Asset Management Plan 2022

TOWNSHIP OF Wilmot

Contents

List of Tables

List of Figures

Executive Summary

This asset management plan (AMP) for the Township of Wilmot is developed in accordance with Ontario Regulation 588/17 (O. Reg 588/17). It includes key elements of an industry-standard and regulation-compliant AMP, including the state of the infrastructure, lifecycle, risk, and levels of service. Although not required through O. Reg, a financial strategy has also been developed to provide a path for the Township to address infrastructure funding gaps over the long term. The scope of this AMP comprises ten service areas:

- Transportation Network
- Water,
- Sanitary,
- Storm,
- Parks and Recreation,
- Buildings and Facilities,
- Fire Services,
- By-Law Services, Development Services, and Corporate Services.

These ten service areas have a total current replacement cost of approximately $534 million. This estimate was derived between 2021 and 2022, using user-defined costing, cost per unit, and inflation of historical or original costs to current date. Worth $224 million, Transportation Network makes up the largest share of the asset portfolio, at 41%.

Condition Data

Based on both assessed condition and age-based analysis, 84% of assets are in fair or better condition, with 68% classified in good or very good condition. Maintaining assets at higher condition levels is typically more cost-effective over the long term than addressing assets needs when they enter the latter stages of their lifecycle or drop to a lower condition rating, e.g., fair or worse. Currently, 16% of assets, with a replacement cost of $85 million, are in poor or worse condition.

This asset management plan relies on assessed condition for 48% of assets, based on replacement cost. For all remaining assets, age was used to approximate their condition. Although a useful metric, age can provide inaccurate approximations of asset condition.

Forecasted Long-term Replacement Needs

Aging assets require maintenance, rehabilitation, and replacement. Between 2022 and 2121, $118 million is needed each decade to remain current with capital replacement needs for the Township's asset portfolio. This expansive time horizon was required to ensure that at least one iteration of replacement was completed for each asset, including those with a service life spanning nearly 100 years.

Capital replacement needs are substantial across the forecasting horizon of 100 years, peaking at $172 million between 2062 and 2071. However, proactive lifecycle management and risk-based project prioritization can extend the life of assets beyond their estimated useful life. In addition to ongoing investment needs, the Township also has an infrastructure backlog of nearly $19 million, comprising assets that remain in service beyond their intended lifespan.

Average Annual Capital Requirements

Each year, investments must be made in infrastructure maintenance, renewal, rehabilitation, and replacement to ensure it remains in good repair. These target investment levels, or average annual capital requirements, are distributed across the asset's lifecycle. The objective is to ensure that when assets reach the end of their useful life, sufficient funding is available to replace them to minimize service disruption. The annual requirements are directly proportional to the value of the infrastructure portfolio and the average useful life of assets contained within it.

Based on a replacement cost of $534 million, Wilmot's average annual requirements total $12.7 million for the ten service areas analyzed in this document. This excludes stormwater ponds which have been historically treated as land assets. Although actual spending will vary yearly, this figure is a helpful benchmark to guide spending levels.

Revenue Sources and Current Funding Levels

With the exception of water and sanitary services funded through utility rates, all other service areas are funded through property taxation. In addition, various government grants from senior government levels also subsidize capital spending. These include the Ontario Community Infrastructure Fund (OCIF) and the Canada-Community Benefit Fund (CCBF, formerly the Federal Gas Tax Fund).

The majority of the $17 million generated through various funding sources, including property taxation, senior government grants, and user fees for water and wastewater, is allocated to operations. From property taxes, capital expenditures for tax-funded categories totalled $1.5 million in 2021, with a further $336k allocated to dedicated reserves; $1.2 million were allocated to reserves for future capital spending for water and wastewater assets. Senior government funding comprised 53% of the funding allocated to tax-funded service areas.

On average, tax-funded categories are funded at 31% of their annual capital requirements; water and sanitary services are funded at 53%. This creates a total annual funding deficit of $8.1 million. Eliminating these annual infrastructure funding shortfalls is a challenging endeavour for municipalities. Substantial investments have been made over decades, and constituents quickly become accustomed to service levels. The Township's current funding position will require many years to reach full funding.

Closing Infrastructure Deficits

Based on data from 2021, to achieve full funding for tax-funded assets and meet 100% of annual requirements, current property tax revenues would need to increase by 11.8% per year over a phase-in period of five years. If the full-funding phase-in period is extended over 20 years, tax revenues would need to increase by 2.8% annually. Similarly, to fund 75% of annual funding needs, a yearly tax rate change of 8.1% would be required for a phase-in period of five years, or 2.0% annually for 20 years. Required tax increases are also outlined for a 10-year and 15-year phase-in period.

Similarly, analysis is also provided for the water and wastewater network. To achieve full funding, water and sanitary rate revenues would need to increase by 3.9% and 2.6% per year, respectively, over a 5-year phase-in period. A 20-year phase-in period for full funding lowers annual rate increases to 1.0% and 0.9%, respectively. Rate increases can be further reduced if funding targets are lowered to 75% of annual requirements

Reducing desired or targeted funding levels below 100% of annual requirements lowers the annual deficit and the resultant financial impact on residents. However, this approach may also decrease Wilmot's financial capacity to maintain its infrastructure in a state of good repair and may generate undesirable long-term consequences, including:

- reduced asset performance and increased rate of asset failures;
- continuation of the 'worst-first' or reactive approach to infrastructure management and project selection;
- reduced customer service levels and increases in citizen complaints;
- potential reputational damage;
- increased risk to public health and safety;
- project deferrals or cancellations, leading to further accumulation of existing infrastructure backlogs

It is recommended that the Township review the feasibility of pursuing full funding for each service area to gradually meet 100% of their respective annual requirements. Under this scenario:

- A 20-year phase-in period is recommended for tax-funded assets, requiring a 2.8% annual tax increase.
- A 10-year phase-in period is recommended for water services, requiring a rate increase of 1.9% annually.
- For wastewater services, a 10-year phase-in period is recommended, requiring a rate increase of 1.3% annually.

Growth and the Use of Debt

Currently, no outstanding debt is associated with the assets analyzed in this asset management. In addition, the funding scenarios outlined in this plan avoid the use of debt.

However, the Township is experiencing rapid growth. By 2031, the population is expected to increase by 30%, from 22,000 residents today to 28,500 within the next decade. This will impose additional stress and demand on infrastructure programs and staff resources, increasing lifecycle costs and accelerating replacement cycles.

As a result, the Township will begin using debt financing in 2022 to continue growing the community and providing quality of life to residents and businesses. Over the next ten years, debentures totalling $13.4 million will be used to finance investments in transportation services ($2.1 million), fire ($4.4 million), and recreation services ($6.9 million).

Effective use of debt may also distribute the burden of infrastructure funding more equitably across multiple generations of Wilmot residents. A Debt Management Strategy has been identified as a strategic initiative for 2022 as part of Wilmot's commitment to responsible governance.

Key Considerations

The Township's current fiscal capacity is not at a sustainable level to meet capital, operations, and maintenance of existing assets. In addition, anticipated population growth will place substantial demand on infrastructure assets, increase lifecycle costs, and accelerate asset replacement cycles. Although growth components of new asset construction or acquisition may be funded through development charges, the ongoing maintenance and eventual replacement of these assets will require additional, sustainable funding to maintain acceptable levels of service.

Using levels of service and risk frameworks developed for the Township as part of this engagement will be essential in prioritizing capital spending and monitoring performance against community expectations and the Township's fiscal capacity. These frameworks should be continuously updated as new information and technical data are obtained.

Finally, the Township's dedicated infrastructure levy is critical to long-term infrastructure sustainability. It places the municipality amongst a small group of local governments proactively addressing persistent infrastructure deficits.

About this document

Township of Wilmot Staff, along with PSD Citywide Inc, created this asset management plan (AMP) in accordance with Ontario Regulation 588/17 (“O. Reg 588/17”). It contains a comprehensive analysis of Wilmot’s infrastructure assets and includes the following sections:

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

The AMP comprises of ten Service Areas, presents the outcomes of the municipality’s asset management program and identifies the resource requirements needed to achieve a defined level of service. It is a living document Township Staff will update every five years as additional assets and financial data become 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.

This asset management plan was prepared with assistance from the Government of Canada and the Federation of Canadian Municipalities. Notwithstanding this support, the views expressed are the authors' personal views, and the Federation of Canadian Municipalities and the Government of Canada accept no responsibility for them.

Introduction & Context

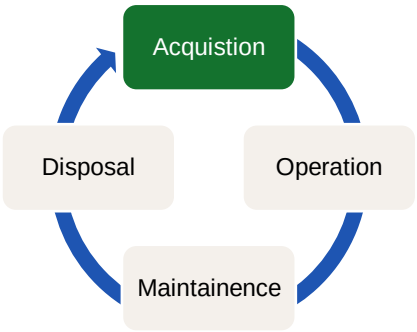
An Overview of Asset Management

Asset management can be best defined as an integrated business approach within an organization to minimize the lifecycle costs of owning, operating, and maintaining assets at an acceptable level of risk while continuously delivering established levels of service for present and future customers. It includes planning, designing, constructing, operating, and maintaining infrastructure used to provide services.

Municipalities are responsible for managing and maintaining a broad portfolio of infrastructure assets to deliver services to the community. Asset management aims to minimize the lifecycle costs of providing infrastructure services and manage the associated risks while maximizing the value and levels of service 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. Lifecycle costs can span decades, requiring planning and foresight to ensure financial responsibility is spread equitably across generations.

Figure 1 Typical Asset Lifecycle



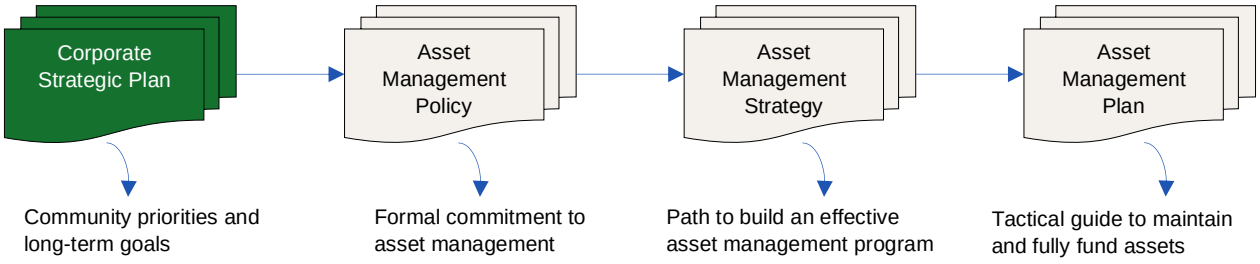
Infrastructure needs can be prioritized over time by implementing asset management processes while ensuring timely investments to minimize repair and rehabilitation costs and maintain municipal assets. An asset management plan is critical to this planning and an essential element of the broader asset management program.

Wilmot's Asset Management Program

The Township of Wilmot's asset management program aims to improve and sustain asset management practices. Overall, the goal of the asset management program is to help the Township maintain its assets at appropriate levels of service by applying the right intervention, to the right asset, at the right time.

The industry-standard approach and sequence to developing a practical asset management program begin with creating a Strategic Plan, then an Asset Management Policy and an Asset Management Strategy, concluding with an Asset Management Plan. In addition, the Township's asset management program includes various community planning policies, documents, and master plans.

Figure 2 Industry Standard Approach to Asset Management



The Strategic Plan

The Township of Wilmot updated its Strategic plan in 2020 to guide decision-making at the corporate level. Created through extensive consultation efforts with the community, the Strategic Plan represents the desired direction and priorities of the Township's residents. The Township's Strategic Plan list numerous strategic actions aligned with the principles of effective asset management. This further solidifies the community's commitment to asset management capacity building and infrastructure investments.

Asset Management Policy

An asset management policy represents a statement of the principles guiding the municipality's approach to asset management activities. It aligns with the organizational strategic plan and provides clear direction to municipal staff on their roles and responsibilities as part of the asset management program. All municipalities were required to develop and adopt an asset management policy in 2019 in compliance with O. Reg 588/17.

Wilmot Council endorsed the Strategic Asset Management Policy on September 18, 2018.

Asset Management Strategy

An asset management strategy is typically a higher-level document focusing on business processes and organizational practices. It is a roadmap that includes key initiatives with recommended timelines that lead to a higher state of asset management maturity. It is intended to convert the asset management policy from a set of formal, standardized, but philosophical commitments into specific actions.

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

Asset Management Plan

The asset management plan (AMP) is often a key output within the strategy. The AMP focuses on the current state of the municipality's asset portfolio and its approach to managing and funding individual service areas or asset groups. It is tactical and provides a snapshot in time.

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

The AMP is a living document that will be updated regularly as additional assets and financial data become 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.

Ontario Regulation 588/17

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

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

Table 1 Ontario Regulation 588/17 Requirements and Reporting Deadlines

Requirement	2019	2022	2024	2025
Asset Management Policy	●		●	
Asset Management Plans		●	●	●
State of infrastructure for core assets		●		
State of infrastructure for all assets			●	●
Current levels of service for core assets		●		
Current levels of service for all assets			●	
Proposed levels of service for all assets				●
Lifecycle costs associated with current levels of service		●	●	
Lifecycle costs associated with proposed levels of service				●
Growth impacts		●	●	●
Financial strategy				●

Key Concepts in Asset Management

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

Lifecycle Management Strategies

The condition or performance of most assets will deteriorate over time. This process is affected by various factors, beginning with the quality of its design, materials used, construction, location, utilization, maintenance programs, and environment. As a result, asset deterioration negatively affects an asset's ability to fulfill its intended function and may be characterized by increased cost, risk and even service disruption.

To ensure that municipal assets perform as expected and meet customers' needs, it is essential to establish a lifecycle management strategy to proactively manage asset deterioration. This strategy can extend the asset's life before its eventual replacement or reconstruction. Depending on initial lifecycle management strategies, asset performance can be sustained through a combination of maintenance and rehabilitation, but at some point, replacement is required. Understanding what effect these activities will have on the lifecycle of an asset and their cost will enable staff to make better recommendations.

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

Table 2 provides a high-level description of different activities required across the lifespan of the assets, the general difference in cost among them, and typical risks associated with each type.

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

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

Table 2 Lifecycle Management: Typical Lifecycle Interventions

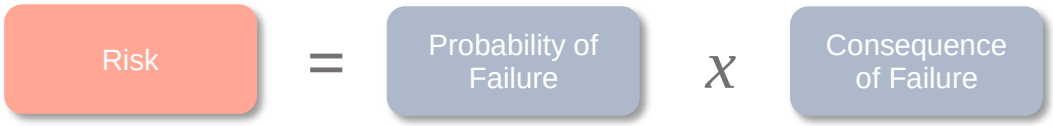
Lifecycle Activity	Description	Cost	Typical Associated Risks
Maintenance	Activities that prevent defects or deteriorations from occurring	$	• Balancing limited resources between planned maintenance and reactive, emergency repairs and interventions; • Diminishing returns associated with excessive maintenance activities, despite added costs; • The 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	$$$$	• Useful life may not be extended as expected • It may be costlier in the long run when assessed against full reconstruction or replacement; • Loss or disruption of service, particularly for underground assets
Replacement/ Reconstruction	Asset end-of-life activities that often involve the complete replacement of assets	$$$$$$	• Incorrect or unsafe disposal of existing assets; • Costs associated with asset retirement obligations; • Substantial exposure to high inflation and cost overruns • Replacements may not meet the capacity needs of a larger population • Loss or disruption of service, particularly for underground assets

Risk and Criticality

In 2021, the Township developed its first comprehensive risk framework. This framework will allow staff to build quantitative models that are integrated with the Township's asset register and can assist in prioritizing projects and better allocating limited funds within the long-term capital forecast.

Risk is a product of two variables: the probability that an asset will fail and the resulting consequences of that failure event. It can be a qualitative measurement (low, medium, high. It can also be a quantitative measurement (1-5); 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 3 Risk Equation



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, including Wilmot Township. Each factor can be weighted from 0-100% depending on how well they capture and explain an asset's likelihood of failure. For example, field condition data is a better indicator of an asset's probability of failure than age and may receive a higher weighting.

Consequence of Failure

Estimating criticality also requires identifying the types of consequences 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 costs but may pose a limited risk to the community. Other assets may have a relatively minor financial value, but downtime may pose significant health and safety hazards to the community. Like the probability of failure, each consequence is weighted from 0-100%.

Table 3 illustrates the various consequences that can be integrated into developing risk and criticality models for each asset category and segment. This list of consequences is typical but not exhaustive.

Table 3 Risk Analysis: Types of Consequences of Failure

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 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.

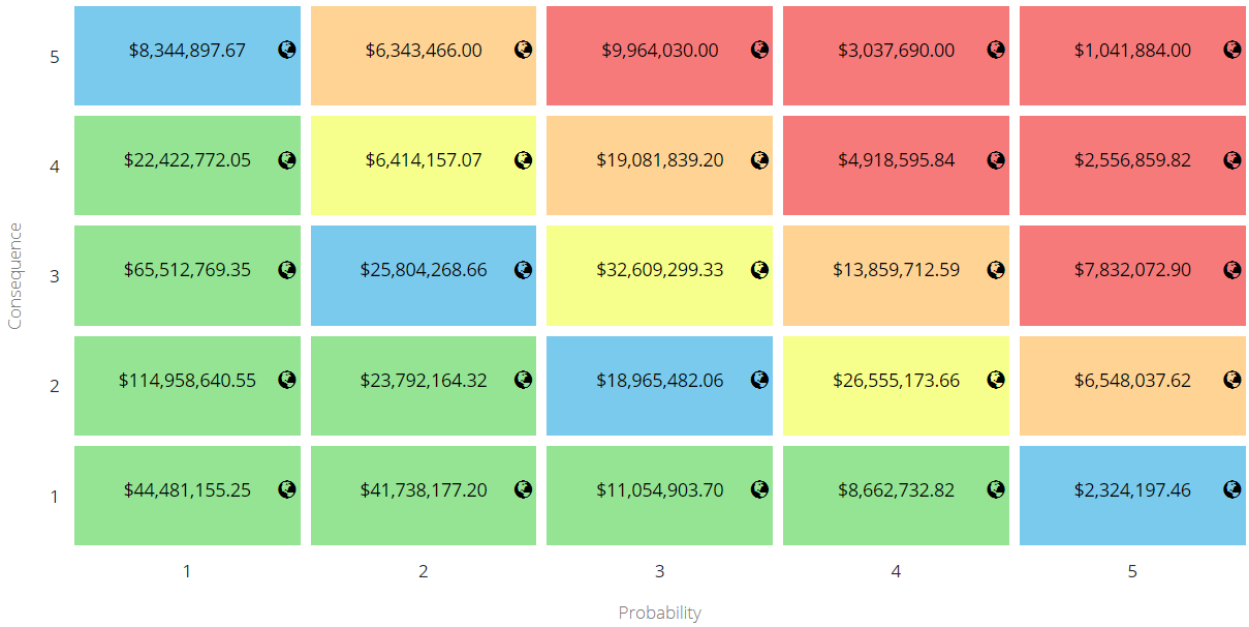
This AMP includes a high-level evaluation of asset risk and criticality. Each asset has been assigned a probability of failure score (1-5) and consequence of failure score (1-5) based on available asset data. The risk equation produces an asset risk rating ranging from 1 to 25. Assets with the highest criticality and likelihood of failure receive a risk rating of 25; those with the lowest probability of failure and lowest criticality carry a risk rating of 1. These risk scores prioritize critical asset maintenance, rehabilitation, and replacement strategies. The risk rating of individual assets is also used to develop risk matrices.

The strength of asset risk and criticality analysis hinges on the depth and breadth of attribute data. As new data and information is gathered, the Township may consider integrating relevant information that improves confidence in the criteria used to estimate and establish an asset's probability and consequence of failure.

Risk Matrix

Figure 4 shows how assets across the different service areas are distributed within a risk matrix. In addition, technical workshops were held with subject matter experts at the Township to identify factors and attributes that can aid in estimating the probability of asset failure and in identifying and quantifying the various consequences of a failure, including financial, environmental, and operational.

Figure 4 Risk Matrix: All Assets



The analysis shows that based on current risk models, approximately 5% of the Township's assets, with a current replacement cost of $29 million, carry a risk rating of 15 or higher (red) out of 25. Assets in this group have a high probability of failure based on available condition data and age-based estimates and were deemed most essential to the Township.

As new asset 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. Therefore, staff should also continue to calibrate risk models.

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 highly critical to the Township based on their costs, economic importance, social significance, and other factors. See Appendix 3: Risk Frameworks for details on how risk ratings were assigned to all asset groups.

Levels of Service

A level of service (LOS) measures 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. For core assets, only those LOS required under O. Reg 588/17 are tracked at this stage.

In 2021, the Township developed a comprehensive level of service framework that identified essential KPIs beyond O. Reg 588/17 requirements that staff will use to track the progress of infrastructure programs. This framework will be populated with data and used to monitor the performance of all service areas. For reference, these KPIs are included in this AMP and can be found in Appendix 2: Levels of Service Framework.

Community Levels of Service

Community levels of service are a simple, plain language description or measure of the service that the community receives. For core asset categories (Roads, Bridges & Culverts, Water, Wastewater, and Stormwater), the province, through O. Reg. 588/17, has provided qualitative descriptions that are required to be included in this AMP.

Technical Levels of Service

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

For core asset categories (Roads, Bridges & Culverts, Water, Wastewater, and Stormwater), the province, through O. Reg. 588/17, has provided technical metrics that are required to be included in this AMP.

Current and Proposed Levels of Service

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

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

Once proposed levels of service have been established, and prior to July 2025, the Township must identify a lifecycle management and financial strategy which allows these targets to be achieved.

Asset Condition

An incomplete or limited understanding of asset condition can misinform 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.

Role of Asset Condition Data

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

In addition to optimizing lifecycle management strategies, asset condition data impacts the Township's risk management and financial strategy. For example, assessed condition is a critical variable in determining an asset's probability of failure. With a strong understanding of the probability of failure across the entire asset portfolio, the Township can develop strategies to mitigate both the probability and consequences of asset failure and service disruption. Furthermore, with condition-based determinations of future capital expenditures, the Township can build long-term financial strategies with higher accuracy and reliability.

Asset Rating Scale

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.

Table 4 Standard Condition Rating Scale

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 the end of service life, condition below standard, a large portion of the system exhibits significant deterioration	20-40
Very Poor	Unfit for sustained service	Near or beyond expected service life, widespread signs of advanced deterioration, some assets may be unusable	0-20

The analysis in this AMP is based on assessed condition data only as available. In the absence of assessed condition data, asset age is used as a proxy to determine asset condition.

Age Profile

An asset's age profile comprises two key values:

- estimated useful life (EUL), or design life
- 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 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.

Reinvestment Rate

As assets age and deteriorate, they require additional investment to maintain a state of good repair. Therefore, the reinvestment of capital funds, through asset renewal or replacement, is necessary to sustain an adequate level of service—the reinvestment rate measures 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:

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

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

Financial Strategy

Infrastructure is expensive to build and even more costly to maintain in a state of good repair. Wilmot's infrastructure portfolio has a total current replacement cost of nearly $534 million. These assets require ongoing and periodic maintenance, repairs, rehabilitation, and eventual replacement. Unfortunately, most municipalities across Canada are unable to meet these annual needs and face annual infrastructure funding shortages or deficits. Over time, these annual deficits accumulate and create infrastructure backlogs.

Each year, this backlog grows, and the quality of infrastructure degrades as projects are deferred due to funding constraints. Infrastructure disrepair can restrict economic activity, jeopardize public safety, lower residents' quality of life, and expose organizations to financial risk. The condition of a community's infrastructure can also create political and reputational damage.

Most local governments have limited options to raise additional funds for infrastructure, relying primarily on tax levies, debt, and user fees. Rural and small municipalities are less attractive for public-private partnerships (P3s) that can leverage private sector funds to deliver major projects. This makes senior government support critical, whether through matching formulas for major capital projects or grants and subsidies that can create additional capital for municipalities.

Given the level of investment required, it will take many years or decades for municipalities to reach fiscal sustainability. This section analyzes the Township of Wilmot's current fiscal framework for supporting its infrastructure portfolio. It includes a financial strategy to close identified annual funding gaps associated with capital spending, including maintenance, rehabilitation, and replacements.

Limitations and Constraints

This AMP required substantial effort by staff. It was developed based on best-available data and was subject to the following limitations, constraints, and assumptions.

- Although the Township's asset datasets have improved over the last year, some gaps still persist, including incomplete condition data. Some asset categories may also require an inventory review to ensure all assets are captured in the register and properly componentized when needed.
- In the absence of condition assessment data, age was used to estimate asset condition ratings. This approach can result in an over- or understatement of asset needs. See Role of Asset Condition Data for further discussion.
- The risk models are designed to support objective project prioritization and selection. However, in addition to the inherent limitations that all models face, they also require the availability of important asset attribute data to ensure that asset risk ratings are valid and assets are appropriately classified within the risk matrix. Missing attribute data can misclassify assets.

These limitations directly impact most of the analysis presented in this AMP, including condition summaries, age profiles, long-term replacement and rehabilitation forecasts, and shorter-term, 10-year forecasts generated from Citywide™, the Township's primary asset management system. In addition, discrepancies between datasets can create inconsistencies between system-generated projections and those developed by staff through first-hand knowledge and assessment of assets.

These challenges are common among municipalities and require a long-term commitment and sustained effort by staff. As Wilmot's asset management program evolves and advances, the quality of future AMPs and other core documents that support asset management will continue to improve.

Portfolio Overview

The ten service areas analyzed in this asset management plan have a total current replacement cost of approximately $534 million. This estimate was derived between 2021 and 2022, using user-defined costing, cost per unit, and inflation of historical or original costs to current date.

Using inflation to estimate replacement costs can produce inaccurate valuations of assets. As a result, this approach is typically used in the absence of more realistic data acquired through recently completed projects or acquired assets. Further, fluctuations in material and labour costs will also influence asset replacement costs.

Replacement Cost of Asset Portfolio

Figure 5 illustrates the total replacement cost of each service area; at 41% of the entire portfolio, Transportation Network is the largest service area by asset valuation. Figure 6 shows replacement costs for each asset type within each service area.

Figure 5 Current Replacement Cost by Service Area

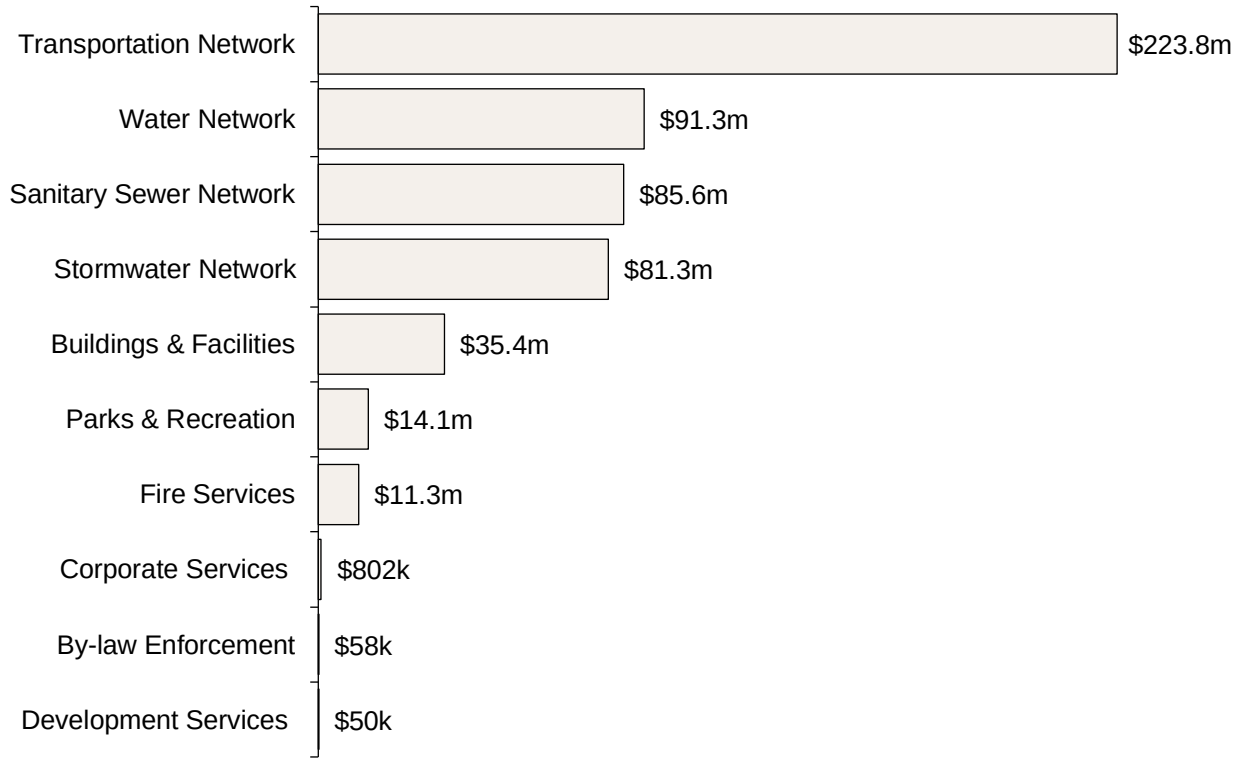
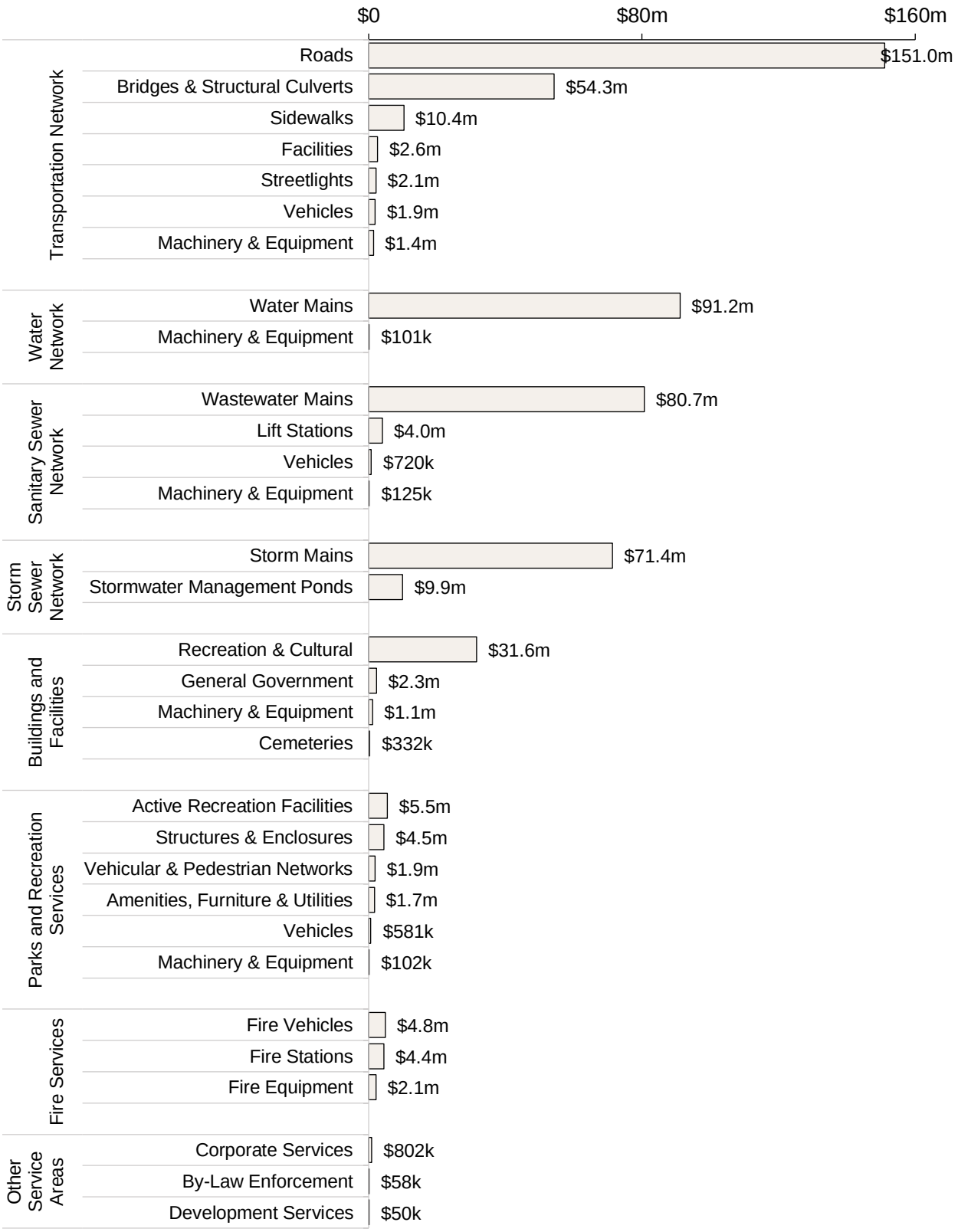


Figure 6 Current Replacement Cost by Asset Type



Age Profile

An asset's age profile comprises two key values: estimated useful life (EUL), or design life, and its current age. 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 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.

