensuring readiness for emergency response. Recreation includes a single vehicle used to facilitate maintenance tasks. Public Works vehicles, such as pick-up trucks, are vital for ensuring safe road conditions and managing infrastructure during inclement weather and construction projects. Water/wastewater vehicles include pick-up trucks, ensure efficient maintenance of water and wastewater infrastructure.

Table 39 Community Levels of Service: Vehicles

11.7.2 Technical Levels of Service

Service Attribute	Technical Metric	Current LOS (2023)
Quality	Average condition of vehicles	33%
Performance	Target vs. Actual capital reinvestment rate	6.2% vs. 3.7%

Table 40 Technical Levels of Service: Vehicles

12. Machinery & Equipment

The Township's machinery and equipment portfolio includes 990 pooled assets that support a variety of general and essential services, including transportation, fire, and recreation. The total current replacement of machinery and equipment is estimated at approximately $5.7 million.

12.1 Inventory & Valuation

Figure 66 summarizes the quantity and current replacement cost of all machinery and equipment assets available in the Township's asset register.

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Environmental Services	9	Quantity	$89,571	CPI
Fire	240	Quantity	$543,223	CPI
General Government	36	Quantity	$77,681	CPI
Rec & Cultural Services	681	Quantity	$3,044,405	CPI
Transportation Services	24	Quantity	$1,999,629	CPI
TOTAL			**$5,754,509**	

Table 41 Detailed Asset Inventory: Machinery & Equipment

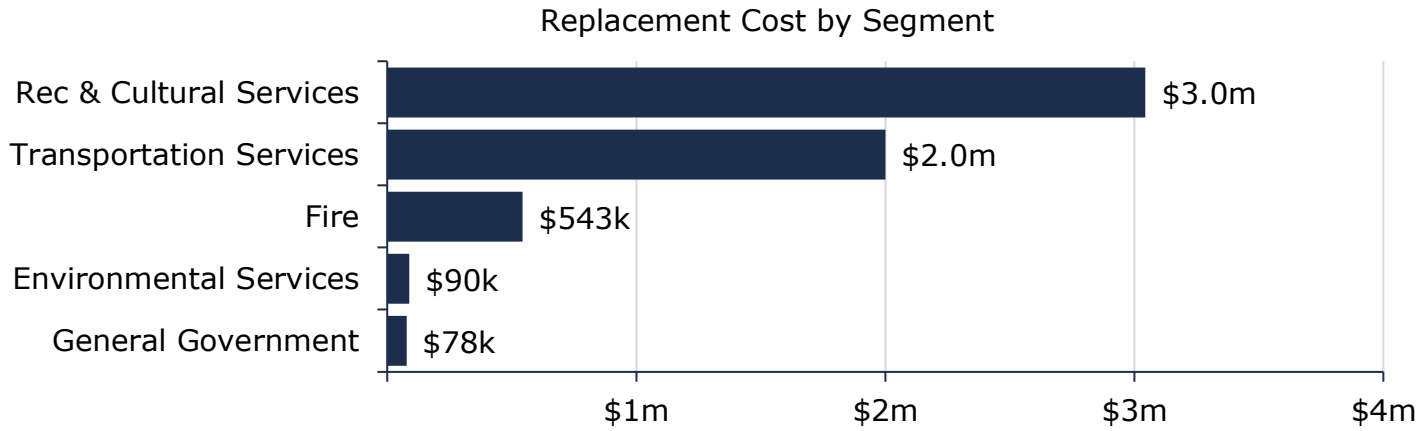

Figure 66 Portfolio Valuation: Machinery & Equipment

12.2 Asset Condition

Figure 67 summarizes the replacement cost-weighted condition of the Township's machinery and equipment portfolio. Based on mostly age data, 69% of assets are in fair or better condition; the

remaining 31% 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.

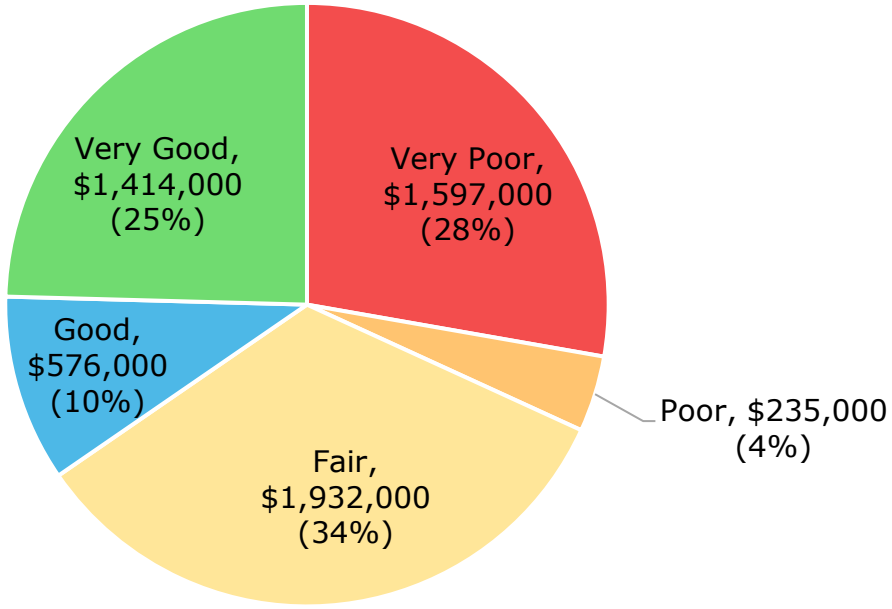

Figure 67 Asset Condition: Machinery & Equipment Overall

Figure 68 summarizes the age-based condition of machinery and equipment by each department. The majority of assets that support fire services are in fair or better condition. Assets in poor or worse condition are concentrated primarily in environmental, transportation, and recreation and cultural services.

