Recommendation

The Corporation of the Township of Tiny

Meeting Date: May 14, 2025

Moved by: M. Evans

Seconded by: C. Heloukas

Carried: 5-0

Defeated:

Signed:

THAT Corporate Services Report CS-FIN-007-25, Level of Service and Lifecycle Cost Requirements for 2025 Asset Management Plan Update be received;

AND THAT Council proceeds with Option1, to use the current levels of service and lifecycle costs as the proposed levels of service and lifecycle costs for the 2025 asset management plan submission.

THIS ITEM

JUN 04 2025

COUNCIL APPROVED

To:	Mayor Evans and Members of Council
From:	Marley Mendel, Asset Manangement Coordinator Corporate Services Department
Report Number:	CS-FIN-007-25
Meeting Date:	14 May 2025
Subject:	**Level Of Service And Lifecycle Cost Requirements For 2025 Asset Management Plan Update** Our File No:

Recommendation

THAT Corporate Services Report CS-FIN-007-25, Level Of Service And Lifecycle Cost Requirements For 2025 Asset Management Plan Update be received;

AND THAT Council proceeds with Option1, to use the current levels of service and lifecycle costs as the proposed levels of service and lifecycle costs for the 2025 asset management plan submission.

Background/Analysis

Per the Ontario Regulation 588/17 (O' Reg), the Township of Tiny has taken proactive steps to achieving and exceeding the asset management (AM) related requirements as set out in this regulation. From the kickoff of the amalgamation of financial and AM related data in 2021, to the submission of the Asset Management Plan (AMP) 2022 (PWR-029-22) and update in 2024 (CS-FIN-010-24), the Township has invested into the overall AM program to gain value, support, and direction beyond the minimum requirements of the regulations. Past and present Council have recognized a potential to enhance our management practices to ensure we are achieving the overall goal of asset management, which is to minimize the lifecycle costs of delivering infrastructure services, manage the associated risks, while maximizing the value and levels of service ratepayers receive from the asset portfolio.

All levels of service referenced in this report are only in reference to the Township's assets. This report does not speak to other services (for example Customer Service) provided by the Township.

Per the O'Reg, the requirement for the 2025 asset management plan submission are the following:

- State of infrastructure for all assets
- Proposed levels of service for all assets
- Lifecycle costs associated with proposed levels of service
- Growth impacts
- Financial strategy

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				●

In the 2024 AMP submission, staff achieved a number of the 2025 requirements ahead of the 2025 deadline. The remaining items requiring updating for the 2025 submission are:

- Proposed levels of service for all assets
- Lifecycle costs associated with proposed levels of service

In preparation for the 2025 Asset Management Plan submission, staff completed a preliminary evaluation of the current levels of service (LOS) and potential implications of an adjustment to the levels of service.
Following discussions with the township's consultant, PSD Citywide, it was determined that value could be gained through a presentation to Council to ensure there is a clear understanding of what levels of service are and what or how an adjustment would impact the township.
PSD Citywide prepared a presentation to Council on "Delivering Affordable Levels of Service" to be received by Council May 14, 2025.

A Level of Service by definition is a measure of the services that the township is providing to the community and the nature and quality of those services. Within each asset category in the AMP, technical metrics and qualitive descriptions that measure both technical and community levels of service has been established.

- Community levels of service are a simple, plain language description or measure of the service that the community receives. For core asset categories (Roads, Bridges & and Culverts, Water, Wastewater, Stormwater) the Province, through O. Reg. 588/17, has provided qualitative descriptions that are required to be included in this AMP. For the non-core assets categories, the descriptions have been determined by Township staff and identified in each associated category.
- Technical levels of service are a measure of key technical attributes of the service being provided to the community. These include mostly quantitative measures and tend to reflect the impact of the Township's asset management strategies on the physical condition of assets or the quality/capacity of the service they provide.

The Lifecycle Costs by definition are the total costs of owning, operating, maintaining and disposing of an asset over its entire life. These costs will fluctuate depending on the level of service.

The current levels of service for all assets, and the lifecycle costs associated with the current levels of service are defined by asset category in the Township of Tiny Asset Management Plan 2024 (CS-FIN-010-24). The table below summarizes the tables within the report where the information can be found.

Asset Category	Current Level of Service	Lifecycle Costs
Road Network	Table 12 & Table 13	Table 11
Bridges & Culverts	Table 17 & Table 18	Table 15
Stormwater Network	Table 21 & Table 22	Table 20
Water Network	Table 25 & Table 26	Table 24
Fleet	Table 30 & Table 31	Table 29
Land Improvements	Table 34 & Table 35	Table 33
Equipment & Reports	Table 38 & Table 39	Table 37
Trails & Boardwalks	Table 43 & Table 44	Table 41
Other Non-Core	Table 47 & Table 48	Table 46

Below are the some examples from the AMP of the township's current level of service in the Roads Network, Bridges & Culverts, and Fleet asset categories, along with an example of an adjustment to the current level of service and the subsequent potential financial impact.

Road Network: Current Level of Service and Example of an Adjustment

Community Level of Service.
Description, which may include maps, of the road network in the township and its level of connectivity.

- The Township's Road Network comprises roadways with maintenance classes ranging from MMS Class 3 to 6. The maximum measured Average Annual Daily Traffic (AADT) of 4000-4999 vehicles.

To define this further, road classifications are determined by Ontario Regulation 239/02 – Minimum Maintenance Standards for Municipal Highways (amended in O.Reg. 366/18, s. 1 (5)). The road classification is determined based on the Average Daily Traffic, and the posted speed limit.
For the Township, the posted speed limit as per Township of Tiny By-Law 23-033 are used for the calculation. The Average Daily Traffic counts have been completed across the Township and updated accordingly between the years 2002-2020.
Once the road classification had been determined, the O'Reg 239/02 – Minimum Maintenance Standards for Municipal Highways continues on to outline the patrolling frequency, snow accumulation allowances, ice formation prevention, treatment of icy roadways, potholes allowances, shoulder drop offs, cracks, luminaires inspection requirements, regulatory and warning signs inspections, bridge deck spalls standards, and surface discontinuities. To fully understand what is included, please reference O'Reg 239/02.

Per the approved Council report PWR-046-22 - Minimum Maintenance Standard for Council Information, the minimum service levels are detailed for the township's road network.

Through recommendations or consultation from Staff, Council may decide to adjust the speed limit of a road (make it higher or lower) which can change the MMS class, and therefore the associated maintenance requirements. Note, any speed limit adjustment will require thorough engineering review to ensure it is in compliance with the Highway Traffic Act, and all roadway standards and regulations.

As an example, Balm Beach Road (between Albert Avenue and County Road 6) has an average daily traffic rate of 1000-1999, and a posted speed limit of 60km/hr = class 4 road. A class 4 road requires the following:

- Snow plowing must start when the accumulation is 8 cm in depth, or within 16 hours after the snowfall has ended.
- If a pothole is 1000cm2 in surface area, and 8 cm in depth, it must be repaired within 14 days.

If Balm Beach Road's speed limit was reduce to 40km/hr, (the AADT rate of 1000-1999 remains the same), it would become a classification 5 road.
A class 5 road requires the following:

- Snow plowing must start when the accumulation is 10 cm in depth, or within 24 hours after the snowfall has ended.
- If a pothole is 1000cm2 in surface area, and 8 cm in depth, it must be repaired within 30 days.

Alternatively, if Balm Beach Road's speed limit was to increase to 80km/hr (the AADT rate of 1000-1999 remains the same), this would become a classification 3 road.
A class 3 road requires the following:

- Snow plowing must start when the accumulation is 8 cm in depth, or within 12 hours after the snowfall has ended.
- If a pothole is 1000cm2 in surface area, and 8 cm in depth, it must be repaired within 7 days.

(Note the example above is not intended to represent the full maintenance requirements as outlined in O'Reg 239/02)

Therefore, a change in speed limit could affect the service level of maintenance activities on roads and will result in a financial implication.

Technical Level of Service.
Average pavement condition for paved roads in the township is 43.3 (Fair).

To define this further, the road ratings for asphalt and surface treated roads are based on a Pavement Condition Index (PCI). The PCI is a numeric index ranging from 0 to 100, that indicates the general condition of a pavement section. A higher PCI score reflects better pavement condition, while a lower score indicates worse conditions. Some factors affecting the PCI include the age, climate, drainage, sub-base quality, traffic loads, etc.

The current level of service could be to change the current average pavement condition benchmark. For example, the average pavement condition could be raised to 76 (Good) which would be achieved by increasing the frequency of lifecycle activity interventions. i.e. repaving more kilometers of road every year. If Council were to consider increasing this level of service as it would have a significant financial impact.

Alternatively, if the average pavement condition were to be lowered to 20 (Very Poor), this would decrease the frequency of lifecycle activity interventions and have a lower financial impact. i.e. repaving less kilometers of road every year.

Therefore if an adjustment were to be made to the benchmark of the average pavement condition the subsequent increase or decrease to the frequency or timing of lifecycle activity interventions will be required and this change will result in a financial implication either positively or negatively.

Bridges and Culverts: Current Level of Service and Example of an Adjustment

Technical Level of Service

Currently, the percentage of bridges in the Township with loading or dimensional restriction is 5.2% (1 of 19).

R6011 which is located on Concession 2 West has a current load limit of 14 tonnes, primarily based on its age.

As an example, through recommendations or consultation from Staff, Council may decide to lower the percentage of bridges to 0% for loading or dimensional restrictions which then would require a replacement of the R6011 bridge as it has a load restriction. This change in service level would create a significant financial implication. Although a significant financial impact it would allow for unrestricted traffic (heavier loads) to use Concession 2 West.

Fleet: Current Level of Service and Example of an Adjustment

Community Level of Service
The Fleet Management Strategy condition ratings ranges from 2-28.

- Current number of fleet listed as 'Replace ASAP' is 5 vehicles/equipment
- Current number of fleet listed as 'Consider for Replacement' is 30 vehicles/equipment
- Current number of fleet listed as 'Good' is 25 vehicles/equipment

To explain this further, using the fleet management plan (Council approved recommendation dated December 13, 2023) a score from 1-30 is given to each vehicle/equipment (excluding fire) based on the following 5 factors.

1. Age - One point for each 20% of the vehicle's estimated service life.
2. Usage - One point for each 20% of the vehicle's estimated service usage (kilometers or hours)
3. Operations and Maintenance Cost - One point for each 20% of the vehicle's operations and maintenance costs over its life when compared to its purchase price.
4. Condition and Reliability - A condition and reliability rating by the mechanics of the vehicle's body, rust, damage, overall reliability, etc. A maximum score of 10 would be given to a vehicle in poor condition with poor reliability.
5. Consequence of Failure - 1 to 5 points assigned based on the consequence of failure of that piece of equipment to the Township's operations For instance, a tandem plow truck would be given a 5 while a passenger vehicle would be given a 1.

A total score of 15 points or less would indicate the vehicle/equipment is in good standing, a score of 16 to 25 points would indicate the vehicle/equipment should be considered for replacement, and a score above 25 would indicate the vehicle/equipment should be replaced as soon as possible.

An adjustment to the current level of service could be to change the benchmarks and set new thresholds for any or all of the condition rating categories.

For example, through recommendations or consultation from Staff, Council may decide to adjust the threshold for the 'Consider for Replacement' score from 16-25 points to be from 20-25 points. This would mean that instead of the 30 vehicles currently (as of 2024 AMP) listed as consider for replacement, it would be reduced to 20 vehicles/equipment scored as consider for replacement.

An adjustment like this would mean less fleet would be brought forward to consider in the annual capital budget for replacement, but could have a financial impact on higher repair and maintenance costs, more mechanic time, less resale value, and potentially more vehicle/equipment down time which could result in a decrease in resident satisfaction.

The examples above are provided as a sample to demonstrate the current level of service in the Roads Network, Bridges & Culverts, and Fleet asset categories. The current level of service for the following asset categories can be found in the 2024 Asset Management Plan (CS-FIN-010-24).

- Stormwater Network
- Water Network
- Land Improvements
- Equipment & Reports
- Trails & Boardwalks
- Other Non-Core

Level of Service Metrics Not Captured in the AMP

Following the submission of the 2024 AMP, the township received the data from the Facility Condition Assessments (CS-FIN-013-24) that were completed on the township's buildings and facilities. As this data was not available prior to the 2024 AMP publication, the available data (with low data confidence) related to buildings and facilities was only included as a segment in the Other Non-Core Category. With the increased data confidence resulting from the Facility Condition Assessments, Buildings have been added as a new category with its own level of service metrics for future AMP updates.

Staff are looking at ways to maximize the relevant categorization of the asset categories listed in the AMP. The level of service metrics for Land Improvements, Trails & Boardwalks, and Other Non-Core are adjusted to allow these 3 categories to be combined. The segments, risk calculation, and condition rating scoring will remain the same.

Setting the Proposed Levels of Service For All Assets - 2025 Asset Management Plan Requirements

Since the submission of the 2024 AMP, the township has undergone a number of activities to improve the data in the portfolio. Updated condition assessments, analyzing and improving the lifecycle strategy of asset classes, trending estimated useful life data, and updating replacement cost values where applicable have all contributed to the value gained from the overall asset management program as a whole.

At this time, staff support the recommendation of maintaining current levels of service, and current lifecycle costs, and reporting this way for the 2025 AMP submission.
Asset management is a living program. As lifecycle strategies continue to improve based on tracking and trending over the years, as risk identification and risk management continue to develop, and as asset performance and conditions continue to be monitored, an adjustment to the levels of service will

be reassessed annually. Any staff recommendations for adjustment would be brought forth to Council as needed.

New metrics will be added across the categories, which will help to create a benchmark for the current levels of service, as well as be used when considering an adjustment.
Updated metrics to include but not limited to

- Historical capital and maintenance reinvestment rates
- Change in reinvestment rate year-over-year (trend)
- Percentage of maintenance and rehabilitation completed annually
- Percentage of number of projects deferred
- Resident feedback: Number of service requests or complaints associated with assets such as
    - Roads
    - Bridges
    - Facilities
    - Parks
- Infrastructure gap (and trend)
- Annual lifecycle cost per unit of asset (e.g., per km of road)

Options/Alternatives
Option #1
Direct staff to use the current levels of service and lifecycle costs as the proposed levels of service and lifecycle costs for the 2025 asset management plan submission.

Option #2
Direct staff to adjust the levels of service and calculate the associated lifecycle costs for the 2025 asset management plan submission.

Financial Implications
Option #1
This is for information only. There are no new financial implications associated with this item.

Option #2
Analysis will need to be done to calculate any required change impact to specific asset categories.

Relationship to Strategic Plan

- Sustainable Long Term Fiscal Management
- Infrastructure Revitalization

Conclusion
The asset management program as a whole is continually growing and improving based on the efforts put forth by the township.
Understanding that this program needs years of data collection to effectively track and trend is important for making informed decisions that will impact the levels of service provided by the Townships tangible capital assets, as well as the financial implications associated with these decisions.
Using our current levels of service and lifecycle costs as the proposed level of service and lifecycle costs for the 2025 asset management plan submission will ensure we are meeting the requirements of O'Reg 588/17, as well as allow for continual data collection to make long term strategic decisions.

Haley Leblond, Director of Corporate Services/Deputy CAO	Approved - 06 May 2025
Haley Leblond, Director of Corporate Services/Deputy CAO	Approved - 06 May 2025
Robert Lamb, Chief Administrative Officer	Approved - 07 May 2025

Township of Tiny | Asset Management Plan

2025

Contents

List of Figures

List of Tables

Executive Summary

As an update to the 2024 Township of Tiny Asset Management Plan (AMP), this report was developed in accordance with Ontario Regulation 588/17 ("O. Reg"). It includes key elements of an industry-standard and regulation compliant AMP and provides a detailed overview of all the Township's assets.

This 2025 AMP includes the same data within the categories and segments that were used in the 2024 AMP. The *About This Document* section has been updated to reflect the 2025 requirements, as well as minor data adjustments to figure 5, 6, 9, and table 57 to correct discrepancies previously reported. The overall messaging remains the same.

The structure, data, and presentation of this report is the same as the 2024 AMP.

As per the Council approved Corporate Services Report CS-FIN-007-25, Level of Service and Lifecycle Costs Requirements for 2025 Asset Management Plan Update, the current level of service will remain the proposed level of service at this time. Each of the Levels of Service tables in the asset categories within the report have been updated to reflect this.

The findings from the facility condition assessments have not been included in this report. As the township staff carry out additional data improvement initiatives in 2024 and 2025 in the storm water, water network, and road network asset categories, a future update will reflect all these changes, and how the current financial strategy is impacted.

As the township staff carry out additional data improvement initiatives in 2025 and 2026, an impending iteration of the AMP will include all of the following

- Updated asset and condition data from the storm water system CCTV investigations
- Updated condition data from the road scanning
- Updated assets, condition data, and replacement costs of the township's buildings and facilities
- Update condition data from Water network building/facility condition assessments
- Updated lifecycle events from road scan/condition tracking/trending.
- Updated financial strategy reflective of a current tax levy and funding gap
- Updated backlog list and funding strategy
- Updated metrics for tracking and trending level of service with historical data
- Updated risk metrics based on the reduced number of asset categories and segments

<u>Previously reported Executive Summary:</u>
This 2024 AMP analyzed the Township's assets and classified them within nine asset categories. The total current replacement cost of the Township's portfolio is over $342 million. The total replacement cost estimate was calculated using a combination of user-defined costing and the inflation of historical costs to present day. At 54%, the road network still forms the largest share of the Township's asset portfolio, followed again by the water network at 20%.
Based on both assessed condition and age-based analysis, 62% of the Township's infrastructure portfolio is in fair or better condition. The remaining 38% of assets, with a current replacement cost of more than $130 million, is estimated to be in poor or very poor condition.

It should be understood that the majority of assets classified as poor or very poor did not have in-

field condition assessments available. This means that the condition of these assets is based on age only data, which in many cases does not properly represent the condition. Assets with assessments based on age only data includes the major infrastructure in the Water Network, Stormwater Network, and the Other Non-Core category. As this data is collected, it is anticipated that the assets will be positively affected, and their conditions will change for the better.

Overall, condition assessment data was available for 60% of the Township's assets. For the remaining 40%, age was used to estimate condition.
While a useful substitute in the absence of inspection data, using asset age to approximate its condition can lead to inaccurate results as age can understate or overstate asset needs. A more programmatic approach to condition assessments is recommended to improve data confidence.

Aging assets require maintenance, rehabilitation, and replacement. On average, $11.6 million is required each year to maintain current capital rehabilitation and/or replacement needs for the Township's asset portfolio. It should be noted that this average estimate does not include inflation, service level improvements, or changes to the asset portfolio. This is based on a like-for-like replacement of assets.

With the aging assets, a like-for-like replacement is not always available. An example of a change in the asset portfolio would be replacing electrical equipment in a pumphouse. There are a number of electrical panels in various pumphouses that are no longer in production, and therefore not available to be replaced like for like. Replacement with available equipment is a change in the portfolio, and therefore the replacement costs currently used for budgeting purposes may not reflect this.

With respect to service level improvements, an example would be Playground Equipment in the Land Improvements category. When playground equipment is being replaced, in many cases it is upgraded with bigger or more robust equipment, and/or barrier free equipment. It should be understood that this is a service level improvement, not a like-for-like replacement.