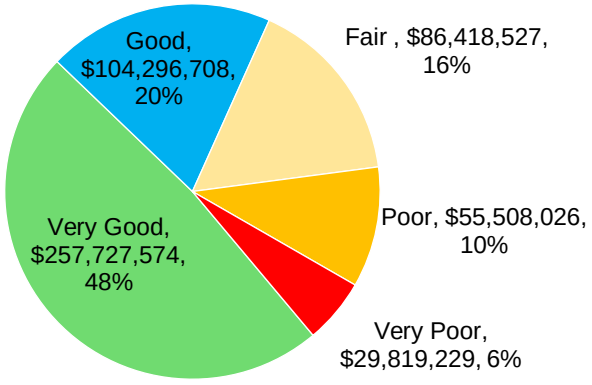
Each asset's estimated useful life should be reviewed periodically to determine whether adjustments are needed to better align with each asset type's observed length of service life.

Condition of Asset Portfolio

The current condition of the Township's assets is central to effective asset management planning. Based on both assessed condition and age-based analysis, 84% of assets are in fair or better condition, with 68% of these classified in good or very good condition. Maintaining assets at higher condition levels is typically more cost-effective over the long term than addressing assets needs when they enter the latter stages of their lifecycle or drop to a lower condition rating, e.g., fair or worse.

Currently, 16% of assets, with a replacement cost of $85 million, are in poor or worse condition. Many of these assets did not have in-field condition assessments available. As a result, their age was used to approximate their condition. Although a useful metric, age can provide inaccurate approximations of asset condition. See Table 5 for details on the source of asset condition used for all assets in this AMP.

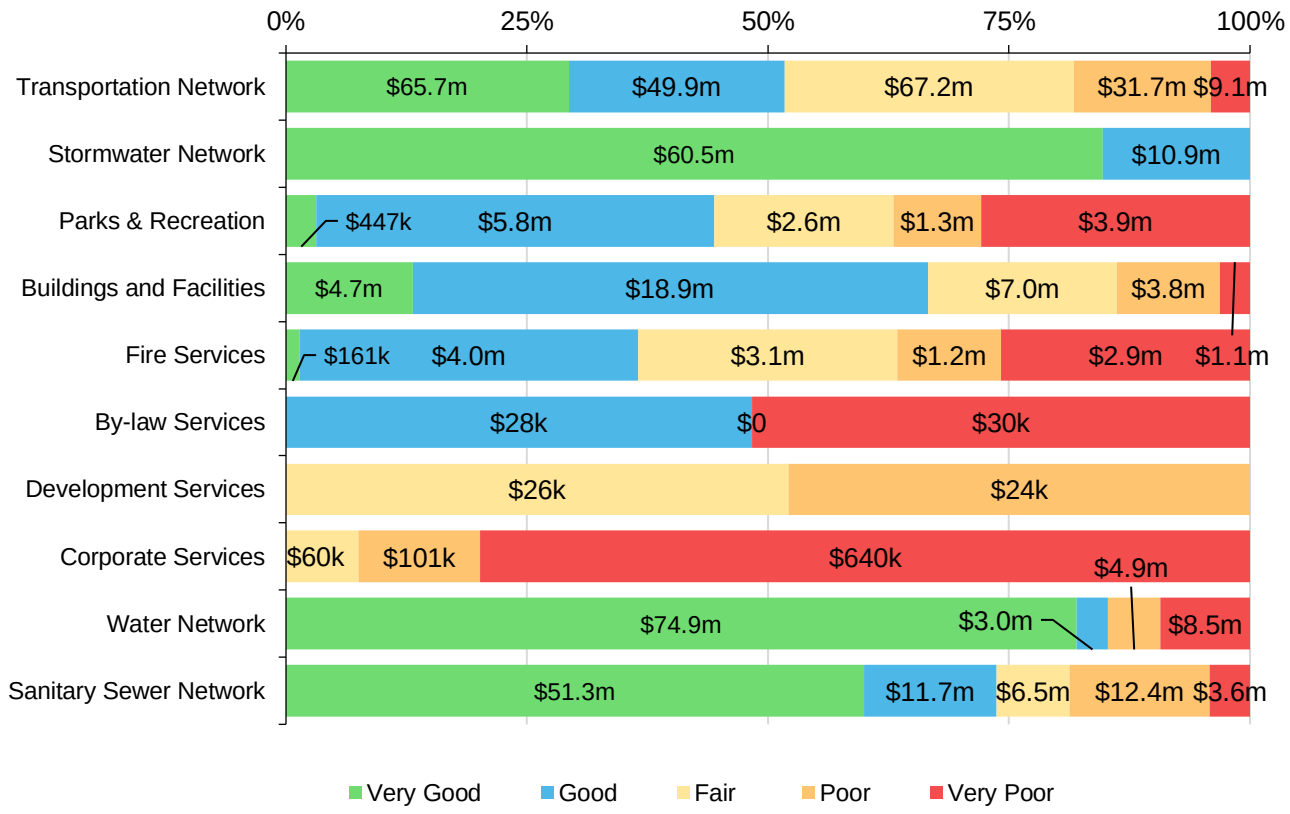
Figure 7 Asset Condition – Portfolio



Based on actual condition assessments, the majority of the Township's transportation assets are in fair or better condition. However, no condition data was available for other critical infrastructure, such as storm, sanitary, and water infrastructure, requiring the use of age for estimating asset conditions.

Although age suggests that the majority of these assets are in fair or better condition, it is likely that some of these assets, particularly stormwater, will require interventions (e.g., rehabilitation or replacements) in the immediate and short terms. CCTV inspections of underground assets will help identify actual asset condition ratings.

Figure 8 Asset Condition – By Service Area



Source of Condition Data

This asset management plan relies on assessed condition for 48% of assets, based on replacement cost. For the remaining assets, aged is used as an approximation of condition. Assessed condition data is invaluable in asset management planning as it reflects the actual condition of the asset and its ability to perform its functions. The table below identifies the source of condition data used throughout this AMP.

Table 5 Source of Condition Data

Service Area	Segment	% of Assets with Assessed Condition	Source of Condition
Transportation Network	Roads	100%	2018 Roads Needs Study
	Sidewalks	100%	2020 Sidewalk Inspections
	Streetlights	0%	Age-based data only
	Bridges & Culverts	100%	2019/2020/2021 OSIM Inspections
	Facilities	100%	2020 Englobe BCA
	Vehicles	0%	Age-based data only
	Machinery & Equipment	0%	Age-based data only
Water Network	Water Mains	0%	Age-based data only
	Machinery & Equipment	0%	Age-based data only
Sanitary Sewer Network	Sanitary Mains	0%	Age-based data only
	Lift Stations	0%	Age-based data only
	Vehicles	0%	Age-based data only
	Machinery & Equipment	0%	Age-based data only
Storm Sewer Network	Storm Mains	0%	Age-based data only
	Storm Water Management Facilities	0%	Age-based data only
Buildings and Facilities	Recreation & Cultural Facilities	100%	2020 Englobe BCA
	General Government	100%	2020 Englobe BCA
	Cemetery	100%	2020 Englobe BCA
	Machinery & Equipment	0%	Age-based data only
Parks and Recreation	Active Recreation Facilities	21%	2020 Englobe BCA
	Structures & Enclosures	80%	2020 Englobe BCA
	Vehicular & Pedestrian Networks	0%	Age-based data only
	Amenities, Furniture & Utilities	0%	Age-based data only
	Machinery & Equipment	0%	Age-based data only
	Vehicles	0%	Age-based data only
Fire Services	Fire Stations	100%	2020 Englobe BCA
	Fire Vehicles	0%	Age-based data only
	Fire Equipment	0%	Age-based data only
Other Service Areas	By-Law Vehicles	0%	Age-based data only
	Development Service Vehicles	0%	Age-based data only
	Corporate Service IT Equipment	0%	Age-based data only
All Assets		**48%**	

Long-term Forecasted Capital Requirements

Each year, capital investments must be made in infrastructure maintenance, renewal, rehabilitation, and replacement to ensure it remains in a state of good repair. These target investment levels, or average annual capital requirements, are distributed across the asset's lifecycle. Although actual capital spending will fluctuate yearly, the average requirements offer a valuable benchmark for estimating long-term needs.

Average Annual Capital Requirements

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

The objective is to ensure that when assets reach the end of their useful life, sufficient funding is available to replace them to minimize service disruption. The annual requirements are directly proportional to the value of the infrastructure portfolio and the average useful life of assets contained within it.

Table 51 outlines current annual capital requirements by service area. Based on a replacement cost of $534 million, Wilmot's annual requirements total approximately $12.7 million for the ten service areas analyzed in this document. This excludes stormwater ponds which are treated as land assets. The table also illustrates the equivalent reinvestment rate (ERR), calculated by dividing the annual capital requirements by the total replacement cost of each service area. There is no industry standard guide on optimal annual investment in infrastructure, so the ERR provides a target for organizations.

Table 6 Average Annual Capital Requirements

Service Area	Replacement Cost	Annual Capital Requirements	Equivalent Reinvestment Rate
Transportation Network	$223,750,997	$6,759,382	3.0%
Stormwater Network	$71,403,722[1]	$885,999	1.2%
Parks & Recreation	$14,107,576	$547,529	3.9%
Buildings & Facilities	$35,521,481	$1,097,307	3.1%
Fire Services	$11,341,463	$756,773	6.7%
By-law Services	$57,934	$5,793	10.0%
Development Services	$50,285	$5,029	10.0%
Corporate Services	$801,504	$160,301	20.0%
Water Network	$91,280,518	$1,265,326	1.4%
Sanitary Sewer Network	$85,562,874	$1,177,447	1.4%
Total	**$533,773,064**	**$12,660,886**	**2.4%**

[1] Excludes stormwater management ponds, with a current replacement cost of $9.9 million.

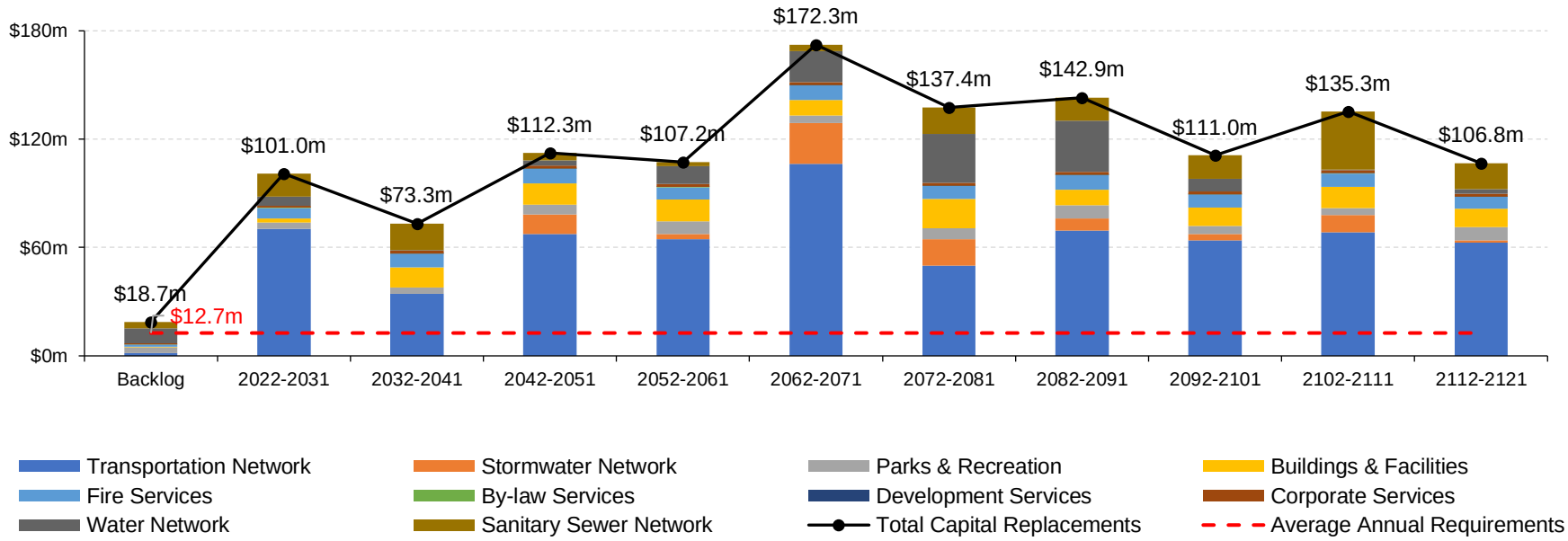
Forecasted Long-term Capital Replacement Needs

Aging assets require maintenance, rehabilitation, and replacement. Figure 9 below illustrates the cyclical short-, medium- and long-term infrastructure replacement requirements for all service areas, based on available asset data. This graph includes at least one iteration of replacement for the longest-lived asset within each asset class, requiring the analysis to extend to 2121 to reflect lengthy timespans for mains. Assets with shorter lifespans may undergo multiple replacement cycles over the coming decades.

On average, $118 million is required each decade to remain current with capital needs for the Township's asset portfolio; on an annual basis, an average of $12.7 million is needed. Although requirements are substantial across the forecasting horizon of 100 years, peaking at $172 million between 2062 and 2071, proactive lifecycle management and risk-based project prioritization will extend the serviceability of assets beyond their estimated useful life. The figure also illustrates an infrastructure backlog of approximately $19 million, comprising assets that remain in service beyond their intended lifespan.

This analysis is presented only for existing assets managed in Wilmot's asset register. These projections will change as the Township's asset portfolio evolves. Continuous upkeep of the asset inventory will ensure forecasts are accurate and reliable.

Figure 9 Long Term Capital Replacement Needs - 2022-2121



Target vs. Actual Reinvestment Rate

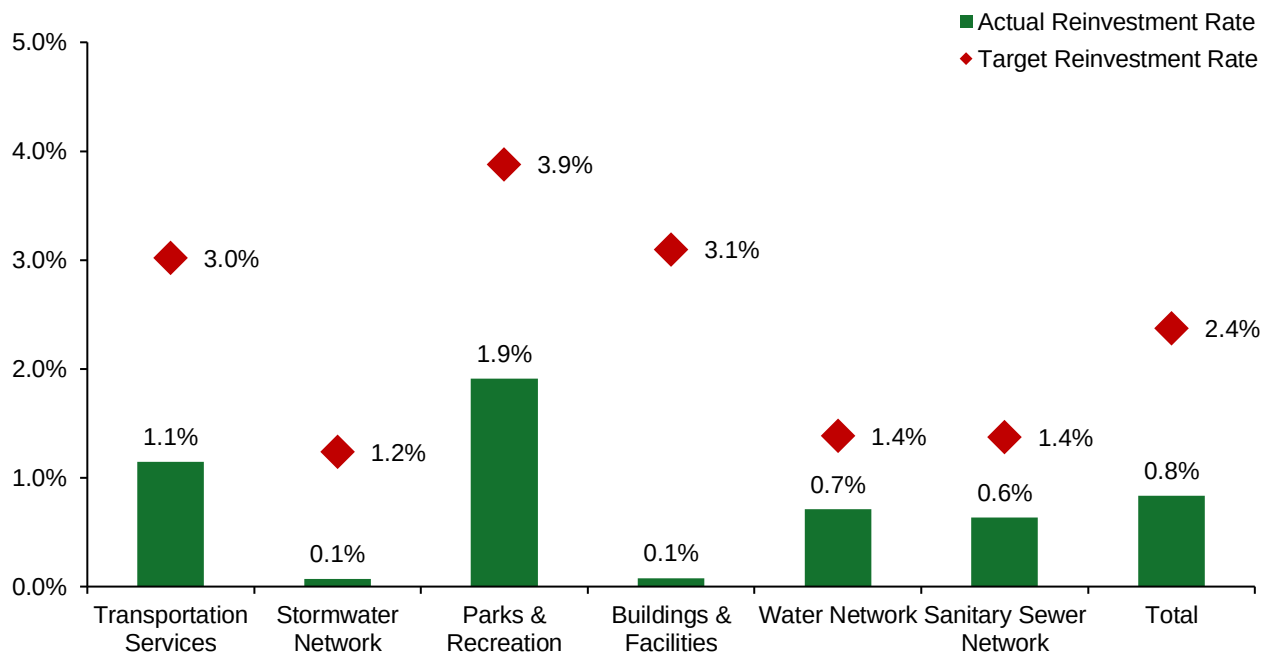
The graph below depicts funding gaps or surpluses by comparing target vs actual reinvestment rates for each service area. To meet the long-term replacement needs, the Township should allocate approximately $12.7 million annually for a target reinvestment rate of 2.4% of the total current replacement value of its infrastructure portfolio.

Actual annual spending on infrastructure totals approximately $4.5 million, for an actual reinvestment rate of 0.8%. As illustrated below, the average annual funding for each service area is below its target reinvestment rate.

The average annual funding available comprises only ‘permanent and predictable’ sources. In addition to Wilmot’s own-source revenue streams, such as property tax and utility rates, other funding sources include the federal gas tax fund and the Canada Community Benefits Fund (CCBF). Although one-time grants and capital injections from senior government programs are essential for meeting project-specific requirements, these are excluded from the analysis.

Machinery and equipment assets typically have very high target reinvestment rates given their relatively short lifespans and have been excluded from the analysis to prevent distortion of data.

Figure 10 Target vs. Actual Reinvestment Rates



State of the Infrastructure

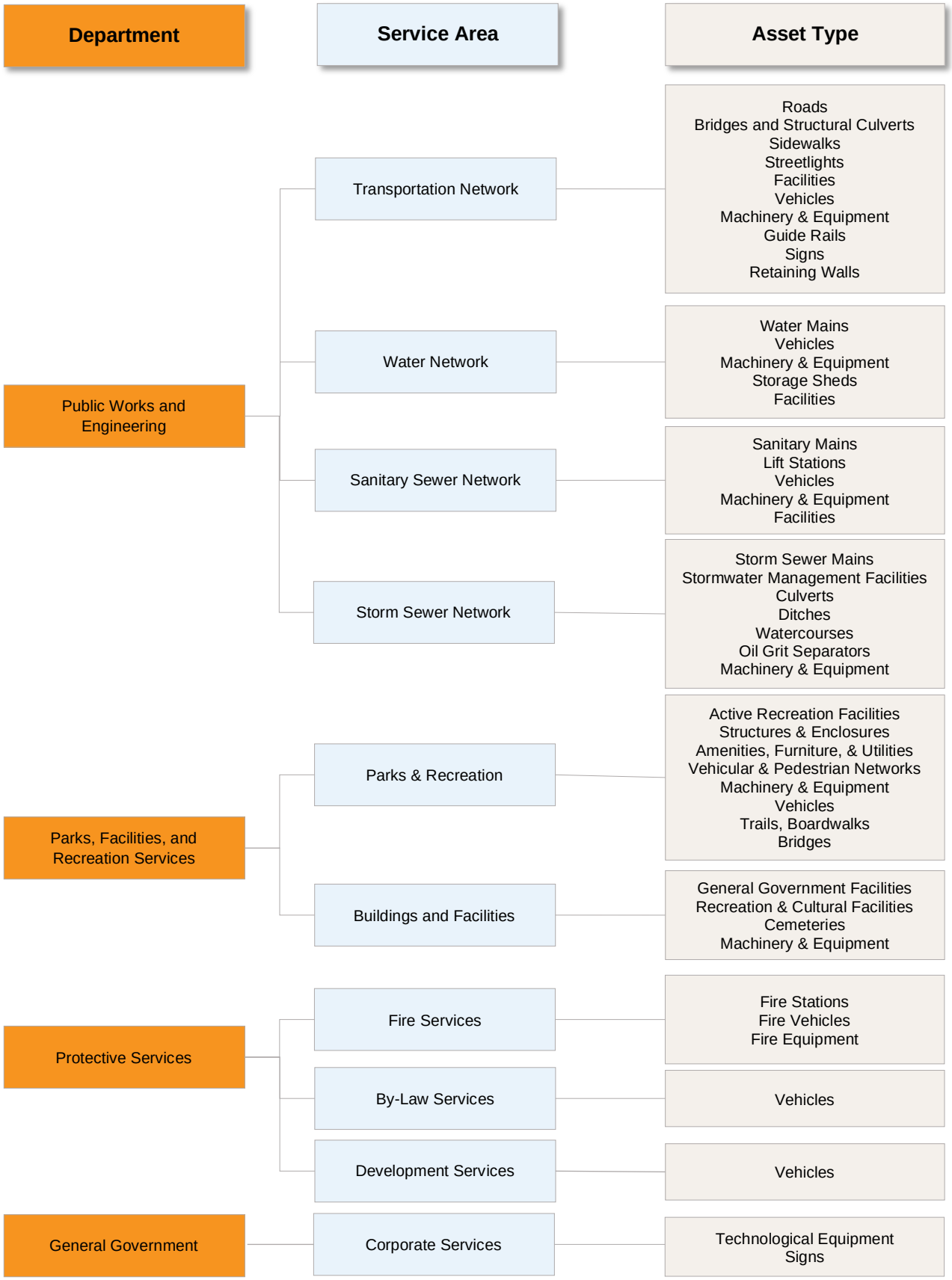
The State of the Infrastructure (SOTI) summarizes the inventory, condition, age profiles, and other key performance indicators for the Township's infrastructure portfolio. These details are presented for ten Service Areas. Figure 11 illustrates how assets are classified within the Township's organizational structure.

Asset Hierarchy and Data Classification

Asset hierarchy explains the relationship between individual assets and their components, a broader, more expansive network and system, and the organizational structure. How assets are grouped in a hierarchy can impact how data is interpreted.

Assets were structured to support meaningful, efficient reporting and analysis. For most service areas, key details are summarized at the third hierarchy level, namely ' Asset Type.' However, for facilities and vehicles, further granularity is included. Facility data is presented at Level 1 of the Uniformat II Code classification system; vehicle type is indicated as either Heavy, Medium, or Light Duty.

Figure 11 Asset Hierarchy and Data Classification



Transportation Network

The Township of Wilmot's Transportation Network is a critical component in providing safe and efficient movement of people and goods. It includes all municipally owned and maintained roadways, bridges and culverts, sidewalks, streetlights/poles and facilities. In addition, vehicles, machinery, and equipment assets are used to support operations.

The roads department is responsible for constructing and maintaining all Township roads. Other administrative responsibilities include the preservation, maintenance and rehabilitation of municipal roads, bridges/culverts, sidewalks, signage, and winter control (roads) and maintenance and repair of vehicles, machinery and equipment.

Inventory and Valuation

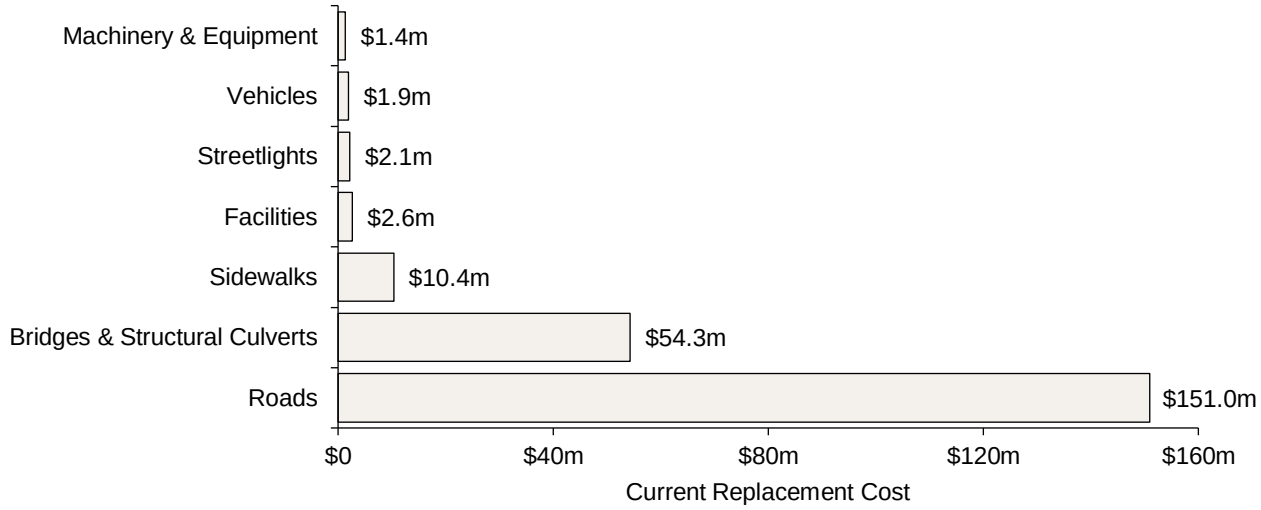
The Township of Wilmot's Transportation Network comprises the largest share of its infrastructure portfolio, with a current replacement cost of nearly $224 million. Roads make up 68% of the total current replacement cost, followed by bridges and structural culverts (>3m). Table 7 summarizes the quantity and current replacement cost of major transportation assets.

Gravel roads are typically not replaced but maintained on a perpetual basis. Alternatively, they may be upgraded or converted to either tar and chip or asphalt to provide higher service levels and meet evolving community needs.

Table 7 Detailed Asset Inventory - Transportation Network

Asset	Quantity	Replacement Cost
Roads	277km	$150,983,908
Asphalt Rural	62km	$39,005,166
Asphalt Urban	71km	$67,111,727
Tar & Chip	122km	$44,867,015
Gravel	22km	Not Planned for Replacement
Sidewalks	90km	$10,354,753
Streetlights & Poles	1,598	$2,141,439
Bridges & Structural Culverts	40	$54,342,560
Facilities	3	$2,615,200
Vehicles	12	$1,927,004
Heavy-Duty Vehicles	9	$1,724,604
Light-Duty Vehicles	4	$157,671
Medium-Duty Vehicles	2	$135,117
Machinery & Equipment	20	$1,386,133
Total		**$223,750,997**

Figure 12 Portfolio Valuation - Transportation Network



Asset Condition

Table 8 outlines each segment's average condition rating and the asset condition source. Only age was used to approximate their condition for segments that do not have a condition assessment available. For example, condition data for major transportation assets, including roads and bridges, was based on in-field inspections; for others, such as machinery, equipment, and vehicles, age was used to approximate condition.

Table 8 Average Condition and Source of Condition Data

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Asphalt Rural	65%	Good	2018 Roads Needs Study
Asphalt Urban	67%	Good	2018 Roads Needs Study
Tar & Chip	65%	Good	2018 Roads Needs Study
Gravel	70%	Good	2018 Roads Needs Study
Sidewalks	88%	Very Good	2020 Sidewalk Inspections
Streetlights & Poles	66%	Good	Age-based only
Bridges & Culverts	67%	Good	OSIM Inspection 2019
Facilities	37%	Fair	2020 Building Condition Assessments
Machinery & Equipment	25%	Poor	Age-based only
Fleet	33%	Poor	Age-based only
Overall Average	58%	Fair	70% Condition Based

Figure 13 summarizes the replacement cost-weighted overall condition of the Township's transportation assets. Based on a combination of condition assessments and age data, 82% of assets are in fair or better condition. However, the remaining 18% are in poor or worse condition—concentrated primarily in machinery and equipment assets. These assets did not have condition data available, so age was used to estimate their condition.

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 14 details the condition of each asset segment.

Figure 13 Asset Condition - Transportation Network: Overall

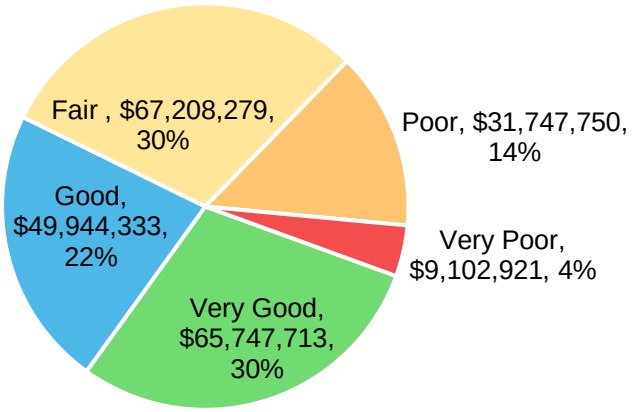
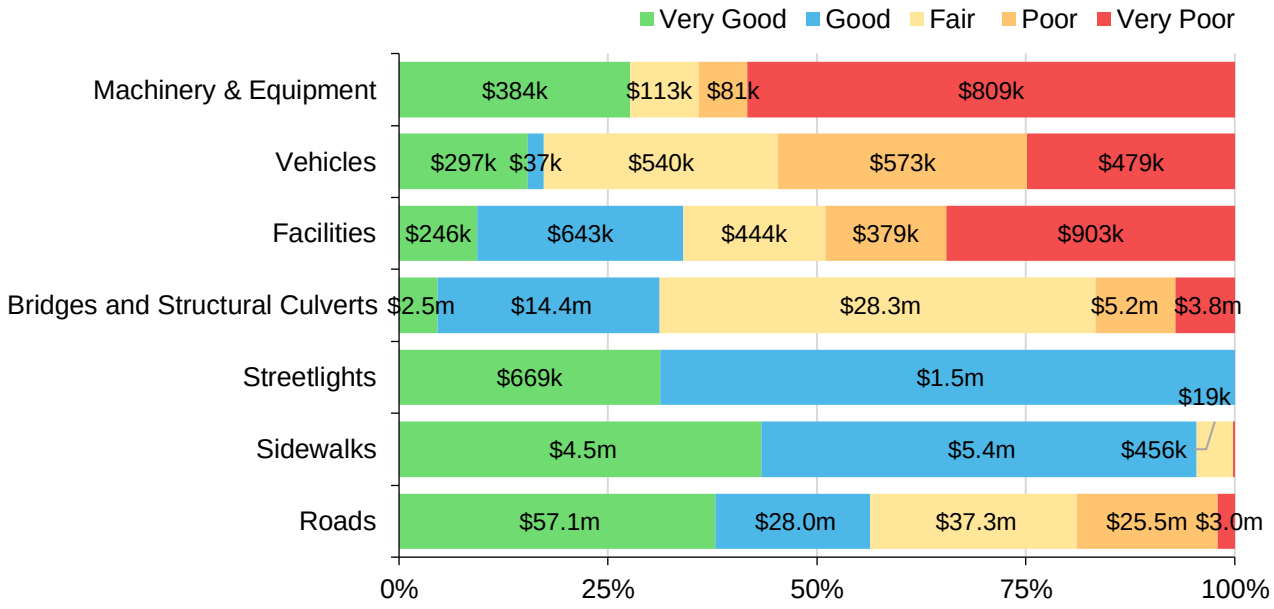


Figure 14 Asset Condition - Transportation Network: By Asset Type



Current Approach to Condition Assessment

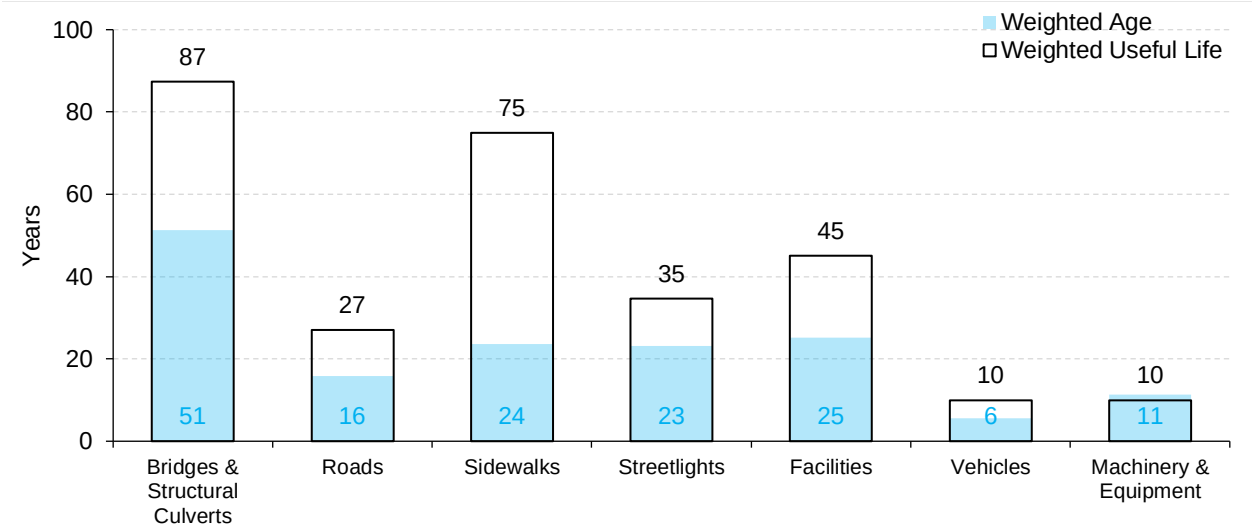
Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets more confidently. The following describes the Township's current approach:

- Road patrols are completed weekly as per minimum maintenance standards.
- Roads needs studies completed every five years
- Sign reflectivity inspections are completed yearly
- Ontario Structure Inspection Manual (OSIM) inspections are completed every two years

Age Profile

Figure 15 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 and then aggregated. Major assets such as roads, bridges, culverts, and sidewalks have many years of service life remaining.

Figure 15 Estimated Useful Life vs. Asset Age - Transportation Network



However, the data reveals that, on average, machinery and equipment assets remain in service beyond their estimated useful life. Facilities enter the latter stages of their service life and may warrant further review through condition assessment programs. The Township upgraded the majority of its streetlight luminaires in 2018. With a useful life of 15 years, these LEDs are only at the early stages of their lifecycle. However, a substantial portion of streetlight assets were installed in 1990, increasing the average age of this asset group.

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

Lifecycle Management Strategy

This section outlines Wilmot's current approach to managing its transportation assets. Key data was collected through staff interviews. Recommended models were also built in Citywide™ for further review and potential application.

Current Lifecycle Management Strategy - Roads

The following table outlines the current strategies to maintain Wilmot's road network and identifies when rehabilitation and replacements may be required.