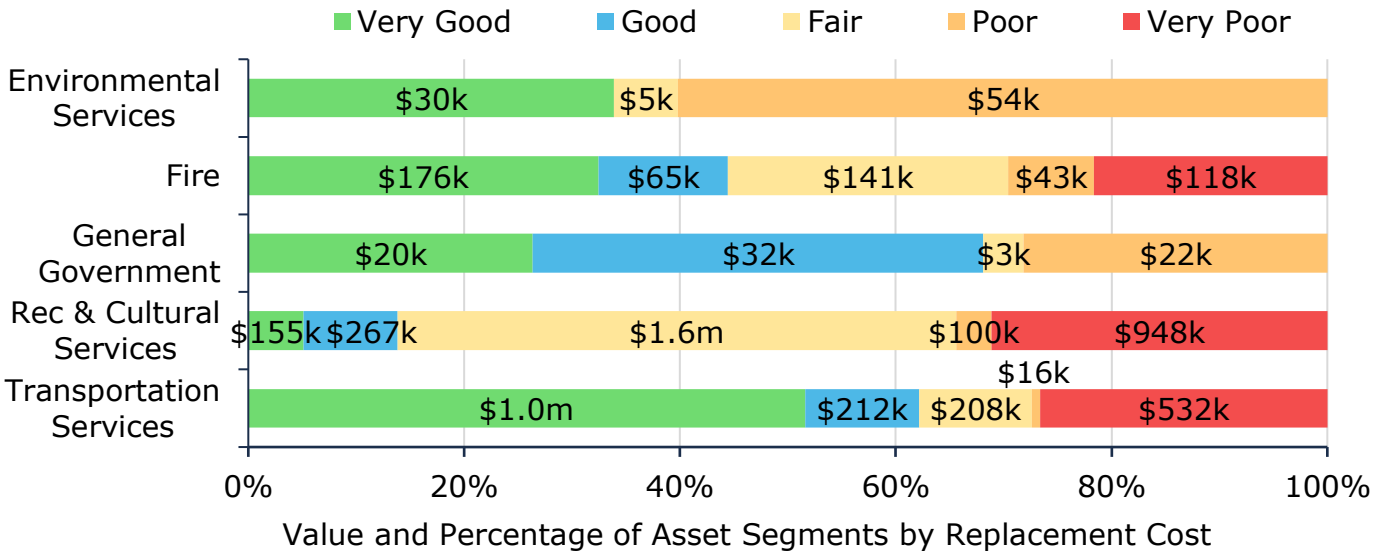

Figure 68 Asset Condition: Machinery & Equipment by Segment

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.

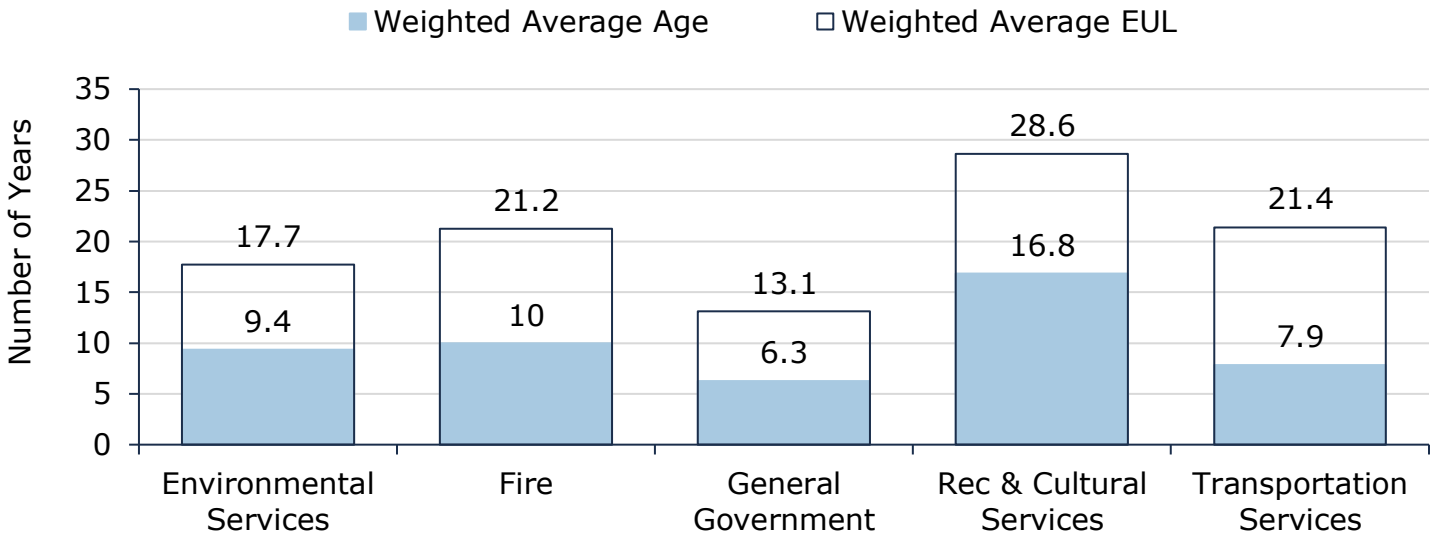

Figure 69 Estimated Useful Life vs. Asset Age: Machinery & Equipment

Age analysis reveals that, on average, most machinery and equipment assets are midway through 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	Oil changes and routine maintenance is completed as per manufacturer recommendations
	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	Without the availability of up-to-date condition assessment information replacement activities are purely reactive in nature
Inspections	Heavy equipment is inspected by the operator daily before use; however, these inspections identify deficiencies but do not provide overall condition ratings
	Fire Assets are assessed as per NFPA standards.

Table 42 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 2073 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 $289,000 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 remain consistent over the 50-year projection period, except for a significant spike of $3.6 million between 2044 and 2048. 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.