Based on a four-year average of actual spending from reliable and predictable sources (taxation, Ontario Community Infrastructure Fund (OCIF), Canadian Community-Building Fund (CCBF) and water user fees), the average annual funding available for long term planning and forecasting totals $3.21 million for all assets in this AMP. This would total 27.7% of the annual capital requirements.
Analysis went further and reviewed all actual spending over the past 4 years and found that on overage $5.67 million was spent, resulting in 49% funding of the average capital requirements. Based on actual spending, there is still an average annual deficit of $5.92 million, or 51%.

Addressing annual infrastructure funding shortfalls is a difficult and long-term endeavour for all municipalities. Considering the Township's current funding position, it will require many years to reach full funding for current assets. Short phase-in periods to meet these funding targets may place too high of a burden on taxpayers too quickly, whereas a phase-in period beyond 20 years may see a continued deterioration of infrastructure, leading to larger backlogs. These scenarios can be found in Tables 58-61.

In addition to annual needs, there is also an infrastructure backlog of $49.6 million, comprising of assets that remain in service beyond their estimated useful life. It is highly unlikely that all such assets are in a state of disrepair, requiring immediate replacements or full reconstruction. Approximately 47% of the highlighted backlog is in the road network. This can be largely attributed to outdated condition assessments. Approximately 37% of this backlog is concentrated in the buildings, which are not effectively componentized into their individual major elements and

components. Without componentization, the analysis related to buildings does not offer sufficient guidance and accuracy.

Most municipalities in Ontario, and across Canada, continue to struggle with meeting infrastructure demands. This challenge was created over many decades and will take many years to overcome. To this end, the Township is committed to the following:

- continuous and dedicated improvement to the Township's infrastructure datasets, which form the foundation for all analysis, including financial projections and needs;
- continuous refinements to risk and lifecycle models as additional data becomes available. This aids in prioritizing projects and creating more strategic long-term capital budgets that are better aligned with corporate goals; and
- establish benchmark data to calibrate levels of service targets for 2025 regulatory requirements.

About this document

The Township of Tiny Asset Management Plan (AMP) was developed in accordance with Ontario Regulation 588/17 ("O. Reg 588/17"). It contains a comprehensive analysis of the Township's infrastructure portfolio. The AMP is a living document that is updated regularly as additional asset and financial data becomes available.

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. Along with creating better performing organizations, more livable 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.

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				●

Scope

The scope of this AMP includes all requirements for the 2025 reporting deadline. Core assets addressed in this AMP include the Township's Road Network, Bridges & Culverts, Storm Network, and Water Network. Non-core asset categories include Fleet, Land Improvements, Equipment & Reporting, Trails & Boardwalks, and Other Non-Core. The state of infrastructure has not changed significantly from 2024 and therefore will be reported the same as 2024. The proposed levels of service for all assets will remain the same as the recorded current level of service in 2024. As the portfolio has not changed since 2024, the lifecycle costs associated

with the proposed level of service remain the same presented in 2024. Growth impacts have been considered and will remain the same for this 2025 update. Again, as the portfolio is unchanged and the proposed level of service remains the same as current level of service reported in 2024, the financial strategy will remain the same.

Overview of Asset Management

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

Lifecycle costs can span decades, requiring planning and foresight to ensure financial responsibility is spread equitably across generations. An asset management plan is critical to this planning, and an essential element of a broader asset management program. The industry standard approach and sequence to developing a practical asset management program begins with a Strategic Plan, followed by an Asset Management Policy and an Asset Management Strategy, concluding with an Asset Management Plan.

This industry standard, defined by the Institute of Asset Management (IAM), emphasizes the alignment between the corporate strategic plan and various asset management documents. The strategic plan has a direct, and cascading impact on asset management planning and reporting.

Key Technical Concepts in Asset Management

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

Lifecycle Management Strategies

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

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

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

Depending on initial lifecycle management strategies, asset performance can be sustained through a combination of maintenance and rehabilitation, but at some point, replacement is required. Understanding what effect these activities will have on the lifecycle of an asset, and their cost, will enable staff to make better recommendations. Table 2 provides a description of each type of activity, the general difference in cost, and typical risks associated with each.

The Township's approach to lifecycle management is described where applicable 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

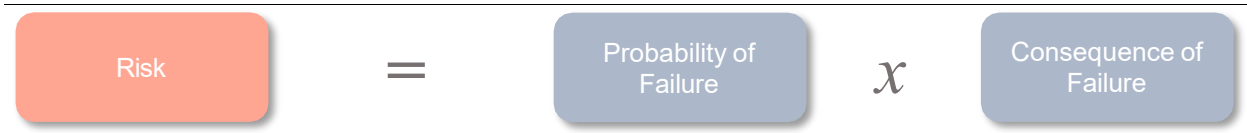
Lifecycle Activity	Description	Cost	Typical Associated Risks
Maintenance	Activities that prevent defects or deteriorations from occurring	$	• Balancing limited resources between planned maintenance and reactive, emergency repairs and interventions; • Diminishing returns associated with excessive maintenance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

Risk and Criticality

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

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

Figure 1 Risk Equation



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

Probability of Failure

Several factors can help decision-makers estimate the probability or likelihood of an asset's failure, including its condition, age, previous performance history, and exposure to extreme weather events.

Consequence of Failure

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

Table 3 illustrates the various types of consequences that can be integrated in developing risk and criticality models for each asset category and segments within. We note that these consequences are common, but not exhaustive.

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

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

These models have been built in Citywide for continued review, updates, and refinements. Risk matrices are also generated using these models. We caution that since risk ratings rely on many factors beyond an asset's physical condition or age, assets in a state of disrepair can sometimes be classified as low-risk, despite their poor condition rating. In such cases, although the probability of failure for these assets may be high, their consequence of failure ratings were determined to be low based on the attributes used and the data available.

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

Levels of Service

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

Community Levels of Service

Community levels of service are a simple, plain language description or measure of the service that the community receives. For core asset categories (Roads, Bridges and Culverts, Water, Wastewater, Stormwater) the Province, through O. Reg. 588/17, has provided qualitative descriptions that are required to be included in this AMP. For the non-core assets categories, the descriptions have been determined by Township staff and identified in each associated category.

Technical Levels of Service

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

For core asset categories (Roads, Bridges and Culverts, Water, and Stormwater) the province, through O. Reg. 588/17, has also provided technical metrics that are required to be included in this AMP. For the non-core assets categories, the metrics have been determined by Township staff and identified in each associated category.

Current and Proposed Levels of Service

This AMP focuses on measuring the current level of service provided to the community. With the current levels of service metrics, 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.

Reinvestment Rate

As assets age and deteriorate, they require additional investment to maintain a state of good repair. The reinvestment of capital funds, through asset renewal or replacement, is necessary to sustain an adequate level of service. The reinvestment rate is a measurement of available or required funding relative to the total replacement cost. By comparing the actual versus target reinvestment rate the Township can determine the extent of any existing funding gap.

Asset Condition

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

A condition assessment rating system provides a standardized descriptive framework that allows comparative benchmarking across the Township's asset portfolio. The Township utilizes two different rating scales to record condition. Table 4 below outlines the condition rating system used across all asset categories with the exception of some Fleet. 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	Pavement Condition Index (PCI)	Pipe Rating	Bridge Condition Index (BCI)	Age-based (Service Life Remaining%)	Broad Description
Very Good	91-100	0-1	>70	80-100	**Fit for the future** Well maintained, good condition, new or recently rehabilitated; no defects or minor defects
Good	76-90	2		60-80	**Adequate for now** Acceptable, signs of minor to defects and deterioration
Fair	66-75	3	50-70	40-60	**Requires attention** Signs of moderate deterioration and defects, some elements exhibit significant deficiencies
Poor	40-65	4	<50	20-40	**Increasing potential of affecting service** Approaching end of service life, condition below standard, large portion of system exhibits significant deterioration; significant defects overall
Very Poor	0-39	5		0-20	**Unfit for sustained service** Near or beyond expected service life, widespread signs of advanced deterioration, some assets may be unusable

Table 5 below outlines the condition rating system used for Fleet as identified in the fleet management strategy.

Table 5 Fleet Strategy Condition Rating Scale

Condition	Fleet Assessment Score	Broad Description
Good	0-15	**Good** Unit is considered in good standing, with not short term plans for replacement.
Consider for Replacement	16-25	**Consider for Replacement** Unit should be considered for replacement. Capital budget planning in the short term.
Replace ASAP	26-30	**Replace ASAP** Unit should be considered for immediate replacement.

Age Profile

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

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

A comparison of the weighted average useful life of all segments and their weighted average age has been provided for all categories.

Foundational Documents in Asset Management

In the municipal sector, ‘asset management strategy’ and ‘asset management plan’ are often used interchangeably. Other concepts such as ‘asset management framework’, ‘asset management system’, and ‘strategic asset management plan’ further add to the confusion; lack of consistency in the industry on the purpose and definition of these elements offers little clarity. Below is a clear distinction between the policy, strategy, and the plan.

Asset Management Policy

An asset management policy represents a statement of the principles guiding the Township’s approach to asset management activities. It aligns with the organizational strategic plan and provides clear direction to municipal staff on their roles and responsibilities as part of the asset management program. The Township completed and adopted an asset management policy in 2019 in compliance with O. Reg 588/17, and has updated the policy in 2024 to remain compliant with the regulation.

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 higher state of asset management maturity. It is intended to convert the asset management policy from a set of formal, institutionalized, but philosophical commitments into specific actions.

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

The Township of Tiny’s Asset Management Strategy was created in 2022. The first year’s priorities and major recommendations are complete, and the second year is currently being implemented.

Asset Management Plan

The asset management plan is often identified as a key output within the strategy. The AMP has a sharp focus on the current state of the Township’s asset portfolio, and its approach to managing and funding individual service areas or asset groups. It is tactical in nature and provides a snapshot in time. The council strategic plan has a direct and cascading impact on asset management planning.

Limitations and Constraints

This AMP was developed based on best-available data as of November 1, 2023, and was subject to the following broad limitations, constrains, and assumptions:

1. The analysis in this AMP is highly sensitive to several critical data fields, including an asset's estimated useful life, replacement cost, quantity, and in-service date. Inaccuracies or imprecisions in any of these fields can have substantial and cascading impacts on all reporting and analytics.

2. User-defined and unit cost estimates, based typically on staff judgment, recent projects, or established through completion of technical studies, offer the most precise approximations of current replacement costs. When this isn't possible, historical costs incurred at the time of asset acquisition or construction can be inflated to the present day. This approach, while sometimes necessary, and deployed in this AMP for some asset groups, can produce highly inaccurate estimates.

3. 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. As a result, financial requirements generated through this approach can differ from those produced by staff.

4. The Township's buildings and facilities are not effectively componentized into their individual elements, major components, and minor components. These facilities contain thousands of individual assets, including the substructures, shell, interior assets, various electrical, plumbing, HVAC systems, and other complex equipment and furnishings. Each of these assets has its own useful life and replacement cost, and individual condition rating, as well as installation history. Without componentization, the value of condition ratings, age profiles, and long- and short-term forecasts remains limited.

5. 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 availability of important asset attribute data to ensure that asset risk ratings are valid, and assets are properly stratified within the risk matrix. Missing attribute data can misclassify assets. Risk models and analysis are defined and refined based on true historical data. As this data continues to be collected over the years, the risk models will continue to change.

These limitations have a direct impact on 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 that are generated from Citywide, the Township's primary asset management system. In general, data confidence for Other Non-Core category, Stormwater Network, and Water Network remains low.

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.

Figure 2 illustrates how assets were classified within the infrastructure data hierarchy. Most reporting and analysis are presented at the segment level.

Asset Hierarchy and Data Classification

Asset hierarchy explains the relationship between individual assets and their components, and a wider, more expansive network and system, as well as the organizational structure as a whole. How assets are grouped in a hierarchy structure can impact how data is interpreted. Assets were structured to support meaningful, efficient reporting and analysis. Details are presented to the segment level.

Figure 2 shows the Core asset hierarchy.

Figure 2 Asset Hierarchy and Data Classification: Core Assets

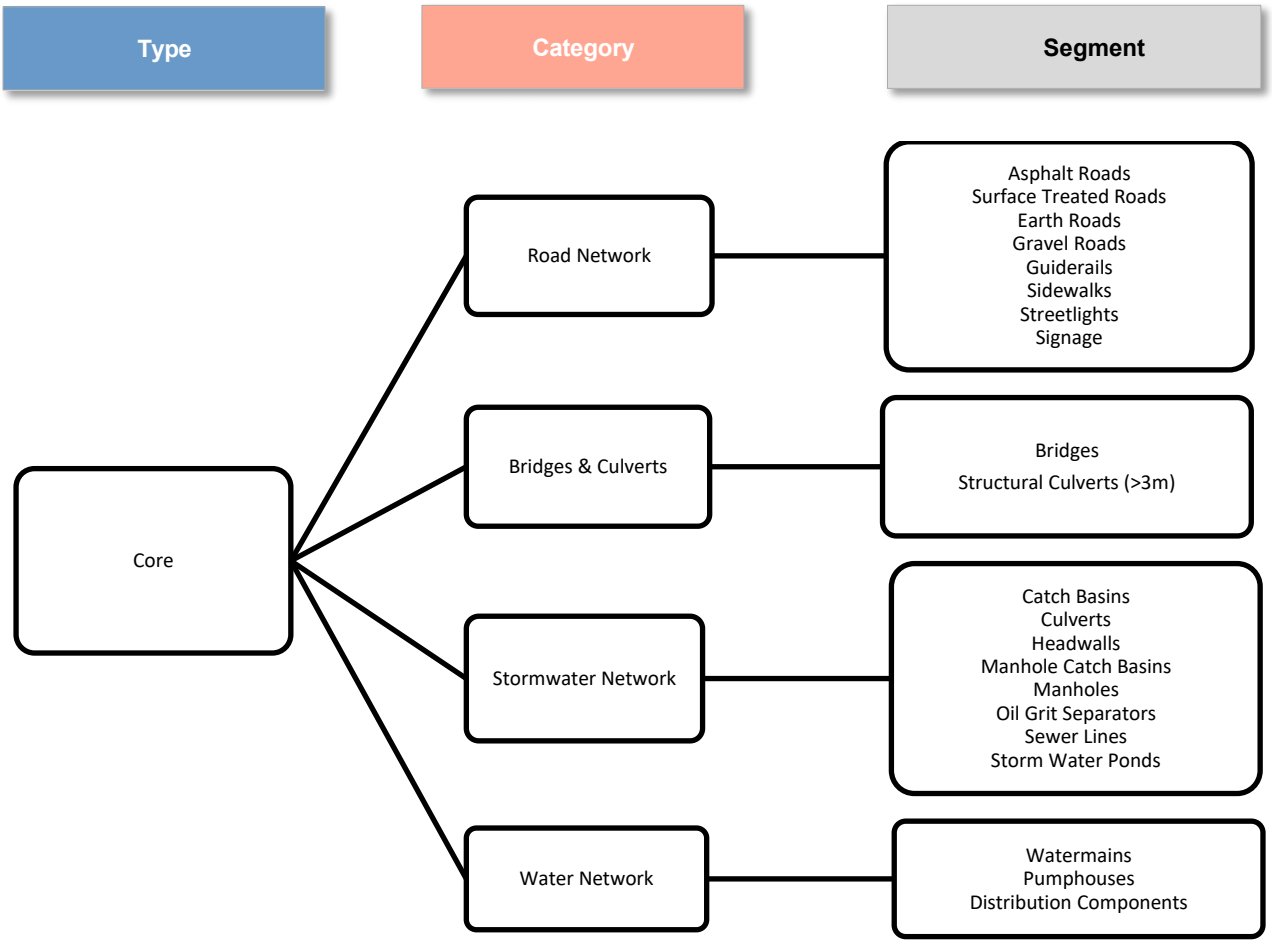
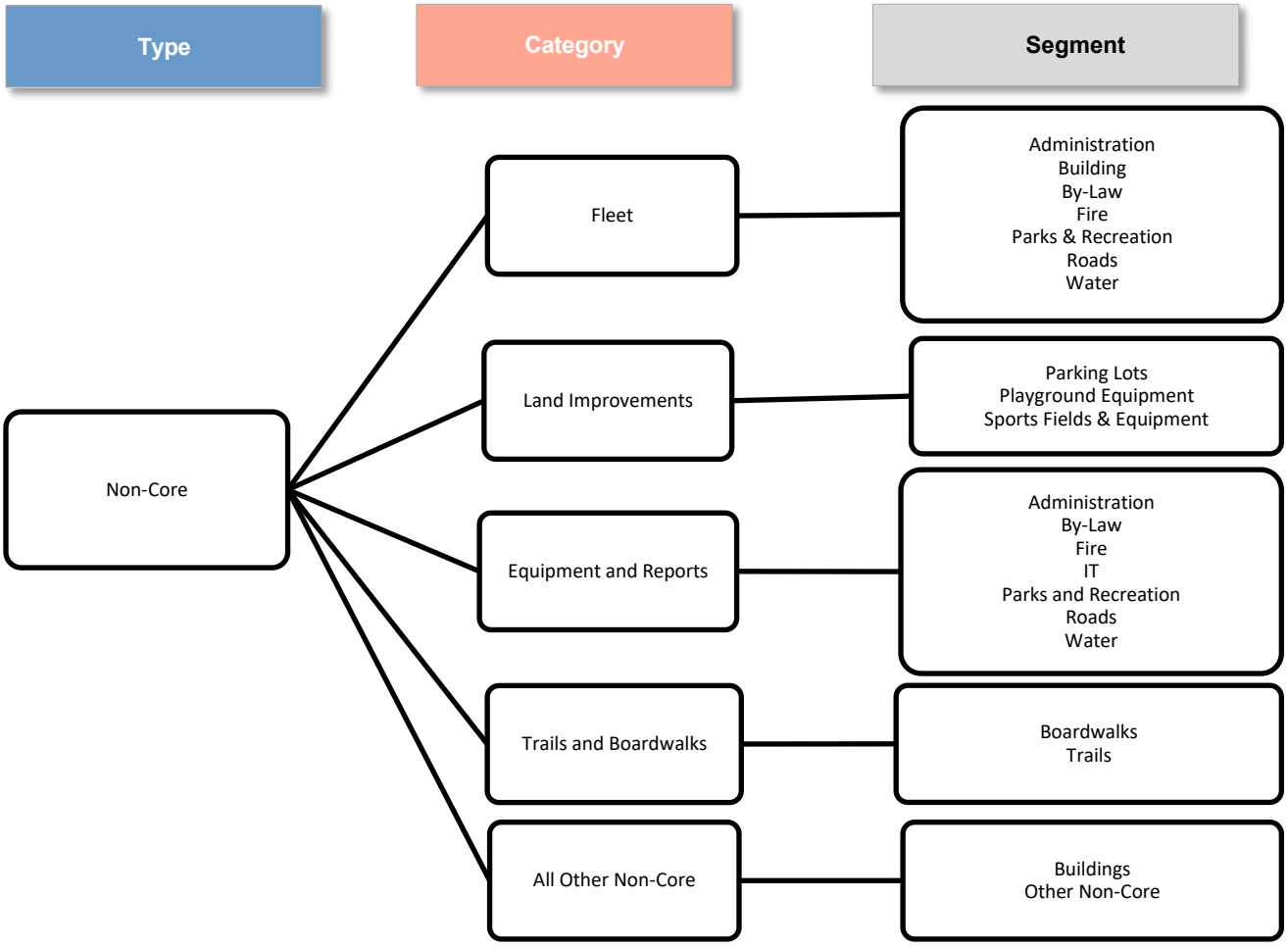


Figure 3 shows the Non-Core asset hierarchy.