Table 9 Current Lifecycle Management Strategies: Roads

Activity Type	Description of Current Strategy
Maintenance	There has been no crack sealing program in place historically. Staff have been evaluating the feasibility of performing crack sealing on asphalt roads. A structured preventative maintenance program request will be made as part of the 2023 budget process.
	A Road Needs Study was last completed in 2018, and staff are planning on a 5-year cycle moving forward.
	Road patrols are completed weekly to comply with Minimum Maintenance Standards, and maintenance needs are identified by staff to be addressed on an as-needed basis (e.g. asphalt patching)
	Winter Road Maintenance – Snow plowing and removal, sanding and salting
	Road Line Painting Program as per O. Reg 239/02
	Sidewalk Maintenance completed in accordance with O. Reg 239/02
Rehabilitation	Asphalt Roads – Pulverize and re-surface – milling and resurfacing urban roads and pulverizing and resurfacing semi-urban and rural roads completed once advanced deterioration of the pavement surface is observed
	Tar & Chip Roads – rehabilitation activities depend on traffic counts and the condition of the road surface; single lift surface treatment occurs approximately every 7-10 years
Replacement	Staff are in the process of integrating data and analysis from the recent Road Needs Study into the capital plan
	Tar & Chip roads may be considered for an upgrade to asphalt at the end of pavement life; there are no formal criteria to determine when this should occur.
	Road reconstruction is typically informed by sub-surface infrastructure requirements (storm/water/sanitary), development activity, or Region of Waterloo Capital Program more than the condition of the road itself.
	Gravel roads are not scheduled for replacement but are maintained until it is time for disposal or repurposing.

The following lifecycle models have been developed based on the recommended strategies outlined in the Township's most recent Road Needs Study and reviewed by staff. Table 10 summarizes the lifecycle strategy in place for urban asphalt roads. Figure 16 depicts this strategy on a typical urban asphalt deterioration curve. The lifecycle strategies for Wilmot's rural asphalt and tar & chip roads are described in subsequent tables and applicable deterioration curves.

Table 10 Current Lifecycle Strategy: Asphalt Urban Roads

Event Name	Event Class	Event Trigger
Crack Sealing/Asphalt Patching	Preventative Maintenance	Every 5 Years (2 per pavement cycle)
R1 (Basic Re-Surfacing)	Rehabilitation	Condition: 55
R2 (Basic Re-Surfacing)	Rehabilitation	Condition: 50
RM (Major Re-Surfacing)	Rehabilitation	Condition: 40
Road Reconstruction	Replacement	Condition: 20

Figure 16 Typical Deterioration Curve: **Asphalt Urban Roads**

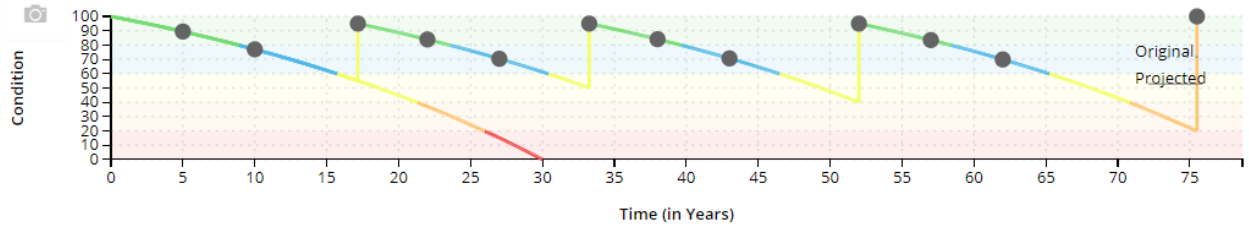


Table 11 Current Lifecycle Strategy: Asphalt Rural Roads

Event Name	Event Class	Event Trigger
Crack Sealing/Asphalt Patching	Preventative Maintenance	Every 5 Years (2 per pavement cycle)
R2 (Basic Re-Surfacing)	Rehabilitation	Condition: 65
PR2 (Pulverizing and Resurfacing)	Rehabilitation	Condition: 55
Road Reconstruction	Replacement	Condition: 20

Figure 17 Typical Deterioration Curve: Asphalt Rural Roads

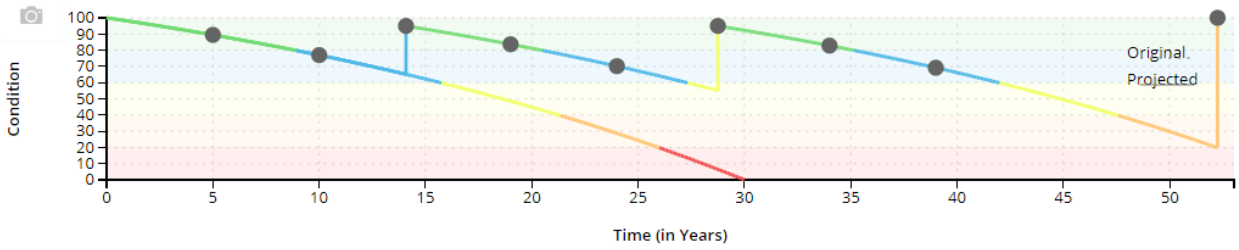
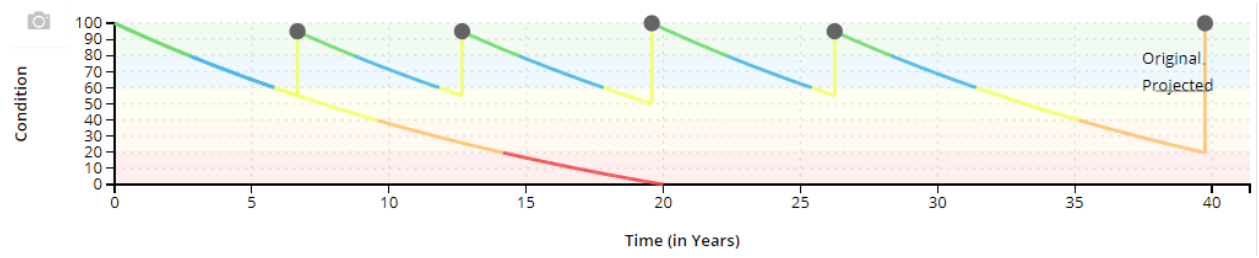


Table 12 Current Lifecycle Strategy: Tar & Chip Roads

Event Name	Event Class	Event Trigger
Single Surface Treatment	Rehabilitation	Condition: 55
Single Surface Treatment	Rehabilitation	Condition: 55
Pulverize and Double Surface Treatment	Rehabilitation	Condition: 50
Single Surface Treatment	Rehabilitation	Condition: 55
Road Reconstruction	Replacement	Condition: 20

Figure 18 Typical Deterioration Curve: Tar & Chip Roads



Current Lifecycle Management Strategy - Bridges and Structural Culverts

The following table outlines the current strategies to maintain infrastructure and identify when rehabilitation and replacement are required.

Table 13 Current Lifecycle Strategy: Bridges and Structural Culverts

Activity Type	Description of Current Strategy
Maintenance	There is no formal maintenance program for bridges and structural culverts. However, staff are developing an annual maintenance program which may include joint cleaning, painting, erosion control, and obstruction removal to ensure that structures meet or exceed their original, useful life.
Rehabilitation /Replacement	Due to a lack of resources and funding, the capital program for bridges and culverts usually includes only end-of-life replacement, and emergency repair items focused on critical structures.

The most recent OSIM Inspection reports were completed in 2020 and 2021. Each municipal structure was visually inspected, and the inspection findings include:

- Observations from the visual site inspection
- Results from the tactile inspection
- Performance deficiencies identified
- Recommendation for rehabilitation/repair
- Maintenance needs
- Additional investigations required
- Timeline for additional investigations, rehabilitation and maintenance, and
- Benchmark costs for capital work planning and budgeting

Projected capital works identified over the next ten years have been built into the Township's Citywide™ AM database to assist with short-term budgeting and the identification of annual capital requirements.

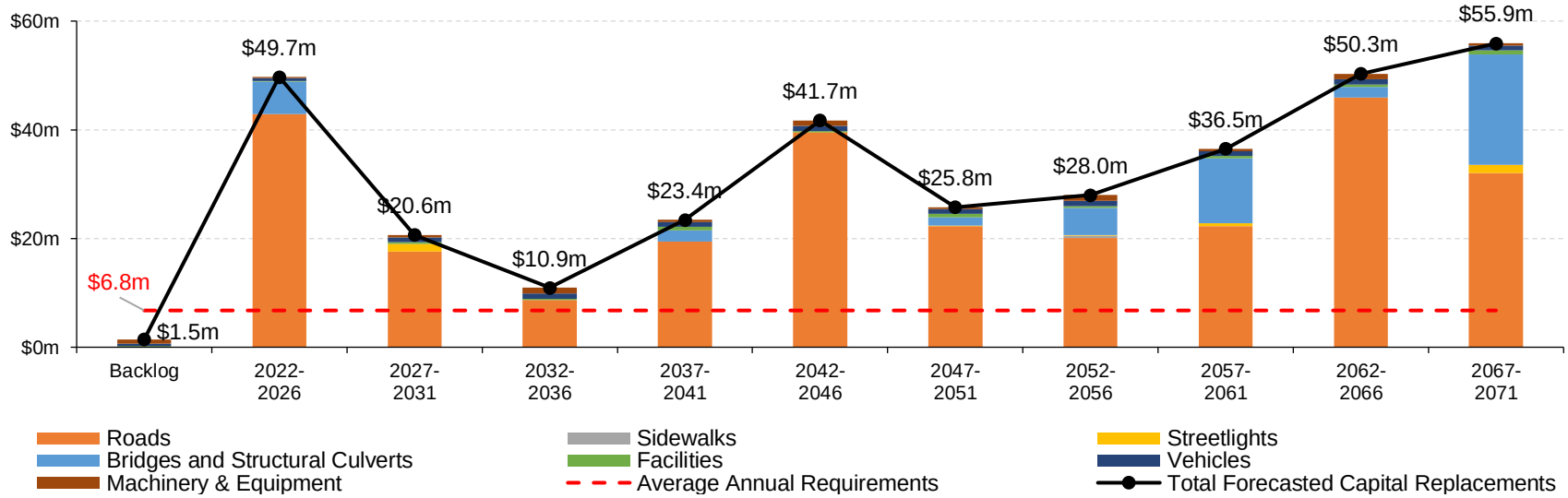
Current Lifecycle Management Strategy - Other Assets

Sidewalk maintenance is completed in accordance with O. Reg 239/02. Sign reflectivity testing is also conducted, and signs are replaced as required to ensure maximum visibility.

Forecasted Long-term Capital Replacement Needs

Figure 19 illustrates the cyclical short-, medium- and long-term capital infrastructure requirements for the Township's transportation assets. Wilmot is projected to experience major spending spikes over the next five decades. Between 2022-2026, a total of $50 million will be required to meet rehabilitation and replacement needs dominated by roads. The chart also illustrates a replacement backlog of $1.5 million, comprising assets that have reached the end of their estimated useful life but remain in service. Both age and condition should be used to forecast replacement needs and refine capital expenditure estimates.

Figure 19 Forecasted Capital Replacement Requirements - Transportation Network: 2022-2071



On average, transportation assets require $6.8 million annually to remain current with replacement and rehabilitation needs. Although actual spending will vary annually, this figure is a useful benchmark. It was based on standard deterioration modelling and a recommended lifestyle strategy for roads, which extends the life of roads through regular maintenance and repairs, thereby deferring the need to replace assets. If no lifecycle strategy is implemented and assets are simply replaced when they reach the end of their useful life, an additional $454,000 would be required annually to remain current with replacement needs.

A strong and proactive lifecycle program that includes crack sealing and timely resurfacing treatments is essential for achieving annual cost savings and extending the life of the road network. Regular condition assessments and a robust risk framework will ensure that high-criticality assets receive proper and timely lifecycle intervention, including replacements.

10-Year Replacement Needs

The table below summarizes the projected cost of lifecycle activities, including replacement and rehabilitation, that will need to be undertaken over the next ten years to maintain the current level of service. These values are derived from Citywide™, the Township's primary asset management application. The projections are based on condition data, lifecycle modelling, and age data.

Table 14 10-Year Capital Replacement Forecast - Transportation Network

Asset Type	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Roads	$9.7m	$4.8m	$10.5m	$12.5m	$5.4m	$7.9m	$5.6m	$590k	$2.7m	$746k
Sidewalks	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Streetlights	$0	$0	$0	$0	$0	$0	$0	$0	$1.5m	$0
Bridges and Structural Culverts	$491k	$392k	$2.8m	$2.3m	$14k	$0	$0	$0	$0	$0
Facilities	$200	$2k	$10k	$0	$22k	$3k	$135k	$0	$183k	$0
Vehicles	$0	$0	$306k	$267k	$0	$540k	$0	$37k	$297k	$0
Machinery & Equipment	$29k	$0	$59k	$21k	$96k	$16k	$246k	$138k	$0	$0
Total Capital Expenditures	**$10.2m**	**$5.2m**	**$13.7m**	**$15.1m**	**$5.5m**	**$8.5m**	**$6.0m**	**$764k**	**$4.7m**	**$746k**

The system-generated 10-year needs list above should be used in conjunction with the Township's 10-year Capital Expenditure Forecast (2022-2031). This forecast outlines approximately $76 million in Public Works/Engineering expenditures over the next decade, including the construction and acquisition of new and growth-related assets. It includes expenditures on road facilities, vehicles and equipment, engineering and reconstruction, continued implementation of the Township's hot mix paving and surface treatment program, and structures. The forecast also includes various water, sanitary, and storm infrastructure expenditures.

Initially, the system-generated forecasts will vary from staff-developed 10-year capital plans. Over time, the alignment between system-generated forecasts and those developed through staff judgement will improve with effective management of the Township's asset register. For example, the replacement forecast for vehicles generated from Citywide™ is age-based and may not reflect actual needs. A replacement strategy that incorporates condition, mileage, engine hours, breakdown history, and other performance indicators would improve these projections and is recommended. This data should also be incorporated into Citywide™ for improved forecasting.

Risk Analysis

The risk matrices below are generated using available asset data and were developed in collaboration with staff. They stratify assets into defined risk groups based on their current replacement costs. In addition, technical workshops were held with subject matter experts at the Township to identify factors and attributes that can aid in estimating the probability of asset failure and in identifying and quantifying the various consequences of a failure, including financial, environmental, and operational.

See Appendix 3: Risk Frameworks for details on how risk ratings were assigned to all asset groups.

Figure 20 Risk Matrix – Transportation Network: Roads

Figure 21 Risk Matrix – Transportation Network: Bridges & Culverts

Figure 22 Risk Matrix – Transportation Network: Sidewalks

Figure 23 Risk Matrix – Transportation Network: Facilities

Figure 24 Risk Matrix – Transportation Network: Fleet

Figure 25 Risk Matrix – Transportation Network: Machinery & Equipment

Figure 26 Risk Matrix – Transportation Network: Streetlights

In addition to asset level risk, the municipality may face risk associated with not executing key lifecycle activities, including repairs, rehabilitation, and replacement or upgrades of critical assets. These include:

- Missed opportunities for cost savings and increases in lifecycle costs
- Deferral of vital projects or further lending and borrowing
- Accelerated asset deterioration and premature failure, may lead to public health and safety hazards, and disruption of services to the Township's residential and commercial base
- A decline in public satisfaction with the Township's service standards and the resulting reputational damage
- Bridges are inherently vital to the Township's transportation infrastructure, and their failures can disconnect communities and lead to public health and safety incidents. In addition, they can impede the efficient flow of residential and commercial traffic. Wilmot is also vulnerable to flooding. Recent flooding events in February 2018 and January 2020 led to road closures (Lisbon Road, Nafziger Road, Wilby Road) and bridge washouts (Wilby).

An asset's criticality rating, determined by the nature and magnitude of the consequences of its potential failure, should be used to prioritize projects, particularly lifecycle management strategies. Using risk in conjunction with levels of service and the recommended treatment options can assist in optimizing limited funds. For example, industry research shows that $1 invested in a road crack sealing program may save $4 in eventual replacement costs. A bridge washing program and an expanded guide rail program will be essential in maintaining vital structures in a state of good repair

Levels of Service

The Township's levels of service framework contain 16 community levels of service KPIs and 26 technical KPIs for the Transportation Network. These KPIs are aligned with core values associated with each service area and reflect the priorities identified within Wilmot's Strategic Plan, including 'Responsible Governance,' 'Quality of Life,' and 'Economic Prosperity.'

The framework is a longer-term initiative but includes KPIs that must be reported by 2022 for core assets under O. Reg 588/17. The following tables summarize Wilmot's current levels of service for O. Reg 588/17 KPIs. In alignment with the regulation, these are listed by asset category rather than service area.

The complete list of these KPIs can be found in Appendix 2: Levels of Service Framework. These KPIs will be used to track the performance of assets on an annual basis and assist in establishing proposed levels of service targets to support compliance with O. Reg 588/17 requirements for the 2025 iteration of the Township's AMP.

Table 15 Ontario Regulation 588/17 Community Levels of Service: Roads

Service Attribute	Qualitative Description	Current Level of Service
Scope	Description, which may include maps of the road network in the municipality and its level of connectivity	The Township of Wilmot's transportation network includes 277 centerline kilometres, of which 247km are paved roads and 22m are unpaved roads. In addition, the transportation network contains 67km of sidewalks and 1600 streetlights and poles.
Quality	Description or images that illustrate the different levels of road class pavement condition	See Appendix 1: A Guide for the Estimation of PCR

Table 16 Ontario Regulation 588/17 Technical Levels of Service: Roads

Service Attribute	Qualitative Description	Current Level of Service
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)	0.96
	Lane-km of local roads (MMS classes 5 and 6) per land area (km/km^2)	0.96
Quality	Average pavement condition for paved roads in the municipality	53
Performance	Average surface condition for unpaved roads in the municipality (e.g., excellent, good, fair, poor)	72

Table 17 Ontario Regulation 588/17 Community Levels of Service: Bridges and Culverts

Service Attribute	Qualitative Description	Current Level of Service
Scope	Description of the traffic that is supported by municipal bridges (e.g., heavy transport vehicles, motor vehicles, emergency vehicles, pedestrians, cyclists).	The Township owns and maintains 41 bridges and structural culverts, a critical component of the transportation network. These structures support the passage of diverse traffic, including heavy transport vehicles, farm equipment, motor vehicles, emergency vehicles, pedestrians, and cyclists. Three bridges have a load or dimensional restriction, which may limit the ability of larger or heavier transport vehicles. These limits are posted at Shade St, Oxford Waterloo Rd and Bridge St Bridges.
Quality	1. Description or images of the condition of bridges and how this would affect use of the bridges. 2. Description or images of the condition of culverts and how this would affect use of the culverts.	1. The Township follows the standard set out by O. Reg 107/ 97: Standards for Bridges and culverts over 3m. A professional engineer carries out inspections on all municipal structures every two years. In addition, each structure is visually inspected under the Ministry of transportation's Ontario Structure Inspection Manual (OSIM) guidelines. 2. The bridge condition index (BCI) is a single value that provides an overall condition of each structure. It is calculated per the Ministry of Transportations methodology based on the remaining economic worth of the structure by considering the current and replacement value of all elements of the bridge. The BCI originates at 100 when the structure has been newly constructed and gradually declines as the components deteriorate due to the severity of their exposure. Typically, the structure with the lowest BCI will require short-term rehabilitation as the BCI for the other structures in the inventory decline. Rehabilitation of a structure boosts the BCI and moves it back down the priority list. The most recent OSIM inspection identified five bridges on the priority list for repairs. The Oxford-Waterloo Rd bridge was closed due to structural issues identified during an inspection. The Bridge Street Bridge was closed due to structural issues after a motor vehicle accident.

Table 18 Ontario Regulation 588/17 Technical Levels of Service: Bridges and Culverts

Service Attribute	Qualitative Description	Current Level of Service
Scope	Percentage of bridges in the municipality with loading or dimensional restrictions.	7.5%
Quality	1. For bridges in the municipality, the average bridge condition index value. 2. For structural culverts in the municipality, the average bridge condition index value.	1. 67 2. 74

Water Network

The Township of Wilmot owns and operates municipal water systems in the towns of New Hamburg, Baden, New Dundee, Mannheim, and St. Agatha. The Utilities Department is committed to ensuring a consistent supply of safe, high-quality drinking water and maintaining and continuously improving its quality management system, meeting all applicable regulations

The Region of Waterloo is responsible for water supply, treatment, storage, and transmission mains. The Township is responsible for water supply, treatment and distribution operations & maintenance, water meter distribution, systems operations & maintenance, and regulatory compliance.

Wilmot's Water Network portfolio includes water mains and various machinery and equipment assets, with a current replacement cost of $91 million.

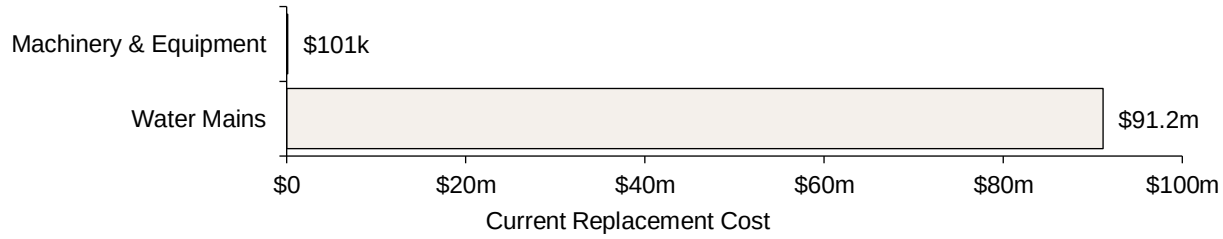
Inventory and Valuation

Water mains comprise nearly 100% of the total current replacement cost; machinery and equipment assets make up less than 1% of the water infrastructure portfolio. Table 19 summarizes the quantity and current replacement cost of major water assets.

Table 19 Detailed Asset Inventory: Water Network

Asset	Quantity	Replacement Cost
Water Mains[2]	76,747m	$91,179,210
Asbestos Concrete	6,410m	$8,030,027
Cast Iron	4,181m	$4,794,566
Copper	488m	$537,719
Ductile Iron	7,419m	$8,813,305
Polyethylene	286m	$346,259
PVC	57,963m	$68,657,334
Machinery & Equipment	Two asset records	$101,307
Total		**$91,280,518**

Figure 27 Portfolio Valuation: Water Network



[2] The Township of Wilmot's asset registry does not currently include appurtenances such as hydrants, valves, and water meters as separate assets. They are included within the linear asset. The asset registry will be updated in time for the next AMP update.

Asset Condition

Table 20 outlines each segment's average condition rating and asset condition source for the Township's water network. As no in-field condition assessment data were available, age was used to estimate the condition of all assets.

Table 20 Average Condition and Source of Condition Data

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Water Mains	81%	Very Good	Age-based only
Machinery & Equipment	6%	Very Poor	Age-based only
Overall Average	81%	Very Good	Age-based only

Figure 28 summarizes the replacement cost-weighted condition of the Township's water network assets. Based on age data, 85% of assets are in fair or better condition; the remaining 15% are in poor or worse condition. Therefore, these assets may be candidates for replacement in the short term.Figure 29 further details the condition of each asset segment.

Figure 28 Asset Condition - Water Network: Overall

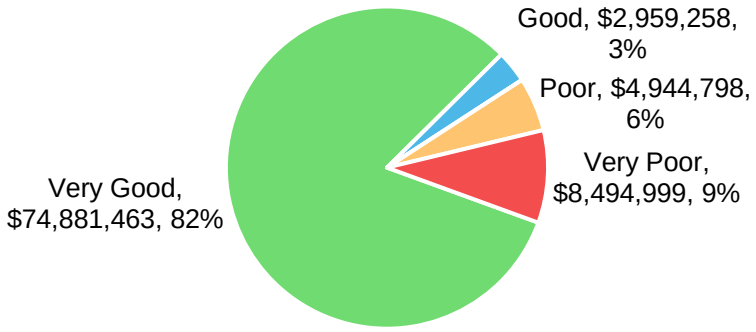
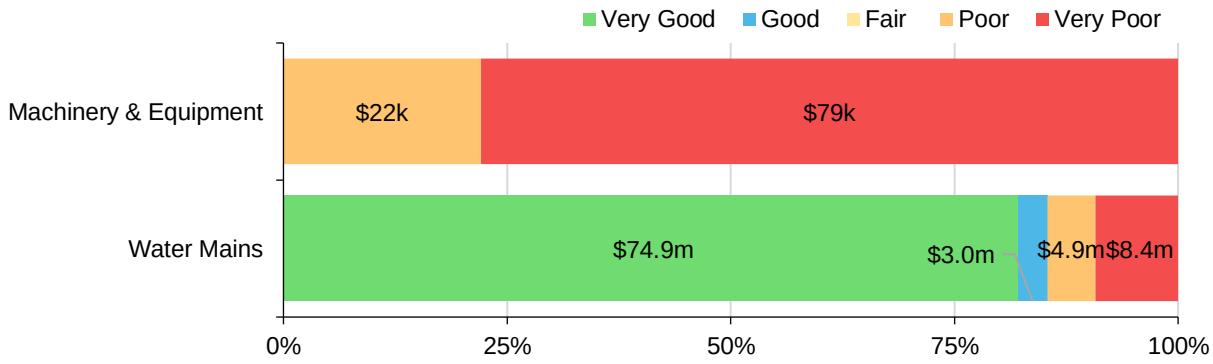


Figure 29 Asset Condition - Water Network: By Asset Type



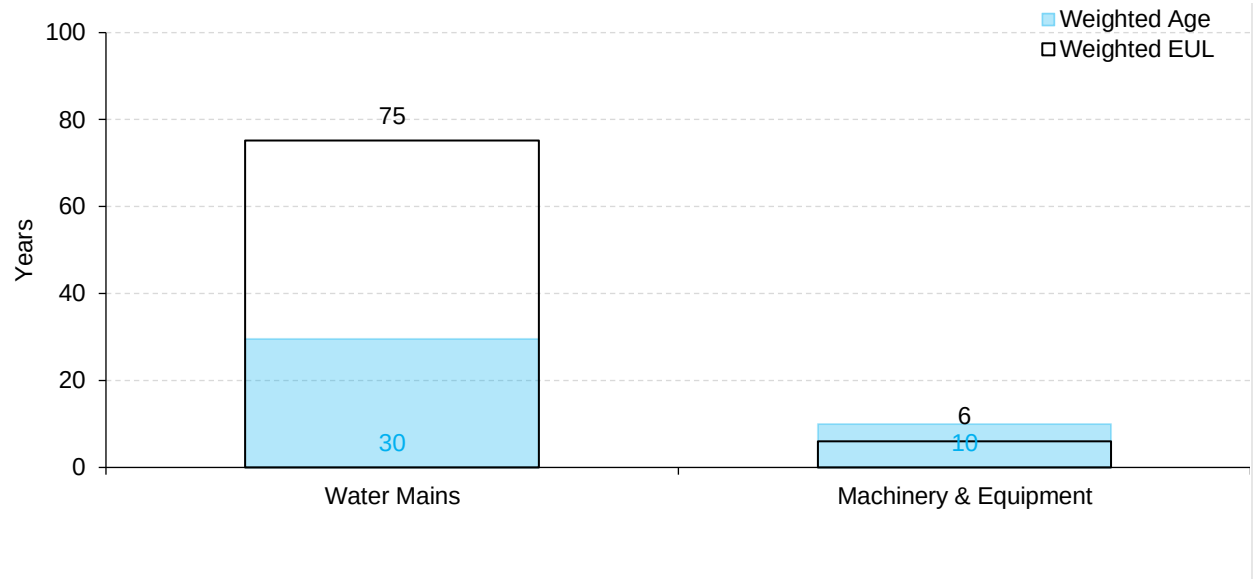
Current Approach to Condition Assessment

Asset condition ratings rely only on age. Water sampling, per the Ministry of Environment, Conservation and Parks, is also conducted.

Age Profile

Figure 30 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 and then aggregated. On average, water mains are still in the early stage of their lifecycle.

Figure 30 Estimated Useful Life vs. Asset Age: Water Network



However, the data reveals that, on average, machinery and equipment assets remain in service beyond their estimated useful life. Therefore, each asset's EUL should periodically be reviewed to better align with actual, in-field performance.

Lifecycle Management Strategy

The following table outlines the current strategies in place to maintain Wilmot's linear water infrastructure and identify when rehabilitation and replacement of water mains may be required.

Table 21 Current Lifecycle Management Strategies: Water Network

Activity Type	Description of Current Strategy
Maintenance	Main flushing and valve and hydrant exercises are completed annually across the entire network.
	Staff are aware of water loss percentage (non-revenue water) due to the Region of Waterloo billing and are evaluating whether a leak detection program may help reduce water loss through targeted maintenance, rehabilitation, and replacement when required.
Rehabilitation	Spot repairs are completed on an as-needed basis. Curb stops tend to fail sooner than the laterals/mains.
Replacement	Replacements are based on asset age (end-of-life) and are prioritized by location, age, pipe material and diameter. In addition, project coordination occurs with other asset types, including roads, storm and sanitary mains.

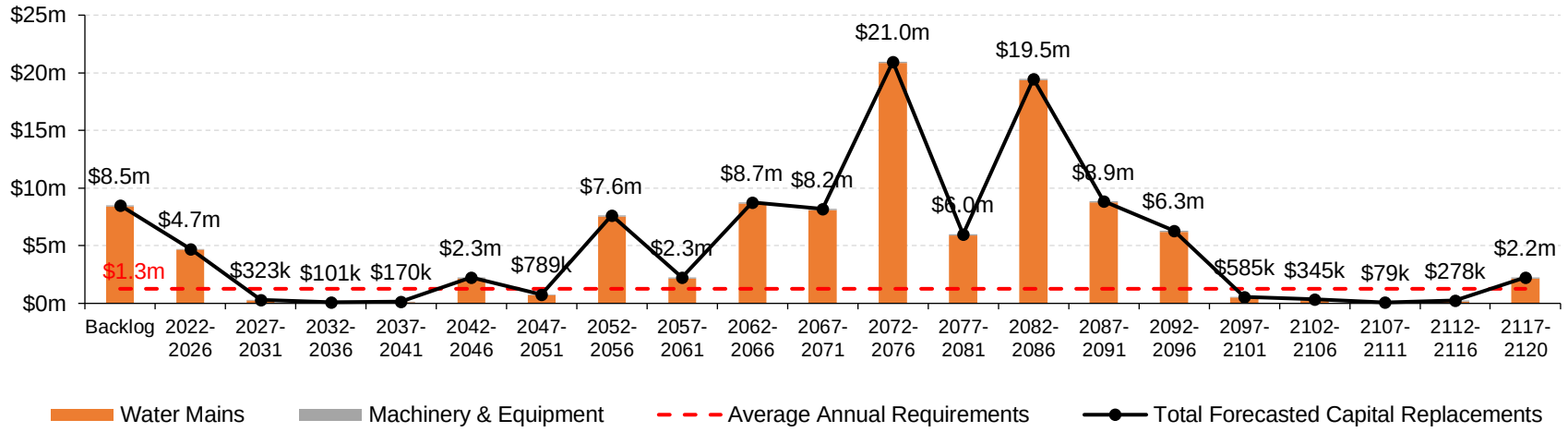
Break history, watermain looping for water quality, pressure zone and fire suppression can also guide replacement activities. In addition, cast iron and ductile iron mains are more susceptible to corrosion and failure. Many municipalities are implementing replacement programs for both main types, often coordinating projects with road work.

Forecasted Long-term Capital Replacement Needs

Figure 31 illustrates the cyclical short-, medium- and long-term infrastructure replacement requirements for the Township's water assets. This analysis was run to capture at least one iteration of replacement for the longest-lived asset within the water asset inventory. This required the projection to span nearly 100 years. As a result, Wilmot is projected to experience significant replacement spikes over the next five decades. Although the next few decades do not require substantial investments in replacing aging assets, these needs will begin to increase rapidly beyond 2052, peaking at $21 million between 2072-2076.

The chart also illustrates a replacement backlog of $8.5 million, comprising mains that have reached the end of their estimated useful life but remain in service. Age, condition, break history, fire flow capacity, and growth should be used to forecast replacement needs and refine capital expenditure estimates.

Figure 31 Forecasted Capital Replacement Requirements - Water Network: 2022-2120



Although actual spending will fluctuate year-to-year based on condition assessment data, emergency work, and opportunities to coordinate with other major projects, water assets require $1.3 million annually to remain current with replacement needs. Often, replacement needs are 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 and gradually building funding capacity over the long term. In addition, a robust risk framework will ensure that high-criticality assets receive proper and timely lifecycle intervention, including replacements.

10-Year Replacement Forecast

The table below summarizes the projected cost of lifecycle activities (capital replacement only) that should be undertaken over the next ten years to maintain the current level of service. These values are derived from Citywide™, the Township's primary asset management application. In addition, these projections are based on available condition data and age data.

Table 22 10-Year Replacement Forecast - Water Network

Asset Type	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Water Mains	$0	$0	$4.68m	$0	$0	$0.24m	$0	$0	$0	$0
Machinery & Equipment	$0	$0	22k	$0	$0	79k	$0	$0	$0	$0
Total Capital Expenditures	**$0**	**$0**	**$4.70m**	**$0**	**$0**	**$0.32m**	**$0**	**$0**	**$0**	**$0**

Initially, system-generated capital expenditures often differ from actual capital forecasts. Wilmot's 10-year Capital Expenditure Forecast (2022-2031) outlines approximately $75.6 million in Public Works/Engineering expenditures over the next decade, including the construction and acquisition of new and growth-related assets. In addition to major roads and bridge expenditures, the forecast includes more than $15 million earmarked specifically for water and sanitary networks and $33 million for engineering and reconstruction of various right-of-way assets, including underground infrastructure.