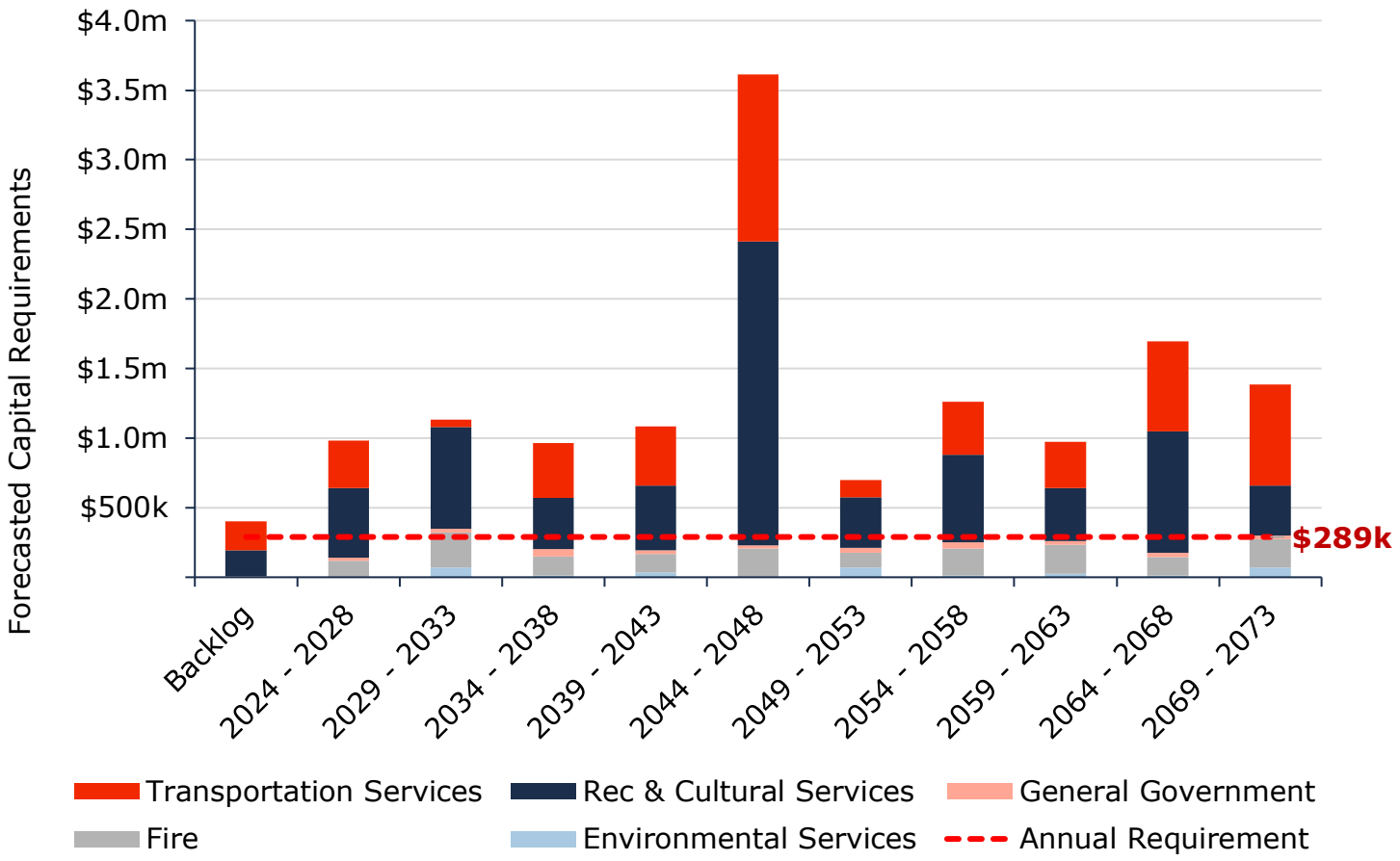

Figure 70 Forecasted Capital Replacement Needs: Machinery & Equipment 2024-2073

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 summary of the 10-year 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, and replacement costs. Breakdowns of the risk criteria used for probability and consequence of failure can be found in Appendix D – Risk Rating Criteria.

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.

1 - 4 **Very Low** $2,472,318 (43%)	5 - 7 **Low** $920,073 (16%)	8 - 9 **Moderate** - (0%)	10 - 14 **High** $559,278 (10%)	15 - 25 **Very High** $1,802,840 (31%)

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	Transportation services is supported by equipment such as a diesel generator. Fire is supported by equipment such as defibrillators, portable pumps, pagers, bunker suits, rescue jackets, and thermal imaging cameras. The library is supported by books and shelving. Recreation is supported by a pre-fabricator, a dishwasher, hot water tanks, and benches, picnic tables & other furniture. General Government/ Administration is supported by computers, servers, electronic databases & phone systems.

Table 43 Community Levels of Service: Machinery & Equipment

12.7.2 Technical Levels of Service

Service Attribute	Technical Metric	Current LOS (2023)
Quality	Average condition of machinery and equipment	51%
Performance	Target vs. Actual capital reinvestment rate	5.0% vs. 4.2%

Table 44 Technical Levels of Service: Machinery & Equipment

Strategies

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 Growth Assumptions

13.1.1 Township of Asphodel-Norwood Community Improvement Plan and Growth

The Township of Asphodel-Norwood's community improvement plan outlines the township's vision of continuous development of a safe, growing community that is rich in heritage and offering a rural lifestyle.

Within its community improvement plan, the Township has defined some goals and objectives to foster growth in the community. A major focus found within these goals are that of the revitalization of commercial areas through the promotion of sustainable development, improved accessibility, renovation, and rehabilitation of Norwood's downtown area. This will be fostered through incentives to building owners and other stakeholders within these areas. In turn, these efforts are expected to attract businesses, residents, and visitors, stimulating economic activity and continuing to foster a vibrant community while promoting sustainability and enhancing quality of life.

According to the Growth Analysis Report conducted by Hemson (2022) for the County of Peterborough, it was identified that population movement from the Greater Toronto Area to be a major driver of population growth for the County and its townships. Asphodel-Norwood would be a major benefactor of this, as it is predicted to receive 16.2% population allocation over the next 30 years. The plan highlighted how young home buyers have and will move into the region in search of affordable housing. This population movement is also fueled by older generations transitioning their second homes in the area into permanent residences. Due to this, the expected growth in the County will occur in the areas closest to the Greater Toronto Area and the City of Peterborough.

13.1.2 A Place to Grow: Growth Plan for the Greater Golden Horseshoe (2020)

The "A Place to Grow" plan was created through an initiative to communicate and align goals for the area in relation to growth and population movement with the overarching goals of prosperity and sustainability. It encompasses the larger overall region of the Golden Horseshoe in southern Ontario including the Township of Asphodel-Norwood as part of Peterborough County. This plan outlined the expected growth from the area, drivers for such growth, and a series of expectations and goals to ensure the changes in population are met responsibly.

The plan highlighted multiple challenges that it expects the region to undergo in the coming years as the area experiences growth. The first of these is that the growth in the region will call for "major infrastructure investments". The plan calls for deliberate and optimized strategies

surrounding lifecycle activities and infrastructure management, as the County will be pushed to provide service to an ever-increasing population base.