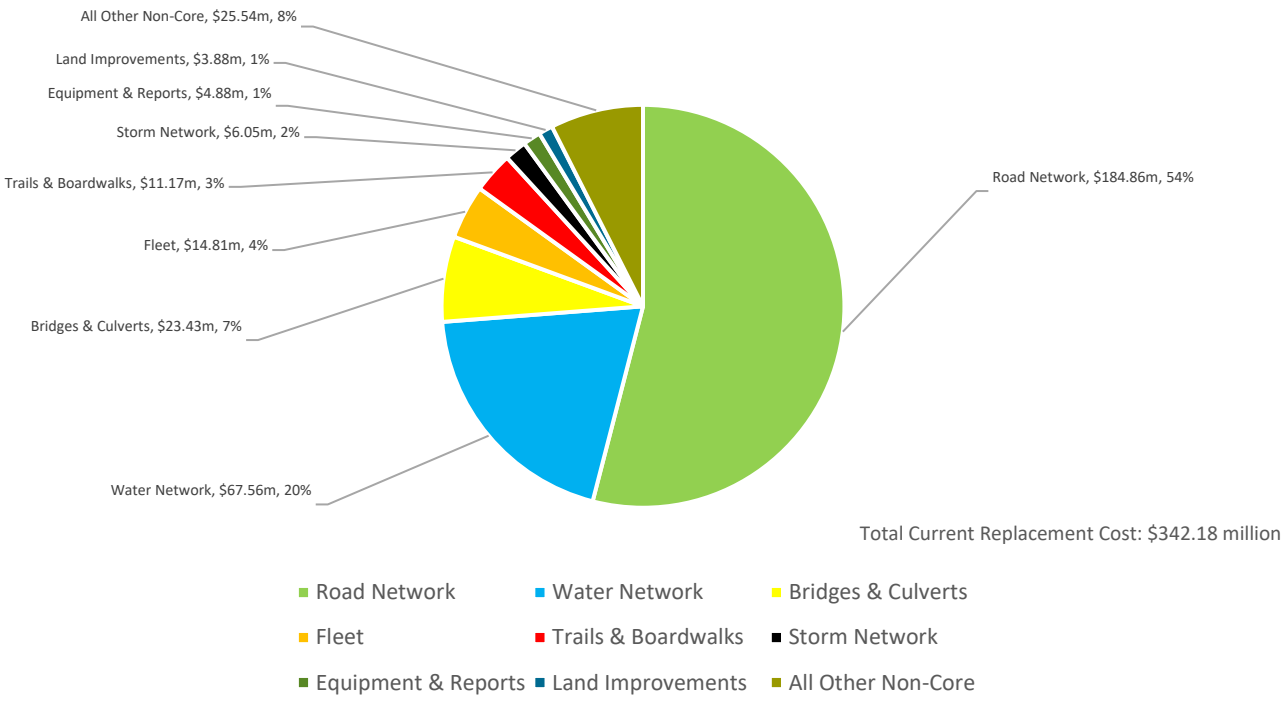
Figure 3 Asset Hierarchy and Data Classification: Non-Core Assets



Portfolio Overview

The nine asset categories analyzed in this asset management plan have a total current replacement cost of $342.18 million. This estimate was calculated using a combination of user-defined costing and the inflation of historical costs to the present day. Figure 3 illustrates the replacement cost of each asset category; at 54%, roads form the largest share of the Township's asset portfolio, followed by the water distribution network at 20%.
The replacement costs and category have been updated since the 2022 asset management plan, as a result of inventory refinement and updated replacement costing.

Figure 4 Current Replacement Cost by Asset Category



Source of Condition Data

How asset condition is estimated can dramatically alter an asset's profile. Periodic in-field condition assessments conducted by qualified personnel provide the most credible data on the true physical state of an asset and its ability to continue to deliver its intended function in a safe and effective manner. In the absence of condition data, an asset's age can be used to approximate its physical condition. However, age can often understate an asset's condition, resulting in inferior assigned condition ratings that may be misleading.

Table 6 illustrates the percentage of each asset category, based on replacement cost, for which condition data was available. Overall, condition assessment data was available for 60% of the Township's assets. For the remaining 40%, only age was used to estimate their condition.

Table 6 Source of Condition Data

Category	Segment	Percentage of assets with assessed condition data. Weighted by replacement cost
Road Network	Asphalt Roads	100%
	Surface Treated Roads	100%
	Earth Roads	25%
	Gravel Roads	3%
	Guiderails	0%
	Sidewalks	0%
	Signage	0%
	Street Lights	0%
Bridges & Culverts	Bridges	100%
	Culverts	100%
Storm Network	Catch Basins	0%
	Culverts	0%
	Headwalls	0%
	Manhole Catch Basins	0%
	Manholes	0%
	Oil Grit Separators	0%
	Sewer Line	0%
	Storm Water Ponds	0%
Water Network	Distribution Components	0%
	Mains	0%
	Pumphouses	37%
Fleet	Administration	100%
	Building	100%
	By-law	100%
	Fire	4%
	Parks & Recreation	100%
	Roads	100%
	Water	100%
Land Improvements	Parking Lots	1%
	Playgrounds	0%
	Sports Fields & Equipment	0%

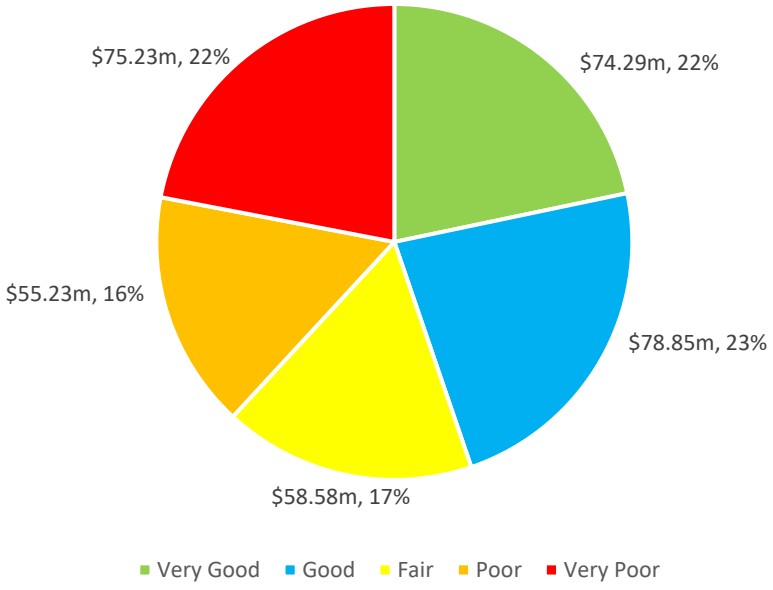
Category	Segment	Percentage of assets with assessed condition data. Weighted by replacement cost
Equipment & Reports	By-Law	0%
	Fire	0%
	IT	0%
	Parks & Recreation	0%
	Roads	0%
	Water	100%
Trails & Boardwalks	Trails	48%
	Boardwalks	0%
Other Non-Core	Buildings	0%
	All Other-Non Core	0%
Total		**60%**

Asset Condition Overview

Based on both assessed condition and age-based analysis, 62% of the Township's infrastructure portfolio is in fair or better condition. The remaining 38% of assets, with a current replacement cost of more than **$130 million, is estimated to be in poor or very poor condition. We reiterate that the majority of assets classified as poor or worse did not have in-field condition assessments available. This includes major infrastructure such as watermains, storm assets, and buildings.

Typically, assets in poor or worse condition may require replacement or major rehabilitation in the immediate or short-term. Targeted condition assessments may help further refine the list of assets that may be candidates for immediate intervention. Keeping assets in fair or better condition is typically more cost-effective than addressing assets needs when they enter the latter stages of their lifecycle or a drop to a lower condition rating, e.g., poor or worse.

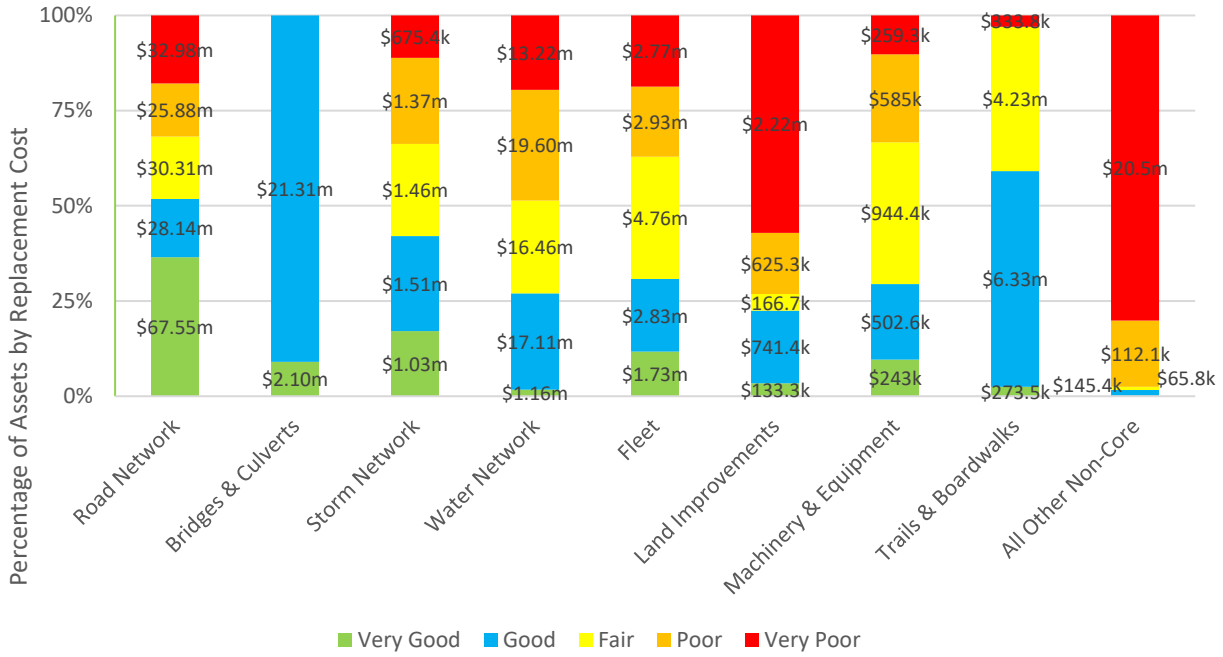
**Figure 5 Asset Condition – Portfolio Overview



**Corrected

Figure 6 provides further details on the condition of each asset category. Based primarily on assessed condition data, **68% of the Township's road network is in fair or better condition. Similarly, 100% of bridges and structural culverts are in good to very good condition.

**Figure 6 Asset Condition – By Asset Category



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The analysis also reveals that the majority of the land improvements assets, and all other non-core (which includes buildings) are in poor or very poor condition. However, these estimates are based only on age as no condition data was available.

Similarly, age analysis also shows that nearly 50% of the Township's Water Network assets and over 30% of the Stormwater Networks assets are in poor to very poor condition. As noted previously, age data alone can drastically understate the condition of assets, particularly underground assets such as water and storm mains. It is expected and presumed that the actual physical condition of these assets is much higher than estimated by age, and they can continue to perform their intended function safely and effectively.

Condition assessments and failure history (e.g., breaks, backups) will help establish true asset condition and identify assets that may require rehabilitation or replacements.

Forecasted Long-term Replacement Needs

Aging assets require maintenance, rehabilitation, and replacement. The Township has made significant investments in roads, bridges, and water assets to support delivery of high-quality infrastructure programs. Figure 7 below illustrates the system-generated rehabilitation and/or replacement requirements for each asset categories within the Townships portfolio. This analysis was run for more than 100 years to capture at least iteration of replacement for the asset with the longest lifespan. Figure 7 illustrates a narrower time frame of 50 years.

For roads, typical maintenance, rehabilitation/renewal strategies and their associated timing and costs were incorporated with asset data. For all remaining asset classes, only replacement needs are shown. The Township's recent Ontario Structural Inspection Manual (OSIM) report also identified approximately $2.43 million in repair and renewal needs for bridges and structural culverts, of which $1.719 million is recommended to be completed over the next 10 years.

On average, $11.6 million is required each year to remain current with capital rehabilitation and/or replacement needs for the Township's asset portfolio (red dotted line). Although actual spending may fluctuate substantially from year to year, this figure is a useful benchmark for annual capital expenditure targets (or allocations to reserves) to ensure projects are not deferred and replacement needs are met as they arise. This figure assumes a like-for-like asset replacement and does not account for capacity upgrades that offer higher levels of service at higher potential costs, as mentioned in the executive summary.

Figure 7 System-generated Capital Replacement Needs - 2024-2073

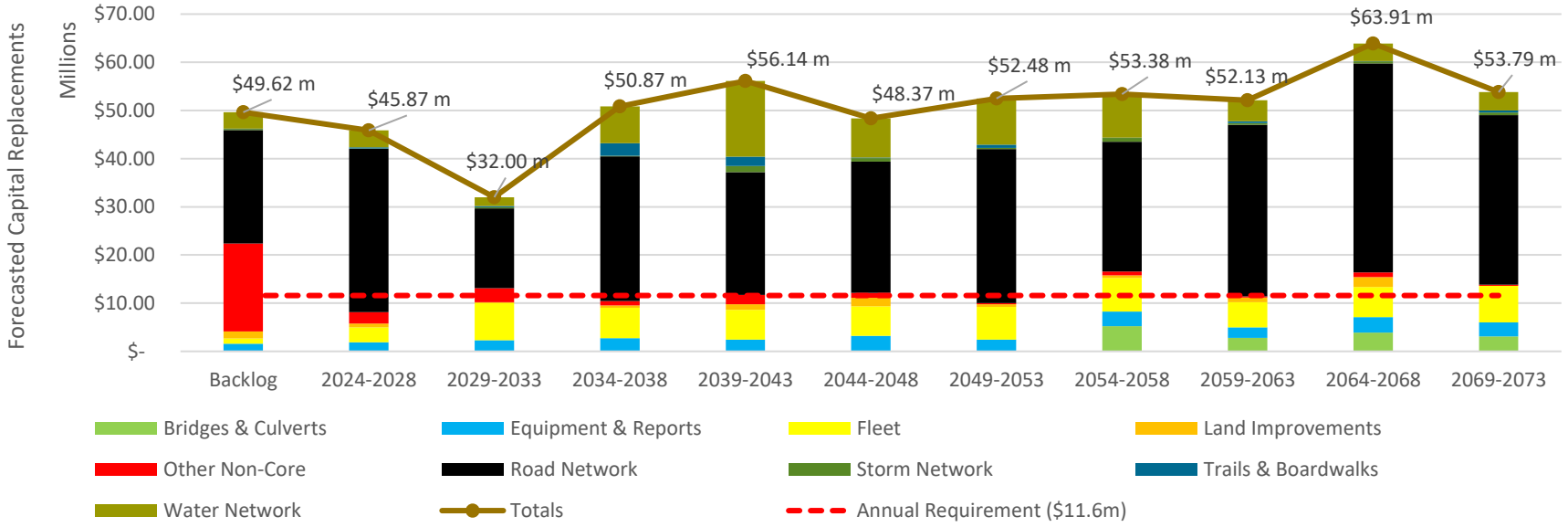


Figure 7 relies on age, available condition data, and lifecycle modeling. It also illustrates a backlog of $49.62 million, comprising assets that remain in service beyond their estimated useful life. Of this, over $23 million is attributed to the Road Network assets, over $18 million is attributed to Other Non-Core, which includes all municipal buildings, $3 million is attributed to the Water Network, $1.5 million each to Land Improvement and Equipment & Reports categories, and $1 million to Fleet.

These estimates are based on a combination of in-field condition assessments, and age-based condition assessments. As age typically underestimates an asset's condition, it is unlikely that all assets for which no condition data was available are truly in a state of disrepair, requiring immediate replacements. Age thereby overestimates associated financial requirements.

Targeted and periodic condition assessments are integral in refining system-generated backlog estimates and ongoing capital needs. With continuous data updates and refinements, these projections will become better aligned with actual asset needs and more closely reflect staff judgment on project prioritization. Risk frameworks and levels of service targets can then be used to prioritize projects, continuously refine estimates for both backlogs and ongoing capital needs and help select the right lifecycle intervention.

The Stormwater Network has in-field closed circuit television (CCTV) condition assessments planned and approved as part of the 2024 capital projects. Once results become available, the data will be added to the database to improve confidence in capital planning in that category. In addition, when the facility condition data is available, it will also be added to the database.

Formal Road Network condition assessments are planned for 2025.

Lastly, effective componentization of buildings into their individual major elements is incomplete. The on- site assessments have been completed by a third-party consultant, however the data and results are not yet available. Once inputted into the asset management software, improved long-term forecasts and replacement needs will be reviewed. Currently, there are 59 assets associated with building

Road Network

The Township of Tiny's Road Network comprises the largest share of its infrastructure portfolio, with a current replacement cost of approximately $184.86 million, distributed primarily between asphalt, surface treated, and gravel roads. The Township also owns and manages other supporting capital assets, including sidewalks, guiderails, signage, and streetlights.

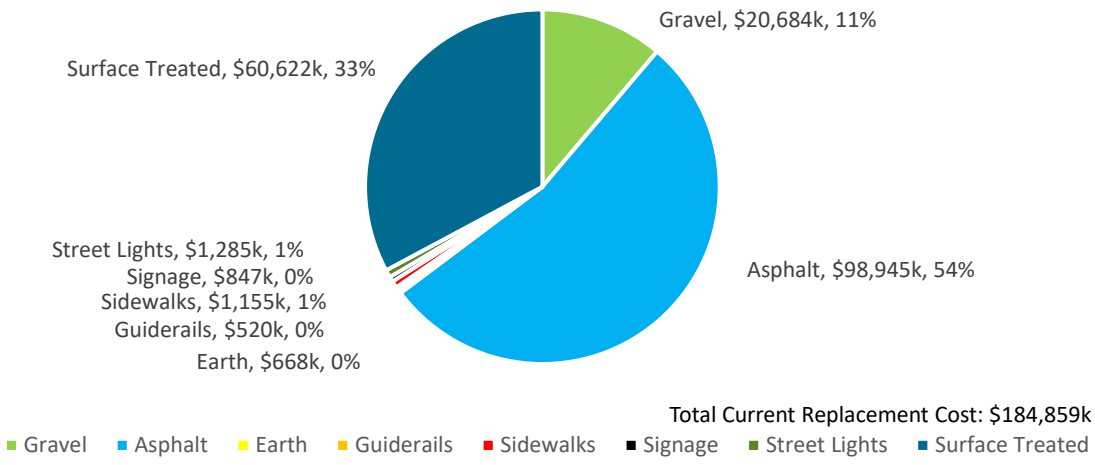
Inventory and Valuation

Table 7 summarizes the quantity and current replacement cost of the Township's various Road Network assets.