Over time, the alignment between system-generated forecasts and those developed through staff judgement will improve with effective management of the Township's asset register and the associated risk and lifecycle frameworks.

The Township is governed *by Ontario's Safe Drinking Water Act, 2002* (SDWA) and O. Reg. 453/07: Financial Plans. Wilmot's 2021-2027 financial plan achieves the Township's goal of attaining a 75-year financial sustainability level for Wilmot Water's water and wastewater systems.

Risk Analysis

The risk matrix below is generated using available asset data and was developed in collaboration with staff. It stratifies assets into defined risk groups based on their current replacement costs. In addition, technical workshops were held with subject matter experts at the Township to identify factors and attributes that can aid in estimating the probability of asset failure and in identifying and quantifying the various consequences of a failure, including financial, environmental, and operational.

Figure 32 Risk Matrix - Water Network: Water Mains

It is important to note that this reality is consistent across the majority of municipalities across the Province and that effective asset management planning programs are starting to establish strategies to minimize the number of assets in this rating area.

See Appendix 3: Risk Frameworks for details on how risk ratings were assigned to all asset groups.

In addition to asset level risk, the municipality may face risk associated with not executing key lifecycle activities, including repairs, rehabilitation, and replacement or upgrades of critical assets. These include:

- Failure of water distribution assets can lead to severe consequences, including boil water advisories, service shutoffs, and disruption and damage to other infrastructure services and assets, such as roadways. It can also lead to non-compliance with Ontario's *Safe Drinking Water Act, 2002.*
- Missed opportunities for cost savings and increases in lifecycle costs
- Deferral of vital projects or further lending and borrowing
- Accelerated asset deterioration and premature failure, may lead to public health and safety hazards, and disruption of services to the Township's residential and commercial base
- A decline in public satisfaction with the Township's service standards and the resulting reputational damage

An asset's criticality rating, determined by the nature and magnitude of the consequences of its potential failure, should be used to prioritize projects, particularly lifecycle management strategies. Using risk in conjunction with levels of service and the recommended treatment options can assist in optimizing limited funds.

Levels of Service

The Township's levels of service framework contain 13 community levels of service KPIs and 15 technical KPIs for the water network. These KPIs are aligned with core values associated with each service area and reflect the priorities identified within Wilmot's Strategic Plan, including 'Fiscal Responsibility' and 'Infrastructure Investments.'

Although the framework is a longer-term initiative, it includes KPIs required under O. Reg 588/17. The following tables summarize Wilmot's current levels of service concerning these O. Reg KPIs. In alignment with the regulation, these are listed by asset category rather than service area.

The complete list of these KPIs can be found in Appendix 2: Levels of Service Framework. These KPIs will be used to track the performance of assets on an annual basis and assist in establishing proposed levels of service targets to support compliance with O. Reg 588/17 requirements for the 2025 iteration of the Township's AMP.

Table 23 Ontario Regulation 588/17 Community Levels of Service: Water Network

Service Attribute	Qualitative Description	Current Level of Service
Scope	1. Description, which may include maps of the user groups or areas of the municipality that are connected to the municipal water system. 2. Description, which may include maps of the user groups or areas of the municipality that have fire flow.	1. There are five separate communities serviced by the municipal water systems, including New Hamburg, Baden, New Dundee, Mannheim, and St. Agatha. The Region of Waterloo is responsible for water supply, treatment, storage, and transmission mains, while the Township is responsible for water distribution and water service connections. 2. There are three communities in the Township that have fire flow: New Hamburg, Baden, and Mannheim.
Reliability	Description of boil water advisories and service interruptions.	There have been no boil water advisories for 2021, 2020, or 2019.

Table 24 Ontario Regulation 588/17 Technical Levels of Service: Water Network

Service Attribute	Qualitative Description	Current Level of Service
Scope	1. Percentage of properties connected to the municipal water system. 2. Percentage of properties where fire flow is available.	1. 69% 2. 63%
Reliability	1. The number 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. *2.* The number of connection-days per year due to water main breaks compared to the total number of properties connected to the municipal water system.	1. 0.003 2. 0

Sanitary Sewer Network

The Township of Wilmot owns and operates a wastewater collection system in Baden, New Hamburg and Mannheim. While the Region of Waterloo is responsible for wastewater treatment, Wilmot is responsible for wastewater collection, systems operation & maintenance, and regulatory compliance.

Wilmot's Sanitary Sewer Network assets comprise sewer mains, lift stations, vehicles, and machinery and equipment, with a current replacement cost of $86 million.

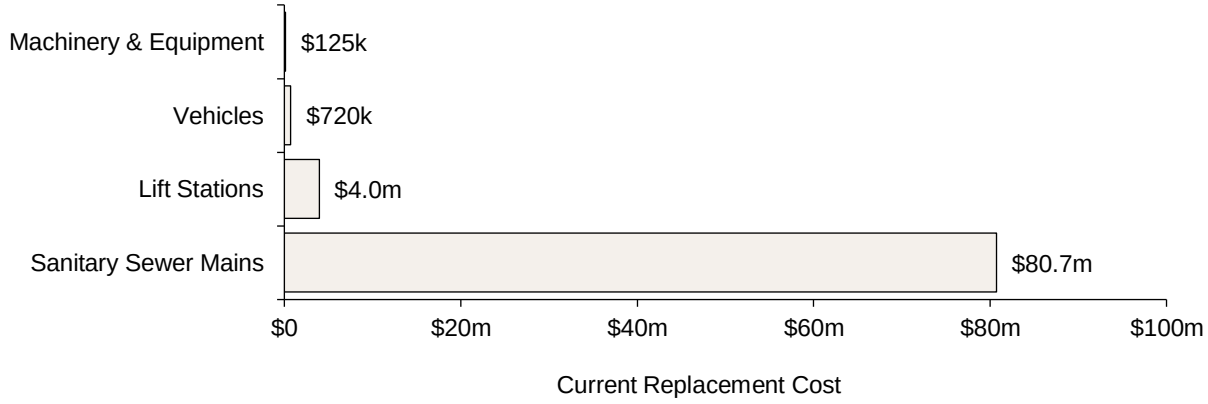
Inventory and Valuation

Sewer mains make up 94% of the total current replacement cost. Table 25 summarizes the quantity and current replacement cost of major sanitary assets.

Table 25 Detailed Asset Inventory: Sanitary Sewer Network

Asset	Quantity	Replacement Cost
Sanitary Sewer Mains[3]	57,966m	$80,749,302
Asbestos Concrete	9,384m	$13,260,811
Concrete	9,632m	$13,309,884
Ductile Iron	75m	$104,200
PVC	36,909m	$51,270,065
Vitrified Clay	1,966m	$2,804,342
Lift Stations	Five lift stations	$3,968,951
Vehicles	6	$720,107
Light Duty Vehicles	1	$41,850
Medium Duty Vehicles	5	$678,257
Machinery & Equipment	6	$124,514
Total		**$85,562,874**

Figure 33 Portfolio Valuation: Sanitary Sewer Network



[3]The Township of Wilmot's asset registry does not currently include appurtenances such as manholes as separate assets. They are included within the linear asset. The asset registry will be updated in time for the next AMP update.

Asset Condition

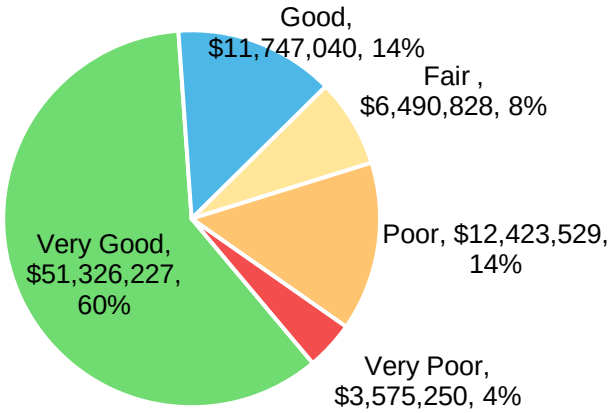
Table 26 outlines each segment's average condition rating and asset condition source for the Township's sanitary sewer network. With the exception of lift stations, no in-field condition assessment data were available for most sanitary assets, including mains. As such, age was used to estimate condition of all remaining assets.

Table 26 Average Condition and Source of Condition Data

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Sanitary Sewer Mains	79%	Good	Age-based only
Lift Stations[4]	37%	Poor	Age-based only
Vehicles	18%	Very Poor	Age-based only
Machinery & Equipment	47%	Fair	Age-based only
Overall Average	76%	Good	Age-based only

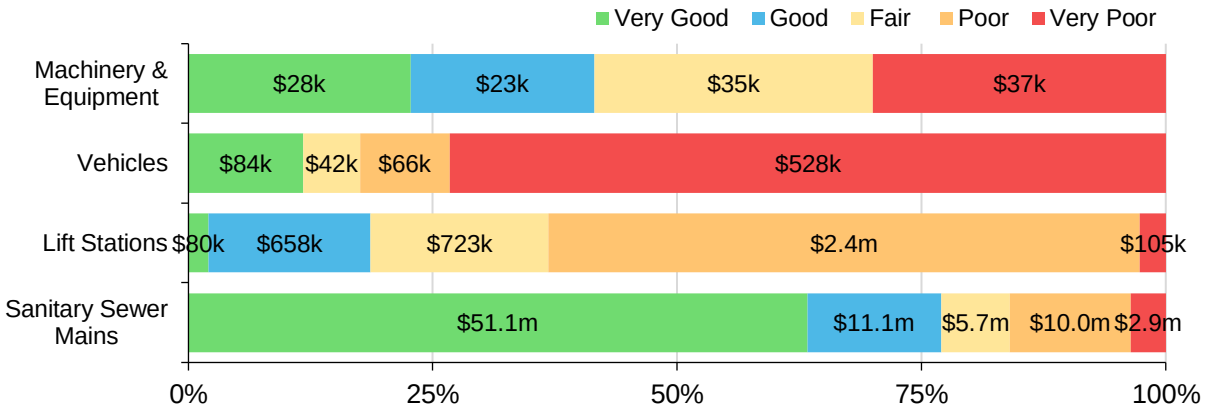
Figure 34 summarizes the replacement cost-weighted condition of the Township's sanitary sewer network. Based on age data, 83% of assets are in fair or better condition. However, the remaining 17% are in poor or worse condition. These assets may be candidates for replacement in the short term; similarly, assets in fair condition may require rehabilitation or replacement in the medium term and should be monitored for further degradation in condition. Figure 35 details the condition of each asset segment.

Figure 34 Asset Condition - Sanitary Sewer Network: Overall



[4] Lift stations were componentized and assessed as part of the Township's 2020 condition assessments. However, this data has not yet been verified by staff to ensure accuracy. As such, the data shown here relies only previously established replacement costs, and age data.

Figure 35 Asset Condition - Sanitary Sewer Network: By Asset Type



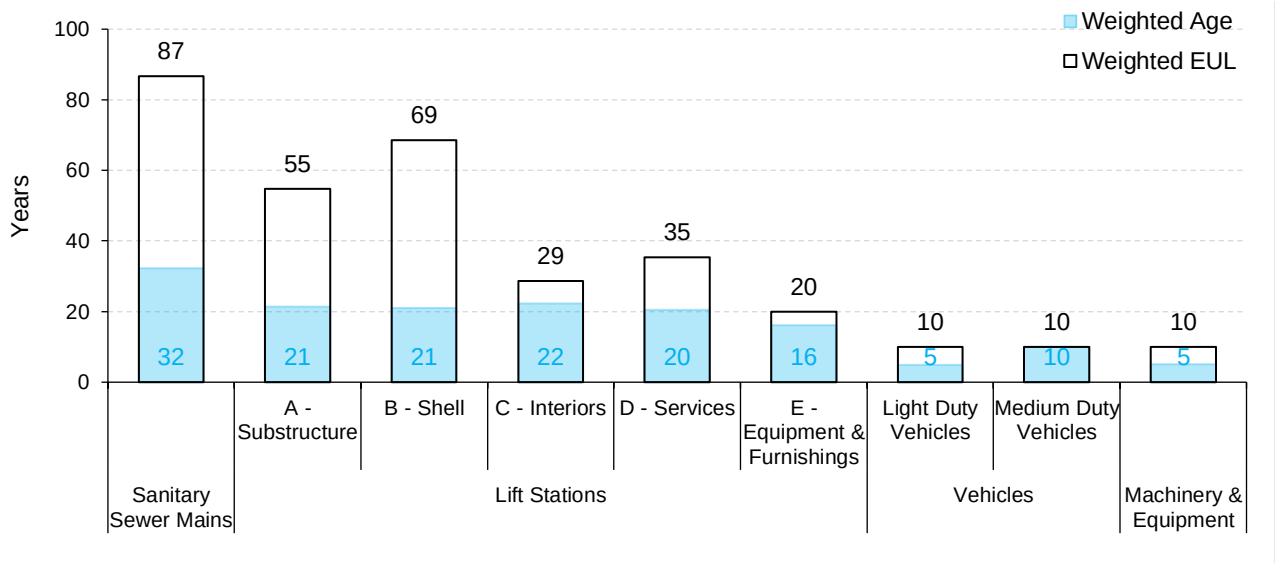
Current Approach to Condition Assessment

CCTV inspections are conducted; however, the budget remains minimal. Lift stations were assessed as part of a recent building condition assessment.

Age Profile

Figure 36 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 and then aggregated. On average, sanitary mains and most lift station assets are still in the early stage of their lifecycle.

Figure 36 Estimated Useful Life vs. Asset Age: Sanitary Sewer Network



However, the data reveals that vehicles remain in service beyond their estimated useful life on average. In addition, various service, interiors, equipment, and furnishing assets within lift stations are entering the latter stages of their lifecycle and may require replacements in the short term. Therefore, each asset's EUL should periodically be reviewed to better align with actual, in-field performance.

Lifecycle Management Strategy

The following table outlines the current strategies to maintain Wilmot's linear sanitary infrastructure and identifies when rehabilitation and replacement of sanitary sewer mains may be required.

Table 27 Current Lifecycle Management Strategies: Sanitary Sewer Network

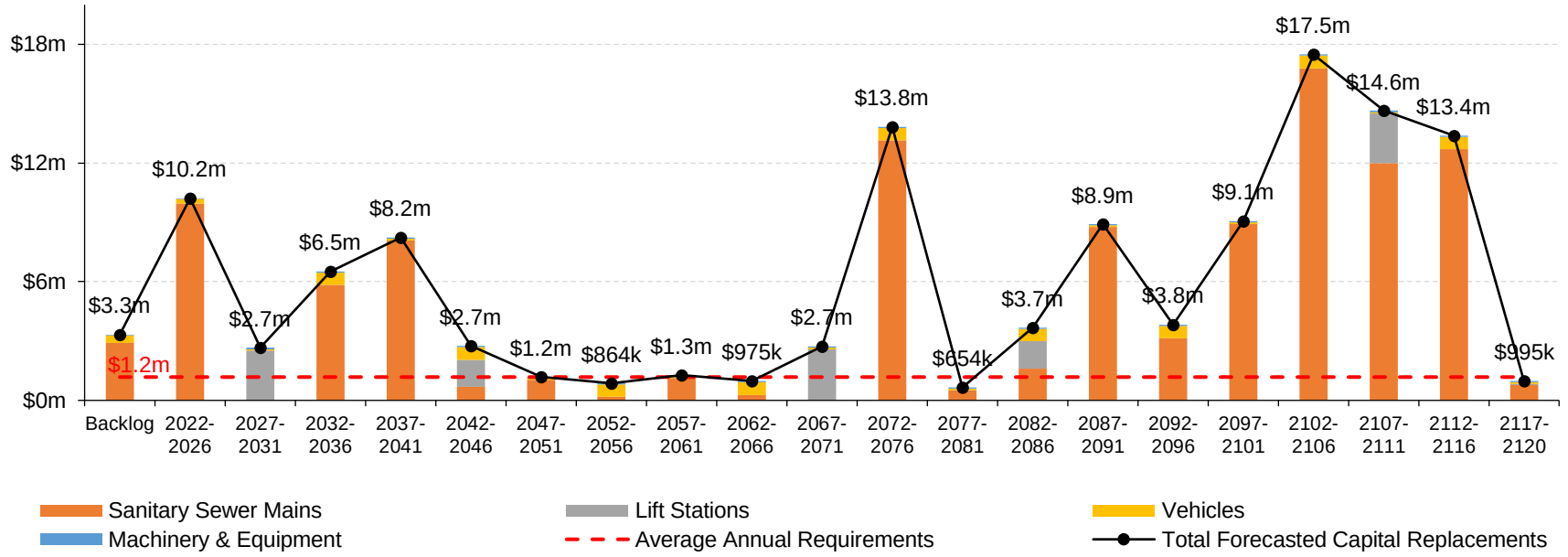
Activity Type	Description of Current Strategy
Maintenance	A small annual budget is available ($15-$20k) for CCTV inspections and to flush sanitary mains. Wilmot operations crew complete flushing activities on a semi-annual basis within identified problem areas (New Hamburg & Baden).
	An annual infiltration & inflow program is in its early stages of development. This program will provide best practices for repair and rehabilitation efforts, including capital and operating programs to help reduce I&I and support capacity for intensification.
	Given the small budget for sewer main maintenance, maintenance strategy involves mainly emergency repairs on an as-needed basis; staff are evaluating the implementation of modern maintenance strategies and the resources required to develop a more proactive approach.
Rehabilitation/ Replacement	Some trenchless re-lining was completed in 2010/11 to address infiltration issues. Additional budget for re-lining has been earmarked for 2023, 2025, and 2028 (~$200k) per year and will be re-confirmed after 2021 budget approval. This money will be targeted toward 9-inch vitrified clay pipes where road reconstruction has just occurred or isn't expected soon.
	Some end-of-life reconstruction activities were completed recently, taking into account I&I issues, project coordination, age, condition and development considerations.

Forecasted Long-term Capital Replacement Needs

Figure 37 illustrates the cyclical short-, medium- and long-term infrastructure replacement requirements for the Township's sanitary network assets. This analysis was run to capture at least one iteration of replacement for the longest-lived asset within the sanitary asset inventory. This required the projection to span nearly 100 years. Wilmot is projected to experience several major replacement spikes over the next five decades, including the current interval spanning 2022-2031, totalling almost $13 million. A second spike will occur between 2072 and 2076, totalling $14 million in sewer replacements.

Although actual spending will fluctuate year-to-year, on average, $1.2 million is required annually to remain current with replacement needs. 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. The chart also illustrates a replacement backlog of $3.4 million, primarily comprising mains that have reached the end of their estimated useful life but remain in service.

Figure 37 Forecasted Capital Replacement Requirements- Sanitary Sewer Network: 2022-2120



Both age and condition should be used to forecast replacement needs and refine capital expenditure estimates. Currently, no condition data is available. However, CCTV inspections can help identify sewer mains that may be on the verge of failure. For example, ductile iron mains are more susceptible to corrosion and failure. In response, many municipalities are implementing replacement programs and relining for these mains, often coordinating projects with road works and other wet utility assets.

Often, replacement needs are 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 and gradually building funding capacity over the long term. A robust risk framework will ensure that high-criticality assets receive proper and timely lifecycle intervention, including replacements.

10-Year Replacement Forecast

The table below summarizes the projected cost of lifecycle activities (capital replacement only) that should be undertaken over the next ten years to maintain the current level of service. These values are derived from Citywide™, the Township's primary asset management application. These projections are based only on age data.

Table 28 10-Year Replacement Forecast - Sanitary Sewer Network

Asset Type	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Sanitary Sewer Mains	$0.0	$0.0	$9.96m	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Lift Stations	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$105.3k	$0.0	$0.0
Vehicles	$72.1k	$58.3k	$0.0	$66.0k	$41.9k	$0.0	$0.0	$0.0	$84.5k	$0.0
Machinery & Equipment	$0.0	$12.7k	$0.0	$0.0	$22.7k	$12.8k	$23.4k	$0.0	$28.3k	$0.0
Total Capital Expenditures	**$72.1k**	**$71.0k**	**$9.96m**	**$66.0k**	**$64.6k**	**$12.8k**	**$23.4k**	**$105.3k**	**$112.8k**	**$0.0**

Initially, system-generated capital expenditures often differ from actual capital forecasts. Wilmot's 10-year Capital Expenditure Forecast (2022-2031) outlines approximately $76 million in Public Works/Engineering expenditures over the next decade, including the construction and acquisition of new and growth-related assets. In addition to major roads and bridge expenditures, the forecast includes more than $15 million earmarked specifically for water and sanitary networks and $33 million for engineering and reconstruction of various right-of-way assets, including underground infrastructure.

Over time, the alignment between system-generated forecasts and those developed through staff judgement will improve with effective management of the Township's asset register and the associated risk and lifecycle frameworks. For example, as CCTV inspection data becomes available and incorporated into the system, it may reveal higher short-term sewer primary replacement needs. For vehicles, a replacement strategy that includes condition, mileage, breakdown history, and other performance indicators would improve these projections and is recommended. This data should also be incorporated into the Township's asset register for improved forecasting. Lastly, while lift stations had been assessed, this data was not verified. It may also highlight additional needs.

Risk Analysis

The risk matrices below are generated using available asset data and were developed in collaboration with staff. The matrices stratify assets into defined risk groups based on their current replacement costs. In addition, technical workshops were held with subject matter experts at the Township to identify factors and attributes that can aid in estimating the probability of asset failure and in identifying and quantifying the various consequences of a failure, including financial, environmental, and operational.

Figure 38 Risk Matrix - Sanitary Sewer Network: Mains

Figure 39 Risk Matrix – Sanitary Sewer Network: Lift Stations

Figure 40 Risk Matrix - Sanitary Sewer Network: Vehicles

Figure 41 Risk Matrix - Sanitary Sewer Network: Machinery & Equipment

See Appendix 3: Risk Frameworks for details on how risk ratings were assigned to all asset groups.

In addition to asset level risk, the municipality may face risk associated with not executing key lifecycle activities, including repairs, rehabilitation, and replacement or upgrades of critical assets. These include:

- Missed opportunities for cost savings and increases in lifecycle costs
- Deferral of vital projects or further lending and borrowing
- Accelerated asset deterioration and premature failure, may lead to public health and safety hazards, and disruption of services to the Township's residential and commercial base
- A decline in public satisfaction with the Township's service standards and the resulting reputational damage
- Failure of wastewater treatment and distribution assets can lead to severe consequences, including sewage backups, service shutoffs, environmental contamination, and disruption and damage to other infrastructure services and assets, such as roadways.

An asset's criticality rating, determined by the nature and magnitude of the consequences of its potential failure, should be used to prioritize projects, particularly lifecycle management strategies. Using risk in conjunction with levels of service and the recommended treatment options can assist in optimizing limited funds.

Levels of Service

The Township's levels of service framework contain 16 community levels of service KPIs and 14 technical KPIs for sanitary sewer infrastructure. These KPIs are aligned with core values associated with each service area and reflect the priorities identified within Wilmot's Strategic Plan, including 'Fiscal Responsibility,' 'Infrastructure Investments,' 'Climate Adaptation and Mitigation', and 'Sustainability.'

Although the framework is a longer-term initiative, it includes KPIs required under O. Reg 588/17. The following tables summarize Wilmot's current levels of service concerning these O. Reg KPIs. In alignment with the regulation, these are listed by asset category rather than service area.

The complete list of these KPIs can be found in Appendix 2: Levels of Service Framework. These KPIs will be used to track the performance of assets on an annual basis and assist in establishing proposed levels of service targets to support compliance with O. Reg 588/17 requirements for the 2025 iteration of the Township's AMP.

Table 29 Ontario Regulation 588/17 Community Levels of Service: Sanitary Sewer Network

Service Attribute	Qualitative Description	Current Level of Service
Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal wastewater system.	Three communities within the Township are serviced by the municipal wastewater system: New Hamburg, Baden and Mannheim The Baden sanitary system serves 185 hectares and comprises of 20.6km of gravity sewers and two pumping stations. All flow in Baden is conveyed to the Baden pump station, then via forcemain to the New Hamburg sewer system. The Region of Waterloo owns and operates the Baden pump station. The New Hamburg system serves an area of roughly 412 ha and comprises 35.8km of gravity sewers and three pumping stations, which ultimately flow to the New Hamburg WWTP. The New Hamburg area flows to the Morningside Pump Station; from there, it is pumped to the New Hamburg WWTP. The Morningside pump station and New Hamburg WWTP are owned and operated by the Region of Waterloo. One subdivision in the community of Mannheim connects to the City of Kitchener trunk on Ottawa St.
Reliability	1. 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. 2. Description of the frequency and volume of overflows in combined sewers in the municipal wastewater system that occur in habitable areas or beaches.	1. The Township of Wilmot does not own combined sewers. 2. The Township of Wilmot does not own combined sewers.

Service Attribute	Qualitative Description	Current Level of Service
	3. Description of how stormwater can get into sanitary sewers in the municipal wastewater system, causing sewage to overflow into streets or backup into homes.	3. Stormwater can enter sanitary sewers if cracks exist in the sanitary mains or through indirect connections. Previous inflow and infiltration studies conducted within the Township identified direct private side connection to the sanitary network through sump pumps, well overflows and downspouts. With heavy rainfall events, sanitary sewers may experience a volume of water and sewage that exceeds their designed capacity. Sometimes, this can cause water and/or sewage to backup into homes. Weeping tiles, sump pumps and pits should be directed to the stormwater system to prevent this from happening. In addition, backflow preventers can be purchased, installed and maintained by homeowners.
	4. Description of how sanitary sewers in the municipal wastewater system are designed to be resilient to avoid events described in paragraph 3.	4. The Township of Wilmot and Region of Waterloo have engineering, construction, and material standards for new sanitary infrastructure. In addition, The Township of Wilmot Staff recently completed the design manual. Section 8 of the Township's Design Manual contains specifications for Sanitary Sewer.
	5. Description of the effluent that is discharged from sewage treatment plants in the municipal wastewater system.	5. Effluent refers to water pollution that may include suspended solids, total phosphorous and biological oxygen demand discharged from a wastewater treatment plant. The Environmental Compliance Approval (ECA) identifies the effluent criteria for municipal wastewater treatment plants. The Region of Waterloo is responsible for effluent within the system.

Table 30 Ontario Regulation 588/17 Technical Levels of Service: Sanitary Sewer Network

Service Attribute	Qualitative Description	Current Level of Service
Scope	Percentage of properties connected to the municipal wastewater system.	69%
Reliability	1. The number 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.	1. 0
	2. The number of connection-days per year due to wastewater backups compared to the total number of properties connected to the municipal wastewater system.	2. 0
	3. The number of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system.	3. 0

Storm Sewer Network

Wilmot's Storm Sewer Network comprises sewer mains and stormwater management facilities (ponds), with a total current replacement cost of $81 million.

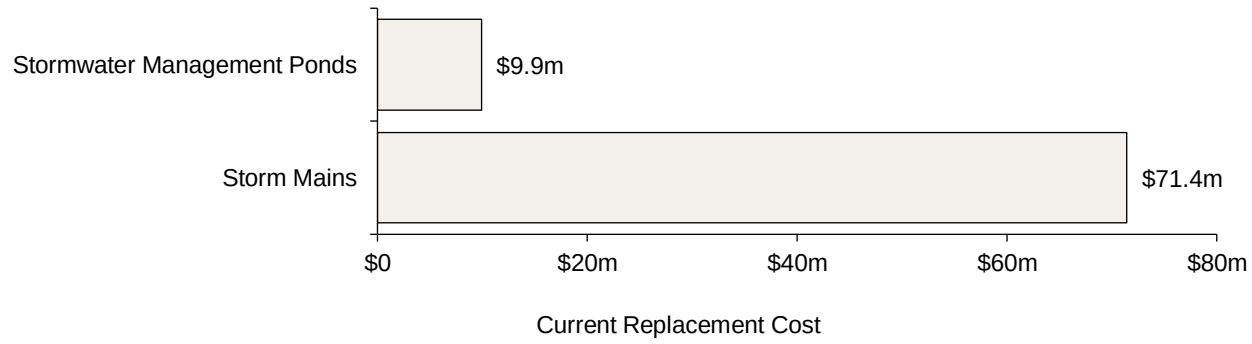
Inventory and Valuation

Table 31 summarizes the quantity and current replacement cost of storm sewers and stormwater management facilities.

Table 31 Detailed Asset Inventory: Storm Sewer Network

Asset	Quantity	Replacement Cost
Storm Sewer Mains	59,122m	$71,403,722
Concrete	39,366m	$50,911,813
Corrugated Steel Pipe	3,637m	$4,248,507
PVC	15,393m	$15,566,756
Reinforced Concrete Pipe	29m	$32,432
Vitrified Clay	13m	$14,879
Unknown	378m	$629,335
Stormwater Management Facilities	25	$9,930,584
Total		**$81,334,306**

Figure 42 Portfolio Valuation - Storm Sewer Network



Asset Condition

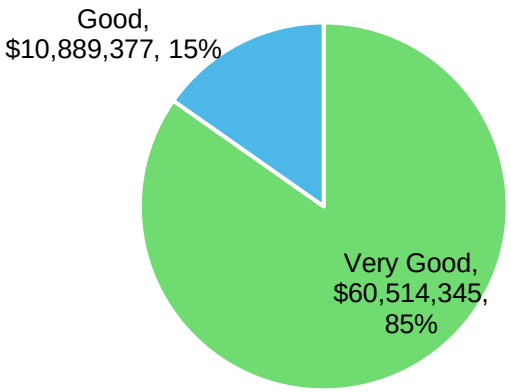
Table 20 outlines each segment's average condition rating and asset condition source for the Township's storm sewers. As no in-field condition assessment data were available, age was used to estimate condition of all storm mains.

Table 32 Average Condition and Source of Condition Data

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Storm Sewer Mains	91%	Very Poor	Age-based only
Overall Average	91%	Very Good	Age-based only

Figure 43 summarizes the replacement cost-weighted condition of the Township's storm sewer mains. Although all assets appear to be in good or better shape, these values are based only on age data. Therefore, results of condition assessments are likely to produce a different distribution of condition ratings and may identify many assets rated poor or worse.

Figure 43 Asset Condition: Storm Sewer Network (Mains Only)



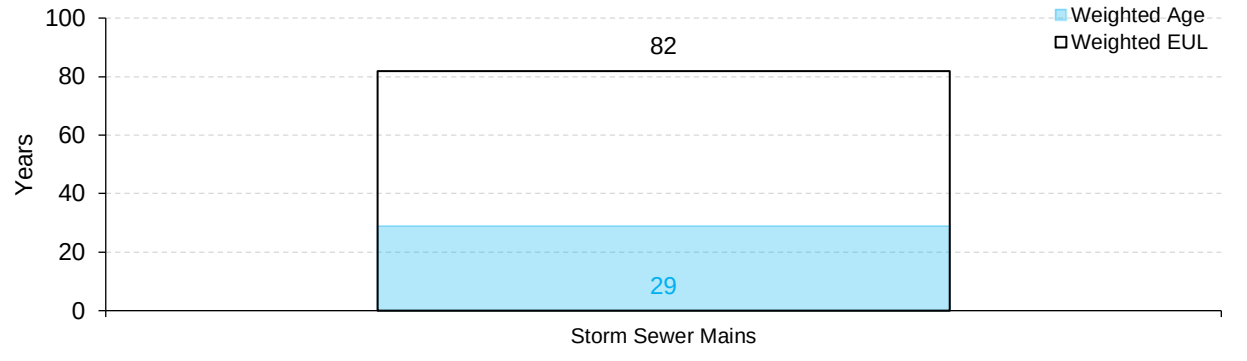
Current Approach to Condition Assessment

A minimal budget is available for CCTV inspection of the Township's stormwater mains. Inspections are completed before road work to identify candidates for replacement through project bundling.

Age Profile

Figure 44 illustrates the average current age of storm mains and their estimated useful life. Both values are weighted by the replacement cost of individual assets and then aggregated. On average, storm mains are still in the early stage of their lifecycle. Stormwater management ponds are maintained perpetually and do not 'expire' like other assets.

Figure 44 Estimated Useful Life vs. Asset Age - Storm Sewer Network



Lifecycle Management Strategy

The following table outlines the current strategies in place to maintain Wilmot's linear storm infrastructure and identify when rehabilitation and replacement of storm sewers mains may be required.