The plan moves on to lay out targets for intensification and density, that are to be strived for by the regions Counties and Cities as they manage the tide of growth.

13.2 Impact of Growth on Lifecycle Activities

By July 1, 2025, the Township's asset management plan must include a discussion of how the assumptions regarding future changes in population and economic activity informed the preparation of the lifecycle management and financial strategy.

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

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 the Township of Asphodel-Norwood 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 $2.3 million annually to address capital requirements for the assets included in this AMP.

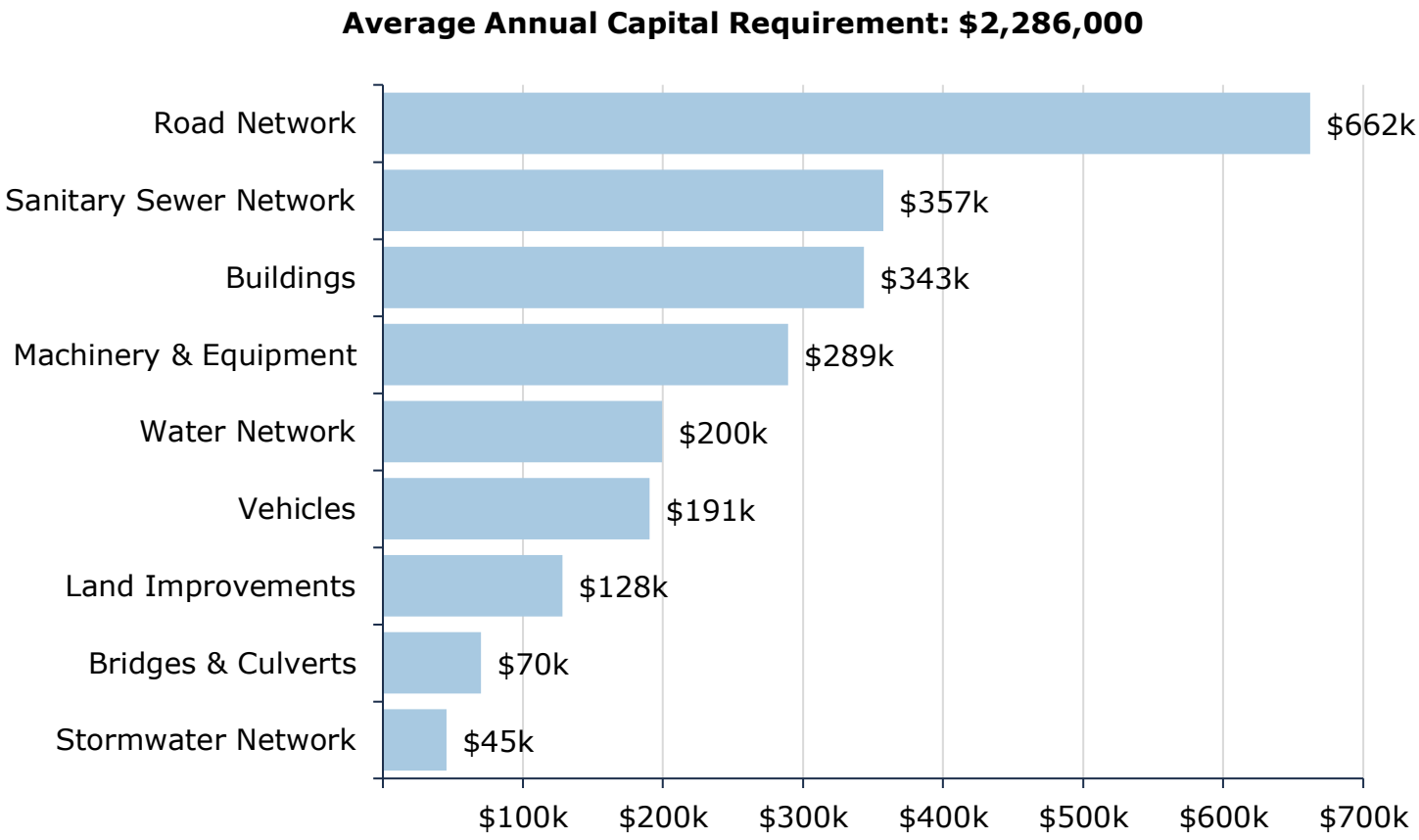

Figure 72 Annual Capital Funding Requirements by Asset Category

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

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

Asset Category	Annual Requirements (Replacement Only)	Annual Requirements (Lifecycle Strategy)	Difference
Road Network	$1,441,000	$662,000	$779,000

Table 45 Lifecycle Strategies Annual Savings

The implementation of a proactive lifecycle strategy for roads leads to a potential annual cost avoidance of $779,000 for the Road Network. This represents an overall reduction of the annual requirements by 54%. 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 $1.6 million towards capital projects per year. Given the annual capital requirement of $2.3 million, there is currently a funding gap of $700,000 annually.