Table 7 Detailed Asset Inventory - Road Network

Segment	Quantity	Unit of Measure	Primary Replacement Cost Method	Replacement Cost (in '000)
Asphalt Roads	1,340,474	Area (m^2)	Cost/Unit	$98,945k
Surface Treated Roads	1,017,351	Area (m^2)	Cost/Unit	$60,622k
Earth Roads	22,260	Area (m^2)	Cost/Unit	$668k
Gravel Roads	461,908	Area (m^2)	Cost/Unit	$20,684k
Guiderails	21	Assets	CPI	$520k
Sidewalks	5,635	Meters	Cost/Unit	$1,155k
Signage	3,798	Assets	User-Defined Cost	$980k
Street Lights	1008	Assets	CPI	$1,285k
Total				**$184,859k**

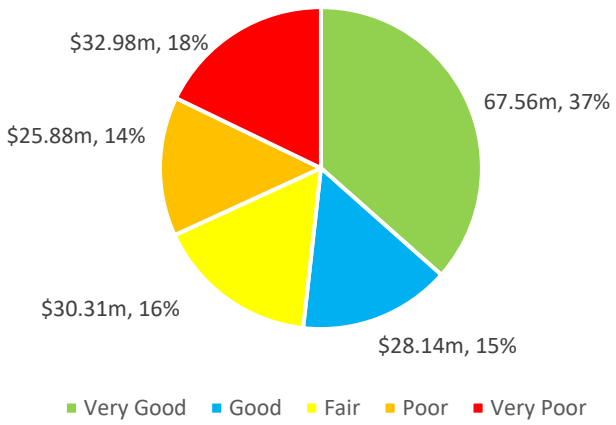
Figure 8 Portfolio Valuation



Asset Condition

Figure 9 summarizes the replacement cost-weighted condition of the Township's Road Network. Based on a combination of field inspection data and age, **68% of assets are in fair or better condition. The remaining **32% of assets, with a current replacement cost of **$58.85 million are in poor to very poor condition. These assets may be candidates for replacement in the short term; similarly, assets in fair condition may require rehabilitation or replacement in the medium term and should be monitored for further degradation in condition.

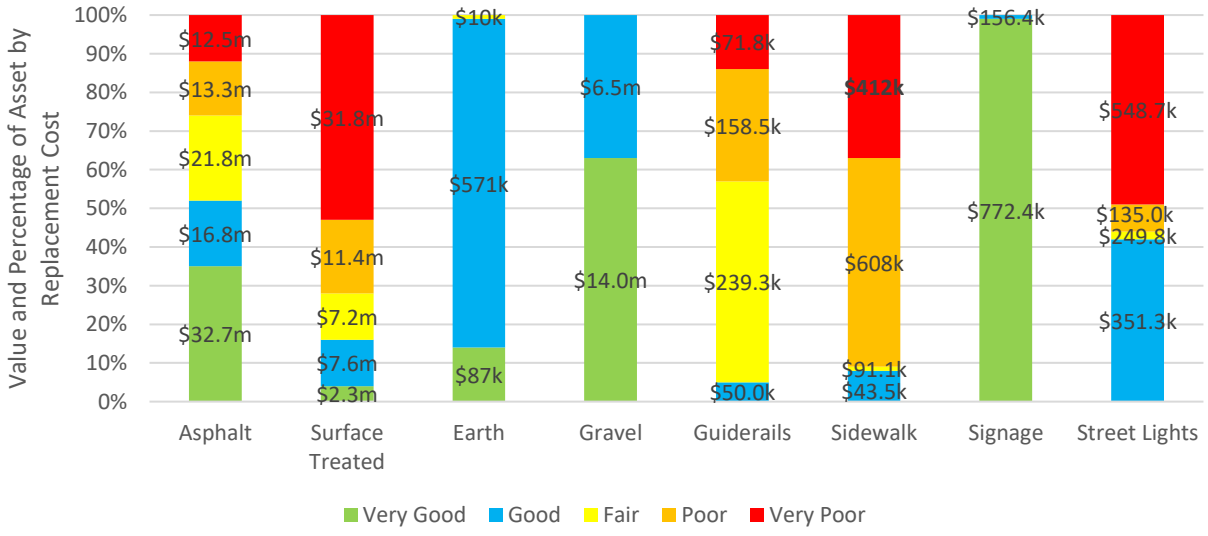
**Figure 9 Asset Condition - Road Network: Overall



**Corrected

As illustrated in Figure 10, the Township Road Network categories are displayed by value and percentage of asset by replacement cost. On site condition assessment for assets range from 2019 to 2021. Ongoing updated in-field condition assessments are required to ensure the true physical state of these assets is being captured.

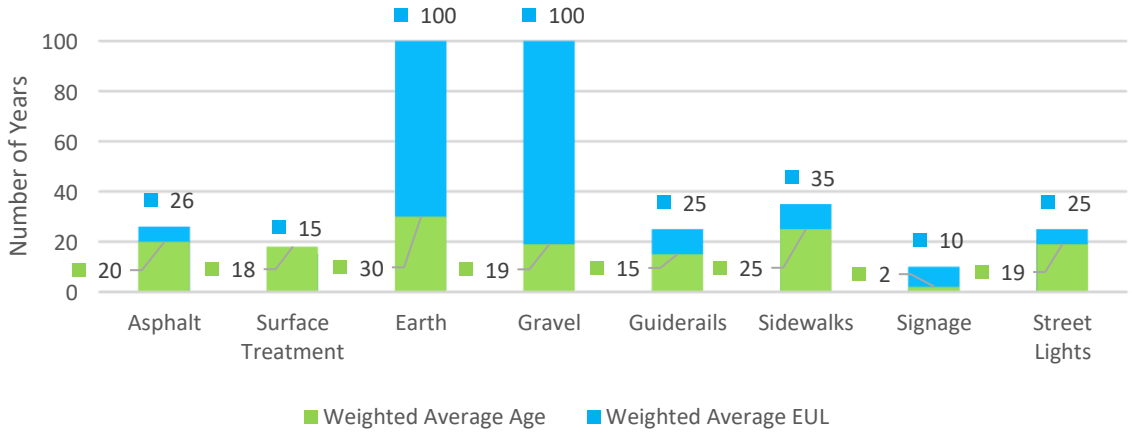
Figure 10 Asset Condition - Road Network: By Asset Type



Age Profile

Figure 11 illustrates the average current age of each asset type and its estimated useful life. Both values are weighted by the replacement cost of individual assets.

Figure 11 Estimated Useful Life vs. Asset Age – Road Network



The EUL for asphalt and surface treated roads varies by road class. On average, however, most asphalt and surface treated roads have entered the latter stages of their estimated useful life, based on the individual service date for all asset records. Although the analysis reveals that surface treated roads have consumed their full design life, with an average age of 18 years against an EUL of 15 years, lifecycle management strategies deployed by Township staff have helped to extend the life of these roads for many years and decades before major rehabilitation or reconstruction is required.

Reflecting the condition data from the previous section, sidewalk, and streetlight assets are in the latter stages of their estimated useful life. However, these assets can likely continue to perform their intended function safely with regular maintenance activities.

Updated signage data from the previous AMP update includes the addition of all Township road signage. While it shows the weighted average of these assets to be in the early stages of their life, based on average EUL, these assets are inspected annually with a reflectometer, and are given a pass or fail score. Weather impacts play the biggest role in when signage will need to be replaced, not age.

Current Approach to Lifecycle Management

This section outlines the current approach to managing the Road Network assets. This data has been reviewed and refined based on actual data collected. Lifecycle trigger events were revised in Citywide for each surface type and road class. These will continue to be reviewed and revised based on actual data collected in the field.

The Township conducts a road scan of its surface treated assets every five years to obtain pavement condition index (PCI) values. The PCI scores, staff judgment, traffic loads, and opportunity to bundle projects with utility work typically determine the optimal lifecycle intervention, ranging from pothole repairs to potential replacements. In addition, projects are also dispersed throughout the Township to ensure broader coverage.

Asphalt Roads: Class 3, 4, 5, and 6

Table 8 summarizes the various lifecycle events or interventions for the Township's asphalt roads, along with the trigger for the application, the expected impact on condition and/or asset life, and the cost per unit.

A typical lifecycle strategy for asphalt roads would see a microsurfacing application triggered by a pavement condition index of 70. This maintenance event extends the life of the road by 3 years and elevates the condition of the road by 15. With age, as the road deteriorates again, a shave-and-pave is triggered at a PCI value of 0. The shave-and-pave restores condition to 95. Once again, as the surface degrades, a second round of microsurfacing is triggered at a PCI of 70. This cycle is implemented three times before a full reconstruction is triggered after the fourth, and final microsurface application.

Although lifecycle interventions are consistent across all asphalt roads, expected design life varies based on road class. As such, a different lifecycle strategy was built for each road class. These are illustrated in Figure 12, Figure 13, Figure 14, and Figure 15.

Table 8 Current Lifecycle Management Strategies - Asphalt Roads Class 3,4,5,6

Event Name	Event Class	Event Range / Trigger	Impact on Asset Condition	Impact on Serviceable Life	Cost Per Unit
Microsurfacing	Maintenance	PCI drops to 70	PCI goes up by 15	Extended by 3 years	$4.50/m.sq
Shave and pave or pulverize and repave)	Rehabilitation or Renewal	PCI drops to 0	PCI goes to 95	Extended by 14 to 24 years	$30/m.sq.
Reconstruction	Replacement or Reconstruction	PCI drops to 0	PCI goes to 100	Resets to 15 or 25 years	$74/m.sq

Figure 12 Typical Deterioration Curve: Asphalt Class 3

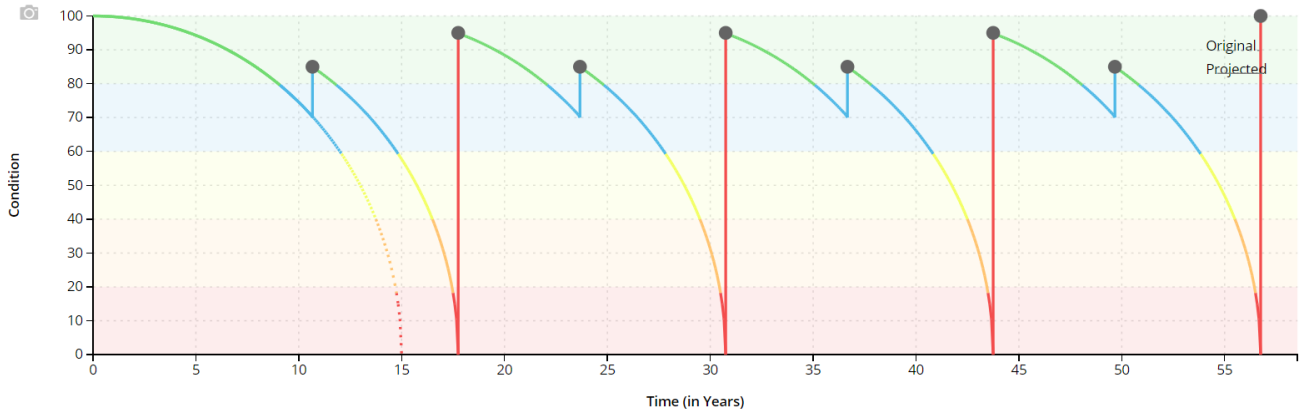
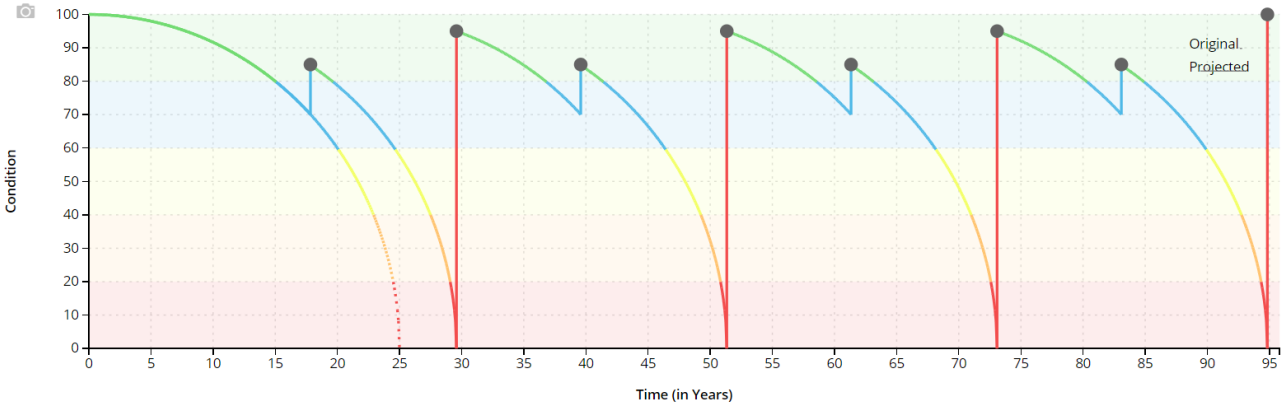


Figure 13 Typical Deterioration Curve: Asphalt Class 4



Without a lifecycle strategy, a Class 3 asphalt road may require reconstruction in 15 years. When the current lifecycle strategy is implemented, the deterioration model suggests that the expected life of a Class 3 asphalt surface can be extended to more than 55 years before a full reconstruction is required. Similarly, Class 4 roads can see a useful life extension from 25 years without a lifecycle strategy, to more than 90 years under the current approach.

Figure 14 Typical Deterioration Curve: Asphalt Class 5

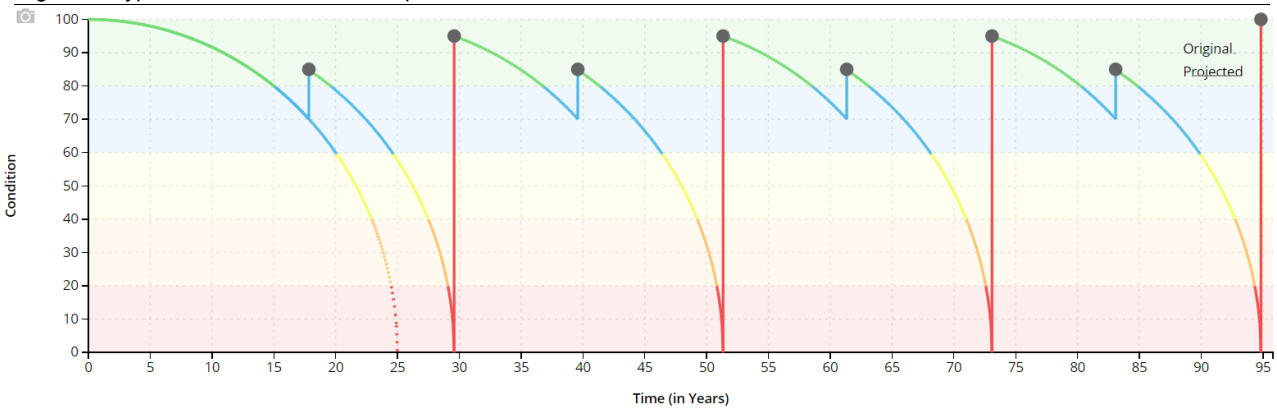
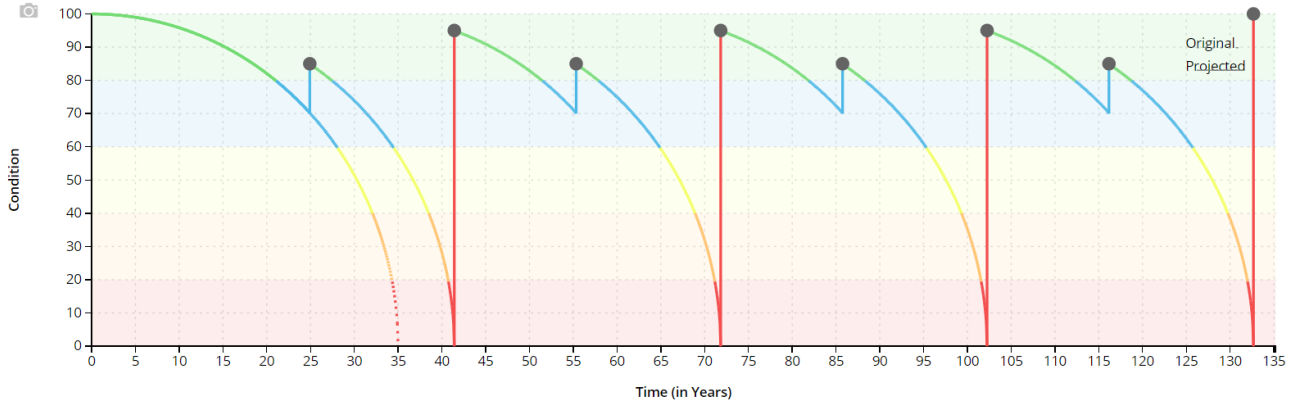


Figure 15 Typical Deterioration Curve: Asphalt Class 6



Without a lifecycle strategy, a Class 5 asphalt road may require reconstruction in 25 years. When the current lifecycle strategy is implemented, the deterioration model suggests that the expected life of a Class 5 asphalt surface can be extended to more than 95 years before a full reconstruction is required. Similarly, Class 6 roads can see a useful life extension from 35 years without a lifecycle strategy, to more than 130 years under the current approach.

Surface Treated Roads: Class 3, 4, 5, and 6

Table 9 summarizes the various lifecycle events or interventions for the Township's surface treated roads, along with the trigger for the application, the expected impact on condition and/or asset life, and the cost per unit.

A typical lifecycle strategy for surface treated roads would see a single surface treatment application triggered by a pavement condition index (PCI) of 70. This maintenance event extends the life of the road by 2 years and elevates the condition of the road by 10. With age, the road deteriorates again until a shave-and-pave event is triggered by a PCI score of 0. The shave-and-pave restores condition to 95.

This cycle of a single surface treatment followed by a shave-and- pave is repeated three times, before a full reconstruction is triggered after the final cycle of single surface treatment. In total, four single surface treatments and three shave-and-pave events are completed before a full reconstruction is considered.

Although lifecycle interventions are consistent across all surface treated roads, expected design life varies based on road class. As such, a different lifecycle strategy was built each for Class 3 and Class 4. As Class 5 and 6 share the same expected design life, the models are identical for these road classes. These are illustrated in Figure 16, Figure 17, and Figure 18.