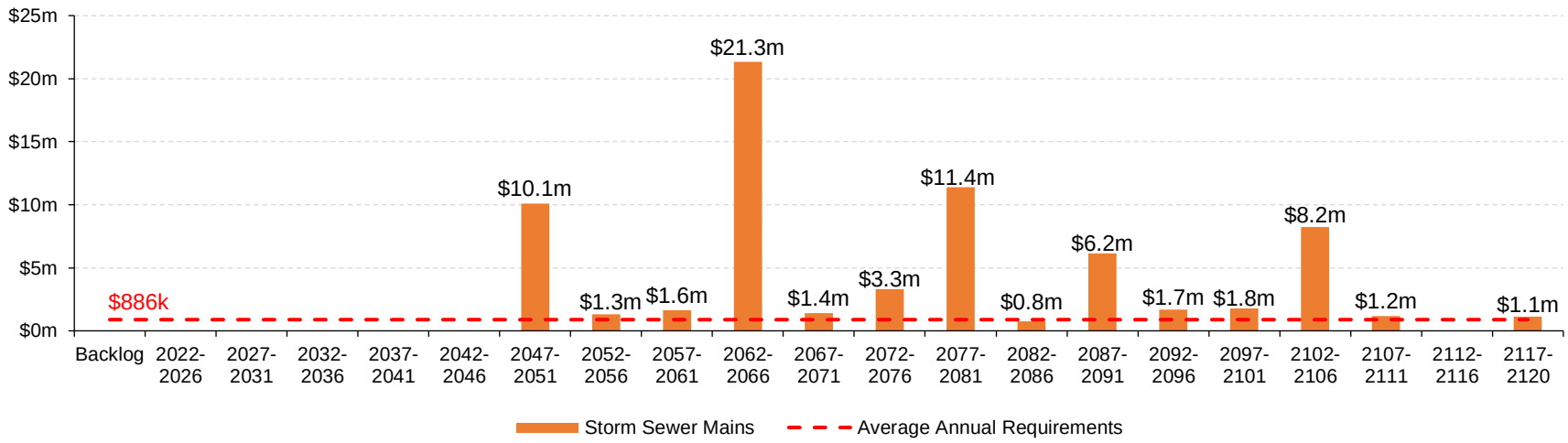
Table 33 Current Lifecycle Management Strategies - Storm Sewer Network

Activity Type	Description of Current Strategy
Maintenance	Staff are in the process of developing modern maintenance strategies for storm sewers. However, no effective storm sewer maintenance strategy exists except for a small budget (~$15,000 per year) for CCTV work and flushing. This program targets storm mains that align with upcoming capital projects and where there is a lack of data.
	Catchbasin cleaning is performed regularly, with the entire network completed on a 4-year schedule. Maintenance for stormwater management ponds includes grass cutting and clearing inlets and outlets of debris.
	Oil grit separators are cleaned occasionally but not as often as necessary. Staff are focusing on building a reliable inventory of manufactured treatment devices before developing a maintenance strategy.
Rehabilitation/ Replacement	Storm sewer rehabilitation (e.g., trenchless re-lining) is not common, and most capital projects are end-of-life replacements.
	Storm sewer replacement is generally aligned with road reconstruction priorities but also considers its location, age, pipe material and diameter when determining and prioritizing capital works.

Forecasted Long-term Capital Replacement Needs

Figure 45 illustrates the cyclical short-, medium- and long-term infrastructure replacement requirements for the Township's storm network assets. This analysis was run to capture at least one iteration of replacement for the longest-lived asset within the storm asset inventory. This required the projection to span nearly 100 years. As a result, no replacement needs are forecasted in the short- to medium- terms. However, these projections are based only on age and may not reflect actual asset needs. In addition, CCTV inspections may expose substantial short-term funding needs.

Figure 45 Forecasted Capital Replacement Requirements - Storm Sewer Network (Mains only): 2022-2120



Although actual spending will vary year to year, storm mains require $886k annually to remain current with replacement needs. Often, replacement needs are 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 and gradually building funding capacity over the long term. A robust risk framework will ensure that high-criticality assets receive proper and timely lifecycle intervention, including replacements. Regular CCTV inspections on a rotating basis should be completed, and the data integrated with Citywide™ to improve long-term forecasting.

10-Year Replacement Forecast

The table below summarizes the projected cost of lifecycle activities (capital replacement only) that should be undertaken over the next ten years to maintain the current level of service. These values are derived from Citywide™, the Township's primary asset management application. As no condition data was available for storm assets, these projections are based only on age data and may not reflect actual asset needs, which may be substantial.

Table 34 10-Year Replacement Forecast: Storm Sewer Network

Asset Type	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Storm Sewer Mains	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Capital Expenditures	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

Initially, system-generated capital expenditures often differ from actual capital forecasts. Wilmot's 10-year Capital Expenditure Forecast (2022-2031) outlines approximately $75.6 million in Public Works/Engineering expenditures over the next decade, including the construction and acquisition of new and growth-related assets. In addition to major roads and bridge expenditures, the forecast includes more than $1.5 million earmarked explicitly for stormwater management facilities and $33 million for various engineering and reconstruction projects, including underground infrastructure.

A comprehensive update is needed for stormwater inventory. Over time, the alignment between system-generated forecasts and those developed through staff judgement will improve with effective management of the Township's asset register and the associated risk and lifecycle frameworks. Available CCTV condition and attribute data should be integrated into Citywide™ for improved long- and short-term forecasting.

Risk Analysis

The risk matrix below is generated using available asset data and was developed in collaboration with staff. It stratifies assets into defined risk groups based on their current replacement costs. In addition, technical workshops were held with subject matter experts at the Township to identify factors and attributes that can aid in estimating the probability of asset failure and in identifying and quantifying the various consequences of a failure, including financial, environmental, and operational.

See Appendix 3: Risk Frameworks for details on how risk ratings were assigned to all asset groups.

Figure 46 Risk Matrix - Storm Sewer Network: Mains

In addition to asset level risk, the municipality may face risk associated with not executing key lifecycle activities, including repairs, rehabilitation, and replacement or upgrades of critical assets. These include:

- Missed opportunities for cost savings and increases in lifecycle costs
- Deferral of vital projects or further lending and borrowing
- Accelerated asset deterioration and premature failure, may lead to public health and safety hazards, and disruption of services to the Township's residential and commercial base
- A decline in public satisfaction with the Township's service standards and the resulting reputational damage
- Failure of stormwater assets can cause excessive flooding, erosion, backups, road and bridge closures, environmental damage, and substantial property damage. The increased frequency of extreme weather events has made some communities even more vulnerable to flooding. For example, Wilmot faces a high risk of flooding. Downtown New Hamburg's commercial and residential area is within the Nith River floodplain and is subject to regular flooding, with significant flooding events occurring in February 2018 and January 2020. These events saw ice jams and road closures and rendered Sobey's plaza, a commercial centre, inaccessible. These events can also create legal liabilities for the municipality. With more frequent and more extreme weather events, such as rainfalls, required maintenance frequency will also increase, including more frequent stormwater management facility cleanouts.

An asset's criticality rating, determined by the nature and magnitude of the consequences of its potential failure, should be used to prioritize projects, particularly lifecycle management strategies. Using risk in conjunction with levels of service and the recommended treatment options can assist in optimizing limited funds.

Levels of Service

The Township's levels of service framework contain 11 community levels of service KPIs and 17 technical KPIs for storm infrastructure. These KPIs are aligned with core values associated with each service area and reflect the priorities identified within Wilmot's Strategic Plan, including 'Fiscal Responsibility' and 'Infrastructure Investments.'

Although the framework is a longer-term initiative, it includes KPIs required under O. Reg 588/17. The following tables summarize Wilmot's current levels of service concerning these O. Reg KPIs. In alignment with the regulation, these are listed by asset category rather than service area.

The complete list of these KPIs can be found in Appendix 2: Levels of Service Framework. These KPIs will be used to track the performance of assets on an annual basis and assist in establishing proposed levels of service targets to support compliance with O. Reg 588/17 requirements for the 2025 iteration of the Township's AMP.

Table 35 Ontario Regulation 588/17 Community Levels of Service: Storm Sewer Network

Service Attribute	Qualitative Description	Current Level of Service
Scope	Description, which may include maps, of the user groups or areas of the municipality that are protected from flooding, including the extent of the protection provided by the municipal stormwater management system.	Six communities within the Township are protected from flooding: New Hamburg, Baden, New Dundee, Petersburg, St. Agatha and Mannheim. Within these communities, the Township operates stormwater management ponds, mains, and catch basins to store, direct and control stormwater runoff. The central part of New Hamburg is situated with the Nith River Floodplain and can experience spring flooding events.

Table 36 Ontario Regulation 588/17 Technical Levels of Service: Storm Sewer Network

Service Attribute	Qualitative Description	Current Level of Service
Scope	1. Percentage of properties in municipality resilient to a 100-year storm.	1. 92%
	2. Percentage of the municipal stormwater management system resilient to a 5-year storm.	2. 75%

Buildings and Facilities

Wilmot's Buildings and Facilities portfolio includes various general government, cultural and recreational facilities, including, but not limited to, community centres, arenas, pools, cemeteries, libraries, field houses, band shells, etc., as well as the various essential machinery and equipment to support and maintain efficient operation. These assets have a total current replacement cost of $35 million.

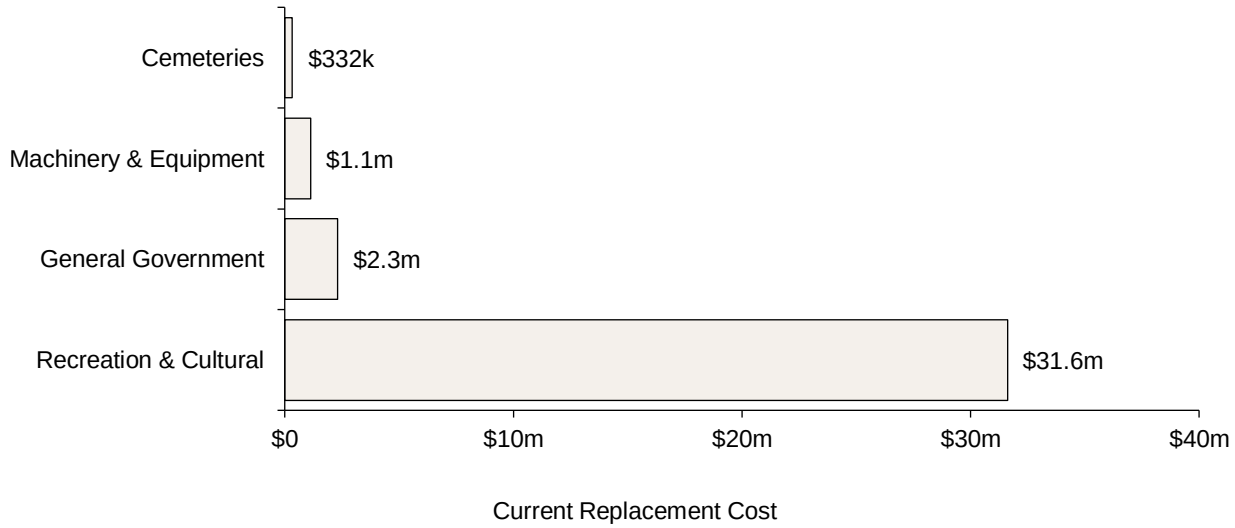
Inventory and Valuation

Recreation facilities represent the largest segment of Wilmot's facilities portfolio, at 89% of the current replacement cost. Table 37 summarizes the quantity and current replacement cost of major facilities assets. The Township owns and operates Riverside Cemetery and maintains various inactive or abandoned cemeteries.

Table 37 Detailed Asset Inventory - Buildings and Facilities

Asset	Quantity	Replacement Cost
Recreation & Cultural Facilities (including storage bunkers)	15	$31,614,160
General Government Facilities	2	$2,325,800
Cemetery (under Township ownership only)	1	$332,292
Machinery & Equipment	20	$1,143,940
Total		**$35,416,192**

Figure 47 Portfolio Valuation: Buildings and Facilities



Asset Condition

Table 8 outlines each segment's average condition rating and asset condition source for the Township's buildings and facilities. When no building condition assessment was available for asset components, age was used to approximate their condition.

Table 38 Average Condition and Source of Condition Data

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Recreation & Cultural Facilities	69%	Good	2020 Englobe Building Condition Assessments
General Government Facilities	60%	Good	2020 Englobe Building Condition Assessments
Cemetery	69%	Good	2020 Englobe Building Condition Assessments
Machinery and Equipment	26%	Poor	Age-based only
Overall Average	67%	Good	70% Condition Based

Figure 48 summarizes the replacement cost-weighted condition of the Township's buildings and facilities portfolio. Based on assessed condition and age data, 86% of assets are in fair or better condition. However, the remaining 14% 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 49 details the condition of each asset segment.

Figure 48 Asset Condition - Buildings and Facilities: Overall

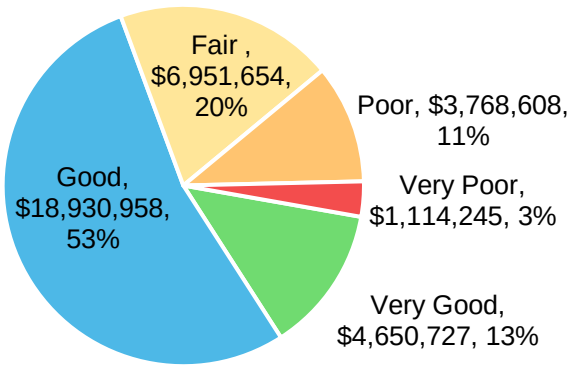
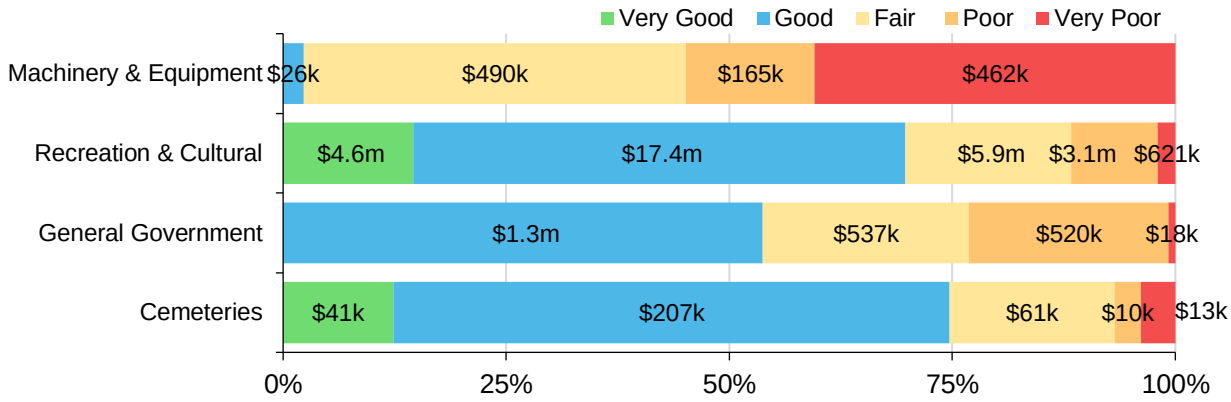


Figure 49 Asset Condition - Buildings and Facilities: By Asset Type



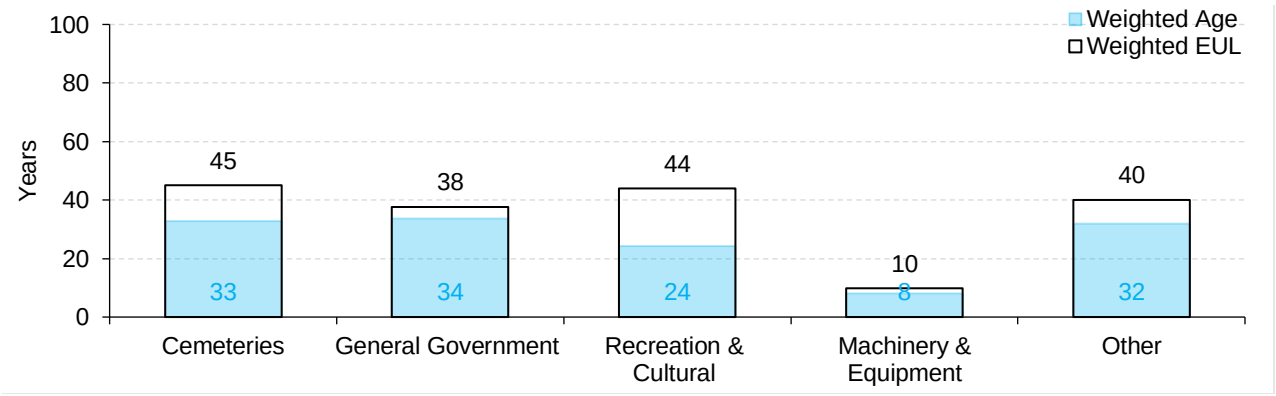
Current Approach to Condition Assessment

In 2020, buildings and facilities were assessed by external consultants. As a result, a detailed inventory of facilities was componentized using the industry standard Uniformat II code classification system.

Age Profile

Figure 50 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 and then aggregated.

Figure 50 Estimated Useful Life vs. Asset Age - Buildings and Facilities



The data reveals that, on average, most major facilities assets, including general government and recreational facilities, are in the latter stages of their serviceable life and may require replacements and rehabilitation in the short term.

Lifecycle Management Strategy

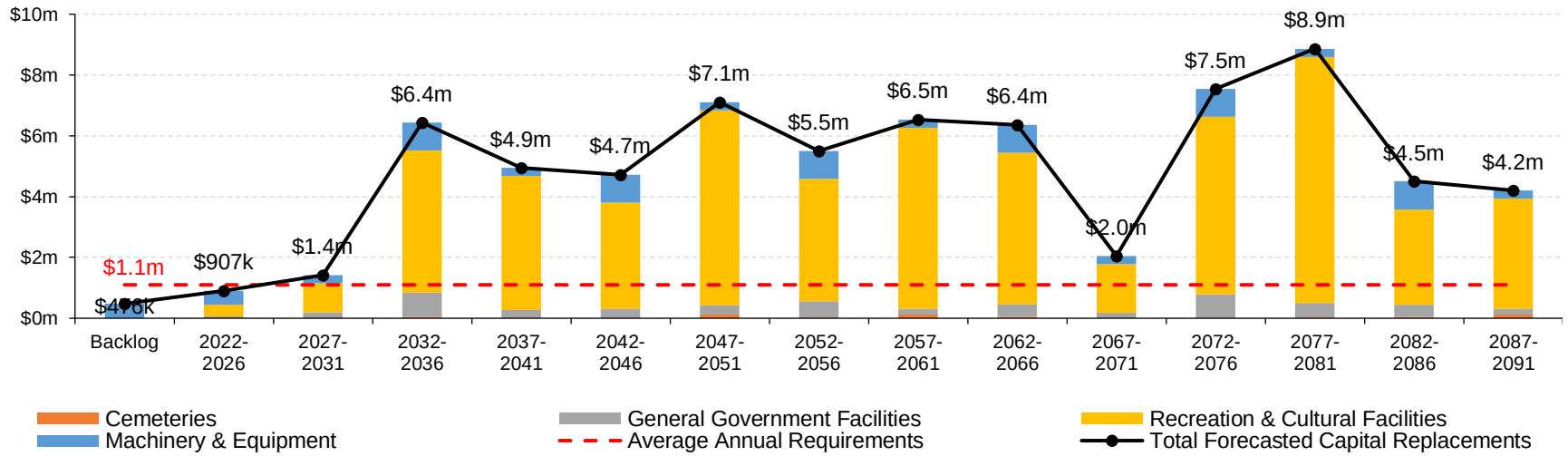
Buildings and facilities include numerous individual components. The building condition assessment provides recommended interventions for these components, including repairs, rehabilitation, and replacements and the timeline for completion. These interventions are also prioritized based on the consequence of failure of individual assets.

Forecasted Long-term Capital Replacement Needs

Figure 51 illustrates the cyclical short-, medium- and long-term infrastructure replacement requirements for the Township's buildings and facilities portfolio. This analysis was run to capture at least one iteration of replacement for the longest-lived asset within the building asset inventory. This required the projection to span 75 years. Capital replacement needs are high and consistent across the forecast horizon, averaging approximately $5.3 million per 5-year period.

The chart also illustrates a replacement backlog of $476k, dominated by machinery and equipment assets. These assets have reached the end of their estimated useful life but remain in service. Therefore, age and condition should be used to forecast replacement needs and refine capital expenditure estimates.

Figure 51 Forecasted Capital Replacement Requirements - Buildings and Facilities: 2022-2096



Although actual spending will fluctuate annually, in alignment with the BCA, building assets require $1.1 million annually to remain current with replacement needs. Often, replacement needs are 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 and gradually building funding capacity over the long term. A robust risk framework and public demand for various recreation services will ensure that high-criticality assets receive proper and timely lifecycle intervention, including replacements. Building condition assessments will also remain integral in project selection.

10-Year Replacement Forecast

The table below summarizes the projected cost of lifecycle activities (capital replacement only) that should be undertaken over the next ten years to maintain the current level of service. These values are derived from Citywide™, the Township's primary asset management application. These projections are based on available condition data and age data.

Table 39 10-Year Replacement Forecast: Buildings and Facilities

Asset Type	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Cemeteries	$0.0	$0.0	$0.0	$400.0	$12.2k	$900.0	$0.0	$0.0	$0.0	$0.0
General Government Facilities	$600.0	$1.5k	$0.0	$16.0k	$40.4k	$0.0	$46.6k	$9.5k	$140.0k	$0.0
Recreation & Cultural Facilities	$4.0k	$49.5k	$92.3k	$56.7k	$174.2k	$14.5k	$618.1k	$81.0k	$236.6k	$7.0k
Machinery & Equipment	$0.0	$0.0	$164.9k	$0.0	$294.2k	$241.5k	$10.7k	$15.7k	$0.0	$0.0
Total Capital Expenditures	**$4.6k**	**$51.0k**	**$257.2k**	**$73.1k**	**$520.9k**	**$256.9k**	**$675.4k**	**$106.1k**	**$376.6k**	**$7.0k**

Initially, system-generated capital expenditures often differ from actual capital forecasts. Wilmot's 10-year Capital Expenditure Forecast (2022-2031) outlines approximately $31 million in Parks, Facilities, and Recreation Services related expenditures over the next decade, including $6.7 million earmarked for Facilities (General). Over time, the alignment between system-generated forecasts and those developed through staff judgement will improve with effective management of the Township's asset register and the associated risk and lifecycle frameworks.

The Township's recent building condition assessments also provide details on various interventions' costs and the recommended timeline for completing these activities.

Risk Analysis

The risk matrices below are generated using available asset data and were developed in collaboration with staff. They stratify assets into risk groups based on current replacement costs. In addition, technical workshops were held with subject matter experts at the Township to identify factors and attributes that can aid in estimating the probability of asset failure and in identifying and quantifying the various consequences of a failure, including financial, environmental, and operational.

Figure 52 Risk Matrix - Buildings and Facilities: Recreation & Cultural Facilities

Figure 53 Risk Matrix - Buildings and Facilities: General Government

Figure 54 Risk Matrix - Buildings and Facilities: Cemeteries

Figure 55 Risk Matrix - Buildings and Facilities: Machinery & Equipment

See Appendix 3: Risk Frameworks for details on how risk ratings were assigned to building and facilities assets.

In addition to asset level risk, the municipality may face risk associated with not executing key lifecycle activities, including repairs, rehabilitation, and replacement or upgrades of critical assets. These include:

- Missed opportunities for cost savings and increases in lifecycle costs
- Deferral of vital projects or further lending and borrowing
- Accelerated asset deterioration and premature failure, may lead to public health and safety hazards, and disruption of services to the Township's residential and commercial base
- A decline in public satisfaction with the Township's service standards and the resulting reputational damage

An asset's criticality rating, determined by the nature and magnitude of the consequences of its potential failure, should be used to prioritize projects, particularly lifecycle management strategies. Using risk in conjunction with levels of service and the recommended treatment options can assist in optimizing limited funds.

Levels of Service

The Township's levels of service framework for Buildings and Facilities contains 18 community levels of service KPIs and 12 technical KPIs for parks, facilities, and recreational infrastructure. These KPIs are aligned with core values associated with each service area and reflect the priorities identified within Wilmot's Strategic Plan, including 'Fiscal Responsibility,' 'Active Transportation,' 'Infrastructure Investments,' and 'Smart Growth.'

The complete list of these KPIs can be found in Appendix 2: Levels of Service Framework. These KPIs will be used to track the performance of assets on an annual basis and will assist in establishing proposed levels of service to support compliance with O. Reg 588/17 requirements in 2025.

O. Reg 588/17 does not require municipalities to report on current performance levels for non-core assets until 2024, nor does it prescribe specific KPIs that must be measured. Therefore, municipalities may use their discretion in establishing appropriate KPIs. The 2024 iteration of the Township's AMP will include current performance levels for KPIs established in the LOS framework.

Parks and Recreation Services

Wilmot's Parks and Recreation program includes various assets to support residents' quality of life. These include various active and passive recreation amenities, including, but not limited to, sports fields, playgrounds, picnic shelters, trails, fountains, etc., and the essential equipment to support and maintain efficient operation. These assets have a total current replacement cost of $14 million.

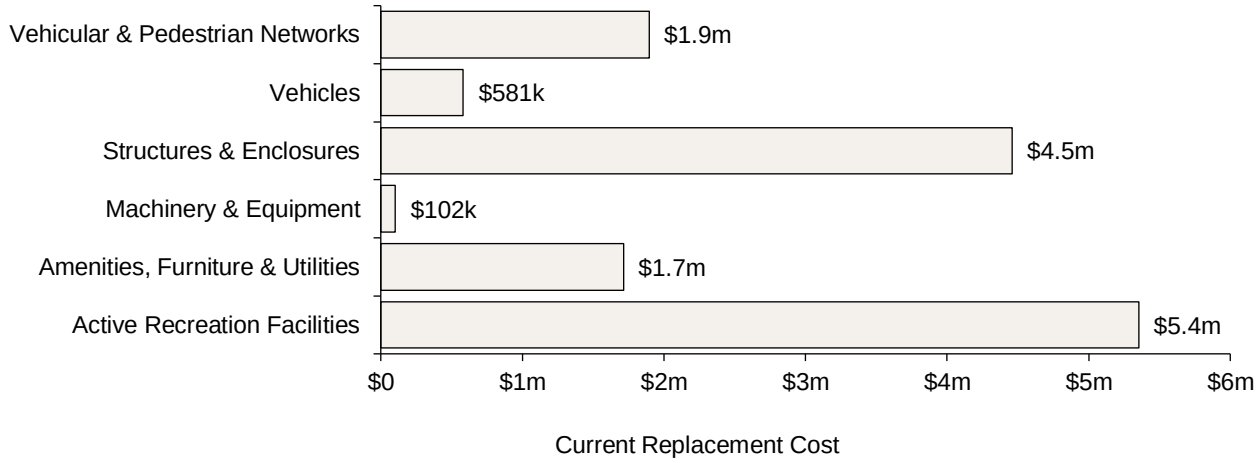
Inventory and Valuation

Active and passive recreation amenities represent the largest segment of Wilmot's parks and recreation portfolio, at 39% of the current replacement cost. Table 40 summarizes major parks and recreation assets' quantity and replacement costs.

Table 40 Detailed Asset Inventory: Parks and Recreation

Asset	Quantity	Replacement Cost
Active Recreation Facilities *(concession stands, field houses, playgrounds, ball diamonds, tennis/multi-use courts, skateboard parks, splash pads, the Grandstand and the dog park)*	216	$5,353,900
Structures & Enclosures *(storage sheds, picnic shelters, bleachers, gazebos and bandshells)*	262	$4,459,050
Vehicular & Pedestrian Networks	16	$1,896,000
Amenities, Furniture & Utilities *(benches, fences, fountains, and signs)*	27	$1,715,000
Machinery & Equipment	7	$102,279
Vehicles	16	$581,347
Total		**$14,047,576**

Figure 56 Portfolio Valuation: Parks and Recreation



Asset Condition

Table 41 outlines each segment's average condition rating and asset condition source for the Township's parks and recreation infrastructure. A combination of in-field condition assessment and age was used to estimate condition of all assets.

Table 41 Average Condition and Source of Condition Data

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Active Recreation Facilities	34%	Poor	2020 Englobe Building Condition Assessments and Age-based
Structures & Enclosures	59%	Fair	2020 Englobe Building Condition Assessments and Age-based
Vehicular & Pedestrian Networks	53%	Fair	Age-based only
Amenities, Furniture & Utilities	44%	Fair	Age-based only
Machinery & Equipment	6%	Very Poor	Age-based only
Vehicles	39%	Poor	Age-based only
Overall Average	45%	Poor	

Figure 57 summarizes the replacement cost-weighted condition of parks and recreation assets. Based on assessed condition and age data, 63% of assets are in fair or better condition. However, the remaining 37% 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 58 details the condition of each asset segment.

Figure 57 Asset Condition - Parks and Recreation: Overall

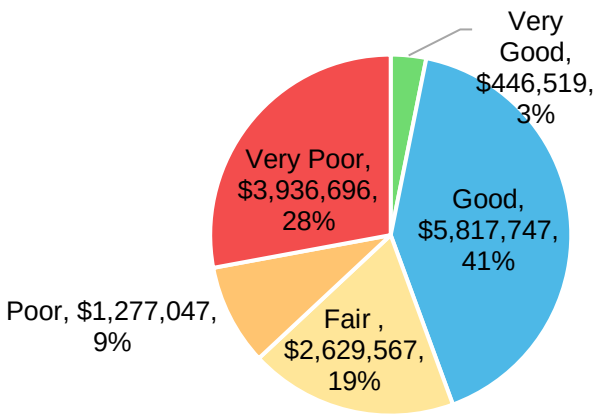
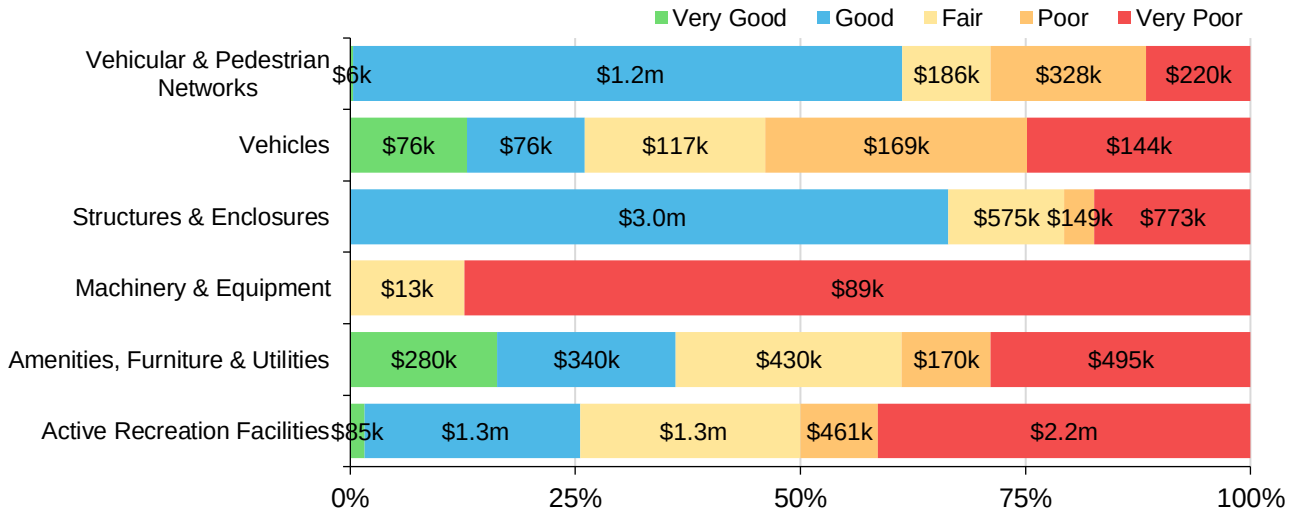


Figure 58 Asset Condition - Parks and Recreation: **By Asset Type**



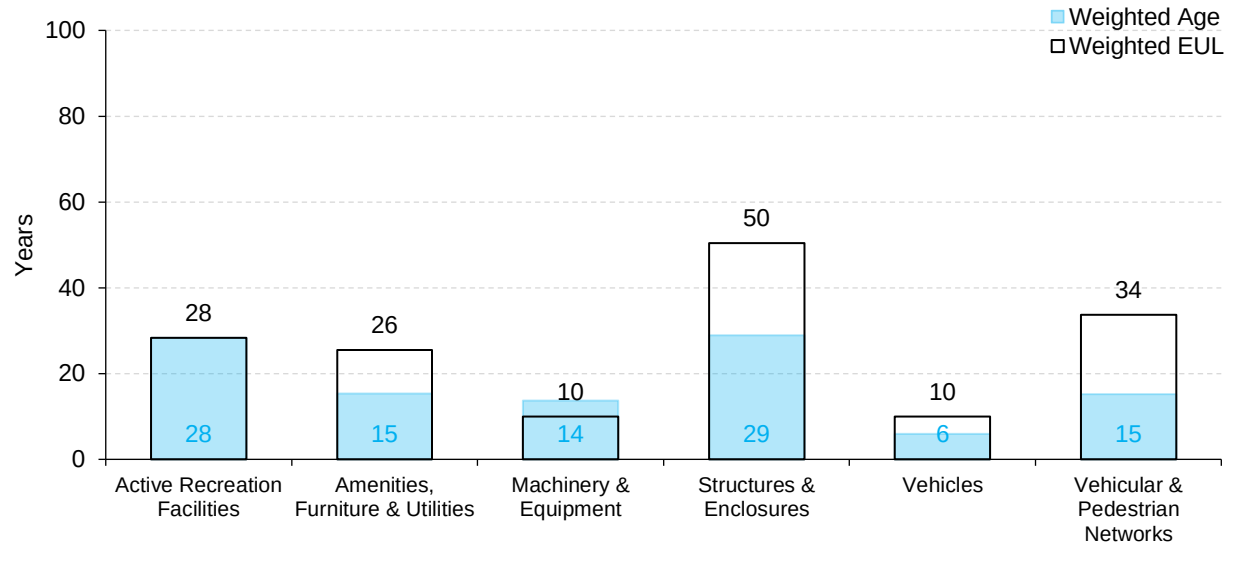
Current Approach to Condition Assessment

A portion of active recreation facilities, structures, and enclosures was assessed by external consultants using a standard building condition assessment approach in 2020. Age was used for estimating the condition of all other assets.