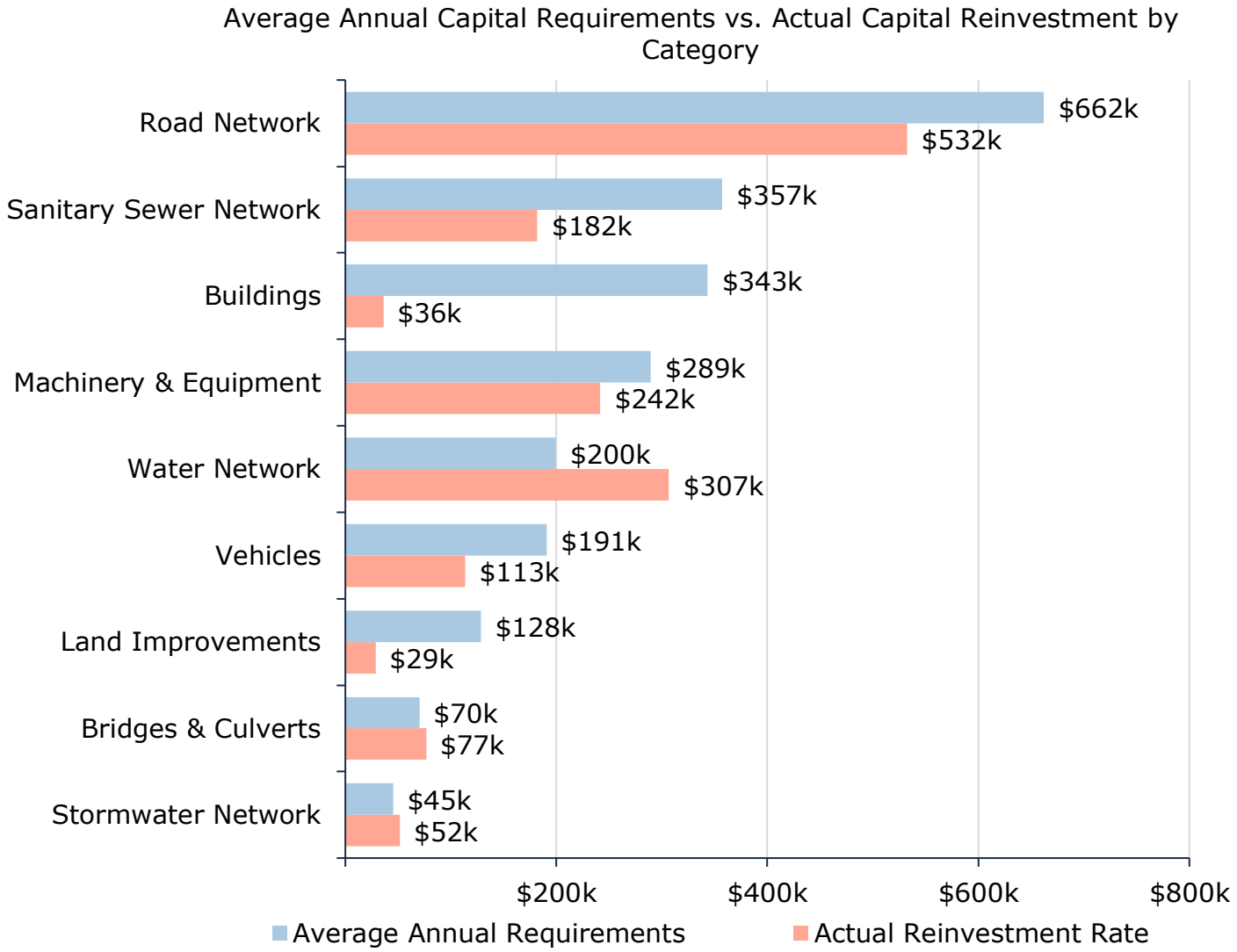

Figure 73 Annual Requirements vs. Capital Funding Available

14.2 Funding Objective

We have developed a scenario that would enable Township of Asphodel-Norwood to achieve full funding within 10 years for the following assets:

1. **Tax Funded Assets:** Road Network, Stormwater Network, Bridges & Culverts, Buildings, 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, Asphodel-Norwood'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	661,918	136,476	135,984	259,784	532,244	129,674
Bridges & Culverts	70,221	47,735	0	28,865	76,600	-6,379
Stormwater Network	45,360	51,731	0	0	51,731	-6,371
Buildings	343,369	36,143	0	0	36,143	307,226
Land Improvements	128,309	28,666	0	0	28,666	99,643
Vehicles	190,594	113,333	0	0	113,333	77,261
Machinery & Equipment	289,402	241,567	0	0	241,567	47,835
Total	**1,729,173**	**655,651**	**135,984**	**288,649**	**1,080,284**	**648,889**

Table 46 Annual Available Funding for Tax Funded Assets

The average annual investment requirement for the above categories is $1.73 million. Annual revenue currently allocated to these assets for capital purposes is $1.08 million leaving an annual deficit of $650,000. Put differently, these infrastructure categories are currently funded at 63% of their long-term requirements.

14.3.2 Full Funding Requirements

In 2023, the Township of Asphodel-Norwood had budgeted annual tax revenues of approximately $4.1 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	3.2%
Bridges & Culverts	-0.2%
Stormwater Network	-0.2%
Buildings	7.6%
Land Improvements	2.5%
Vehicles	1.9%
Machinery & Equipment	1.2%
Total	**16.0%**

Table 47 Tax Increase Requirements for Full Funding

Any changes in costs and/or revenues over the next number of years should also be considered in the financial strategy. As of 2025 Asphodel-Norwood did not have any debt relating to tax-funded asset categories.

	5 Years	10 Years	15 Years	20 Years
Infrastructure Deficit	648,889	648,889	648,889	648,889
Change in Debt Costs	N/A	N/A	N/A	N/A
Resulting Infrastructure Deficit:	**648,889**	**648,889**	**648,889**	**648,889**
Tax Increase Required	16.0%	16.0%	16.0%	16.0%
Annually:	**3.1%**	**1.5%**	**1.0%**	**0.8%**

Table 48 Tax Increase Options 5-20 Years

14.3.3 Financial Strategy Recommendations

Considering all the above information, we recommend the 10-year option. This involves full funding being achieved over 10 years by:

a) increasing tax revenues by 1.5% each year for the next 10 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[4].
2. We realize that raising tax revenues by the amounts recommended above for infrastructure purposes will be very difficult to do. However, considering a longer phase-in window may have even greater consequences in terms of infrastructure failure.

Although this option achieves full funding on an annual basis in 10 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 $4.4 million for tax-funded categories.

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, Asphodel-Norwood'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	To Operating	OCIF	Total Available	
Water Network	199,528	507,773	-201,125	0	306,648	-107,120
Sanitary Sewer Network	357,146	560,601	-378,611	0	181,990	175,156
Total	**556,674**	**1,068,374**	**-579,736**	**0**	**488,638**	**68,036**

Table 49 Annual Available Funding for Rate Funded Assets

The average annual investment requirement for the above categories is $557,000. Annual revenue currently allocated to these assets for capital purposes is $489,000 leaving an annual deficit of $68,000. Put differently, these infrastructure categories are currently funded at 88% of their long-term requirements.

[4] 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.