Table 9 Current Lifecycle Management Strategies – Surface Treated Roads Class 3,4,5,6

Event Name	Event Class	Event Range / Trigger	Impact on Asset Condition	Impact on Serviceable Life	Cost Per Unit
Single Surface Treatment	Maintenance	PCI drops to 70	PCI goes up by 10	Extended by 2 years	$4.50/m.sq
Shave and pave or pulverize and repave	Rehabilitation or Renewal	PCI drops to 0	PCI goes to 95	Extended by 7 to 10 years	$30/m.sq
Reconstruction	Replacement or Reconstruction	PCI drops to 0	PCI goes to 100	Resets to 10, 12, or 15 years	$60/m.sq

Figure 16 Typical Deterioration Curve: Surface Treated Class 3

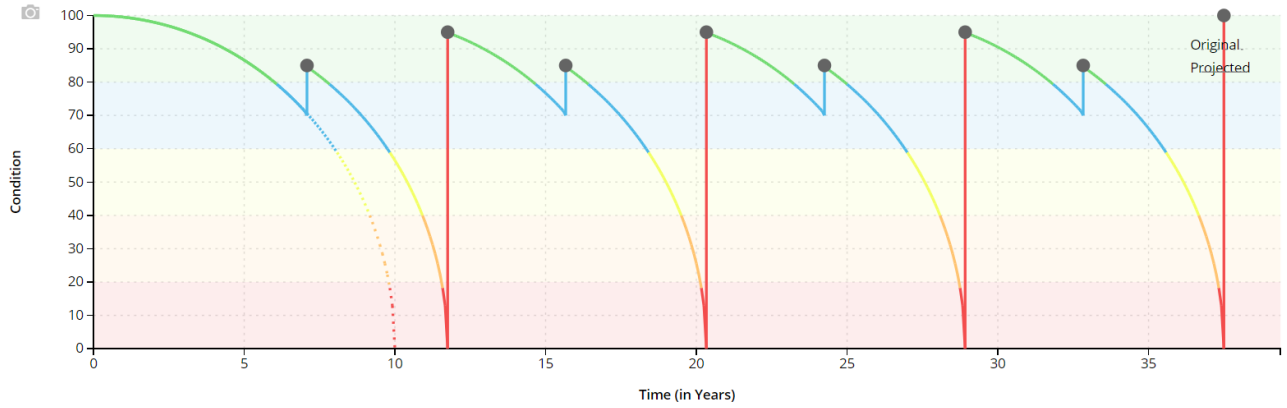
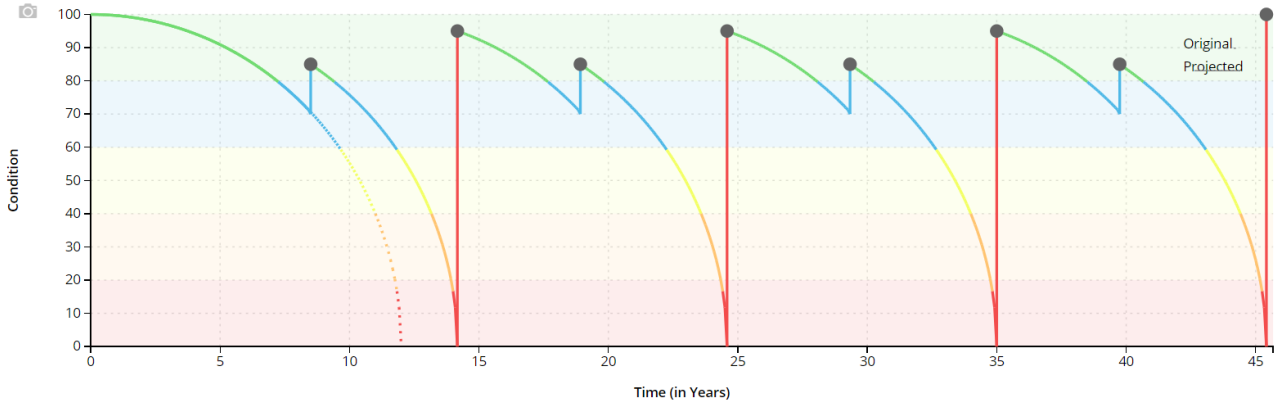
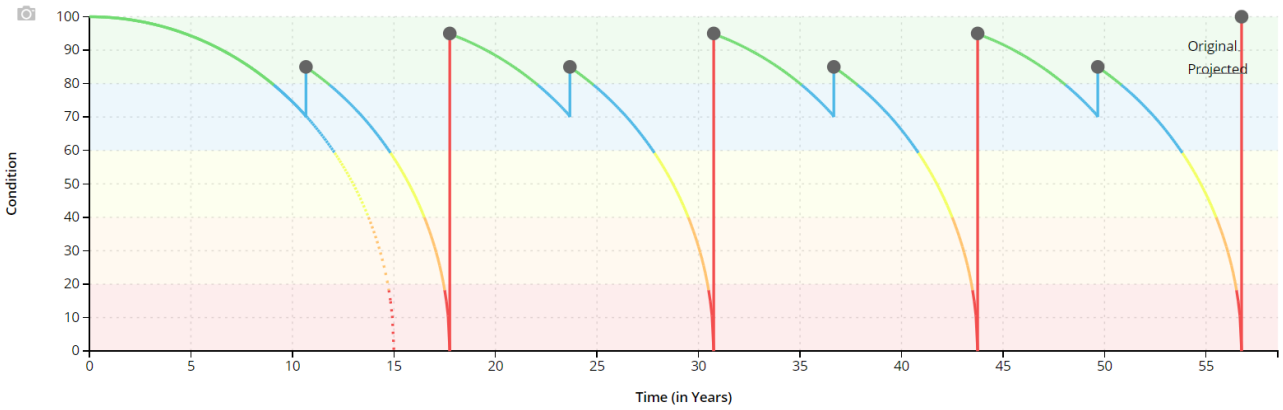


Figure 17 Typical Deterioration Curve: Surface Treated Class 4



Without a lifecycle strategy, a Class 3 surface treated road may require reconstruction in 10 years. When the current lifecycle strategy is implemented, the deterioration model suggests that the expected life of a Class 3 surface treated road can be extended to approximately 37 years before a full reconstruction is required. Similarly, Class 4 roads can see a useful life extension from 12 years without a lifecycle strategy, to 45 years under the current approach.

Figure 18 Typical Deterioration Curve: Surface Treated Class 5 and Class 6



Without a lifecycle strategy, Class 5 and 6 surface treated roads may require reconstruction in 15 years. When the current lifecycle strategy is implemented, the deterioration model suggests that the expected life of these roads can be extended to approximately 56 years before a full reconstruction is required.

Gravel Roads

In addition to asphalt and surface treated roads, the Township also owns and maintains gravel roads. A single lifecycle strategy was built in Citywide. Gravel roads are typically maintained on a perpetual cycle. Based on current lifecycle practices, gravel roads are expected to last for 100 years.

Table 10 Current Lifecycle Management Strategies - Gravel Roads

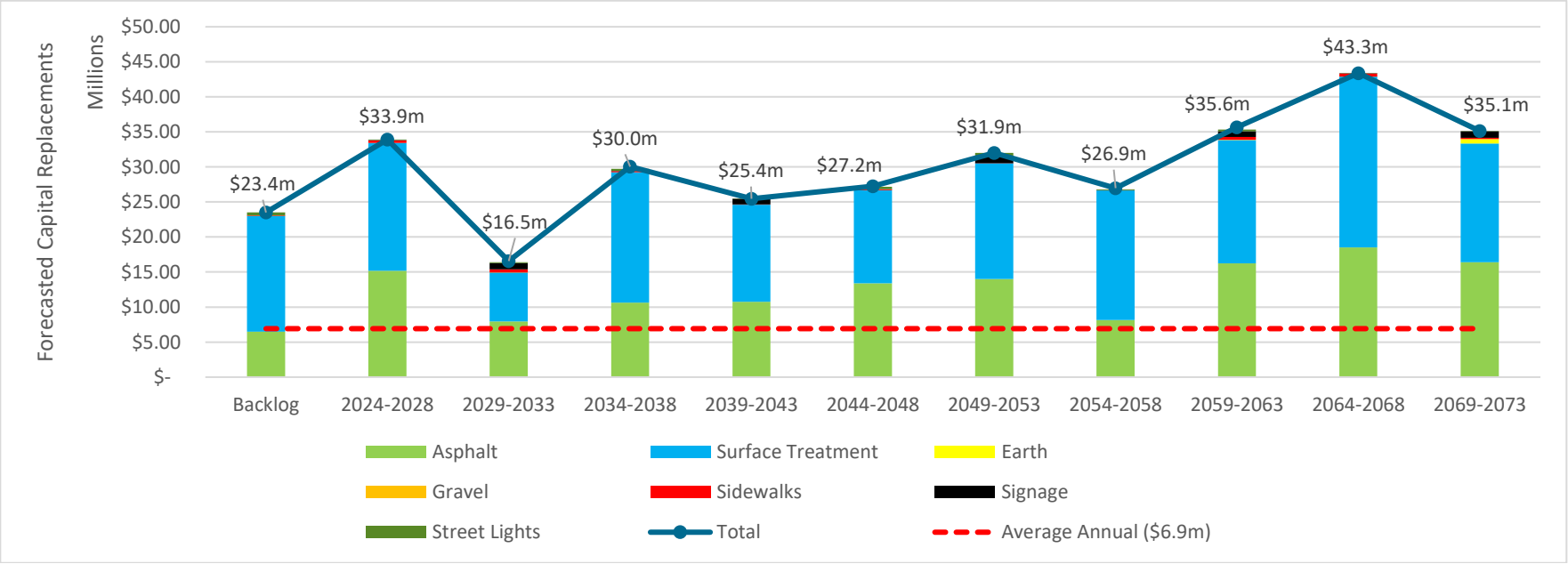
Event Name	Event Class	Event Range / Trigger	Impact on Asset Condition	Cost Per Unit
Grading/Regravel	Maintenance	Condition goes to poor	Condition goes to Very Good	$5/m.sq.
Reconstruction	Replacement or Reconstruction	PCI drops to 20	PCI goes to 100	$42/m.sq

Forecasted Long-term Replacement Needs

Figure 19 illustrates the forecasted 50-year infrastructure rehabilitation and replacement requirements for the Township's Road Network. The average annual requirements (dotted red line) total $6.9 million for all assets in the road network. Although actual spending may fluctuate substantially from year to year, this figure is a useful benchmark for annual capital expenditure targets (or allocations to reserves) to ensure projects are not deferred and replacement needs are met as they arise.

The chart illustrates the assets within each segment that are expected to come to require a lifecycle intervention activity in each 5-year block. In addition to this forecasted projection, the chart also illustrates a current backlog totaling $23.4 million. These projections and estimates are based on asset replacement costs, age analysis, condition data, and lifecycle modeling. They are designed to provide a long-term, portfolio-level overview of capital needs and should be used to support improved financial planning over several decades.

Figure 19 Forecasted Capital Replacement Requirements - Road Network: 2024-2073



Often, the magnitude of replacement needs is substantially higher than most municipalities can afford to fund. It is also highly unlikely that assets will require full replacement or reconstruction when they reach the end of their useful life. However, quantifying and monitoring these spikes is essential for long-term financial planning, including establishing dedicated reserves. Regular pavement condition assessments and a robust risk framework will ensure that high-criticality assets receive proper and timely lifecycle intervention, including replacements.

10-Year Replacement Needs

The table below summarizes the projected cost of lifecycle activities (maintenance, rehabilitation, and replacements) that will need to be undertaken over the next 10 years to support current levels of service. These projections are generated in Citywide and rely on condition data, available lifecycle modeling, and age data.

Table 11 System-generated 10-Year Capital Replacement Forecast - Road Network

Segment	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Asphalt	$931k	$4.6m	$4.5m	$1.8m	$3.3m	$2.3m	$1.9m	$1.2m	$575k	$1.9m
Surface Treated	$5.7m	$7.1m	$3.9m	$1.1m	$353k	$302k	$993k	$3.5m	$1.1m	$1.1m
Earth	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Gravel	$0	$0	$0	$0	$0	$0	$0	$5k	$0	$0
Guiderails	$0	$0	$0	$0	$0	$72k	$0	$0	$62k	$17k
Sidewalks	$0	$0	$333k	$0	$0	$0	$0	$0	$296k	$129k
Signage	$0	$0	$51k	$0	$0	$0	$21k	$15k	$121k	$751k
Street Lights	$0	$8k	$36k	$27k	$13k	$19k	$5k	$68k	$30k	$12k
Total	**$6.6m**	**$11.7m**	**$8.8m**	**$2.9m**	**$3.7m**	**$2.7m**	**$2.9m**	**$4.8m**	**$2.2m**	**$3.9m**

These estimates are developed at the segment level and are based on available asset data, including quantities, replacement costs, age, or assessed condition. They can be different from actual capital forecasts. Consistent data updates, particularly condition, and asset acquisitions and disposals, will improve the alignment between the system generated expenditure requirements, and the Township's capital expenditure forecasts.

This forecast will continue to be refined as historical data is modelled to identify trends and improve on identifying the correct lifecycle intervention events. Industry advancements are continuously monitored and feasibility of implementation of advancements are reviewed on an ongoing basis, looking for potential areas for improvement to the performance of the Road Network assets.

Risk Analysis

The risk matrices below are generated using available asset data, such as condition, service life remaining, replacement costs, traffic data, and road class.

The matrix classifies assets based on their individual probability and likelihood of failure, each scored from 1 to 5. Their product generates a risk index ranging from 1-25. Assets with the highest criticality and likelihood of failure receive a risk rating of 25; those with lowest probability of failure and lowest criticality carry a risk rating of 1. As new data is gathered, relevant information that improves data confidence will be integrated into the risk model.

The figures below are a snapshot of where the assets in this category rate. The lower left hand side being assets with the least amount of risk (green), and upper right-hand side being the most amount of risk (red).

Figure 20 represents the asphalt, surface treated, and gravel roads in the Road Network category.

Figure 20 Risk Matrix - Road Network: Asphalt, Surface Treated, and Gravel Roads

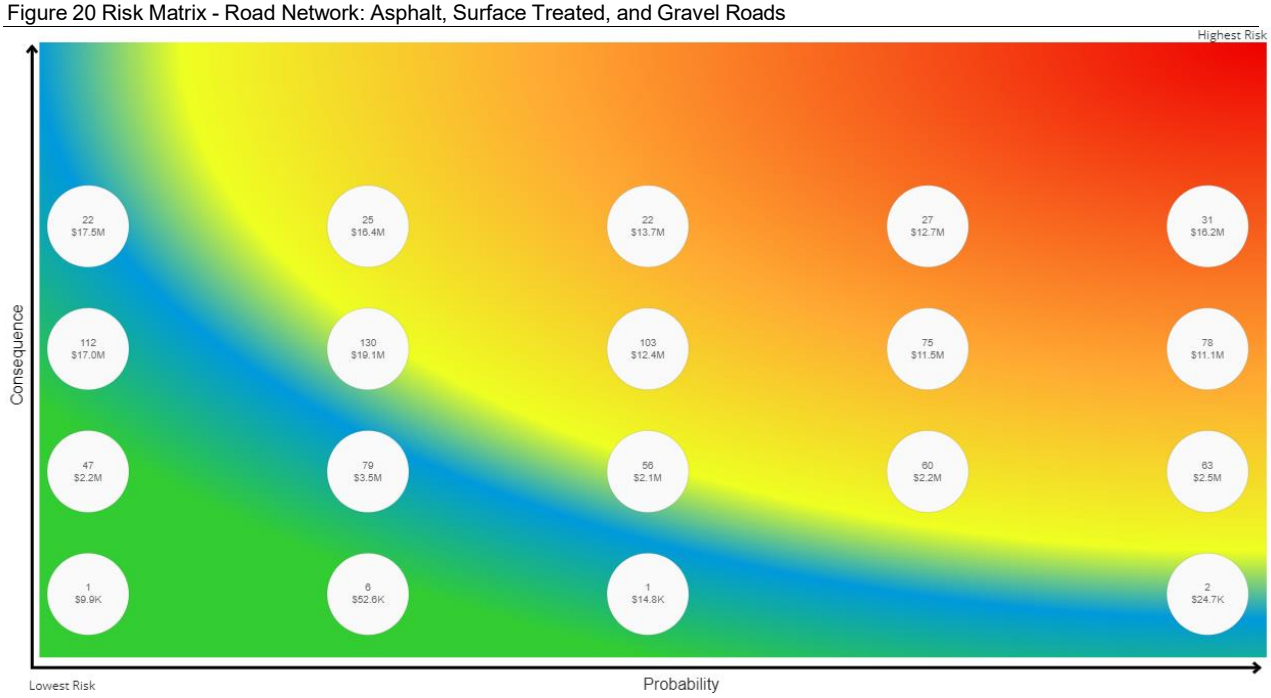
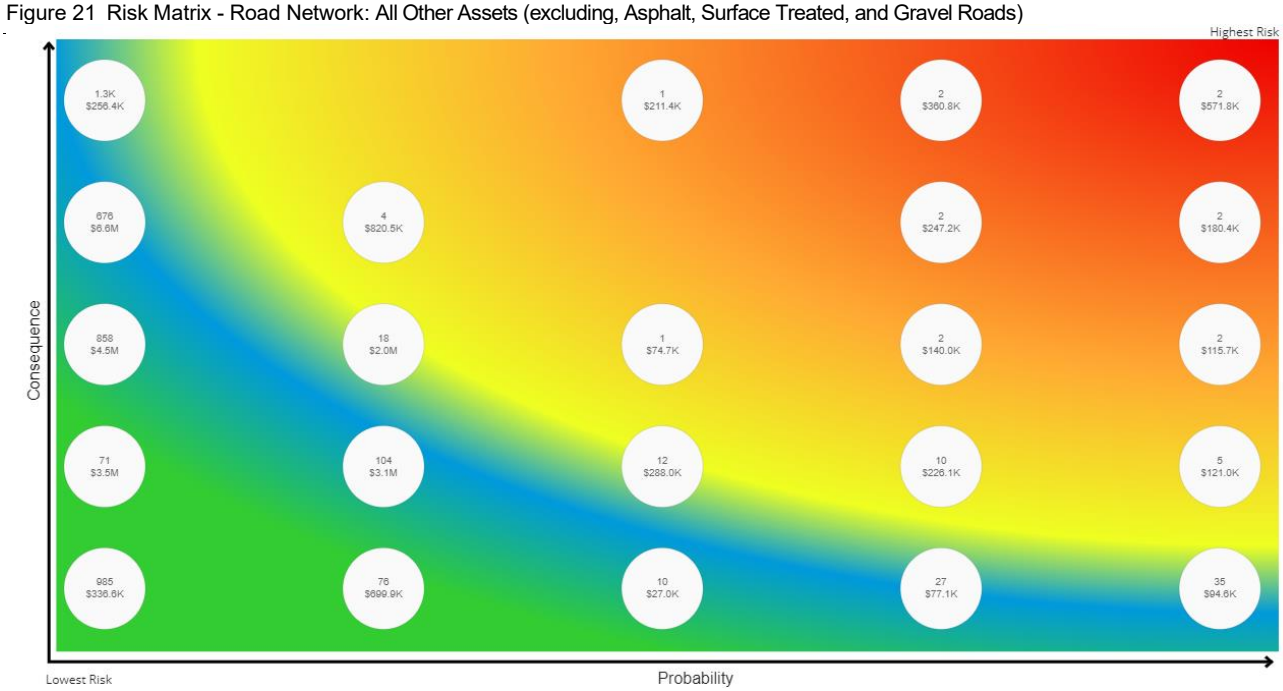


Figure 21 represents all other assets in the Road Network Category.

Figure 21 Risk Matrix - Road Network: All Other Assets (excluding, Asphalt, Surface Treated, and Gravel Roads)



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

- Missed opportunities for cost savings and increases in lifecycle costs
- Misallocation of funds leading to over- or under-investments
- Deferral of vital projects
- Accelerated asset deterioration and premature failure
- A decline in public satisfaction with the Township's service standards and the resulting reputational damage

The Township performs regular inspections and maintenance on all road network assets to ensure there are no immediate or ongoing health and safety concerns, and to reduce risk to the public.