Age Profile

Figure 36 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 and then aggregated.

Figure 59 Estimated Useful Life vs. Asset Age: Parks and Recreation



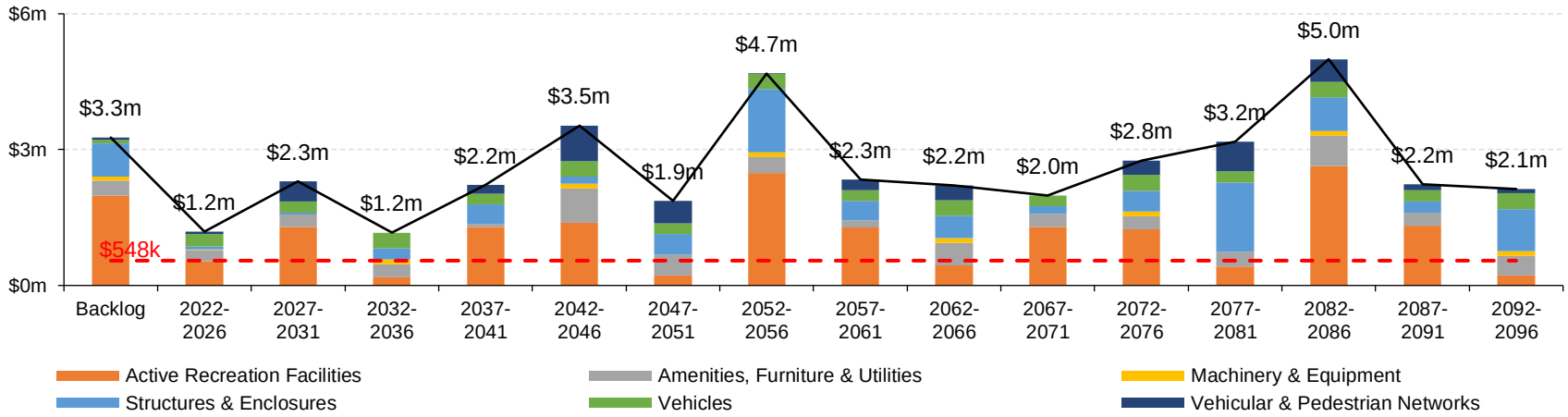
The data reveals that most active recreation facilities, machinery, and equipment assets remain in service beyond their estimated useful life. On average, the majority of other assets are also entering the latter stages of their lifecycle and may require replacements and/or rehabilitation in the short term. Periodically, each asset's EUL should be reviewed to better align with actual, in-field performance.

Forecasted Long-term Capital Replacement Needs

Figure 37 illustrates the cyclical short-, medium- and long-term infrastructure replacement requirements for the Township's parks and recreation assets. This analysis was run to capture at least one iteration of replacement for the longest-lived asset within the parks and recreation asset inventory. This required the projection to span 75 years. Capital replacement needs are consistent across the forecast horizon, averaging approximately $2.6 million per 5-year period.

The chart also illustrates a replacement backlog of $3.3 million, dominated by active recreation facilities and various structures and enclosures. These assets have reached the end of their estimated useful life but remain in service. Both age and condition should be used to forecast replacement needs and refine capital expenditure estimates.

Figure 60 Forecasted Capital Replacement Requirements - Parks and Recreation: 2022-2096



On average, parks and recreation assets require $548k annually to remain current with replacement needs. Often, replacement needs are 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 and gradually building funding capacity over the long term. A robust risk framework and public demand analysis for various parks and recreation services will ensure that high-criticality assets receive proper and timely lifecycle intervention, including replacements. In addition, building condition assessments will be integral in further prioritizing projects.

10-Year Replacement Forecast

The table below summarizes the projected cost of lifecycle activities (capital replacement only) that should be undertaken over the next ten years to maintain the current level of service. These values are derived from Citywide™, the Township's primary asset management application. These projections are based on available condition data and age data.

Table 42 10-Year Replacement Forecast: Parks and Recreation

Asset Type	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Active Recreation Facilities	$130k	$0k	$4k	$250k	$155k	$61k	$159k	$127k	$508k	$438k
Amenities, Furniture & Utilities	$0k	$100k	$0k	$60k	$85k	$85k	$0k	$0k	$25k	$170k
Machinery & Equipment	$0k	$0k	$0k	$0k	$13k	$0k	$0k	$0k	$0k	$0k
Structures & Enclosures	$10k	$13k	$2k	$13k	$27k	$0k	$34k	$5k	$2k	$0k
Vehicles	$41k	$15k	$101k	$68k	$48k	$87k	$60k	$16k	$76k	$0k
Vehicular & Pedestrian Networks	$0k	$0k	$0k	$0k	$50k	$250k	$0k	$165k	$0k	$33k
Total Capital Expenditures	**$181.0k**	**$127.0k**	**$107.3k**	**$390.6k**	**$377.7k**	**$482.4k**	**$252.7k**	**$312.2k**	**$610.2k**	**$641.0k**

Initially, system-generated capital expenditures often differ from actual capital forecasts. Wilmot's 10-year Capital Expenditure Forecast (2022-2031) outlines approximately $31 million in Parks, Facilities, and Recreation Services related expenditures over the next decade, including $14 million on the Wilmot Recreation Complex and $3.3 million on Trails and Active Transportation.

Over time, the alignment between system-generated forecasts and those developed through staff judgement will improve with effective management of the Township's asset register and the associated risk and lifecycle frameworks. Portions of parks and recreation services were assessed as part of the Township's 2020 building condition assessments. This BCA outlines key interventions at the asset level, their timing, and associated costs. Vehicles are typically replaced based on age. Therefore, a replacement strategy that incorporates condition, mileage, breakdown history, and other performance indicators would improve these projections and is recommended. This data should also be incorporated into the Township's asset register for improved forecasting.

Risk Analysis

The risk matrices below are generated using available asset data and were developed in collaboration with staff. They stratify assets into risk groups based on current replacement costs. In addition, technical workshops were held with subject matter experts at the Township to identify factors and attributes that can aid in estimating the probability of asset failure and in identifying and quantifying the various consequences of a failure, including financial, environmental, and operational.

Figure 61 Risk Matrix - Parks and Recreation: Active Recreation Facilities

Figure 62 Risk Matrix - Parks and Recreation: Amenities, Furniture, and Utilities

Figure 63 Risk Matrix - Parks and Recreation: Machinery & Equipment

Figure 64 Risk Matrix - Parks and Recreation: Structures & Enclosures

Figure 65 Risk Matrix - Parks and Recreation: Vehicles

Figure 66 Risk Matrix - Parks and Recreation: Vehicular & Pedestrian Networks

See Appendix 3: Risk Frameworks for details on how risk ratings were assigned to Parks and Facilities assets.

In addition to asset level risk, the municipality may face risk associated with not executing key lifecycle activities, including repairs, rehabilitation, and replacement or upgrades of critical assets. These include:

- Missed opportunities for cost savings and increases in lifecycle costs
- Deferral of vital projects or further lending and borrowing
- Accelerated asset deterioration and premature failure, may lead to public health and safety hazards, and disruption of services to the Township's residential and commercial base
- A decline in public satisfaction with the Township's service standards and the resulting reputational damage

An asset's criticality rating, determined by the nature and magnitude of the consequences of its potential failure, should be used to prioritize projects, particularly lifecycle management strategies. Using risk in conjunction with levels of service and the recommended treatment options can assist in optimizing limited funds.

Levels of Service

The Township's levels of service framework contain 18 community levels of service KPIs and 12 technical KPIs for parks, facilities, and recreational infrastructure. These KPIs are aligned with core values associated with each service area and reflect the priorities identified within Wilmot's Strategic Plan, including 'Fiscal Responsibility,' 'Active Transportation,' 'Infrastructure Investments,' and 'Smart Growth.'

Although O. Reg 588/17 does not require municipalities to provide current performance levels for non-core assets, the tables below comprise select KPIs for which current performance data was available.

The complete list of KPIs developed for parks and recreation services can be found in Appendix 2: Levels of Service Framework. The framework will be used to track the performance of assets on an annual basis. The 2024 iteration of the Township's AMP will include current performance levels for the KPIs below. This data will be used to assist in establishing proposed levels of service.

Table 43 Current Community Levels of Service: Parks and Recreation Services

Service Attribute	Community Levels of Service KPI	Current Level of Service
Accessible and Reliable	Parkland service level per 1000 residents (hectares)	4.3
	% of parks with an 800m service area	68%
	% of parks and recreation facilities connected to the Township's active transportation network	5%
	# of complaints regarding the condition of outdoor courts and sports facilities	5
	% of parks facilities that are AODA compliant	75%
	Number of monthly inspections completed	142
	% facilities uptime (Covid-19 restrictions severely limited facility uptime.)	15%
Safe and Regulated	# of complaints regarding the safety of playground equipment	6
Affordable	% of users that identify costs as a barrier to using recreation facilities	0%
	Financial assistance program % of the funding available that is consumed	40%

Table 44 Current Technical Levels of Service: Parks and Recreation Services

Service Attribute	Technical Levels of Service KPI	Current Level of Service
Accessible and Reliable	# of facilities with environmentally conscious designs	29%
	% of facilities that have undergone a detailed condition assessment	100%
	The utilization rate for Recreational facilities	25%
Safe and Regulated	% of facilities in poor or very poor condition	1%
	% of facilities that meet AODA standards	46%
	Average Facilities Condition Index (weighted by replacement cost)	91%
	% of facilities with a high or very high-risk rating	1%

Fire Services

Fire services is considered a “non-core” asset with respect to O. Reg 588/17. As such, The Township is not required to report on this asset category until 2024. Including fire services in the 2022 AMP is important when developing an effective financial strategy. However, not all fire service assets were included in the development of risk and levels of services frameworks or lifecycle strategies. These will be included in the 2024 AMP update.

Inventory and Valuation

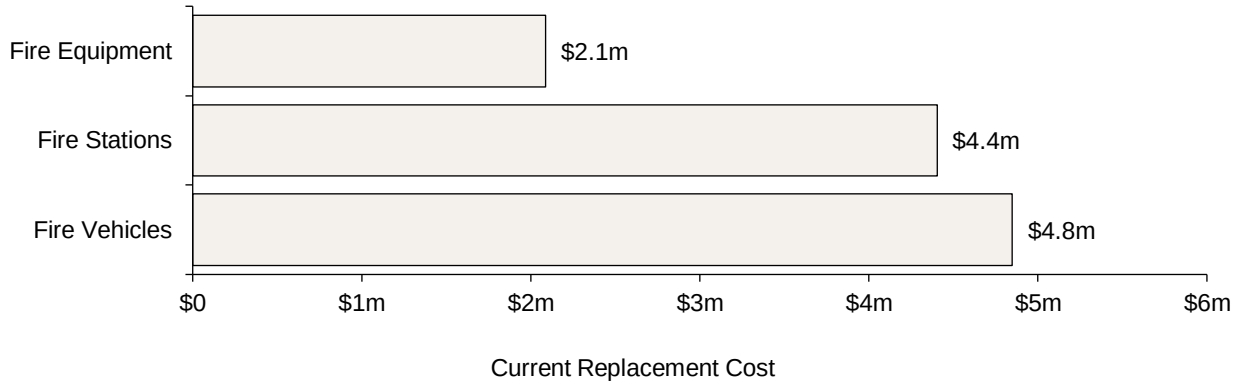
Wilmot’s Fire Services portfolio includes fire stations, critical fire equipment and vehicles. These assets have a total current replacement cost of $11 million.

Fire service vehicles represent the largest segment of Wilmot’s Fire Service portfolio, at 43% of the current replacement cost. Table 37 summarizes the quantity and current replacement cost of major Fire Service assets.

Table 45 Detailed Asset Inventory: Fire Services

Asset	Quantity	Replacement Cost
Fire Stations	3	$4,400,010
Fire Vehicles	17	$4,849,619
Fire Equipment	29	$2,088,834
Total		**$11,338,463**

Figure 67 Portfolio Valuation: Fire Services



Asset Condition

Table 20 outlines each segment's average condition rating and asset condition source for the Township's fire services. Condition data was available for fire stations. However, for vehicles and equipment, age was used to estimate the condition of these assets.

Table 46 Average Condition and Source of Condition Data

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Fire Stations	64%	Good	2020 Englobe Building Condition Assessment
Fire Vehicles	23%	Poor	Age-based only
Fire Equipment	56%	Fair	Age-based only
Overall Average	45%	Fair	Age-based only

Figure 68 summarizes the replacement cost-weighted condition of the Township's fire services assets. Based on assessed condition data, 63% of assets are in fair or better condition. The remaining 37%, primarily equipment and vehicles, are in poor or worse condition, based only on age. 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 69 details the condition of each asset segment.

Figure 68 Asset Condition - Fire Services: Overall

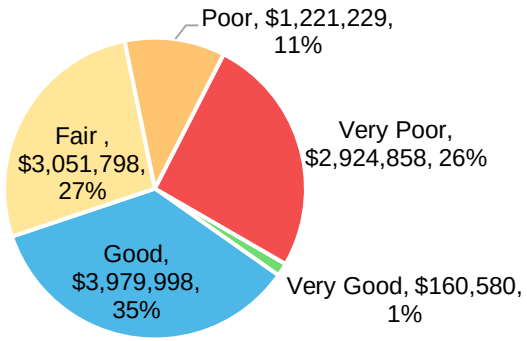
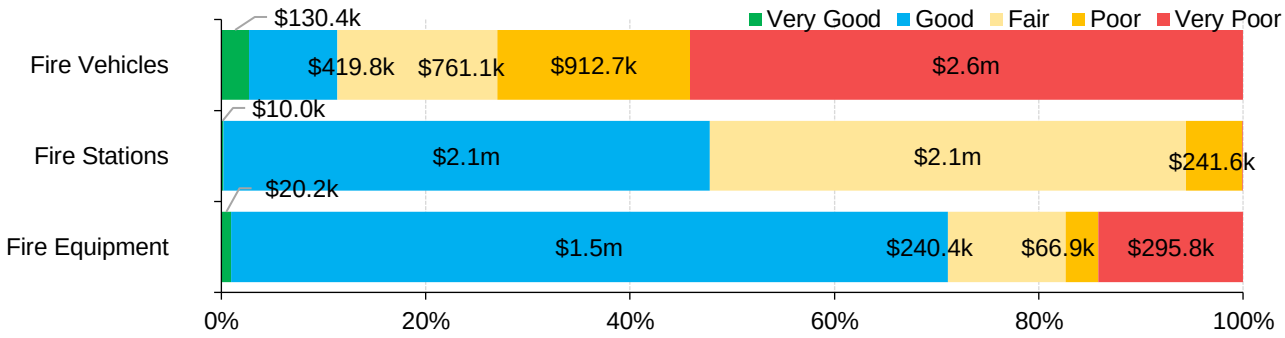


Figure 69 Asset Condition - Fire Services: By Asset Type



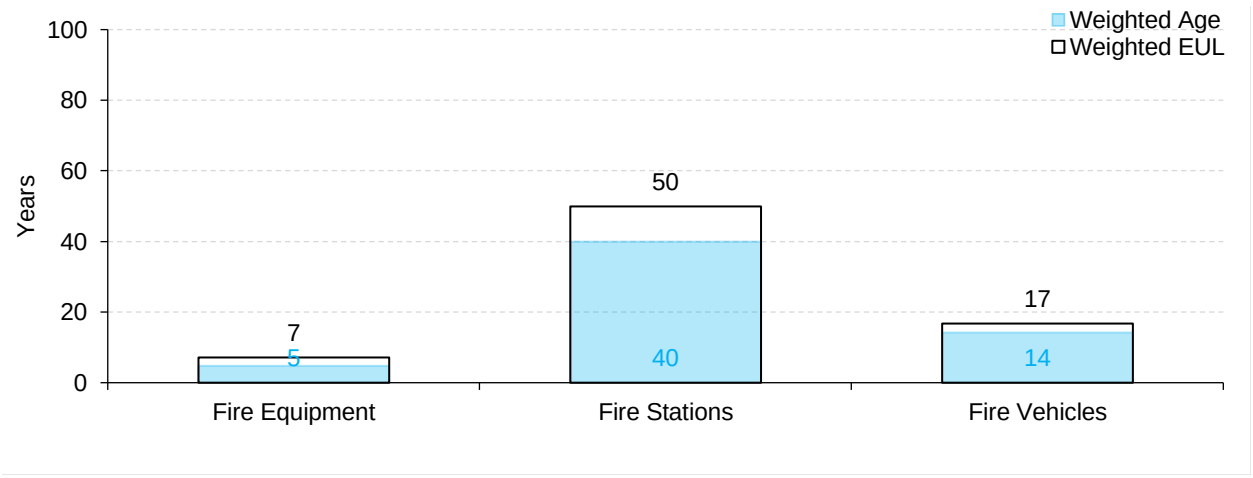
Current Approach to Condition Assessment

Fire stations were assessed as part of the Township's 2020 building condition assessment. Each facility was componentized into 227 individual building elements using an industry-standard Uniformat II code classification system.

Age Profile

Figure 70 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 and then aggregated.

Figure 70 Estimated Useful Life vs. Asset Age: Fire Services



The data reveals that, on average, most fire service assets are in the latter stages of their serviceable life and may require replacements and rehabilitation in the short term. Therefore, building condition assessments will be integral in project selection.

Lifecycle Management Strategy

Fire stations are complex facilities and include many individual components. The building condition assessment provides recommended interventions for these components, including repairs, rehabilitation, and replacements and the timeline for completion. These interventions are also prioritized based on the consequence of failure of individual assets.

The Township's 2019 Fire Master Plan outlines specific future needs and upgrades required, including potential reconstruction of the Township's fire stations and construction of new facilities to meet needs. Although the Township endeavours to adhere to a 15-20 year replacement cycle for fire trucks, with some gaps. The Master Plan shows rescue trucks are on a 20-year replacement cycle. Lastly, pickups are on a 10-year replacement cycle.

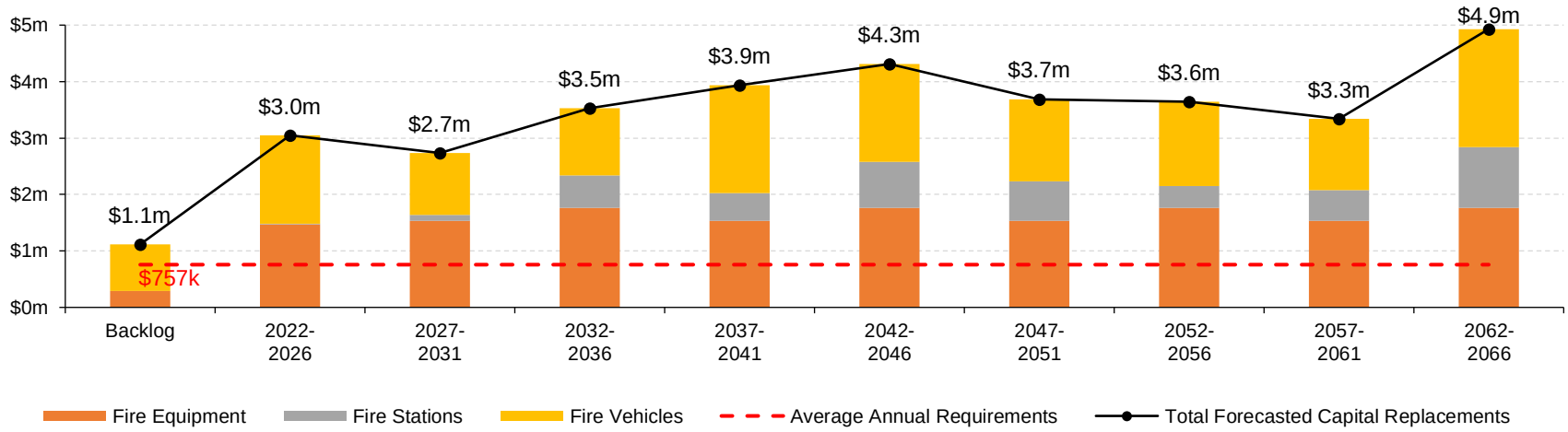
Firefighting staff complete all weekly and monthly (general) inspections and testing of vehicles and equipment. If any mechanical repairs are required for a vehicle, they are contracted out to a third-party facility/mechanic with appropriate skills to facilitate needed repairs.

Forecasted Long-term Capital Replacement Needs

Figure 71 illustrates the cyclical short-, medium- and long-term infrastructure replacement requirements for the Township's fire services portfolio. This analysis captured at least one replacement cycle for the longest-lived asset within the fire services asset inventory. This required the projection to span 45 years. The analysis shows that the current decade requires nearly $6 million in replacement investments, dominated by equipment and vehicles.

The chart also illustrates a replacement backlog of $1.1 million, primarily within fire vehicles. These assets have reached the end of their estimated useful life but remain in service. Both age and condition should be used to forecast replacement needs and refine capital expenditure estimates.

Figure 71 Forecasted Capital Replacement Requirements - Fire Services: 2022-2066



On average, $757k is required to remain current with replacement needs associated with fire services. Although actual spending will vary based on condition assessments and recommendations within the Master Plan, this figure is a valuable benchmark. In addition, continued upkeep and improvement of the Township's asset inventory, including integration of vehicle performance and repair data and facilities condition, will lead to improved long-term forecasting.

10-Year Replacement Forecast

The table below summarizes the projected cost of lifecycle activities (capital replacement only) that should be undertaken over the next ten years to maintain the current level of service. These values are derived from Citywide™, the Township's primary asset management application. These projections are based on available condition data and age data.

Table 47 10-Year Replacement Forecast - Fire Services

Asset Type	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Fire Equipment	$0	$16.9k	$0.0k	$1.24m	$205.0k	$35.4k	$192.2k	$96.1k	$1,214.3k	$0.0k
Fire Stations	$0	$0.0k	$5.6k	$3.0k	$5.3k	$0.4k	$75.6k	$1.5k	$27.5k	$0.0k
Fire Vehicles	$0	$228.0k	$254.2k	$622.2k	$461.5k	$237.4k	$419.8k	$302.0k	$0.0k	$130.4k
Total Capital Expenditures	**$0**	**$244.9k**	**$259.8k**	**$1.87m**	**$671.8k**	**$273.2k**	**$687.6k**	**$399.6k**	**$1,241.8k**	**$130.4k**

Initially, system-generated capital expenditures often differ from actual capital forecasts. Wilmot's 10-year Capital Expenditure Forecast (2022-2031) outlines approximately $12.4 million in Fire Services related expenditures over the next decade, distributed primarily between Vehicles and Facilities.

Over time, the alignment between system-generated forecasts and those developed through staff judgement will improve with effective management of the Township's asset register and the associated risk and lifecycle frameworks. For vehicles, a replacement strategy that incorporates condition, mileage, breakdown history, and other performance indicators would improve these projections and is recommended. This data should also be incorporated into the Township's asset register for improved forecasting.

Risk Analysis

It is important to note that a comprehensive risk analysis for Fire Services has not been carried out. The following risk matrices are based solely on the framework for the specific asset category fire services assets belong to. For example, fire stations are categorized as a “building” in the Township’s asset register. Therefore, the risk criteria for buildings were applied to all fire stations. A complete risk analysis that takes into account all possible consequences will included in the 2024 AMP update.

Figure 72 Risk Matrix - Fire Services: Stations

Figure 73 Risk Matrix - Fire Services: Vehicles

Figure 74 Risk Matrix - Fire Services: Equipment

In addition to asset level risk, the municipality may face risk associated with not executing key lifecycle activities, including repairs, rehabilitation, and replacement or upgrades of critical assets. These include:

- Given the inherently critical nature of fire services, asset failures may pose substantial threats to public health and safety.
- Missed opportunities for cost savings and increases in lifecycle costs
- Deferral of vital projects or further lending and borrowing
- Accelerated asset deterioration and premature failure may lead to public health and safety hazards, and disruption of services to the Township's residential and commercial base
- A decline in public satisfaction with the Township's service standards and the resulting reputational damage

An asset's criticality rating, determined by the nature and magnitude of the consequences of its potential failure, should be used to prioritize projects, particularly lifecycle management strategies. Using risk in conjunction with levels of service and the recommended treatment options can assist in optimizing limited funds.

See Appendix 3: Risk Frameworks for details on how risk ratings were assigned some of Fire Services' assets.

Levels of Service

The Township's levels of service framework contain ten community levels of service KPIs and 16 technical KPIs for fleet, machinery, and equipment. These include protective services. These KPIs are aligned with core values associated with each service area and reflect the priorities identified within Wilmot's Strategic Plan, including 'Fiscal Responsibility' and 'Infrastructure Investments.'

The complete list of these KPIs can be found in Appendix 2: Levels of Service Framework. These KPIs will be used to track the performance of assets on an annual basis and will assist in establishing proposed levels of service to support compliance with O. Reg 588/17 requirements in 2025.

O. Reg 588/17 does not require municipalities to report on current performance levels for non-core assets until 2024, nor does it prescribe specific KPIs that must be measured. Therefore, municipalities may use their discretion in establishing appropriate KPIs. The 2024 iteration of the Township's AMP will include current performance levels for KPIs established in the LOS framework.

Other Service Areas

This section provides the state of the infrastructure for Wilmot's By-Law, Development, and Corporate Services assets. Data was consolidated due to the relatively minor and uniform nature of the assets in these service areas.

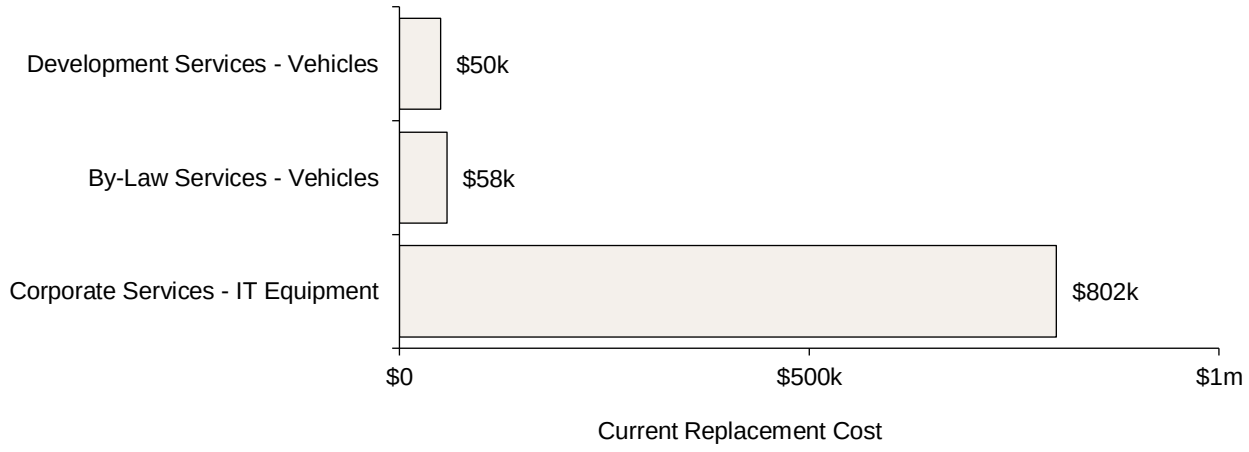
Inventory and Valuation

Table 48 summarizes the quantity and current replacement cost of vehicles and equipment that support general operations at the Township.

Table 48 Detailed Asset Inventory: By-Law, Development, and Corporate Services

Asset	Quantity	Replacement Cost
By-Law Services - Vehicles (Light Duty)	2	$57,934
Development Services - Vehicles (Light Duty)	2	$50,285
Corporate Services - Technological Equipment	21	$801,504
Total		**$909,723**

Figure 75 Portfolio Valuation: By-Law, Development, and Corporate Services



Asset Condition

Table 41 outlines each segment's average condition rating and asset condition source for the Township's other service areas. Age was used to estimate condition of all assets.

Table 49 Average Condition and Source of Condition Data

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
By-Law Services - Vehicles (Light Duty)	31%	Poor	Age-based only
Development Services - Vehicles (Light Duty)	40%	Fair	Age-based only
Corporate Services - Technological Equipment	8%	Very Poor	Age-based only
Overall Average	12%	Very Poor	

Figure 77 summarizes the replacement cost-weighted condition of the by-law, development, and corporate services assets. Based on age data only, 87% of assets are in poor or worse condition. These assets may be candidates for replacement in the short term.

Figure 76 Asset Condition - Other Service Areas**: Overall**

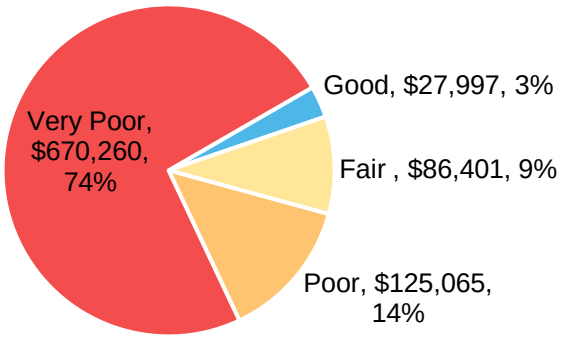
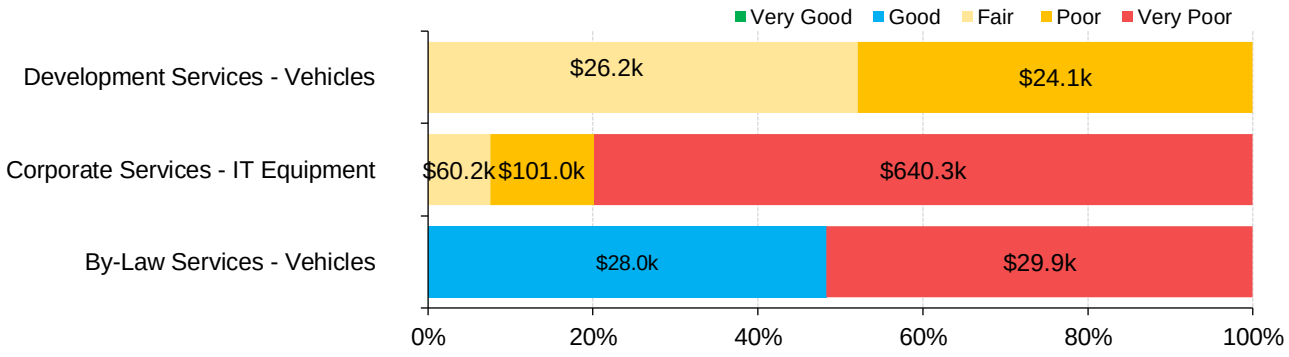


Figure 77 Asset Condition - By-Law, Development, and Corporate Services: By Service Area



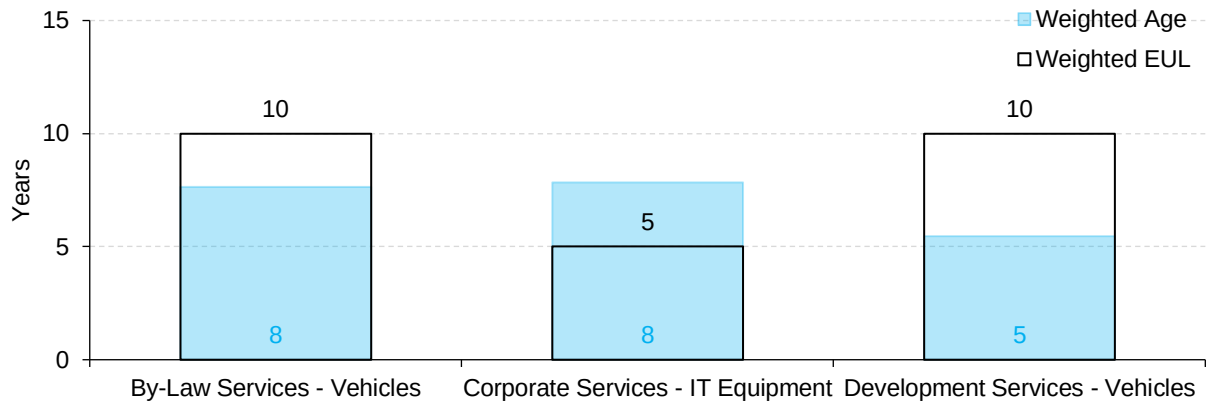
Current Approach to Condition Assessment

Vehicle condition is estimated by age; no regular condition assessment program exists.

Age Profile

Figure 78 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 and then aggregated. On average, across the three service areas, assets are either in the latter stages of their lifecycle or remain in service beyond their estimated useful life, requiring replacement.

Figure 78 Estimated Useful Life vs. Asset Age: By-Law, Development, and Corporate Services



Lifecycle Management Strategy

Assets within these services areas are typically managed on a buy-replace cycle (e.g., ten years) and do not require sophisticated lifecycle management strategies. However, manufacturer recommendations may be followed to remain current with repair needs and minimize equipment and vehicle downtime.