14.4.2 Full Funding Requirements

In 2023, Asphodel-Norwood had budgeted annual sanitary revenues of $591,000 and annual water revenues of $495,000. 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	-21.6%
Sanitary Sewer Network	29.6%

Table 50 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 20 years:

	Water Network			
	5 Years	**10 Years**	**15 Years**	**20 Years**
Infrastructure Deficit	-107,120	-107,120	-107,120	-107,120
Change in Debt Costs	0	0	-63,694	-63,694
Resulting Infrastructure Deficit:	**-107,120**	**-107,120**	**-170,813**	**-170,813**
Rate Increase Required	0%	0%	0%	0%
Annually:	**0%**	**0%**	**0%**	**0%**

Table 51 Water Rate Increase Options 5-20 Years

	Sanitary Sewer Network			
	5 Years	**10 Years**	**15 Years**	**20 Years**
Infrastructure Deficit	175,156	175,156	175,156	175,156
Change in Debt Costs	-14,088	-28,334	-42,334	-56,322
Resulting Infrastructure Deficit:	**161,068**	**146,822**	**132,822**	**118,834**
Rate Increase Required	27.2%	24.8%	22.5%	20.1%
Annually:	**5.0%**	**2.3%**	**1.4%**	**1.0%**

Table 52 Sanitary Rate Increase Options 5-20 Years

14.4.3 Financial Strategy Recommendations

Considering all of the above information, we recommend the 10-year option. This involves full funding being achieved over 10 years by:

a) when realized, reallocating the debt cost reductions of $28,000 for sanitary services and to the applicable infrastructure deficit.
b) maintaining water services revenue and increasing sanitary sewer services by 2.3% each year for the next 10 years solely for the purpose of phasing in full funding to the asset categories covered in this section of the AMP.
c) 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 10 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 $266,000 for the Water Network and $869,000 for the Sanitary Sewer Network.

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

14.5 Use of Debt

Debt can be strategically utilized as a funding source within 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:

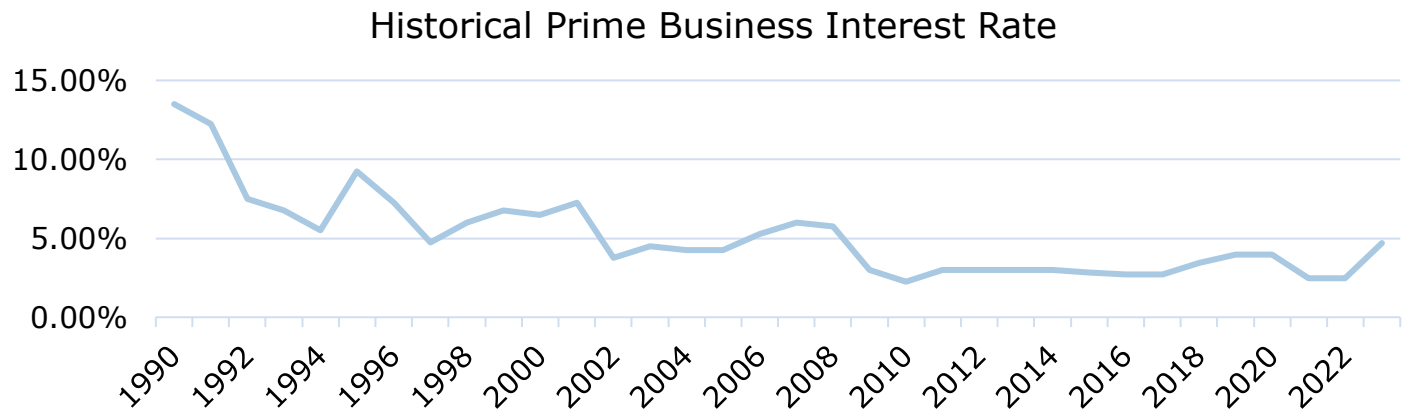

Figure 74 Historical Prime Rate

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.

The following tables outline how Asphodel-Norwood has historically used debt for investing in the asset categories as listed. As of year-end 2024, there is currently $1.2 million of external debt outstanding for the assets covered by this AMP with corresponding external principal and interest payments of $122,000, well within its provincially prescribed maximum of $1.3 million. Additionally, Asphodel-Norwood has $64,000 annual payments to internally funded debt which is excluded from the above amounts.

Asset Category	Current Debt Outstanding	Use of Debt in the Last Five Years				
		2020	2021	2022	2023	2024
Road Network	0	0	0	0	0	0
Bridges & Culverts	0	0	0	0	0	0
Stormwater Network	0	0	0	0	0	0
Buildings	0	0	0	0	0	0
Land Improvements	0	0	0	0	0	0
Vehicles	0	0	0	0	0	0
Machinery & Equipment	0	0	0	0	0	0
Total Tax Funded	**0**	**0**	**0**	**0**	**0**	**0**
Water Network	550,031	0	0	0	0	0
Sanitary Sewer Network	1,171,429	0	0	0	0	0
Total Rate Funded	**1,721,460**	**0**	**0**	**0**	**0**	**0**

Table 53 Asphodel-Norwood Use of Debt 2020-2024

Asset Category	Principal & Interest Payments in the Next Ten Years						
	2024	2025	2026	2027	2028	2029	2034
Road Network	0	0	0	0	0	0	0
Bridges & Culverts	0	0	0	0	0	0	0
Stormwater Network	0	0	0	0	0	0	0
Buildings	0	0	0	0	0	0	0
Land Improvements	0	0	0	0	0	0	0
Vehicles	0	0	0	0	0	0	0
Machinery & Equipment	0	0	0	0	0	0	0
Total Tax Funded	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Water Network	63,694	63,694	63,694	63,694	63,694	63,694	63,694
Sanitary Sewer Network	116,975	123,688	111,041	108,241	105,575	102,886	88,641
Total Rate Funded	**180,668**	**187,381**	**174,735**	**171,935**	**169,269**	**166,580**	**152,335**

Table 54 Asphodel-Norwood Principal and Interest Payments

The revenue options outlined in this plan allow the Township of Asphodel-Norwood 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 Asphodel-Norwood.

Asset Category	Balance at December 31, 2023
Road Network	1,505,904
Bridges & Culverts	28,139
Stormwater Network	18,177
Buildings	1,074,502
Land Improvements	459,776
Vehicles	260,206
Machinery & Equipment	228,728
Total Tax Funded:	**3,575,432**
Water Network	81,045
Sanitary Sewer Network	515,212
Total Rate Funded:	**596,257**

Table 55 Asphodel-Norwood 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 Asphodel-Norwood'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 Asphodel-Norwood 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 1.5% per year over a period of 10 years.
    b. Increasing sanitary rates by 2.3% per year over a period of 10 years; and
    c. Maintaining existing water rates.