Levels of Service

The tables that follow summarize Tiny's current levels of service with respect to prescribed KPIs under Ontario Regulation 588/17.

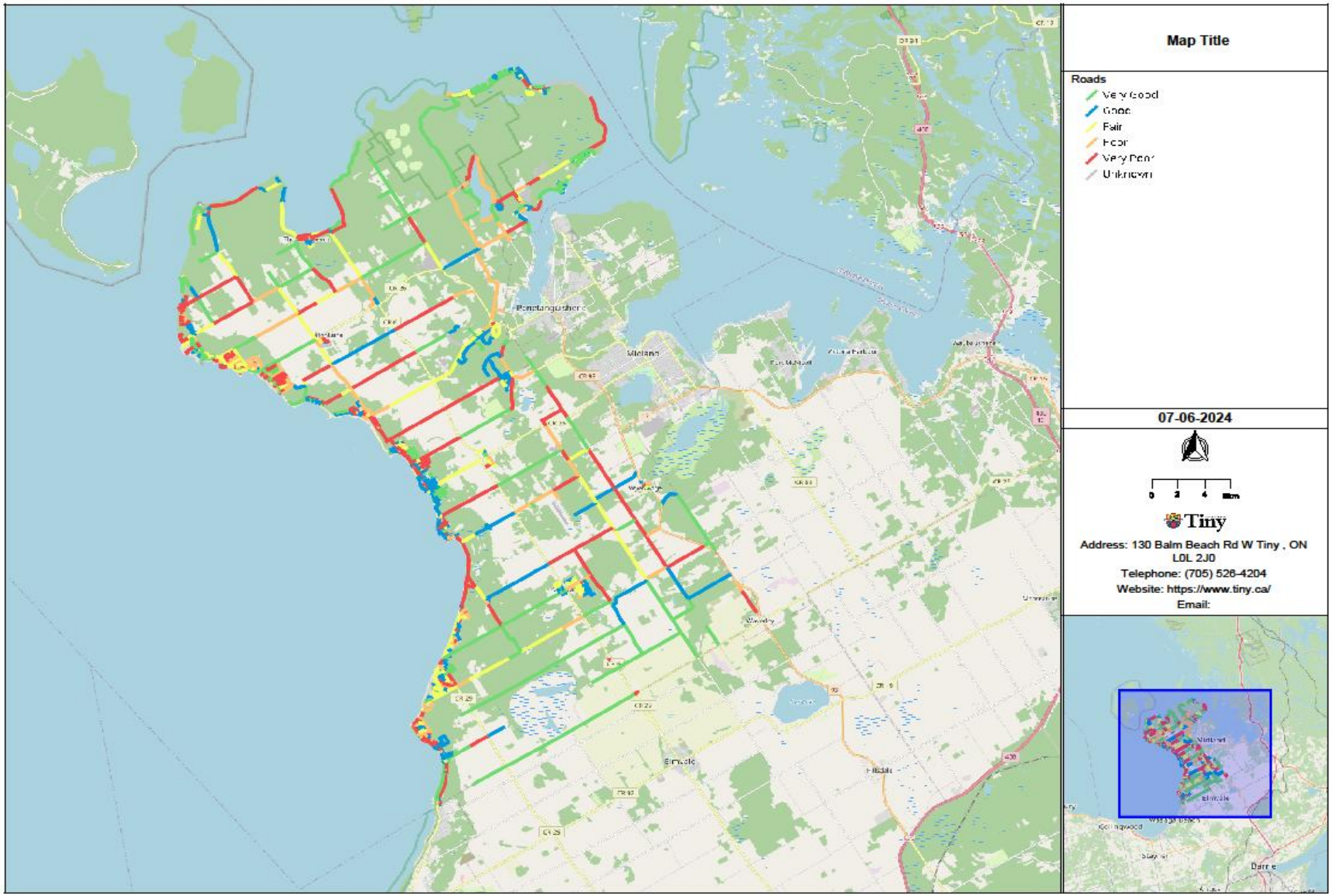
Table 12 Ontario Regulation 588/17 Community Levels of Service - Roads

Service Attribute	Qualitative Description	Current Level of Service	Proposed Level of Service (Same as Current)
Scope	Description, which may include maps, of the road network in the Township and its level of connectivity.	The Township's Road Network comprises roadways with maintenance classes ranging from MMS Class 3 to 6. The maximum measured AADT of 4000-4999 vehicles.	The Township's Road Network comprises roadways with maintenance classes ranging from MMS Class 3 to 6. The maximum measured AADT of 4000-4999 vehicles.
Quality	Description or images that illustrate the different levels of road class pavement condition.	The majority of roadways are rated as fair or better. See Figure 21	The majority of roadways are rated as fair or better. See Figure 21

Table 13 Ontario Regulation 588/17 Technical Levels of Service – Roads

Service Attribute	Qualitative Description	Current Level of Service	Proposed Level of Service (Same as Current)
Scope	Lane-km of arterial roads (MMS classes 1 and 2) per land area (km/km^2)	0	0
	Lane-km of collector roads (MMS classes 3 and 4) per land area (km/km^2)	1.09	1.09
	Lane-km of local roads (MMS classes 5 and 6) per land area (km/km^2)	1.57	1.57
Quality	Average pavement condition for paved roads in the Township	43.3	43.3
Performance	Average surface condition for unpaved roads in the Township (very good, good, fair, poor, very poor)	Very Good	Very Good

Figure 22 Current Road Conditions – Map (this does not include 2023 roads capital work)



Bridges & Culverts

The Township of Tiny's transportation network also includes Bridges & Culverts, with a current replacement cost of $23.4 million.

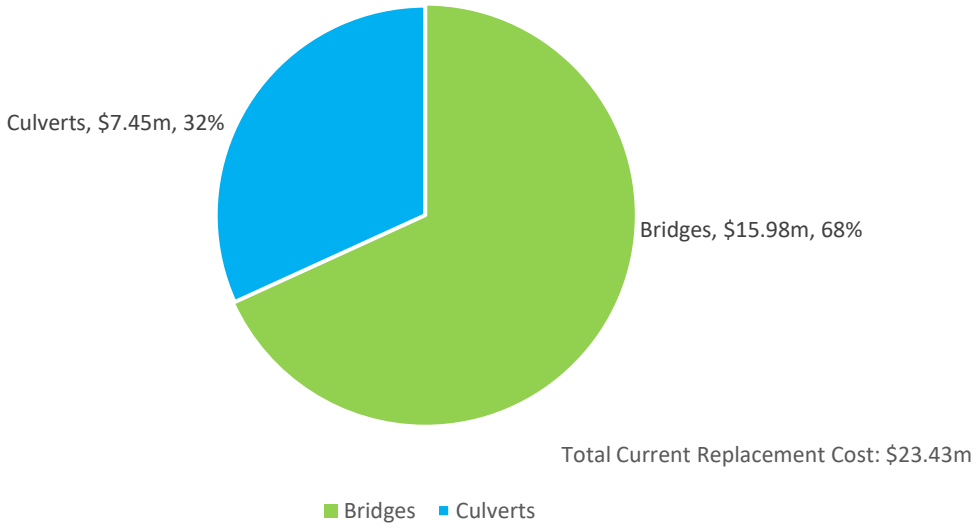
Inventory and Valuation

Table 14 summarizes the quantity and current replacement cost of bridges and culverts. The Township fully owns and manages 10 bridges and 7 structural culverts. The Township shares ownership of 1 bridge and 1 structural culvert with Springwater Township

Table 14 Detailed Asset Inventory - Bridges and Culverts

Segment	Quantity	Unit of Measure	Primary Replacement Cost Method	Replacement Cost (in '000)
Bridges	11	Assets	User Defined	$15,981k
Culverts (Structural, >3m)	8	Assets	User Defined	$7,454k
Total	**19**			**$23,435k**

Figure 23 Portfolio Valuation – Bridges & Culverts



Asset Condition

Figure 24 summarizes the replacement cost-weighted condition of the Township's Bridges & Culverts. Based on the Township's recent Ontario Structures Inspection Manual (OSIM) assessments, 100% of bridges and culverts are in good or better condition. However, bridges have many individual elements and components that may require repairs and rehabilitation. The Township's 2022 OSIM includes recommended workplans for repairs and major rehabilitation work that should be completed.

Figure 24 Asset Condition - Bridges & Culverts: Overall

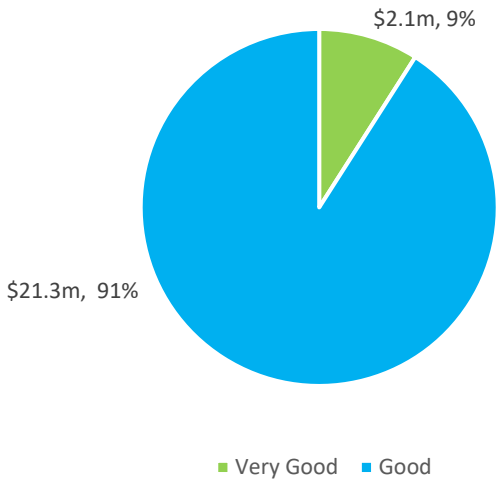
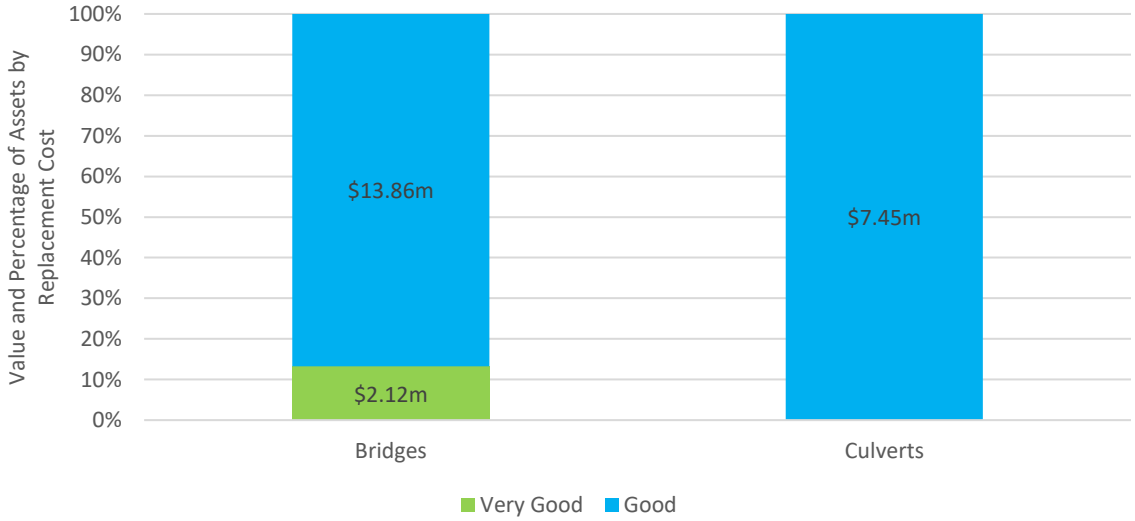


Figure 25 further details the condition of bridges and culverts by segment.

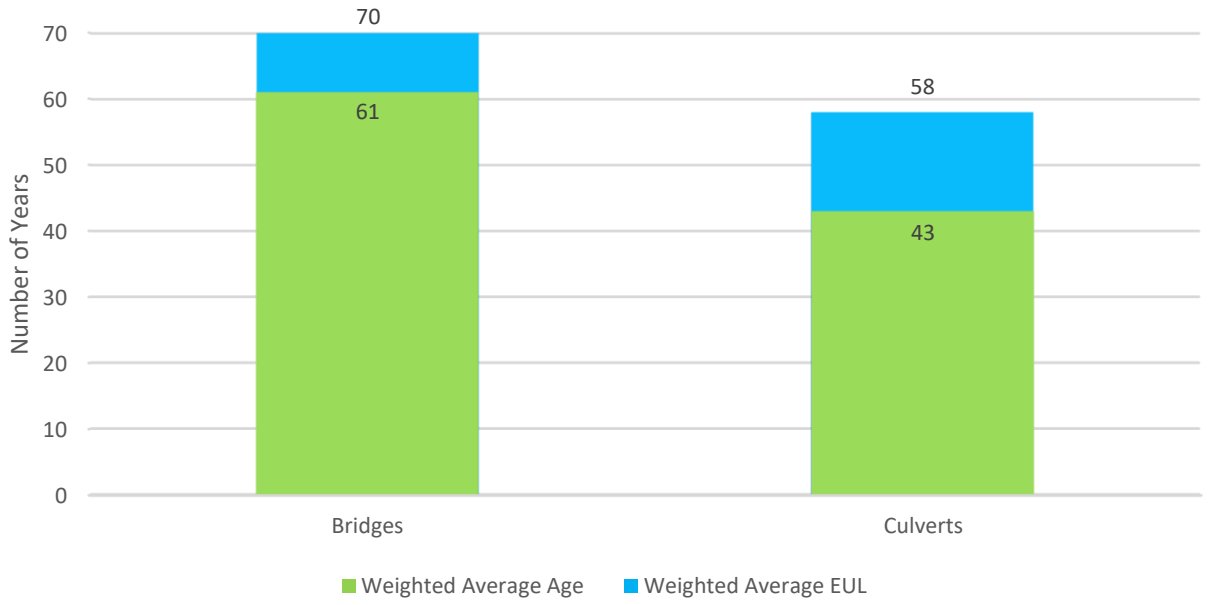
Figure 25 Asset Condition - Bridges & Culverts: By Segment



Age Profile

Figure 26 illustrates the average current age of each asset type and its estimated useful life. Both values are weighted by the replacement cost of individual assets.

Figure 26 Estimated Useful Life vs. Asset Age – Brides & Culverts



Age analysis reveals that on average, bridges have consumed 87% of their estimated useful life, with an average age of 61 years against an average EUL of 70 years. On average, culverts are also in the latter stages of their lifecycle, with an average age of 43 years, against an average EUL of 58 years. OSIM assessments should continue to be used in conjunction with age and asset criticality to prioritize capital and maintenance expenditures.

Current Approach to Lifecycle Management

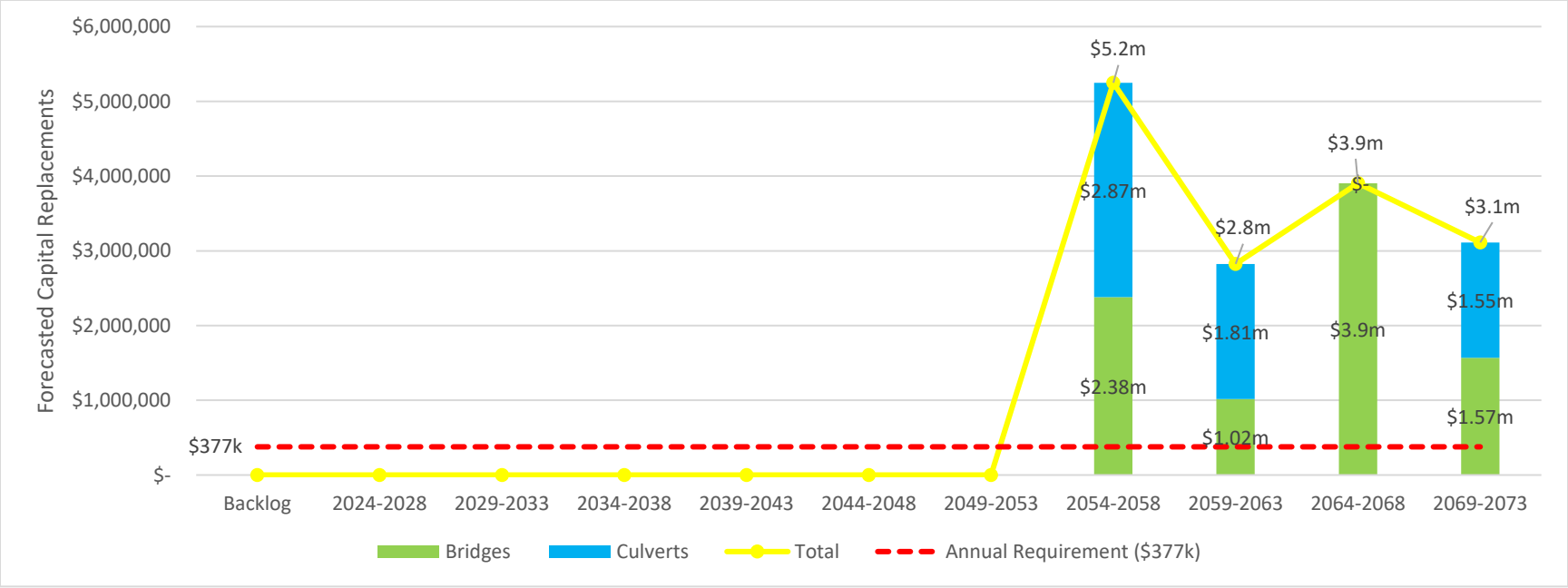
The condition of bridges and structural culverts is assessed biennially in compliance with Ontario Structure Inspection Manual (OSIM). The most recent inspection report was completed in 2022. The bridge condition index (BCI) is used to guide and prioritize capital investment, unless health and safety concerns warrant a different, more immediate intervention.

Forecasted Long-term Replacement Needs

Figure 27 illustrates the forecasted 50-year replacement requirements for the Township's Bridges & Culverts. The average annual requirements (red dotted line) for bridges and culverts total $377k. Although actual spending may fluctuate substantially from year to year, this figure is a useful benchmark value for annual capital expenditure targets (or allocations to reserves) to ensure projects are not deferred and replacement needs are met as they arise.

Although no major replacement spikes are anticipated for the next three decades, capital needs will rise to $5.2 million between 2054 and 2058. These projections and estimates are based on asset replacement costs, age analysis, and condition data. They are designed to provide a long-term, portfolio-level overview of capital needs and should be used to support improved financial planning over several decades. The Township's OSIM report includes rehabilitation and repair needs, totaling $2.43 million, of which $1.719 million are recommended to be completed within the current decade. These recommendations should be used in conjunction with long-term replacement needs to stay current with major capital investments.

Figure 27 Forecasted Capital Replacement Requirements - Bridges & Culverts: 2024-2073



10-Year Replacement Needs

The table below summarizes the projected cost of lifecycle activities (capital replacement only) that will need to be undertaken over the next 10 years to support current levels of service. These projections are generated in Citywide and rely on OSIM condition data and age data.

Table 15 System-generated 10-Year Capital Replacement Forecast - Bridges & Culverts

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

These estimates are developed at the segment level, illustrate replacement needs only, and are built on available asset data, including quantities, the extent to which elements are componentized, replacement costs, age, or assessed condition. They can be different from actual capital forecasts as outlined in OSIM inspections and recommended workplans, as outlined below.

Table 16 OSIM Workplan - Bridges & Culverts

Timeframe for recommended repairs, renewals, and replacements	Cost (in '000)
Within 1 year	$254k
Within 2-5 years	$742k
Within 6-10 years	$723k
Beyond 10 years	$ -
No timeframe	$711k
Total	**$2,430k**

Consistent data updates, especially condition, will improve the alignment between the system generated expenditure requirements, and the Township's capital expenditure forecasts, including long-term capital plans.