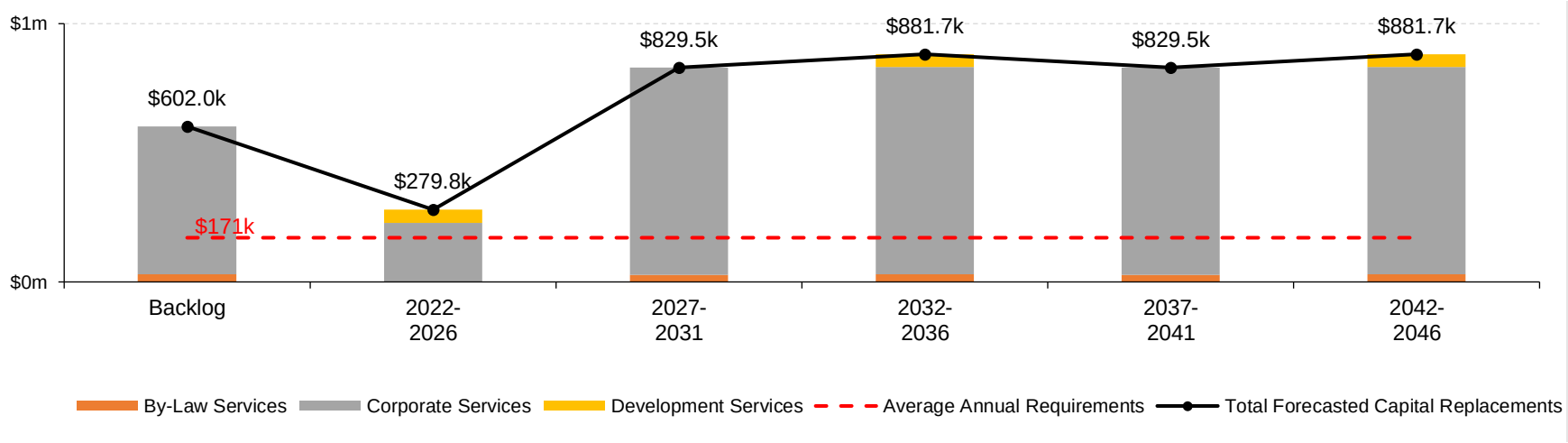
Forecasted Long-term Capital Replacement Needs

Vehicle performance and utilization history can be used to improve forecasting. This data, as available, should be integrated with Citywide™.

Figure 79 illustrates the cyclical short-, medium- and long-term infrastructure replacement requirements for the Township's by-law, development services, and corporate services assets. This analysis was run to capture at least one iteration of replacement for the longest-lived asset within these service areas. This required the projection to span 25 years. Capital replacement needs are consistent across the forecast horizon, averaging approximately less than $1 million per 5-year period. On average, $171k is required to remain current with annual replacement needs, although actual spending may vary year to year.

The chart also illustrates a replacement backlog of $600k, dominated by corporate services assets, primarily software and hardware. These assets often have short lifespans and do not require complex lifecycle strategies. Instead, a buy-replace approach is usually sufficient to meet long-term needs. Vehicle performance and utilization history can be used to improve forecasting. This data, as available, should be integrated with Citywide™.

Figure 79 Forecasted Capital Replacement Requirements - By-Law, Development, and Corporate Services: 2022-2046



10-Year Replacement Forecast

The table below summarizes the projected cost of lifecycle activities (capital replacement only) that should be undertaken over the next ten years to maintain the current level of service. These values are derived from Citywide™, the Township's primary asset management application. These projections are based on available condition data and age data.

Table 50 10-Year Replacement Forecast - By-Law, Development, and Corporate Services

Asset Type	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
By-Law Services	$0k	$0k	$0k	$0k	$0k	$0k	$28k	$0k	$0k	$0k
Corporate Services	$68k	$101k	$60k	$0k	$0k	$640k	$101k	$60k	$0k	$0k
Development Services	$0k	$0k	$0k	$24k	$26k	$0k	$0k	$0k	$0k	$0k
Total Capital Expenditures	**$68k**	**$101k**	**$60k**	**$24k**	**$26k**	**$640k**	**$129k**	**$60k**	**$0k**	**$0k**

Initially, system-generated capital expenditures often differ from actual capital forecasts. Wilmot's 10-year Capital Expenditure Forecast (2022-2031) outlines approximately $2.2 million in expenditures related to Corporate Services and Development Services over the next decade. Over time, the alignment between system-generated forecasts and those developed through staff judgement will improve with effective management of the Township's asset register and the associated risk and lifecycle frameworks. Vehicle performance and utilization history should be used to establish and revise short- and long-term replacement needs.

Risk Analysis

The risk matrices below are generated using available asset data and were developed in collaboration with staff. They stratify assets into defined risk groups based on their current replacement costs. In addition, technical workshops were held with subject matter experts at the Township to identify factors and attributes that can aid in estimating the probability of asset failure and in identifying and quantifying the various consequences of a failure, including financial, environmental, and operational.

Figure 80 Risk Matrix – Other Service Areas: By-Law Services Vehicles

Figure 81 Risk Matrix – Other Service Areas: Corporate Services IT Equipment

Figure 82 Risk Matrix – Other Service Areas: Development Services Vehicles

In addition to asset level risk, the municipality may face risk associated with not executing key lifecycle activities, including repairs, rehabilitation, and replacement or upgrades of critical assets. These include:

- Although assets in these service areas are not inherently critical, their failure can disrupt efficient and effective operations and delivery of reliable public service.
- Missed opportunities for cost savings and increases in lifecycle costs
- A decline in public satisfaction with the Township's service standards and the resulting reputational damage

An asset's criticality rating, determined by the nature and magnitude of the consequences of its potential failure, should be used to prioritize projects, particularly lifecycle management strategies. Using risk in conjunction with levels of service and the recommended treatment options can assist in optimizing limited funds.

See Appendix 3: Risk Frameworks for details on how risk ratings were assigned to Fleet, Machinery and equipment assets.

Levels of Service

The Township's levels of service framework contain ten community levels of service KPIs and 16 technical KPIs for fleet, machinery, and equipment. These KPIs are aligned with core values associated with each service area and reflect the priorities identified within Wilmot's Strategic Plan, including 'Fiscal Responsibility' and 'Infrastructure Investments.'

The complete list of these KPIs can be found in Appendix 2: Levels of Service Framework. These KPIs will be used to track the performance of assets on an annual basis and will assist in establishing proposed levels of service to support compliance with O. Reg 588/17 requirements in 2025.

O. Reg 588/17 does not require municipalities to report on current performance levels for non-core assets until 2024, nor does it prescribe specific KPIs that must be measured. Therefore, municipalities may use their discretion in establishing appropriate KPIs. The 2024 iteration of the Township's AMP will include current performance levels for KPIs established in the LOS framework.

Financial Strategy

Each year, investments must be made in infrastructure maintenance, renewal, rehabilitation, and replacement to ensure it remains in a state of good repair. The Township's dedicated infrastructure levy is a critical instrument that supports these important investments.

The focus of this asset management strategy, and that of most municipal asset management plans, is typically annual capital expenditures. These target investment levels, or annual capital requirements, are distributed across the asset's lifecycle.

The objective is to ensure that when assets reach the end of their useful life, sufficient funding is available to replace them to minimize service disruption. The annual requirements are directly proportional to the value of the infrastructure portfolio and the average useful life of assets contained within it.

Annual Capital 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 address capital expenditures for the assets included in this AMP.

Table 51 outlines current annual capital requirements by service area. Based on a replacement cost of $533 million (excludes stormwater management ponds), Wilmot's annual requirements total approximately $12.7 million for the ten services analyzed in this document.

The table also illustrates the equivalent reinvestment rate (ERR), calculated by dividing the annual capital requirements by the total replacement cost of each service area. There is no industry standard guide on optimal annual investment in infrastructure, so the ERR provides a target for organizations.

Table 51 Average Annual Capital Requirements

Service Area	Replacement Cost	Annual Capital Requirements	Equivalent Reinvestment Rate
Transportation Network	$223,750,997	$6,759,382	3.0%
Stormwater Network	$71,403,722	$885,999	1.2%
Parks & Recreation	$14,107,576	$547,529	3.9%
Buildings & Facilities	$35,521,481	$1,097,307	3.1%
Fire Services	$11,341,463	$756,773	6.7%
By-law Services	$57,934	$5,793	10.0%
Development Services	$50,285	$5,029	10.0%
Corporate Services	$801,504	$160,301	20.0%
Water Network	$91,280,518	$1,265,326	1.4%
Sanitary Sewer Network	$85,562,874	$1,177,447	1.4%
Total	**$533,773,064**	**$12,660,886**	**2.4%**

Current Infrastructure Funding Framework

An annual reinvestment rate of 2.4% of the total replacement cost of Wilmot's infrastructure portfolio would ensure that replacement needs are fulfilled, and high service levels are delivered across all service areas and infrastructure categories.

The majority of the $17 million generated through various funding sources, including property taxation, senior government grants, and user fees for water and wastewater, is allocated to operations. From property tax revenues, capital expenditures for tax-funded categories totalled $1.5 million in 2021, with a further $336k allocated to appropriate reserves. For water and sanitary service areas, $1.2 million were allocated to reserves for future capital spending. Senior government funding comprised 53% of the total funding allocated to tax-funded service areas, as further illustrated in Table 52.

Current Funding Position and Reinvestment Rates

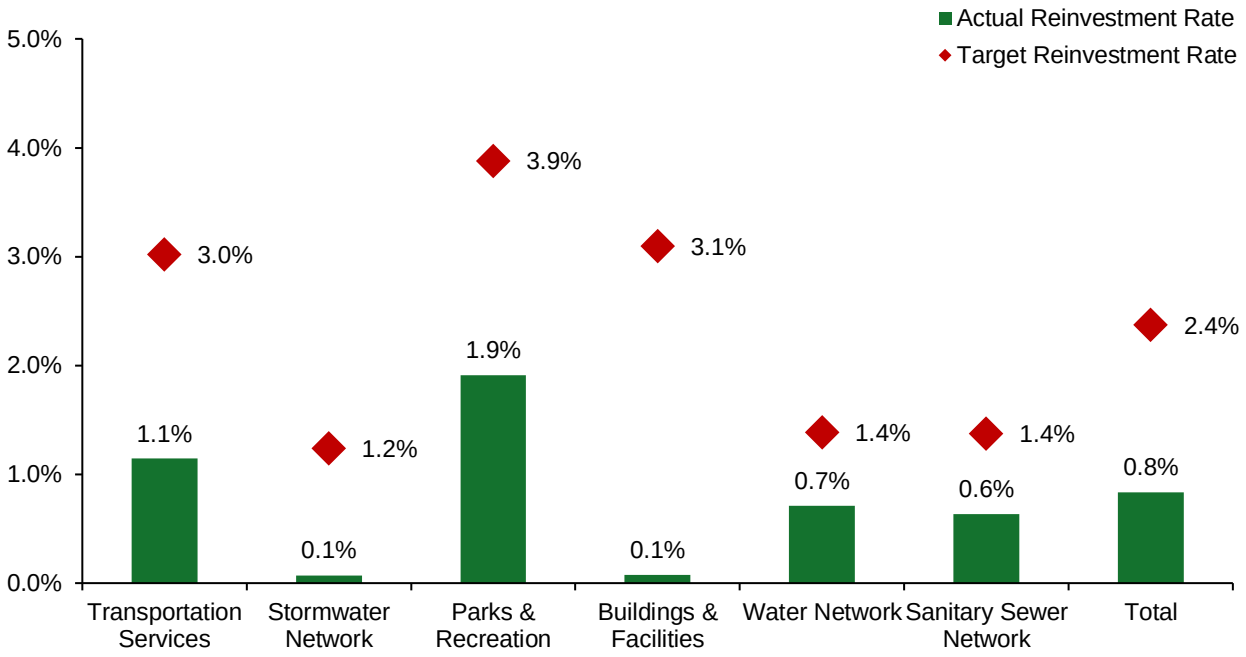
Table 52 summarizes in further detail the average annual funding required to meet the capital needs of the current asset portfolio and the level of funding currently available for each service area. At existing levels, the Township is funding 35% of its annual capital requirements for all infrastructure analyzed in this asset management plan, producing an actual reinvestment rate of 0.8%. On average, tax-funded categories are funded at 31% of their annual requirements; water assets meet 49% of their annual requirements, and sanitary services at 54%. This creates a total annual funding deficit of $8.2 million.

Table 52 Current Funding Position vs. Required Funding

Service Area	Annual Capital Requirements	Total Funding Available	Annual Infrastructure Deficit/Surplus	Funding Position
Transportation Network	$6,759,382	$2,561,291	$4,198,091	38%
Stormwater Network	$885,999*	$51,143	$834,856	6%
Parks & Recreation	$547,529	$269,846	$277,683	49%
Buildings & Facilities	$1,097,307	$27,707	$1,069,600	3%
Fire Services	$756,773	$179,451	$577,322	24%
By-law Services	$5,793	$0	$5,793	0%
Development Services	$5,029	$17,317	-$12,289	>100%
Corporate Services	$160,301	$92,127	$68,174	57%
Water Network	$1,265,326	$618,238	$647,088	49%
Sanitary Sewer Network	$1,177,447	$636,531	$540,916	54%
Total	**$12,660,886**	**$4,453,652**	**$8,207,234**	**35%**

Figure 83 illustrates Wilmot's target and actual reinvestment rates for major asset classes. By-law, Development, and Corporate Services were excluded as their target rates were extreme outliers. Minor assets such as small equipment or light-duty vehicles typically have high reinvestment rates due to their short lifespans.

Figure 83 Target vs. Actual Reinvestment Rates



Closing Funding Gaps

Eliminating annual infrastructure funding shortfalls is a challenging and long-term endeavour for municipalities. Substantial investments have been made over decades, and constituents quickly become accustomed to service levels. The Township's current funding position will require many years to reach full funding.

Tax Funded Service Areas

In 2021, Wilmot's budgeted annual tax revenues totalled $9.4 million. This value is the foundation for calculating potential adjustments to tax rates to meet infrastructure needs.

Table 53 presents two scenarios:

- Scenario 1 sets a desired or target funding level at 100% of annual capital requirements
- Scenario 2 sets this target at 75% of annual requirements

As previously illustrated in Table 52, funding for these assets total $3.2 million, against average annual requirements of $10.2 million. As a result, the Township is funding 31% of the total annual requirements associated with its tax-funded assets, leaving an annual shortfall of $7.0 million.

Table 53 Funding Scenarios: Tax Funded Assets

	Annual Requirements	Target Funding Level	Current Funding Level	Funding change required to achieve target funding level	Tax rate change required to achieve target funding level over the phase-in period (in years)			
					5 years	10 years	15 years	20 years
Scenario 1	$10,218,113	$10,218,113 (100%)	$3,198,883 (31%)	$7,019,230	↑ 11.8%	↑ 5.7%	↑ 3.8%	↑ 2.8%
Scenario 2	$10,210,824	$7,658,118 (75%)	$3,198,883 (42%)	$4,464,701	↑ 8.1%	↑ 4.0%	↑ 2.6%	↑ 2.0%

To achieve full funding for tax-funded assets and meet 100% of annual requirements, current tax revenues would need to increase by 11.8% per year over a phase-in period of five years. If the full-funding phase-in period is extended to 20 years, tax revenues would need to increase by 2.8% annually.

Similarly, to fund 75% of annual funding needs, an annual tax rate change of 8.1% would be required for a phase-in period of five years, or 2.0% annually over 20 years. Required tax increases are also outlined for each scenario for a 10-year and 15-year phase-in period.

These scenarios assume that the current Canada Community-Building Fund (CCBF, formerly the Federal Gas Tax Fund) and the Ontario Community Infrastructure Fund (OCIF) continue to be allocated as they are today.

Rate Funded Service Areas

A similar analysis was conducted for Wilmot's rate-funded service areas, namely water and sanitary sewer networks. In 2021, water distribution services generated rate revenues totalling $3.1 million; sanitary collection services generated rate revenues totalling $3.3 million. These values are used as the foundation for calculating potential adjustments to water and sanitary user rates.

Table 54 presents two scenarios each for water and sanitary:

- Scenario 1 sets a desired or target funding level at 100% of annual capital requirements
- Scenario 2 sets this target at 75% of annual requirements

As previously illustrated in Table 52, funding for water assets totals $618k, against average annual requirements of $1.3 million. As a result, the Township is funding only 49% of its water infrastructure funding needs, creating an annual funding gap of $647k. Similarly, funding for sanitary totals $637k against average annual requirements of $1.1 million, leaving a funding shortfall of $541k.

Water Network

To achieve full funding for water infrastructure and meet 100% of annual requirements, current rate revenues would need to increase by 3.9% per year if a phase-in period of five years is selected. If the full-funding phase-in period is extended to 20 years, rate revenues would need to increase 1.0% annually. Similarly, to fund 75% of annual funding needs, an annual rate increase of 2.0% would be required for a phase-in period of five years, or 0.5% annually for 20 years. Required rate increases are also outlined for a 10-year and 15-year phase-in period.

Sanitary Sewer Network

To achieve full funding for sanitary sewer infrastructure and meet 100% of annual requirements, current rate revenues would need to increase by 2.6% per year if a phase-in period of five years is selected. If the full-funding phase-in period is extended to 20 years, rate revenues would need to increase 0.7% annually. Similarly, to fund 75% of annual funding needs, an annual tax rate change of 1.5% would be required for a phase-in period of five years, or 0.4% annually for 20 years.

Table 54 Rate Funded Assets

	Annual Requirements	Target Funding Level	Current Funding Level	Funding change required to achieve target funding level	Tax rate change required to achieve target funding levels over the phase-in period (in years)			
Water					5 years	10 years	15 years	20 years
Scenario 1	$1,265,326	$1,265,326 (i.e., 100% of annual requirements)	$618,238 (i.e., 49% of target funding level)	$647,088	↑ 3.9%	↑ 1.9%	↑ 1.3%	↑ 1.0%
Scenario 2	$1,265,326	$948,995 (i.e., 75% of annual requirements)	$618,238 (i.e., 65% of target funding level)	$330,757	↑ 2.0%	↑ 1.0%	↑ 0.7%	↑ 0.5%
Wastewater					5 years	10 years	15 years	20 years
Scenario 1	$1,177,447	$1,177,447 (i.e., 100% of annual requirements)	$636,531 (i.e., 65% of target funding level)	$540,916	↑ 2.6%	↑ 1.3%	↑ 0.9%	↑ 0.7%
Scenario 2	$1,177,447	$883,085 (i.e., 75% of annual requirements)	$636,531 (i.e., 77% of target funding level)	$246,554	↑ 1.5%	↑ 0.7%	↑ 0.5%	↑ 0.4%

Funding Levels and Levels of Service

Funding 100% of annual capital requirements ensures that all major capital events, including replacements, are completed as required. Under this scenario, no projects are deferred for future years. This delivers the highest asset performance and customer levels of service. In addition, reducing annual funding targets to 75% of annual capital requirements substantially decreases the financial burden on tax- and rate-payers, as illustrated in Table 55.

Table 55 Scenario 2 vs. Scenario 1: Impact on Required Tax or Rate Increase at 75% Annual Funding Level Target

Service Area	5-year phase-in	10-year phase-in	15-year phase-in	20-year phase-in
Tax Funded - All	-32%	-31%	-31%	-31%
Rate Funded - Water Network	-47%	-47%	-47%	-47%
Rate Funded - Sanitary Sewer Network	-45%	-45%	-45%	-45%

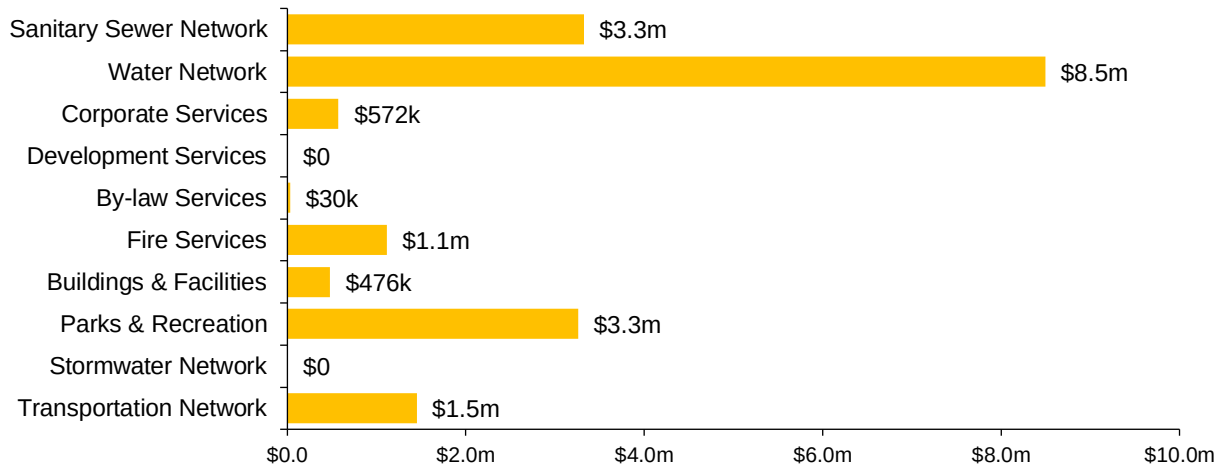
Under Scenario 2, the required tax increases are reduced by more than 30% for each phase-in period for tax-funded service areas. Water and sanitary services see a potential decrease of nearly 50% in required rate increases for each phase-in period.

However, this approach will also reduce the financial capacity of Wilmot to maintain its infrastructure in a state of good repair and may produce undesirable long-term consequences, including:

- reduced asset performance and increased rate of asset failures; with a longer replacement cycle, assets may remain in service beyond their useful life
- continuation of the 'worst-first' or reactive approach to infrastructure management and project selection;
- reduced customer service levels and increases in citizen complaints;
- potential reputational damage;
- increased risk to public health and safety;
- project deferrals or cancellations, leading to further accumulation of existing infrastructure backlogs.

Figure 84 shows that the current infrastructure backlog totals approximately $18 million across all service areas. However, as no condition data was available for stormwater, the backlog of $0 may be an unreliable figure as it is based only on age data. Similarly, backlog estimates for sanitary and water services, machinery, equipment, and fleet assets were based only on asset age. They may change with additional details on asset condition and performance.

Figure 84 Current Infrastructure Backlog by Service Area



Reserve Levels

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

- the ability to stabilize tax rates when dealing with variable and sometimes uncontrollable factors; such as labour shortages, commodity prices, regulation changes, climate change and supply chain issue
- financing one-time or short-term investments;
- accumulating the funding for significant future infrastructure investments;
- managing the use of debt;
- normalizing infrastructure funding requirement;

Table 56 summarizes the magnitude of current infrastructure reserves and their size as a portion of the current replacement cost for the applicable service areas. Across all service areas, infrastructure reserves total $8 million, or 1.5% of the total current replacement value of assets.

Table 56 Infrastructure Reserve Levels vs. Asset Replacement Costs

Reserve Name	Service Areas	Balance at YE 2020	% of Current Replacement Cost
Tax Funded Service Areas			
Infrastructure Reserve Fund - Equipment	Fire Services; Buildings & Facilities	$480,620	1.0%
Infrastructure Reserve Fund - Facilities	Buildings & Facilities; Parks and Recreation	$688,918	1.4%
Infrastructure Reserve Fund - Transportation	Transportation Network; Storm Network	$609,928	0.2%
Total Tax Funded Reserves		**$1,779,467**	
Rate Funded Service Areas			
Infrastructure Reserve Fund - Water	Water Network	$3,373,133	3.7%
Infrastructure Reserve Fund - Water Meter	Water Network	$559,916	0.6%
Infrastructure Reserve Fund - Sanitary Sewer Network	Sanitary Network	$2,289,435	2.8%
Total Rate Funded Reserves		**$6,222,485**	

There is considerable debate in the municipal sector on the appropriate level of reserves that an organization should have on hand. However, no clear guideline has gained widespread acceptance.

Factors that Wilmot should consider when determining its capital reserve requirements include

- the breadth of services provided;
- age and condition of infrastructure;
- use and level of debt;
- economic situation and outlook; and
- internal reserve and debt policies.

Growth and Use of Debt

Currently, no outstanding debt is associated with the assets analyzed in this asset management. In addition, the funding scenarios outlined in this plan avoid the use of debt.

However, the Township is experiencing rapid growth. By 2031, the population is expected to increase by 30%, from 22,000 residents today to 28,500 within the next decade. This will impose additional stress and demand on infrastructure programs and staff resources, increasing lifecycle costs and accelerating replacement cycles.

As a result, the Township will also begin using debt financing in 2022 as a tool to continue growing the community and providing quality of life to residents and businesses. Long-term debentures totalling $13.4 million will be used to finance investments in transportation services ($2.1 million), fire ($4.4 million), and recreation services ($6.9 million).

Effective use of debt may also distribute the burden of infrastructure funding more equitably across multiple generations of Wilmot residents. Therefore, a Debt Management Strategy has been identified as a strategic initiative for 2022 as part of Wilmot's commitment to responsible governance.

Within the Township's Official Plan, new greenfield growth has been allocated to Baden and New Hamburg as the Region of Waterloo is one of the fastest-growing communities in Ontario. With this expected growth in the next 3 – 5 years, several additional assets will be assumed by the Township, including approximately:

- 11 km of new centreline of asphalt roadways, a 4% increase from the Township's existing inventory
- 22 km of new sidewalk, a 23% increase from the Township's existing Inventory
- 4.3 km of new asphalt boulevard multi-use trails, a 195% increase from the Township's existing inventory
- 11 km of new watermain, a 14% increase from the Township's existing inventory
- 11 km of new sanitary sewer, a 19% increase from the Township's existing inventory
- 11 km of new storm sewer, a 19% increase from the Township's existing inventory
- six new stormwater management ponds, a 26% increase from the Township's existing inventory

Through the development and budget process, the Township may need to update the asset management plan, asset register, operational and capital budgets, and maintenance programs to ensure service levels and minimum maintenance standards are met for the community.

Recommendations

1. **Review feasibility of adopting Scenario 1 for tax and rate-funded service areas.** Under this scenario, the target funding level is set at 100% of the annual requirements for current assets.

    i. For tax-funded assets: a 20-year phase-in period is recommended, requiring a 2.8% annual tax increase.
    ii. Continue to allocate the CCBF and OCIF funding as outlined previously.
    iii. Capture any increase in funding through these programs to reduce tax increases.
    iv. For water services: a 10-year phase-in period is recommended, requiring a rate increase of 1.9% annually.
    v. For wastewater services: a 10-year phase-in period is recommended, requiring a rate increase of 1.3% annually.

    Although the impact on tax and utility rates is high under the full-funding scenario, establishing lower annual funding targets or adopting a longer phase-in period may compound existing infrastructure challenges. In addition, although difficult to capture, climate change, regulation change, inflation costs, supply chain issues, and fluctuations in commodity prices will also influence capital expenditures.

2. **Assess the feasibility of implementing a dedicated stormwater user fee.** Stormwater is funded at only 6% of its annual capital requirements. Separate, distinct utility charges for stormwater would increase funding for this critical infrastructure in an equitable manner, support the ongoing management and upkeep of assets, particularly in an evolving climate more prone to extreme weather events, and meet regulatory compliance.

3. **Assess the feasibility of a dedicated crack sealing and bridge washing program.** Critical investments in the road network may defer significant future costs. For example, industry research shows that $1 invested in a crack sealing program may save $4 in replacement needs. Staff estimates suggest that $80,000 is needed annually to implement this program. Similarly, a bridge washing program is also required for the Township, estimated at $35,000 annually.

4. **Long-term financial planning should be aligned with the Township's risk and levels of service frameworks.** Developed as part of this engagement, these frameworks are central to effective asset management.

    i. Risk frameworks identify assets with the highest probability and consequences of failure (asset criticality). They should be used in conjunction with staff judgement to inform project selection and maximize the use of existing funding capacity. In addition, an asset's criticality should be used to address existing infrastructure backlogs.

ii. As new attribute information is obtained, it should be entered into Citywide™ to refine risk frameworks and improve asset prioritization and project selection.
iii. Performance targets should be established for each key performance indicator (KPI) contained in the levels of service framework and tracked annually.
iv. 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, the nature of population growth; climate change and extreme weather events; economic conditions and the local tax base.

5. **Implement key recommendations outlined in lifecycle frameworks**. In particular:

i. **Roads**
   i. Evaluate lifecycle events, timing, and costs regularly and update lifecycle models in Citywide™ to reflect necessary changes.
   ii. Develop a preventative maintenance program for roads with a sustainable annual budget to maintain road pavement condition and reduce the frequency of more costly rehabilitation and replacement events. This strategy may include crack sealing, spray patching, and mill & ratch/pothole repairs.
   iii. Complete a network-wide road condition assessment on a cyclical basis (5 years) to determine how current lifecycle management strategies impact overall network condition.
   iv. Identify and document criteria to determine when a road surface should be considered for upgrade (e.g., gravel to paved or LCB to HCB).

ii. **Bridges**
   i. Evaluate lifecycle events, timing, and costs regularly and update lifecycle models in Citywide™ to reflect necessary changes.
   ii. Develop a routine preventative maintenance program for bridges that considers the needs outlined in OSIM inspection reports. Regular maintenance will assist in minimizing the potential for premature structural deterioration and maximize the useful life of each structure.

iii. Water Network
   i. Evaluate lifecycle events, timing, and costs regularly and update lifecycle models in Citywide™ to reflect necessary changes.
   ii. Evaluate and update replacement unit costs for water mains on an annual basis to ensure costs are a reasonable approximation of total capital costs of replacement/reconstruction
   iii. Evaluate and update useful lives for water mains regularly (3-5 years) as knowledge and understanding of pipe deterioration evolves.

iv. Sanitary Network
   i. Update inventory to include appurtenances as separate assets with their respective useful life, replacement costs, and other key data fields.

ii. Evaluate lifecycle events, timing, and costs regularly and update lifecycle models in Citywide™ to reflect necessary changes.
iii. Evaluate and update replacement unit costs for sanitary mains on an annual basis to ensure costs are a reasonable approximation of total capital costs of replacement/reconstruction
iv. Evaluate and update useful lives for sanitary mains regularly (3-5 years) as knowledge and understanding of pipe deterioration evolves.
v. Consider expanding the scope of the annual CCTV and flushing program for sanitary mains to complete CCTV inspections across the entire network on an 8 to 12-year cycle
vi. Use the data from the CCTV and flushing program to verify sanitary sewer inventory data (e.g. pipe diameter, pipe material) and inform pipe deterioration modelling

v. Stormwater Network

i. Prioritize the development of a complete and comprehensive asset inventory
ii. Evaluate lifecycle events, timing, and costs regularly and update lifecycle models in Citywide™ to reflect necessary changes
iii. Evaluate and update replacement unit costs for water, sanitary, and storm mains on an annual basis to ensure costs are a reasonable approximation of total capital costs of replacement/reconstruction
iv. Evaluate and update useful lives for storm mains regularly (3-5 years) as knowledge and understanding of pipe deterioration evolves.
v. Given the relatively young age of storm network assets and the lack of projected capital costs over the next 20 years, staff should focus on developing a more robust preventative maintenance and inspection program for storm sewer mains. This may include:

    1. Increasing the scope and budget of the annual CCTV and flushing program (8 to 12-year cycle to complete the entire network). These assessments will be essential in identifying assets in poor or worse condition and improving capital forecasts.
    2. Using the data from the CCTV and flushing program to verify storm sewer inventory data (e.g. pipe diameter, pipe material) and inform pipe deterioration modelling
    3. Increasing the frequency of catchbasin and oil/grit separator cleaning and visual inspections (entire network annually)

vi. Non-Core Assets (Considerations for AMP 2024 Update)

i. Evaluate lifecycle events, timing, and costs regularly and update lifecycle models in Citywide™ to reflect necessary changes.
ii. Evaluate and update replacement unit costs for non-core assets to ensure costs are a reasonable approximation of total capital costs of replacement/reconstruction
iii. Evaluate and update useful lives for non-core assets regularly (3-5 years) as knowledge and understanding of assets increases

6. Data management and governance

i. Implement a data management and governance strategy that codifies roles and responsibilities to ensure regular upkeep and maintenance of asset register (Citywide™), asset datasets, and asset management plans.
ii. Conduct semi-annual audit or data gap analysis of inventory to evaluate for completeness, accuracy, and validity
iii. Critical asset data, such as condition and attribute data, should be shared with the Asset Management Coordinator so that it is regularly integrated with the asset register

Appendix 1: A Guide for the Estimation of PCR

/PCR (Condition)	Asphalt – SP-022 (HCB)	Surface-Treated – SP-021 (LCB)	Gravel – SP-025 (G/S)
81-100 (Excellent)	- Pavement is in excellent condition with very smooth ride, just a few bumps or depressions from slight surface deformation distresses. No surface defects or cracking distresses. - Ride is very good.	- A few bumps or depressions with slight deformation. - No or slight surface defects such as streaking, potholes or cracking distress. - Ride is very good	- Road surface well shaped with well defined shoulders between roundings. - No surface distress manifestations, just a :slight" classification for dust and loose gravel distress. - No frost heave or soft spots. - Good drainage.
61-80 (Good)	- Pavement is in good condition with smooth ride. Just a few bumps or depressions from slight to moderate surface deformation distresses. Slight to moderate intermittent surface defects and/or cracking distresses. - Ride is good.	- A few bumps or depressions with slight to moderate deformation. - Intermittent slight to moderate surface defects and/or cracking distresses. - Ride is good	- Road surface well shaped with well defined shoulders between roundings. - Some distress manifestation in slight to moderate class such as loose gravel, dust, potholes, etc. - There may be a few soft spots of frost heaving. - Generally good drainage.
41-60 (Fair)	- Pavement is in fair condition with acceptable ride. Intermittent to frequent bumps or depressions from surface deformation distresses. Moderate intermittent to frequent surface defects and or cracking distresses. Localized slight alligator cracking may be present. - Ride is fair.	- Intermittent to frequent bumps or depressions with slight to moderate deformation. - Intermittent to frequent slight to moderate surface defects and/ or cracking distresses. - Ride is fair	A mixture of properly and improperly shaped roadway areas. - Slight to moderate shoulder ponding and overgrowth. - Presence of slight to moderate washboard, potholes distresses. - The localized breakup may be present.
21-40 (Poor)	- Pavement is in poor condition with barely acceptable ride from frequent bumps or depressions because of moderate deformation distresses. Moderate to frequent severe surface defects and/or cracking distresses. Localized slight to moderate alligator cracking may be present. - Ride is poor.	- Frequent bumps or depressions because of moderate deformation distresses. - Moderate to frequent severe surface defects and/or cracking distresses. - Localized slight to moderate alligator cracking may be present. - Ride is poor.	- Majority of roadway surface improperly shaped. - Shoulder distress manifestations in moderate to severe class. - Various roadway surface distress manifestations making travel unpleasant because of washboarding, dust, potholes, distortions, etc. - Localized breakup areas.
0-20 (Very Poor)	- Pavement is in very poor condition with uncomfortable ride. Frequent to extensive bumps or depressions from moderate to severe frequent to extensive surface defects and/or cracking distresses. Frequent slight to moderate alligator cracking may be present. - Ride is very poor.	- Frequent to extensive bumps or depressions from moderate to severe. - Frequent to extensive surface defects and/or cracking distresses. - Frequent slight to moderate alligator cracking may be present. - Ride is very poor.	- Flat or reverse crown, severe roadway surface distresses such as washboarding, loose gravel, potholes, etc. - Very rough on vehicels from severe distortion and breakup areas. - Severe shoulder distresses trapping surface water at all time. - Little or no gravel due to severe wind-row of loos gravel, on roadway surface.