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; economic conditions and the local tax base. This data can also be used to review service level targets.

Appendices

Appendix A – Infrastructure Report Card

Asset Category	Replacement Cost	Average Condition	Financial Capacity		% Funded
Road Network	**$25.6 m**	**Fair**	Annual Requirement:	$662,000	80%
			Funding Available:	$532,000	
			Annual Deficit:	**$130,000**	
Bridges & Culverts	**$3.2 m**	**Good**	Annual Requirement:	$70,000	110%
			Funding Available:	$77,000	
			Annual Deficit:	**($6,000)**	
Water Network	**$9.2 m**	**Good**	Annual Requirement:	$200,000	153%
			Funding Available:	$307,000	
			Annual Deficit:	**($107,000)**	
Sanitary Sewer Network	**$10.6 m**	**Fair**	Annual Requirement:	$357,000	51%
			Funding Available:	$182,000	
			Annual Deficit:	**$175,000**	
Stormwater Network	**$3.0 m**	**Good**	Annual Requirement:	$45,000	111%
			Funding Available:	$52,000	
			Annual Deficit:	**($7,000)**	
Buildings	**$20.2 m**	**Good**	Annual Requirement:	$343,000	10%
			Funding Available:	$36,000	
			Annual Deficit:	**$307,000**	
Land Improvements	**$2.1 m**	**Good**	Annual Requirement:	$128,000	23%
			Funding Available:	$29,000	
			Annual Deficit:	**$100,000**	
Vehicles	**$3.1 m**	**Poor**	Annual Requirement:	$191,000	59%
			Funding Available:	$113,000	
			Annual Deficit:	**$77,000**	
Machinery & Equipment	**$ 9.2 m**	**Fair**	Annual Requirement:	$289,000	84%
			Funding Available:	$242,000	
			Annual Deficit:	**$48,000**	

Appendix B – 10-Year Capital Requirements

Road Network

Segment	Backlog	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Gravel Roads	$138k	-	-	-	-	-	$785k	$4.0m	$195k	$2.7m	$3.7m
Guiderails	-	-	-	-	-	-	-	-	-	-	-
Paved Roads - HCB	$42k	$62k	-	-	$347k	$47k	$2.6m	-	-	-	-
Paved Roads - LCB	-	-	-	-	-	-	-	-	-	-	-
Sidewalks	-	-	$3k	-	-	$35k	-	-	$79k	-	-
Streetlights	-	-	-	-	-	-	-	-	-	-	-
Total	**$179k**	**$62k**	**$3k**	**-**	**$347k**	**$82k**	**$3.4m**	**$4.0m**	**$274k**	**$2.7m**	**$3.7m**

Table 56: 10-Year Capital Requirements: Road Network

Bridges & Culverts

No capital requirements forecasted for the next 10 years.

Water Network

Segment	Backlog	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Hydrants	-	-	-	-	-	-	-	-	-	-	-
Water Facilities	$33k	$2k	$555k	-	$166k	-	$3k	$6k	$150k	$38k	$33k
Water Laterals	-	-	-	-	-	-	-	-	-	$4k	-
Water Mains	$226k	-	-	-	-	-	-	-	-	-	-
Water Meters	-	-	-	-	-	-	-	-	$16k	-	-
Water Valves	$7k	$8k	-	-	-	-	-	-	-	-	-
Total	**$266k**	**$10k**	**$555k**	**-**	**$166k**	**-**	**$3k**	**$6k**	**$167k**	**$41k**	**$33k**

Table 57: 10-Year Capital Requirements: Water Network

Sanitary Sewer Network

Segment	Backlog	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Manholes	-	-	-	-	-	-	-	-	-	-	-
Sewer Mains	-	-	-	-	-	-	-	-	-	-	-
Wastewater Treatment Plant	$869k	$768k	$446k	$312k	$112k	$19k	$334k	$17k	$102k	$10k	$38k
Total	**$869k**	**$768k**	**$446k**	**$312k**	**$112k**	**$19k**	**$334k**	**$17k**	**$102k**	**$10k**	**$38k**

Table 58: 10-Year Capital Requirements: Sanitary Sewer Network

Stormwater Network

Segment	Backlog	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Basins	-	-	-	-	-	-	-	-	-	-	-
Connections	-	-	-	-	-	-	-	-	-	-	-
Curb & Gutter	-	-	-	-	-	-	-	-	-	-	-
Manholes	-	-	-	-	-	-	-	-	-	-	-
Storm Culverts	$78k	-	-	-	-	$7k	-	-	-	-	-
Storm Mains	-	-	-	-	-	-	-	-	-	-	-
Stormwater Storage System	-	-	-	-	-	-	-	-	-	-	-
Total	**$78k**	**-**	**-**	**-**	**-**	**$7k**	**-**	**-**	**-**	**-**	**-**

Table 59: 10-Year Capital Requirements: Stormwater Network

Buildings

Segment	Backlog	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Environmental Services	$203k	-	-	-	-	-	-	-	-	-	-
Fire	$375k	-	-	$64k	-	-	-	$147k	-	-	-
General Government	$1.4m	-	-	-	-	-	$3k	-	-	-	-
Health Services	-	-	-	-	-	-	-	-	-	-	-
Rec & Cultural Services	$654k	-	-	-	-	-	-	$4k	-	-	-
Transportation Services	$553k	-	-	-	-	-	-	-	-	-	-
Total	**$3.2m**	**-**	**-**	**$64k**	**-**	**-**	**$3k**	**$151k**	**-**	**-**	**-**

Table 60: 10-Year Capital Requirements: Buildings

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. 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	Backlog	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Environmental Services	$117k	-	$41k	$35k	$35k	$35k	$35k	$35k	$255k	$35k	$35k
General Government	-	-	-	-	-	-	-	-	-	-	-
Rec & Cultural Services	$85k	$29k	-	-	-	$226k	$2k	$160k	$19k	$12k	$90k
Total	**$203k**	**$29k**	**$41k**	**$35k**	**$35k**	**$261k**	**$37k**	**$194k**	**$273k**	**$47k**	**$125k**