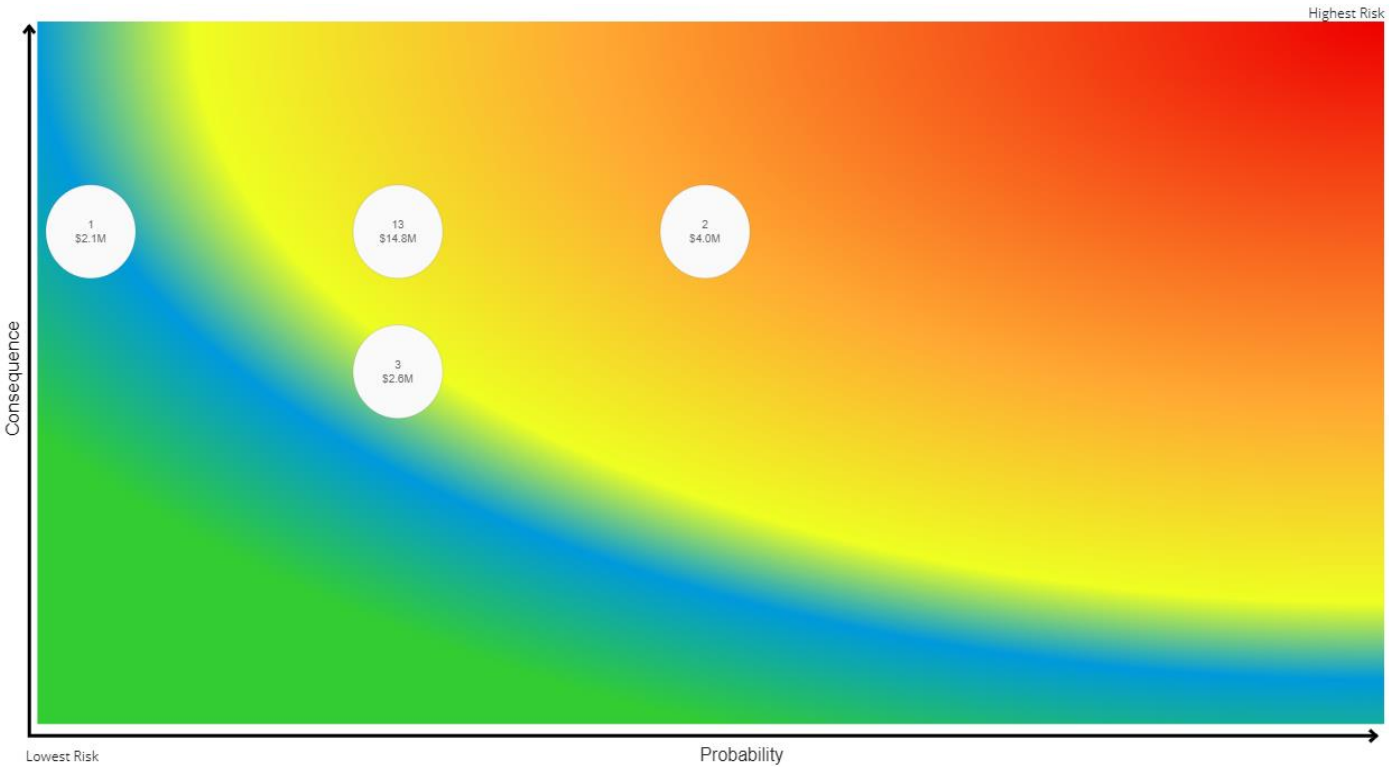
Risk Analysis

The risk matrices below are generated using available asset data, such as condition, service life remaining, replacement costs, traffic data, and detour distance.

The matrix classifies assets based on their individual probability and likelihood of failure, each scored from 1 to 5. Their product generates a risk index ranging from 1-25. Assets with the highest criticality and likelihood of failure receive a risk rating of 25; those with lowest probability of failure and lowest criticality carry a risk rating of 1. As new data is gathered, relevant information that improves data confidence will be integrated into the risk model.

The figure below is a snapshot of where the assets in this category rate. The lower left hand side being assets with the least amount of risk (green), and upper right-hand side being the most amount of risk (red).

Figure 28 Risk Matrix - Bridges & Culverts



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

- Missed opportunities for cost savings and increases in lifecycle costs
- Deferral of vital projects
- Accelerated asset deterioration and premature failure
- 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, lead to public health and safety incidents, and can impede the efficient flow of traffic.

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 workplans in OSIM inspections, can assist in optimizing limited funds.

Levels of Service

The tables that follow summarize Tiny's current levels of service with respect to prescribed KPIs under Ontario Regulation 588/17.

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

Service Attribute	Qualitative Description	Current Level of Service	Proposed Level of Service (Same as Current)
Scope	Description of the traffic that is supported by municipal bridges (e.g., heavy transport vehicles, motor vehicles, emergency vehicles, pedestrians, cyclists).	Together, the Township's bridges support all traffic types, ranging from MMS road class 3 to 6.	Together, the Township's bridges support all traffic types, ranging from MMS road class 3 to 6.
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.	All of the Township's bridges and structural culverts are rated as good or better based on 2022 OSIM inspections and individual bridge condition indices (BCI).	All of the Township's bridges and structural culverts are rated as good or better based on 2022 OSIM inspections and individual bridge condition indices (BCI).

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

Service Attribute	Qualitative Description	Current Level of Service	Proposed Level of Service (Same as Current)
Scope	Percentage of bridges in the Township with loading or dimensional restrictions.	5.2% (1 of 19)	5.2% (1 of 19)
Quality	1. For bridges in the Township, the average bridge condition index value.	72.3	72.3
	2. For structural culverts in the Township, the average bridge condition index value.	72.5	72.5

Stormwater Network

Tiny's Stormwater Network comprises of sewer lines and other critical supporting capital assets with a total current replacement cost of over $6 million. The Township is responsible for approximately 14.7 kilometers of storm lines.

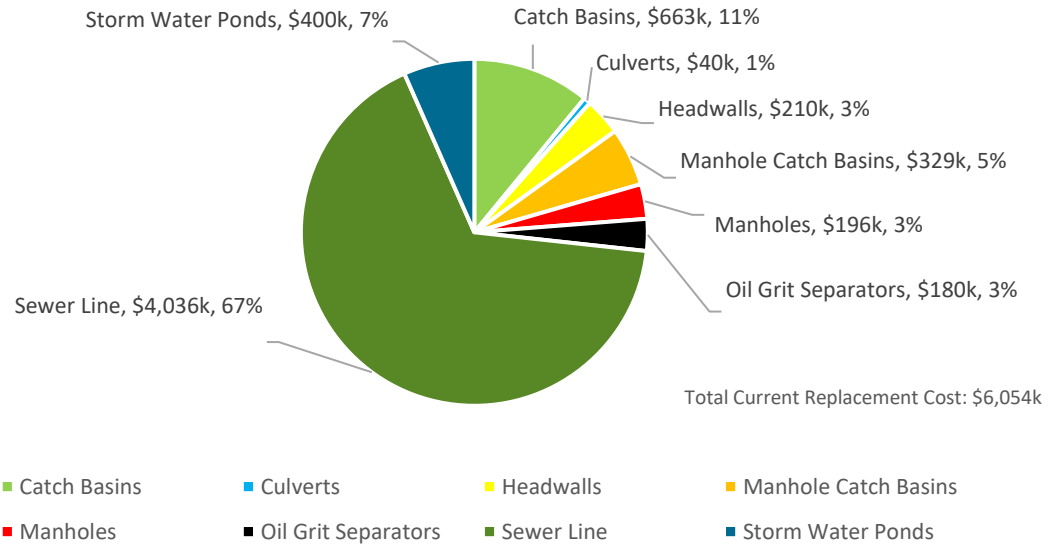
Inventory and Valuation

Table 19 summarizes the quantity and current replacement cost of all Stormwater Network assets available in the Township's asset register.

Table 19 Detailed Asset Inventory - Stormwater Network

Segment	Quantity	Unit of Measure	Primary Replacement Cost Method	Replacement Cost (in '000)
Catch Basins	221	Assets	User Defined	$663k
Culverts	1	Assets	User Defined	$40k
Headwalls	21	Assets	User Defined	$210k
Manhole Catch Basins	47	Assets	User Defined	$329k
Manholes	28	Assets	User Defined	$196k
Oil Grit Separators	3	Assets	User Defined	$180k
Sewer Lines	14,675.51	Meters	User Defined	$4,036k
Storm Water Ponds	4	Assets	User Defined	$400k
Total				**$6,054k**

Figure 29 Portfolio Valuation – Stormwater Network



Asset Condition

Figure 30 summarizes the replacement cost-weighted condition of the Township's Stormwater Network assets. Based on age data only, approximately 34% of assets are in poor to very poor condition. These assets may be candidates for replacement in the short term; similarly, assets in fair condition may require rehabilitation or replacement in the medium term and should be monitored for further degradation in condition.

Figure 30 Asset Condition - Stormwater Network

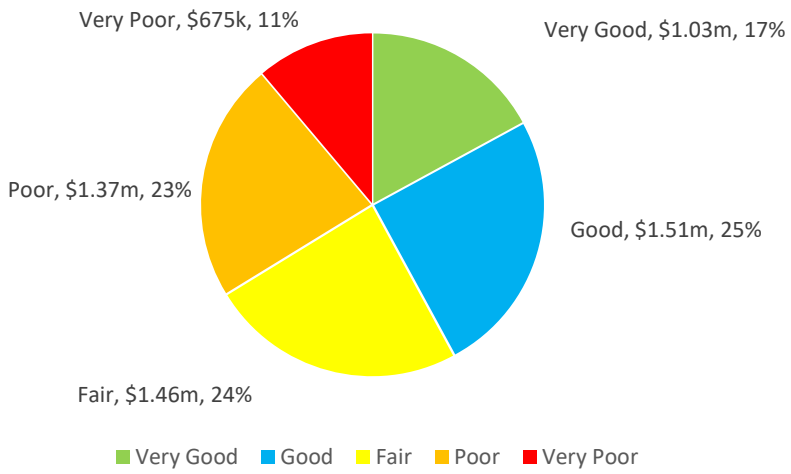
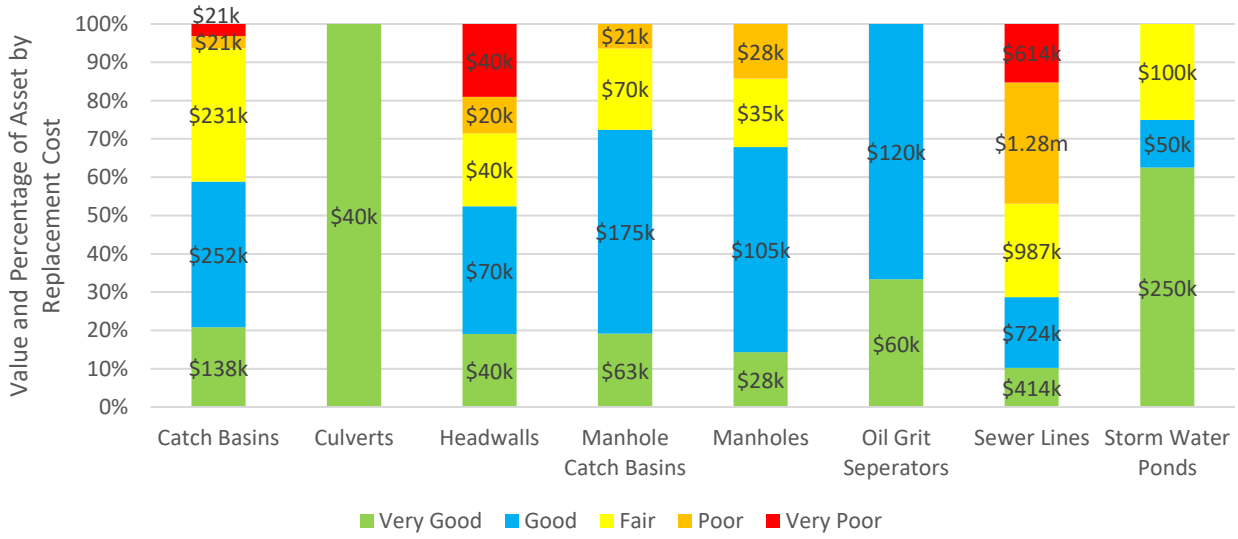


Figure 31 summarizes the age-based condition of stormwater assets. The analysis illustrates that the majority of the Stormwater Network are in fair or better condition. However, approximately 33% of storm water, with a current replacement cost over $2 million are in poor or worse condition. We reiterate that these ratings are based only on asset age. Age can understate the true physical condition of an asset, particularly sewer lines, which tend to continue to perform at adequate service levels despite their age.

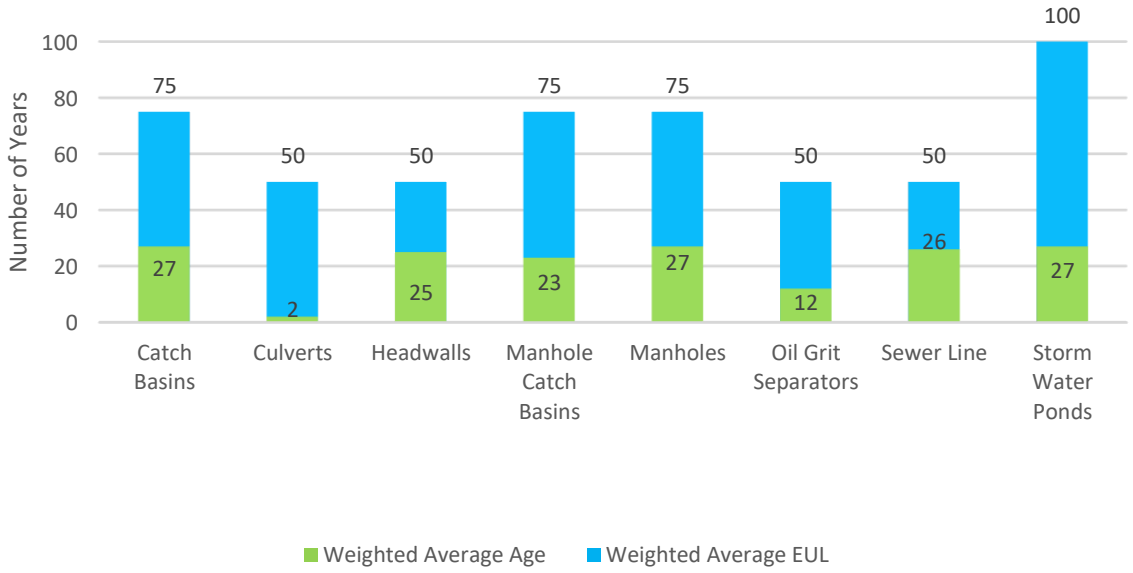
Figure 31 Asset Condition - Stormwater Network – By Segment



Age Profile

Figure 32 illustrates the average current age of each segment type and its average estimated useful life. Both values are weighted by the replacement cost of individual assets.

Figure 32 Estimated Useful Life vs. Asset Age – Stormwater Network



The data reveals that on average, sewer lines are entering the latter stages of their expected design life, with an average age of 26 years against an EUL of 50 years. Headwalls have also reached 50% of their expected useful life. The majority of other stormwater assets are still in the earlier stages of their lifecycle. Age profiles and future CCTV inspections will help to identify the need for replacements and/or upgrades. Extensions to EULs for sewer lines may also be considered based on performance history to date.

Current Approach to Lifecycle Management

The Township currently completes regular preventative maintenance, including cleaning of manholes, catch basins, and flushing of sewer lines. Preventative maintenance is conducted to ensure proper and safe management of stormwater runoff. Staff monitor flow to identify and address backup issues.

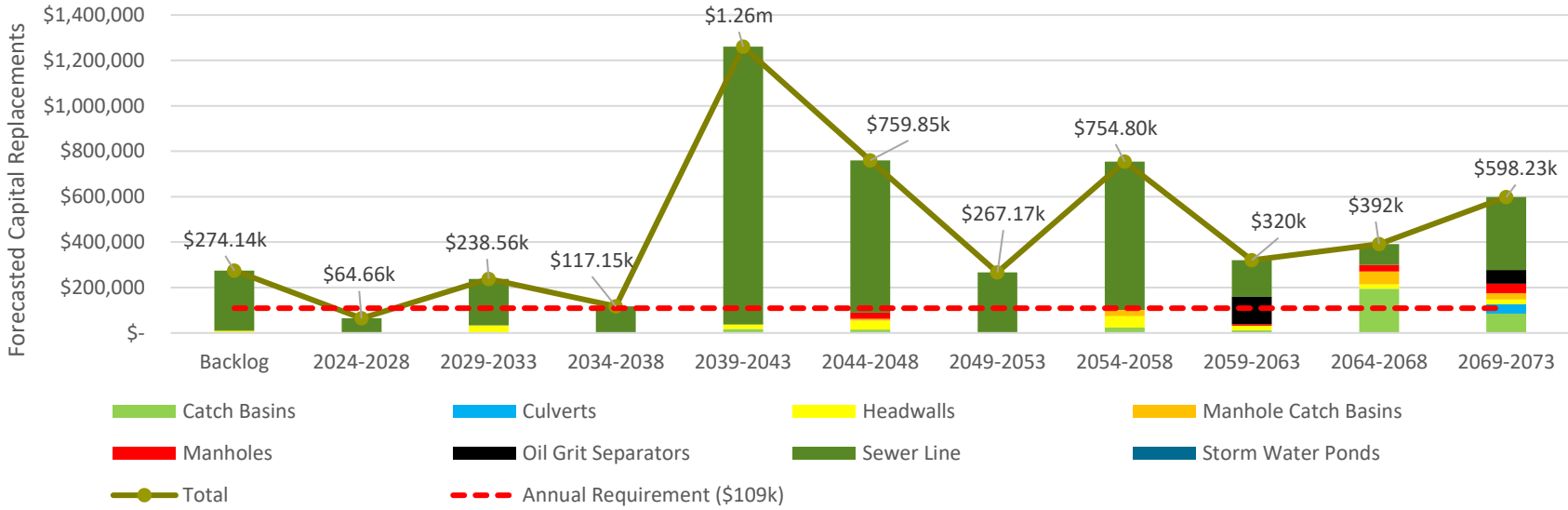
Scheduled CCTV inspections will allow for accurate condition assessments to be added to the asset profile. Following several years of collecting and refining this data, the lifecycle management scheduled events may be built into the Townships asset management software to aid in capital planning and forecasting.

Forecasted Long-term Replacement Needs

Figure 33 illustrates the 50-year replacement requirements for the Township's Stormwater Network assets. The average annual requirement (red dotted line) totals $109k for all assets in the Stormwater Network. Although actual spending may fluctuate substantially from year to year, this figure is a useful benchmark value for annual capital expenditure targets (or allocations to reserves) to ensure projects are not deferred and replacement needs are met as they arise.

The chart illustrates a backlog of $274.14k comprising of sewer lines and a headwall that have reached the end of their useful life but remain in service. The largest replacement spike is forecasted in 2039-2043, totaling $1.26m as more sewer lines reach the end of their expected design life. These projections and estimates are based on asset replacement costs and age analysis. They are designed to provide a long-term, portfolio-level overview of capital needs and should be used to support improved financial planning over several decades.