Appendix 2: Levels of Service Framework

This appendix outlines KPIs developed in collaboration with staff that will be used to track the performance of the Township's infrastructure programs. The KPIs selected are advanced and offer additional information and insight on the performance of various infrastructure and capital assets beyond the requirements of O. Reg 588/17. The KPIs are also intended to be aligned with the Township's Strategic Plan 2020 and its priorities.

Transportation Network

Table 57 Levels of Service Framework: Transportation Network

Transportation Network

⚠ Required by Ontario Regulation 588/17

Core Value and Levels of Service Statement	Strategic Plan 2020 Goal Alignment	KPI Community Levels of Service	KPI Technical Levels of Service
Accessible and Reliable The road network (open/unopen road allowances) provides efficient and reliable access to properties throughout the municipality, and supports efficient transport of goods, services, and people.	**Responsible Governance, Quality of Life, and Economic Prosperity** KPIs will support measurement of performance against identified 'Strategies' within the Stategic Plan such as 'Active Transportation and Transit', 'Fiscal Responsibility', and 'Infrastructure Investments'.	% of road users satisfied that the network is reliable and travel times are predictable	Lane-km of arterial roads (MMS classes 1 and 2) per land area in the municipality (km/km^2) ⚠
		% of residents satisfied with condition of residential streets (local roads)	Lane-km of collector roads (MMS classes 3 and 4) per land area in the municipality (km/km2) ⚠
		% of residents satisfied with condition of major streets (Primary St. / Collector Roads)	Lane-km of local roads (MMS classes 5 and 6) per land area in the municipality (km/km2) ⚠
		% of residents satisfied with condition of Right of Way active transportation network	Kilometers of paved roads per 100 residents
		% of residents satisfied with condition of Right of Way active transportation network	Kilometers of multi-use pathways and trails (to be evaluated by Parks) per 100 residents
		Number of unplanned bridge closures ('Bridge' as defined under OSIM)	Average expenditures ($/km) on preservation
			Average expenditure ($/km) on road improvements (expansions and betterments)
Safe and Regulated The road network is safe for pedestrians, cyclists, and motor vehicles, and is managed in accordance with minimum maintenance standards and all other regulatory requirements.Where suitable, traffic calming measures are used to enhance safety.		# of roads, bridges, multi use trails, bike lane or sidewalk related customer complaints/1,000 people served related to perception of safety	# of non-compliance reports related to road patrols
		Average traffic speed in urban areas	# of service requests related to road condition
		Average traffic speed in rural areas	# of service requests related to bridge condition
		# of guardrail related complaints/requests	# of bridge closures due to safety concerns
		# of pavement marking complaints/requests	# of uncontrolled traffic crossings
		# of pavement/pothole/washboarding complaints/service requests/work orders	% of transportation assets in poor or very poor condition
			% of assets carrying a high to very high risk rating
			Average pavement condition index (PCI) ⚠
			Average surface condition (unpaved roads) ⚠
			Average bridge condition index (BCI) for bridges and structural culverts ⚠
			% of bridges with loading or dimensional restrictions ⚠
Affordable The road network is managed cost-effectively for the established level of service.		% of average after-tax income per household to fully fund annual capital requirements for transportation services	Annual capital reinvestment rate for roads and bridges
		Total transportation services capital and O&M cost per household (and per KM)	O&M costs for paved roads / lane-km (excluding winter control) (street sweeping, signage, guiderail, etc)
		% of total capital expenditures spent on transportation services	O&M costs for unpaved roads / lane-km (excluding winter control) (signage, guiderail, grading ditching, etc)
		% of annual funding from own source revenue (vs. grants/subsidies from senior governments)	Winter control costs / lane-km for roads
			Winter control costs / km of sidewalks
			Winter control costs per km of multi-use trails (excluding private property)
			Average annual O&M cost for bridges
			Average annual O&M cost for culverts

Water Network

Table 58 Levels of Service Framework: Water Network

Water Network			⚠ Required by Ontario Regulation 588/17
Core Value and Levels of Service Statement	Strategic Plan 2020 **Goal Alignment**	KPI **Community Levels of Service**	KPI **Technical Levels of Service**
Accessible and Reliable The water distribution network and infrastructure deliver water to residents and cirtical, protective services with minimal service disruption.	**Responsible Governance, Quality of Life** KPIs will support measurement of performance against identified 'Strategies' within the Stategic Plan such as 'Fiscal Responsibility', and 'Infrastructure Investments'.	% of residents satisfied with the reliability of water services	% of properties connected to the municipal water system ⚠
		# of aesthetic complaints related to water	% of properties where fire flow is available ⚠
		# of users affected by service interruptions	# of new customer accomodated by servicing
		# of no-water or low pressure complaints	# of connection-days per year due to water main breaks compared to the total number of properties connected to the municipal water system ⚠
		Average duration of service interuptions (hyd, service, WM breaks maintenace issues)	% of watermains and appurtenances receiving proactive rehabilitation and preventative maintenance activities
			% km of watermains flushed annually per total km of watermains
Safe and Regulated The water network and infrastructure meet all safety standards and regulatory requirements, and support public health.		# of incidents of non-compliance with applicable water quality regulations	# 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 ⚠
		# of low pressure incidents (meets MOE guidelines, measursed at hyd.)	# of occurences where regulatory water quality parameters are not met (e.g., chlorine residual)
		# of adverse water quality incidents: Baden & NH	% of the watermains in good or very good condition
		# of adverse water quality incidents: New Dundee	Average age of watermains
		# of adverse water quality incidents: St. Agatha	% of watermains with a high or very high risk rating
Affordable Water services are affordable and household/properties charges are fair and equitable, accounting for the full cost of service delivery at current levels of service standars.		Average annual household water bill as a % of average after-tax income per household	Annual capital reinvestment rate for water distribution network
		% of total capital expenditures spent on water services	O&M cost for water system / pipe km length
		O&M cost for water system per household	Ratio of billed to treated water/water loss ratio
			Outstanding water receivables as a % of total water receivables

Sanitary Sewer Network

Table 59 Levels of Service Framework: Sanitary Sewer Network

Sanitary System

⚠ Required by Ontario Regulation 588/17

Core Value and Levels of Service Statement	Strategic Plan 2020 Goal Alignment	KPI Community Levels of Service	KPI Technical Levels of Service
Accessible and Reliable The sanitary system provides efficient conveyance service with minimal disruption.		% of residents satisfied with the reliability of sanitary services	% of properties connected to the municipal sanitary sewer system ⚠
		# of customers who experienced sanitary service disruption which effects Twps service level	# of events per year where combined sewer flow in the municipal sanitary system exceeds system capacity compared to the total number of properties connected to the municipal sanitary system ⚠
		# of complaints regarding sanitary service quality	# connection-days per year due to sanitary backups compared to the total number of properties connected to the municipal sanitary system ⚠
		% of customer requests addressed within 24 hours	# of effluent violations per year due to sanitary discharge compared to the total number of properties connected to the municipal sanitary system ⚠
		# of major distruptions (>2 days) to service provision to large portion of residents (>5%)	% km of sanitary mains flushed
			% of sanitary mains receiving proactive rehabilitation and preventative maintenance activities (including lift stations)
Safe and Regulated The sanitary system meets all safety standards and regulatory requirements, and minimizes adverse impacts on the surrounding environment.	**Responsible Governance, Quality of Life, and Environmental Protection** KPIs will support measurement of performance against identified 'Strategies' within the Stategic Plan such as 'Fiscal Responsibility', and 'Infrastructure Investments'. Further alignment with 'Climate Adaptation and Mitigation' and 'Sustainability' is also encouraged by tracking incidents of overflows may adversely impact the surrounding natural environment and property impacts.	# of total sanitary system overflows (SSO)	% km of sewer mains that have undergone CCTV inspection
		# of sanitary system overflows (SSO) due to pipe failure	% of the sewer mains in poor or very poor condition
		# of sanitary system overflows (SSO) due to pump/lift station failure	Average age of sewer mains
		# of sanitary system overflows (SSO) due to inflow/infiltration	% of sewer mains with a high or very high risk rating
		# of sanitary system overflows (SSO) due to blockages	Average Structural Pipe Rating Index (SPRI) - Sanitary
		# of basement flooding events due to blockages in the system	Number of weekly sanitary lift station inspections completed (major components, such as pumps and generators)
		# of service requests related to surface flooding	
		# of overflow/backup flooding events that cause harm to residents or property, or limit access to critical services	
Affordable Sanitary services are affordable and household/properties charges are fair and equitable, accounting for the full cost of service delivery at current levels of service standards.		Average annual household sanitary bill as a % of average after-tax income per household	Annual capital reinvestment rate for sanitary system
		% of total capital expenditures spent on sanitary services	O&M cost for sanitary system / pipe km length
		O&M cost for sanitary system per household	

Stormwater Network

Table 60 Levels of Service Framework: Stormwater Network

Stormwater System

⚠ Required by Ontario Regulation 588/17

Core Value and Levels of Service Statement	Strategic Plan 2020 Goal Alignment	KPI Community Levels of Service	KPI Technical Levels of Service
Accessible and Reliable The stormwater system provides efficient conveyance service with minimal disruption.	**Responsible Governance, Quality of Life, and Environmental Protection** KPIs will support measurement of performance against identified 'Strategies' within the Stategic Plan such as 'Fiscal Responsibility', and 'Infrastructure Investments'. Further alignment with 'Climate Adaptation and Mitigation' and 'Sustainability' is also encouraged by tracking incidents of overflows and flooding that may adversely impact the surrounding natural environment and property impacts.	# of road closures due to flooding	% km of storm mains flushed
		# of major distruptions (>24hr) to service provision to large portion of residents (>10%)	% of storm mains receiving proactive rehabilitation and preventative maintenance activities
		# of safety incidents related to stormwater management ponds	% of properties in municipality resilient to a 100-year storm ⚠
		% of residents disatisfied with stormwater management services	% of the municipal stormwater management system resilient to a 5-year storm ⚠
		# of locations in the municipality prone to flooding incidents during extreme weather events	% of stormwater management facilities not meeting provincial suspended solids targets
Safe and Regulated The stormwater system meets all safety standards and regulatory requirements, and minimizes adverse impacts on the surrounding environment.		# of service requests related to surface flooding	Average age of stormwater sewer network - Linear
		# of overflow/backup flooding events that cause harm to residents or property, or limit access to critical services	Average age of stormwater network - Facilities
		# of SWMPs cleaned out / year	% km of storm mains that have undergone CCTV inspection
			% of storm mains with a high or very high risk rating
			% of storm mains in poor or very poor condition
			Average Structural Pipe Rating Index (SPRI) - Storm
			% of manholes and catchbasins inspected and cleaned
			# of stormwater pond inspections / monitoring completed as per ECA requirements.
			# of inspections for OGS (Oil Grit Seperators)
Affordable Stormwater management services are affordable and household/properties costs are fair and equitable, accounting for the full cost of service delivery at current levels of service standards.		% of total capital expenditures spent on stormwater services	Annual capital reinvestment rate for stormwater system
		O&M cost for stormwater system per household	O&M cost for stormwater system / pipe km length
		Average annual household strowmater management cost as a % of average after-tax income per household	O&M costs for SWMF

Parks, Facilities and Recreation Services

Table 61 Levels of Service Framework: Parks, Facilities, and Recreation Services

Parks, Facilities, and Recreation			
Core Value and Levels of Service Statement	Strategic Plan 2020 **Goal Alignment**	KPI **Community Levels of Service**	KPI **Technical Levels of Service**
Accessible and Reliable Facilities and parks are well-maintained, meet customer expectations for usability, and support service provisions with minimal disruption.	**Responsible Governance, Quality of Life, Economic Prosperity** KPIs will support measurement of performance against identified 'Strategies' within the Stategic Plan such as 'Fiscal Responsibility', 'Infrastructure Investments', 'Active Transportation', and 'Smart Growth'. KPIs are also aligned with the Township's 'Parks, Facilities, and Recreation' Master Plan. Further alignment with 'Climate Adaptation and Mitigation' and 'Sustainability' is also encouraged by tracking energy consumption across the facilities portfolio.	% of users satisfied with facilities condition - Recreation and Cultural Services	# of facilities with environmentally conscious designs
		# of complaints regarding accessibility or capacity of parks and recreational facilities - Township-wide	% of facilities that have undergone a detailed condition assessment
		# of complaints regarding accessibility or capacity of parks and recreational facilities - Growth Areas	Utilization rate for Recreational facilities
		# of unplanned public-facing facility closures due to disrepair	
		Parkland service level per 1000 residents (hectares)	
		% of parks with an 800m service area	
		% of parks and recreation facilities connected to Township active transportation network	
		# of complaints regarding condition of outdoor courts and sports facilities	
		% of parks facilities that are AODA compliant	
		Number of monthly inspections completed	
		% facilities uptime	
Safe and Regulated All facilities and parks provide a safe environment for users, and meet all regulatory requirements.		# of reported injuries due to poor condition - All Facilities	% of facilities in poor or very poor condition
		# of complaints regarding safety of playground equipment	% of facilities that meet AODA standards
			Average Facilities Condition Index (weighted by replacement cost)
			% of facilities with a high or very high risk rating
Affordable Facilities and parks are managed cost effectively, services are delivered in an affordable manner to the community, while minimizing environmental footprints.		% of users that identify costs as a barrier to using recreation facilities	O&M costs of facilities per square meter - Recreation and Cultural Services
		% of average after-tax income per household to fully fund annual capital requirements for facilities (excludes Environmental Services)	O&M costs of facilities per square meter - Administration
		Ratio of user and rental fee revenue to total O&M cost - Recreation Facilities	O&M costs of facilities per square meter - Environmental Services
		Financial assistance program % of funding available that is consumed	Annual capital reinvestment rate - All Facilities
		Percentage of residents aware of financial assistance programs	Total equivalent kWh energy consumption / ft2 of all buildings and facilities

Fleet, Machinery, & Equipment

Table 62 Levels of Service Framework: Fleet, Machinery, & Equipment

Fleet, Machinery & Equipment

Core Value and Levels of Service Statement	Strategic Plan 2020 Goal Alignment	KPI Community Levels of Service	KPI Technical Levels of Service
Accessible and Reliable Fleet and machinery assets are well-maintained, readily available, and support efficient service delivery.	**Responsible Governance** KPIs will support measurement of performance against identified 'Strategies' within the Stategic Plan such as 'Fiscal Responsibility', and 'Infrastructure Investments'.	% of Protective Services vehicles out of service (unplanned)	Total breakdowns - Vehicles
		# of complaints due to vehicle body condition - Protective Services	Total breakdowns - Machinery & Equipment
		# of complaints due to vehicle body condition - All other service areas	Average time to repair a vehicle or major equipment out of service
		% of emergency response times that meet NFPA standards - Fire Services	Annual fuel consumption
			% of preventative maintenance activities completed as scheduled
			Number of spare fire trucks for every eight - Fire Services
			Equipment replacement cycle - Fire Services
			% of vehicles and equipment in service vs. required - Fire Services
			Total hours of downtime
Safe and Regulated All fleet and machinery assets support safe operations and meet regulatory requirements for maintenance and replacement.		# of vehicles and machinery assets requiring retrofits to address health and safety concerns	% of all fleet and machinery & equipment assets in poor or very poor condition
		Average age of vehicles - Protective Services	% of Protective Services vehicles in poor or very poor condition
		Average age of vehicles - All other service areas	% of vehilces and equipment past its service life - Protective Services
		Uptime % - Protective Services	% of vehilces and equipment past its service life - All other service areas
		Uptime % - All other services	
Affordable Fleet and machinery assets are managed cost effectively.		% of average after-tax income per household to fully fund annual capital requirements for fleet, machinery & equipment assets	Average capital reinvestment rate for fleet, machinery & equipment
			O&M cost per vehicle - All Vehicle
			O&M cost per vehicle - Protective Services

Appendix 3: Risk Frameworks

This section illustrates risk models for each of the Township's major asset types. For some minor assets and appurtenances, no additional attribute data was available to aid in assigning the consequence and/or probability of failure ratings. In the absence of attribute data, the risk matrices illustrated previously relied only on asset condition (or age) for estimating the probability of failure and replacement costs for estimating the consequence of failure.

Transportation Network – Roads

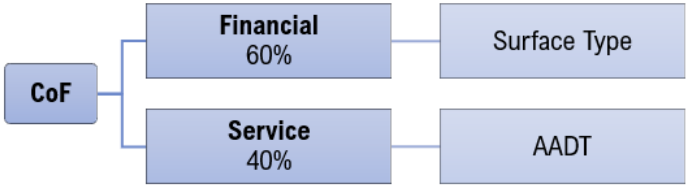
Table 63 Risk Framework: Roads

Roads (HCB/LCB/Gravel)

Probability of Failure

Criteria	Value/Range	PoF Score
Asset Condition	0-20	5 - Almost Certain
	20-40	4 - Likely
	40-60	3 - Possible
	60-80	2 - Unlikely
	80-100	1 - Rare

Consequence of Failure



Criteria	Sub-Criteria	Value/Range	CoF Score
Financial	Surface Type	HCB	4 - Major
		LCB	2 - Minor
		G/S	1 - Insignificant
Service	AADT	>4200	5 - Severe
		1540-4200	4 - Major
		400-1540	3 - Moderate
		200-400	2 - Minor
		>200	1 - Insignificant

Future Considerations

Criteria	Description/Example
Drainage Score	Score reflecting road drainage capabilities
Proximity to Floodplain	Identify roads located within floodplain

Sub-Criteria	Description/Example
Roadside Environment	Urban, Rural, Semi-Urban
Traffic Type	Identify heavy machinery routes, farming etc.
Land Use Zone	e.g. Residential, Industrial, Commercial

Transportation Network – Bridges & Culverts

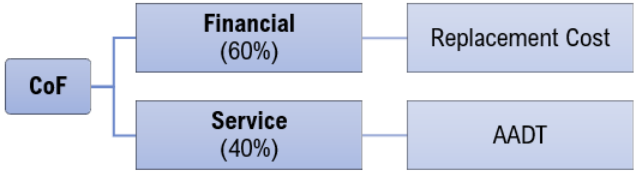
Table 64 Risk Framework: Bridges & Culverts

Bridges & Structural Culverts

Probability of Failure

Criteria	Value/Range	PoF Score
Asset Condition	0-40	5 - Almost Certain
	40-60	4 - Likely
	60-70	3 - Possible
	70-85	2 - Unlikely
	85-100	1 - Rare

Consequence of Failure



Criteria	Sub-Criteria	Value/Range	CoF Score
Financial	Replacement Cost	>$1,000,000	5 - Severe
		$500k - $1M	4 - Major
		$250k - $500k	3 - Moderate
		$125k - $250k	2 - Minor
		>$125k	1 - Insignificant
Service	AADT	>1500	5 - Severe
		1100 - 1500	4 - Major
		700 - 1100	3 - Moderate
		300 - 700	2 - Minor
		< 300	1 - Insignificant

Future Considerations

Criteria	Description/Example
Structural Environment	E.g. Benign, Moderate, Severe
Structure Type	e.g. Solid Slab, Box Culvert, CSP Culvert
Load Limit	Structural load capacity

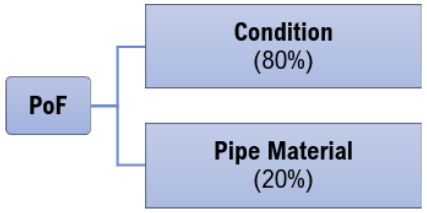
Sub-Criteria	Description/Example
Detour Length	Detour distance if structure is closed
Land Use Zone	e.g. Residential, Industrial, Commercial
Critical Services	Identification of critical services that rely on structure

Water Network – Watermains

Table 65 Risk Framework: Water Mains

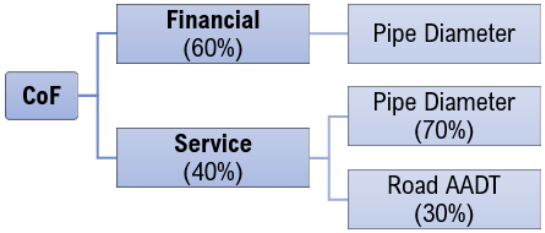
Water Mains

Probability of Failure



Criteria	Value/Range	PoF Score
Asset Condition	0-20	5 - Almost Certain
	20-40	4 - Likely
	40-60	3 - Possible
	60-80	2 - Unlikely
	80-100	1 - Rare
Pipe Material	CI	5 - Almost Certain
	CO	4 - Likely
	COP	4 - Likely
	DI	3 - Possible
	AC	3 - Possible
	PE	1 - Rare
	PVC	1 - Rare

Consequence of Failure



Criteria	Sub-Criteria	Value/Range	CoF Score
Financial	Pipe Diameter	>300mm	5 - Severe
		200-300mm	4 - Major
		100-200mm	3 - Moderate
		125-150mm	2 - Minor
		<125mm	1 - Insignificant
Service	Pipe Diameter	>300mm	5 - Severe
		200-300mm	4 - Major
		100-200mm	3 - Moderate
		125-150mm	2 - Minor
		<125mm	1 - Insignificant
	Road Section AADT	>3000	5 - Severe
		1800-3000	4 - Major
		700-1800	3 - Moderate
		200-700	2 - Minor
		<200	1 - Insignificant

Future Considerations

Criteria	Description/Example
Community/Location	e.g. New Hamburg, Petersburg, St. Agatha
Soil Composition	Identify corrosive soils

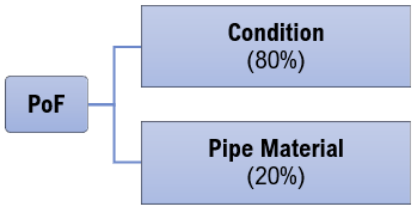
Criteria	Description/Example
Community/Location	e.g. New Hamburg, Petersburg, St. Agatha
Main Type	e.g. Trunk, Distribution, Looped
Bury Depth	Deeper bury depths mean higher financial costs
Floodplain Proximity	Identify mains located in known floodplain
# of Service Connections	Identify # of connections that link to each watermain
Water Meter Size	Indicator of type of connection (Industrial/Residential)

Sanitary Network – Sanitary Mains

Table 66 Risk Framework: Sanitary Mains

Sanitary Mains

Probability of Failure

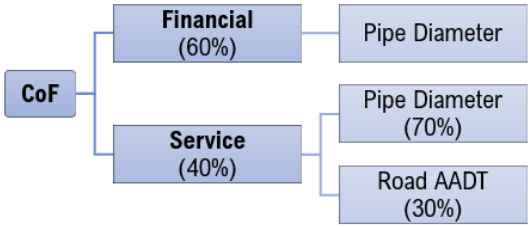


Criteria	Value/Range	PoF Score
Asset Condition	0-20	5 - Almost Certain
	20-40	4 - Likely
	40-60	3 - Possible
	60-80	2 - Unlikely
	80-100	1 - Rare
Pipe Material	AC	4 - Likely
	TRANSITE	4 - Likely
	CONC	3 - Possible
	DI	3 - Possible
	VIT	3 - Possible
	PVC	1 - Rare

Future Considerations

Criteria	Description/Example
Community/Location	e.g. New Hamburg, Petersburg, St. Agatha
Soil Composition	Identify corrosive soils

Consequence of Failure



Criteria	Sub-Criteria	Value/Range	CoF Score
Financial	Pipe Diameter	>400mm	5 - Severe
		200-400mm	4 - Major
		175-200mm	3 - Moderate
		125-175mm	2 - Minor
		<125mm	1 - Insignificant
Service	Pipe Diameter	>400mm	5 - Severe
		200-400mm	4 - Major
		175-200mm	3 - Moderate
		125-175mm	2 - Minor
		<125mm	1 - Insignificant
	Road Section AADT	>3000	5 - Severe
		1800-3000	4 - Major
		700-1800	3 - Moderate
		200-700	2 - Minor
		<200	1 - Insignificant

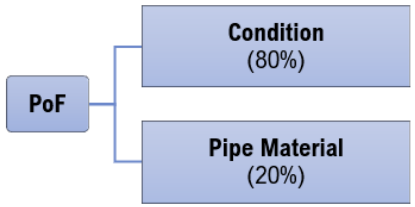
Criteria	Description/Example
Community/Location	e.g. New Hamburg, Petersburg, St. Agatha
Sewer Type	e.g. Gravity, Force Main
Bury Depth	Deeper bury depths mean higher financial costs
Floodplain Proximity	Identify mains located in known floodplain
CSOs	Identify combined sewers, if any

Stormwater Network – Stormwater Mains

Table 67 Risk Framework: Storm Mains

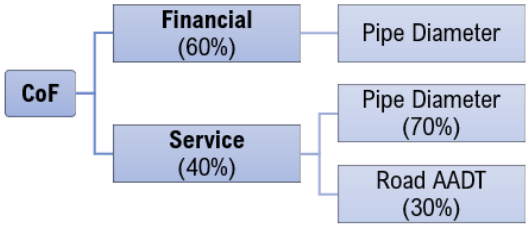
Storm Mains

Probability of Failure



Criteria	Value/Range	PoF Score
Asset Condition	0-20	5 - Almost Certain
	20-40	4 - Likely
	40-60	3 - Possible
	60-80	2 - Unlikely
	80-100	1 - Rare
Pipe Material	Unknown	5 - Almost Certain
	CSP	4 - Likely
	CONC	3 - Possible
	VIT	3 - Possible
	RCP	2 - Unlikely
	PVC	1 - Rare

Consequence of Failure



Criteria	Sub-Criteria	Value/Range	CoF Score
Financial	Pipe Diameter	>1150mm	5 - Severe
		800-1150mm	4 - Major
		500-800mm	3 - Moderate
		250-500mm	2 - Minor
		<250mm	1 - Insignificant
Service	Pipe Diameter	>1150mm	5 - Severe
		800-1150mm	4 - Major
		500-800mm	3 - Moderate
		250-500mm	2 - Minor
		<250mm	1 - Insignificant
	Road Section AADT	>3000	5 - Severe
		1800-3000	4 - Major
		700-1800	3 - Moderate
		200-700	2 - Minor
		<200	1 - Insignificant

Future Considerations

Criteria	Description/Example
Community/Location	e.g. New Hamburg, Petersburg, St. Agatha
Soil Composition	Identify corrosive soils

Criteria	Description/Example
Community/Location	e.g. New Hamburg, Petersburg, St. Agatha
Sewer Type	e.g. Gravity, Force Main
Bury Depth	Deeper bury depths mean higher financial costs
Floodplain Proximity	Identify mains located in known floodplain

Buildings & Facilities

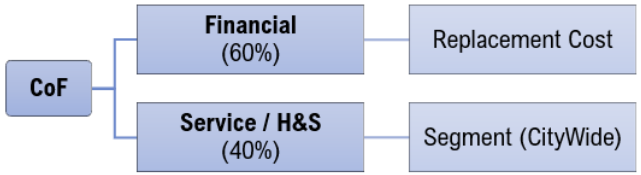
Table 68 Risk Framework: Buildings and Facilities

Facilities Assets

Probability of Failure

Criteria	Value/Range	PoF Score
Asset Condition	0-20	5 - Almost Certain
	20-40	4 - Likely
	40-60	3 - Possible
	60-80	2 - Unlikely
	80-100	1 - Rare

Consequence of Failure



Criteria	Sub-Criteria	Value/Range	CoF Score
Financial	Replacement Cost	>$1,000,000	5 - Severe
		$500,000-$1,000,000	4 - Major
		$250,000 - $500,000	3 - Moderate
		$50,000 - $250,000	2 - Minor
		>$50,000	1 - Insignificant
Service / Health & Safety	Segment (CityWide)	Cemetery	5 - Severe
		Fire Stations	5 - Severe
		Administration	4 - Major
		Recreation Facilities	4 - Major
		Community Centres	3 - Moderate
		Cultural Structures	2 - Minor
		Libraries	2 - Minor
		Accessory Structures	1 - Insignificant
		Other	1 - Insignificant
		Storage Sheds	1 - Insignificant

Parks and Recreation Services

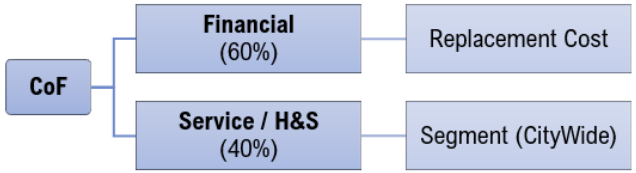
Table 69 Risk Framework: Parks and Recreation Services

Parks Assets

Probability of Failure

Criteria	Value/Range	PoF Score
Asset Condition	0-20	5 - Almost Certain
	20-40	4 - Likely
	40-60	3 - Possible
	60-80	2 - Unlikely
	80-100	1 - Rare

Consequence of Failure



Criteria	Sub-Criteria	Value/Range	CoF Score
Financial	Replacement Cost	>$500,000	5 - Severe
		$250,000-$500,000	4 - Major
		$100,000-$250,000	3 - Moderate
		$50,000-$100,000	2 - Minor
		<$50,000	1 - Insignificant
Service / Health & Safety	Segment (CityWide)	Ball Diamonds	5 - Severe
		Playgrounds	5 - Severe
		Tennis Courts	5 - Severe
		Soccer Fields	4 - Major
		Fountains	3 - Moderate
		Lighting	3 - Moderate
		Parking Lots	3 - Moderate
		Picnic Shelters	3 - Moderate
		Signs	3 - Moderate
		Bandshells	2 - Minor
		Fences	2 - Minor
		Skateboard Equipment	2 - Minor
		Bleachers	1 - Insignificant
		Other	1 - Insignificant

Fleet

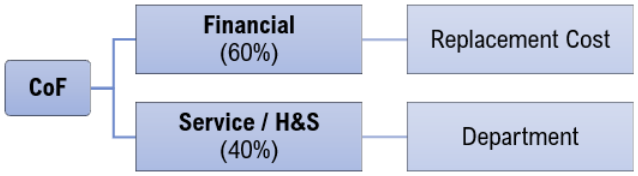
Table 70 Risk Framework: Fleet

Fleet

Probability of Failure

Criteria	Value/Range	PoF Score
Asset Condition	0-20	5 - Almost Certain
	20-40	4 - Likely
	40-60	3 - Possible
	60-80	2 - Unlikely
	80-100	1 - Rare

Consequence of Failure



Criteria	Sub-Criteria	Value/Range	CoF Score
Financial	Replacement Cost	>$250,000	5 - Severe
		$100,000 - $250,000	4 - Major
		$50,000 - $100,000	3 - Moderate
		$25,000 - $50,000	2 - Minor
		<$25,000	1 - Insignificant
Service / Health & Safety	Department	Fire Services	5 - Severe
		Roads	4 - Major
		Utilities	4 - Major
		Facilities & Recreation Services	3 - Moderate
		Development Services	2 - Minor
		General Government	2 - Minor

Machinery & Equipment

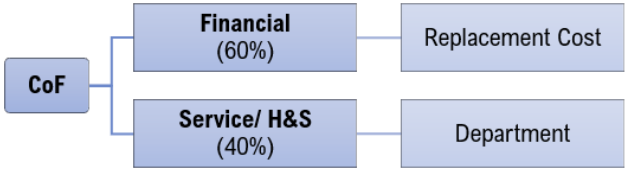
Table 71 Risk Framework: Machinery & Equipment

Machinery & Equipment

Probability of Failure

Criteria	Value/Range	PoF Score
Asset Condition	0-20	5 - Almost Certain
	20-40	4 - Likely
	40-60	3 - Possible
	60-80	2 - Unlikely
	80-100	1 - Rare

Consequence of Failure



Criteria	Sub-Criteria	Value/Range	CoF Score
Financial	Replacement Cost	>$250,000	5 - Severe
		$100,000 - $250,000	4 - Major
		$50,000 - $100,000	3 - Moderate
		$25,000 - $50,000	2 - Minor
		<$25,000	1 - Insignificant
Service / Health & Safety	Department	Fire Services	5 - Severe
		IT Services	5 - Severe
		Roads	4 - Major
		Utilities	4 - Major
		Cemetery	2 - Minor
		General Government	1 - Insignificant