Table 61: 10-Year Capital Requirements: Land Improvements

Vehicles

Segment	Backlog	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Fire	-	$53k	$44k	-	$352k	-	$293k	$157k	-	-	$72k
Health Services	-	-	-	$42k	-	-	-	-	-	-	$35k
Rec & Cultural Services	-	-	-	$35k	-	-	-	-	-	-	-
Transportation Services	$316k	-	$350k	$245k	$263k	$53k	-	-	-	$64k	-
Total	**$316k**	**$53k**	**$394k**	**$322k**	**$615k**	**$53k**	**$293k**	**$157k**	**-**	**$64k**	**$106k**

Table 62: 10-Year Capital Requirements: Vehicles

Machinery & Equipment

Segment	Backlog	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Environmental Services	-	-	-	-	-	$3k	$11k	$54k	-	-	$5k
Fire	$6k	$8k	$34k	$36k	$17k	$19k	$69k	$23k	$119k	$26k	$14k
General Government	-	-	-	-	$22k	-	$3k	$11k	$1k	-	$12k
Rec & Cultural Services	$188k	$413k	$15k	$27k	$10k	$36k	$380k	$69k	$135k	$116k	$30k
Transportation Services	$206k	-	-	-	$342k	-	-	-	$30k	-	$25k
Total	**$400k**	**$421k**	**$50k**	**$63k**	**$390k**	**$58k**	**$462k**	**$158k**	**$284k**	**$142k**	**$86k**

Table 63: 10-Year Capital Requirements: Machinery & Equipment

Appendix C – Level of Service Maps & Photos

Bridges & Culverts

Example of a Bridge in a 'Very Good' Condition:

Asphodel Norwood Landfill Bridge – Bridge Condition Index: **98.16**

Roadway looking west

South elevation

West abutment

Typical soffit

Figure 75: Photos of a bridge in a 'very good' condition: Asphodel-Norwood landfill bridge

Example of a Bridge in a 'Fair' Condition:

Norwood Pedestrian Bridge – Bridge Condition Index: **51.38**

Figure 76: Photos of a bridge in a 'fair' condition: Norwood pedestrian bridge

Example of a Culvert in a 'Very Good' Condition:

Sixth Line Culvert – Condition Score: **99.54**

Roadway looking south

Looking west through north barrel

East elevation

Downstream

Figure 77: Photos of a culvert in a 'very good' condition: Sixth line culvert

Example of a Culvert in a 'Fair' Condition:

River Road Culvert – Condition Score: **57.78**

Roadway looking east

North elevation

Looking south through barrel

Upstream

Figure 78: Photos of a culvert in a 'fair' condition: River road culvert

Water Network

Figure 79 Norwood Water Distribution and Hydrant Network

Figure 80 Trentview Estates Water Distribution and Hydrant Network

Appendix D – Risk Rating Criteria

Probability of Failure

Asset Category	Risk Classification	Risk Critera	Value/Range	Probability of Failure Score
Water Network (Mains)	Economic (80%)	Condition	80 - 100	1
			60- 79	2
			40 - 59	3
			20 - 39	4
			0 - 19	5
	Operational (20%)	Material Type	PVC	2
			AC, CI	4

Table 64: Probability of Failure Criteria: Water Mains

Asset Category	Risk Classification	Risk Critera	Value/Range	Probability of Failure Score
Stormwater Network (Mains)	Economic (80%)	Condition	80 - 100	1
			60- 79	2
			40 - 59	3
			20 - 39	4
			0 - 19	5
	Operational (20%)	Material Type	PVC, HDPE	2
			Cement, Concrete	3
			Clay, Perforated	4

Table 65: Probability of Failure Criteria: Stormwater Mains

Asset Category	Risk Classification	Risk Criteria	Value/Range	Probability of Failure Score
All other assets	Economic (100%)	Condition	80 - 100	1
			60- 79	2
			40 - 59	3
			20 - 39	4
			0 - 19	5

Table 66: Probability of Failure Criteria: All Other Assets

Consequence of Failure

Asset Category	Risk Classification	Risk Criteria	Value/Range	Consequence of Failure Score
HCB Roads LCB Roads Gravel Roads	Economic (60%)	Replacement Cost	0-$10,000	1
			$10,001 - $250,000	2
			$250,001 - $50,0000	3
			$500,001 - $1,000,000	4
			$1,000,001+	5
	Health & Safety (40%)	Speed Limit	0-30	1
			31-50	2
			51-80	3
			81-90	4
			91+	5

Table 67: Consequence of Failure criteria: Road Surfaces

Asset Category	Risk Classification	Risk Criteria	Value/Range	Consequence of Failure Score
Sanitary Sewer Mains	Economic (40%)	Replacement Cost	0-$10,000	1
			$10,001 - $250,000	2
			$250,001 - $50,0000	3
			$500,001 - $1,000,000	4
			$1,000,001+	5
	(60%)	Diameter (mm)	0-100	1
			101-150	2
			151-200	3
			201-250	4
			251+	5

Table 68: Consequence of Failure Criteria: Sanitary Sewer Mains

Asset Category	Risk Classification	Risk Criteria	Value/Range	Consequence of Failure Score
Water Mains	Economic (40%)	Replacement Cost	0-$10,000	1
			$10,001 - $250,000	2
			$250,001 - $50,0000	3
			$500,001 - $1,000,000	4
			$1,000,001+	5
	(60%)	Diameter (mm)	0-75	1
			76-100	2
			101-150	3
			151-200	4
			201+	5

Table 69: Consequence of Failure Criteria: Water Mains

Asset Category	Risk Classification	Risk Criteria	Value/Range	Consequence of Failure Score
Stormwater Mains	Economic (40%)	Replacement Cost	0-$10,000	1
			$10,001 - $250,000	2
			$250,001 - $50,0000	3
			$500,001 - $1,000,000	4
			$1,000,001+	5
	(60%)	Diameter (mm)	0-150	1
			151-200	2
			201-300	3
			301-450	4
			451+	5

Table 70: Consequence of Failure Criteria: Stormwater Mains

Asset Category	Risk Classification	Risk Criteria	Value/Range	Consequence of Failure Score
All other Assets	Economic (100%)	Replacement Cost (100%)	0-$10,000	1
			$10,001 - $250,000	2
			$250,001 - $50,0000	3
			$500,001 - $1,000,000	4
			$1,000,001+	5

Table 71: Consequence of Failure Criteria: All Other Assets