Figure 33 Forecasted Capital Replacement Requirements - Stormwater Network: 2024-2073



It is highly unlikely that all sewer lines that reach the end of their expected design life will require replacement. However, quantifying and monitoring these spikes is essential for long-term financial planning, including establishing dedicated reserves. CCTV inspections may reveal a higher or lower backlog. The inspections may also help reduce long-term projections by providing more accurate condition data for sewer lines. 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 will need to be undertaken over the next 10 years to support current levels of service. These projections are generated in Citywide and rely only on age data.

Table 20 System-generated 10-Year Replacement Forecast - Stormwater Network

Segment	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Catch Basins	$0	$0	$0	$0	$0	$0	$3k	$0	$0	$0
Culverts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Headwalls	$10k	$0	$0	$0	$0	$30k	$0	$0	$0	$0
Manhole Catch Basins	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Manholes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Oil Grit Separators	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sewer Line	$264.1k	$0	$64.6k	$0	$0	$115.2k	$66.7k	$0	$0	$23.7k
Storm Water Ponds	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$274.1k**	**$0**	**$64.6k**	**$0**	**$0**	**$145.2k**	**$69.7k**	**$0**	**$0**	**$23.7k**

These estimates are developed at the segment level, illustrate replacement needs only, and are built on available asset data, including quantities, replacement costs, and age. They can be different from actual capital forecasts. Consistent data updates, especially condition through CCTV inspections, and asset acquisitions and disposals will improve the alignment between the system generated expenditure requirements, and the Township's capital expenditure forecasts.

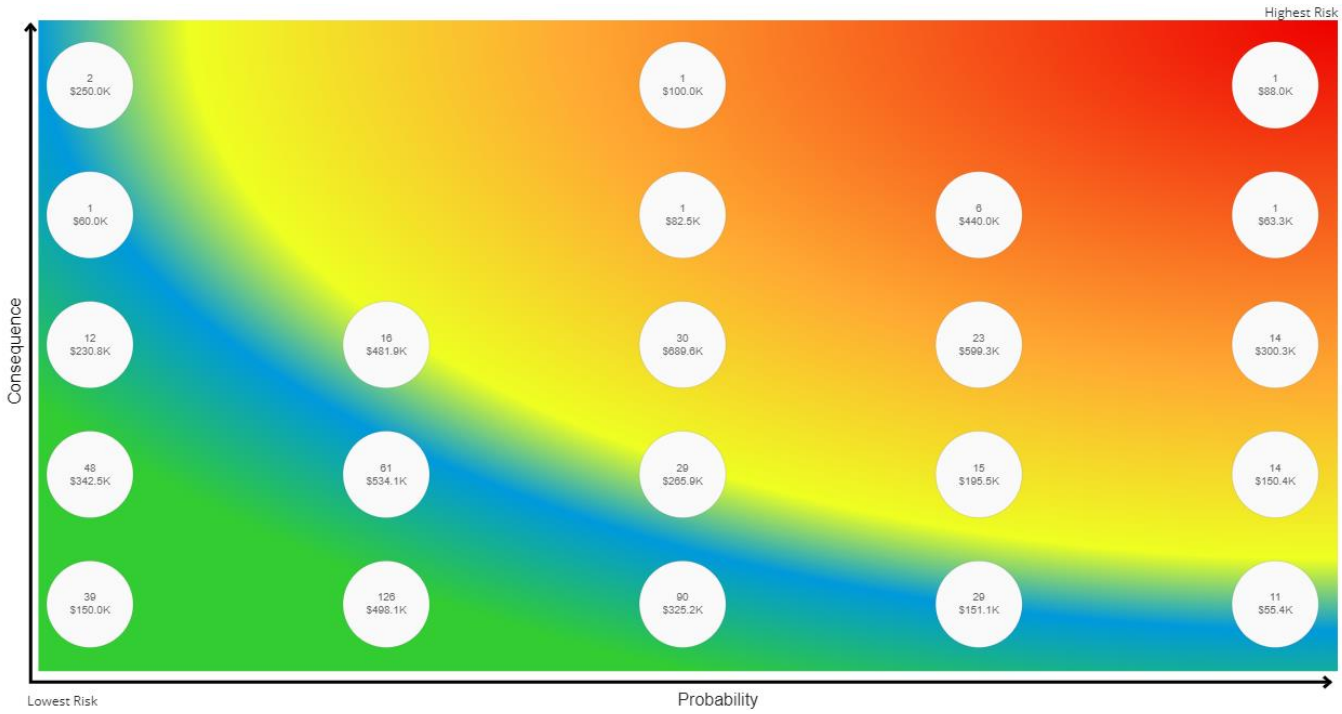
Risk Analysis

The risk matrices below are generated using available asset data, such as service life remaining, replacement costs, and the traffic data associated with the attached road section.

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

The figure below is a snapshot of where the assets in this category rate. The lower left hand side being assets with the least amount of risk (green), and upper right-hand side being the most amount of risk (red).

Figure 34 Risk Matrix - Stormwater Network



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

- Missed opportunities for cost savings and increases in lifecycle costs associated with more frequent asset maintenance
- Deferral of vital projects
- Accelerated asset deterioration and premature failure
- A decline in public satisfaction with the Township's service standards and the resulting reputational damage
- Failure of stormwater assets can be particularly detrimental, causing excessive flooding, erosion, backups, road and bridge closures, environmental damage, and substantial property damage. Water quality may also be jeopardized, further exacerbating public health and safety challenges.
- Increased frequency of extreme weather events has made some communities even more vulnerable to flooding. These events can also create legal liabilities for the Township in the event of asset failure.

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 findings from standard CCTV inspections will assist in optimizing limited funds.

Levels of Service

The tables that follow summarize Tiny's current levels of service with respect to prescribed KPIs under Ontario Regulation 588/17.

Table 21 Ontario Regulation 588/17 Community Levels of Service - Stormwater Network

Service Attribute	Qualitative Description	Current Level of Service	Proposed Level of Service (Same as Current)
Scope	Description, which may include maps, of the user groups or areas of the Township that are protected from flooding, including the extent of the protection provided by the municipal stormwater management system.	Very little of the Township is serviced by the storm water management system.	Very little of the Township is serviced by the storm water management system.

Table 22 Ontario Regulation 588/17 Technical Levels of Service - Stormwater Network

Service Attribute	Qualitative Description	Current Level of Service	Proposed Level of Service (Same as Current)
Scope	1. Percentage of properties in municipality resilient to a 100-year storm.	3.6% of lots *971 acres of 81,500 acres, and 456 lots out of 12,699 lots are within subdivisions designed for a 100-year storm**	3.6% of lots *971 acres of 81,500 acres, and 456 lots out of 12,699 lots are within subdivisions designed for a 100-year storm**
	2. Percentage of the municipal stormwater management system resilient to a 5-year storm.	19.4% of lots *3,124 acres out of 81,500 acres, and 2,463 lots out of approximately 12,699 lots are within subdivision designed for at least a 5-year storm** The majority of Township's municipal stormwater system is designed to provide protection from 5-year storm flows which is the standard for local storm sewer design guidelines.	19.4% of lots *3,124 acres out of 81,500 acres, and 2,463 lots out of approximately 12,699 lots are within subdivision designed for at least a 5-year storm**
	**These estimates are those that can be substantiated by available documentation. However, staff estimate that a substantially higher portion of properties are resilient to these storm return periods.*		

Water Network

Tiny's Water Network comprises distribution components, mains, and pumphouse component assets with a total current replacement cost of over $67.5 million. The Township is responsible for 82.6 kilometers of underground linear infrastructure.

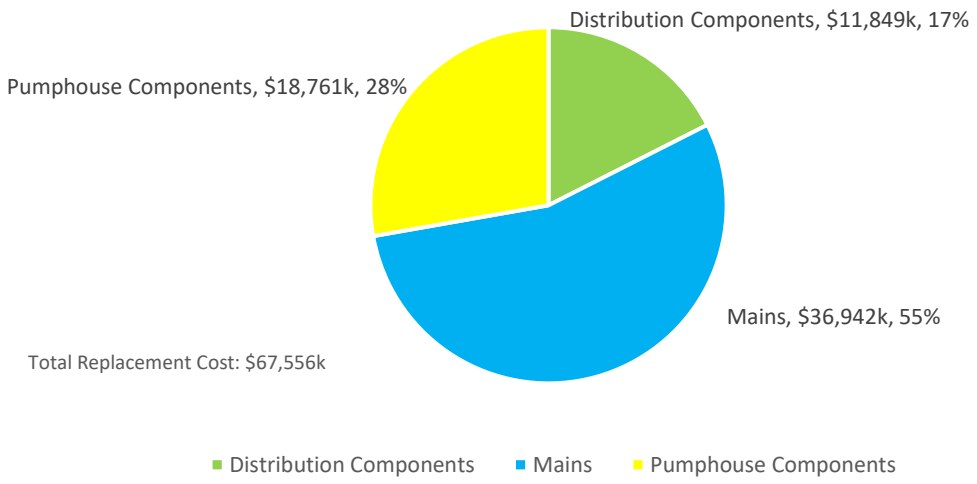
Inventory and Valuation

Table 23 summarizes the quantity and current replacement cost of the Water Network assets in the Township's asset register. Due to the variety of components and elements associated with pumphouses, and the variance in how these assets are measured, the quantity field contains the number of asset records for pumphouse components found in the asset register.

Table 23 Detailed Asset Inventory - Water Network

Segment	Quantity	Unit of Measure	Primary Replacement Cost Method	Replacement Cost (in '000)
Distribution Components	2762	Assets	User Defined	$11,849k
Mains	82,646	Length (m)	User Defined	$36,946k
Pumphouses Components	3779	Length (m)	Cost/Unit, User Defined	$5,089k
	48,431	Area (m2)	Cost/Unit	$5,336k
	2887	Volume (m3)	Cost/Unit, User Defined	$1,825k
	1665	Quantity	Cost/Unit, User Defined	$6,511k
Total				**$67,556k**

Figure 35 Portfolio Valuation – Water Network



Asset Condition

Figure 36 summarizes the replacement cost-weighted condition of the Township's Water Network assets. Based primarily on age data, approximately 49% of assets are in poor to very poor condition. These assets may be candidates for replacement in the short term; similarly, assets in fair condition may require rehabilitation or replacement in the medium term and should be monitored for further degradation in condition.

Figure 36 Asset Condition - Water Network

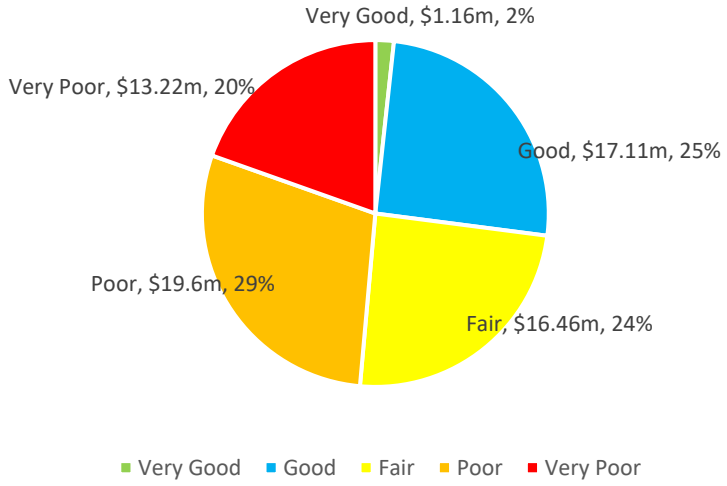
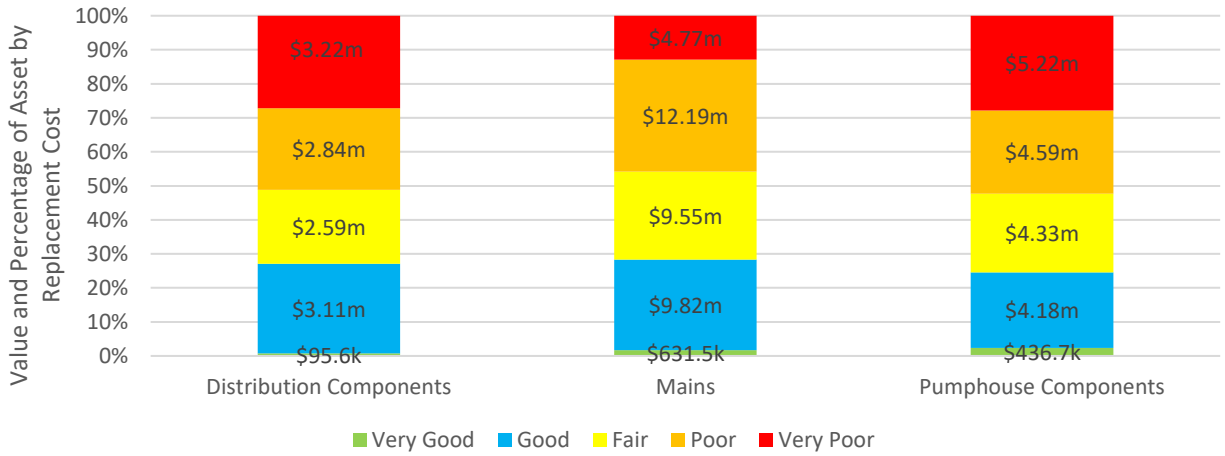


Figure 37 summarizes the condition of water assets by segment. Although the analysis suggests that a substantial portion of major water infrastructure may be in poor or worse condition, we note that age often understates the condition of assets, particularly mains. The actual physical state of these infrastructure assets is expected and presumed to be much higher than age would indicate, and these assets should continue to deliver adequate levels of service and safe, high quality drinking water despite their age.

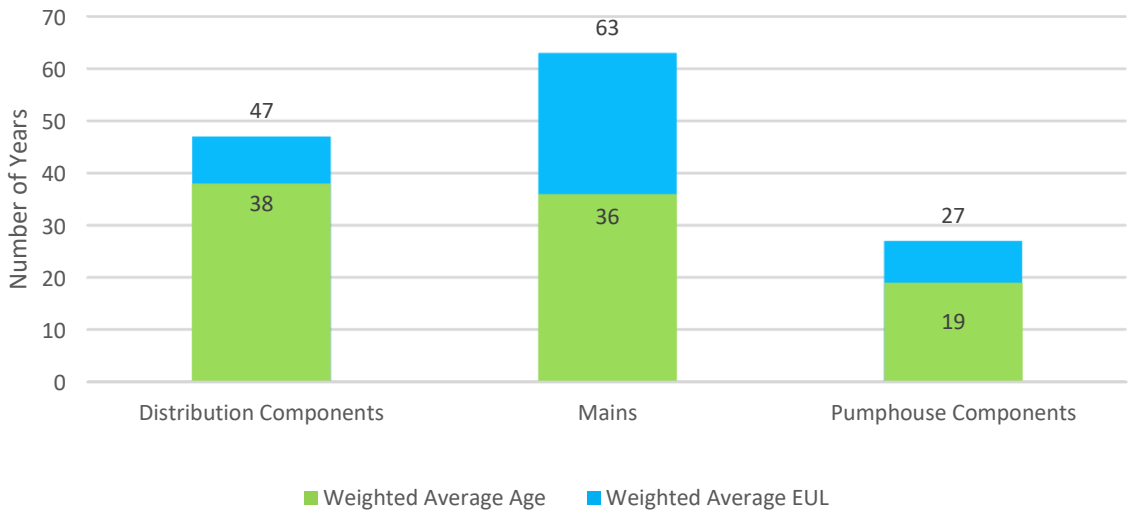
Figure 37 Asset Condition - Water Network – By Segment



Age Profile

Figure 38 illustrates the average current age of each asset type and its average estimated useful life. Both values are weighted by the replacement cost of individual assets.

Figure 38 Estimated Useful Life vs. Asset Age – Water Network



The data reveals that on average, mains are now in the latter stages of their expected design life, with a weighted average age of 36 years against a weighted average EUL of 65 years. Similarly, pumphouse components have a weighted average age of 19 years, against a weighted average EUL of 27 years, and distribution components have a weighted average age of 38 years against a weighted average EUL of 47 years.

Current Approach to Lifecycle Management

The Township currently does not have a programmatic approach to assessing its water infrastructure. Safety issues and watermain breaks within a system drive rehabilitation or replacement activities. In addition, capacity issues resulting from undersized mains drives the Township's replacement program.

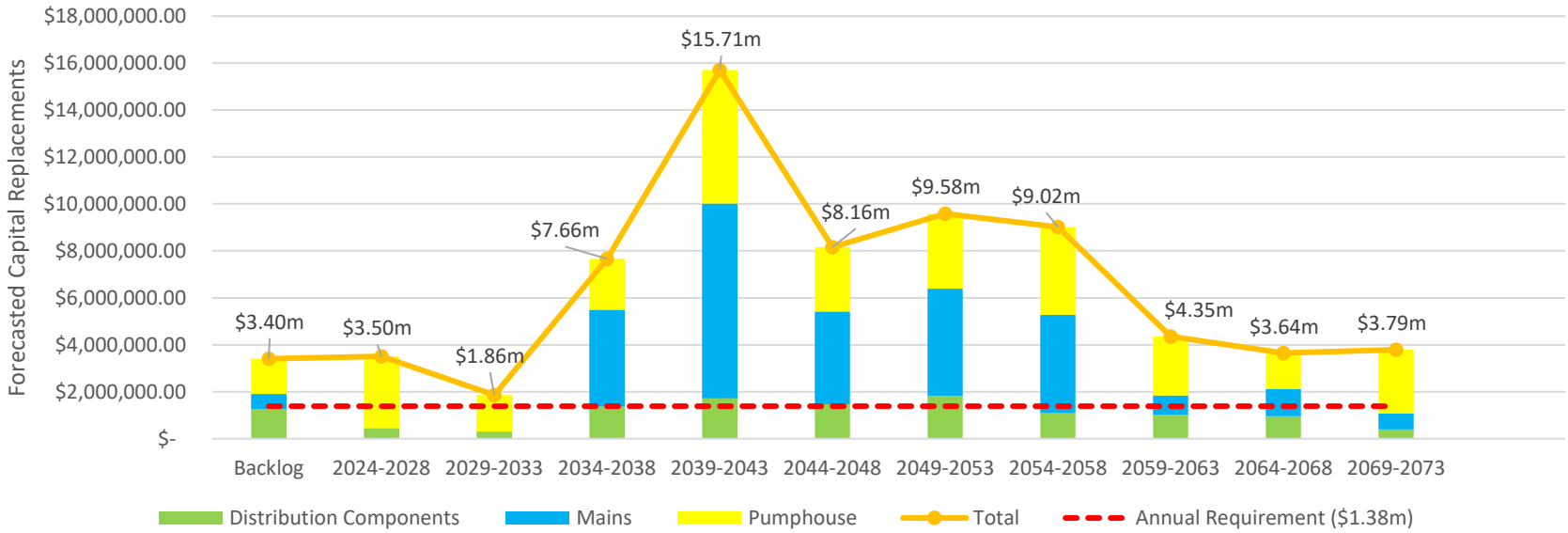
Regular maintenance is performed on pumphouse components where applicable; however, these assets are unique in that they can be managed by an approach where replaced only follows an asset failure. In general, in the event of a failure, repairs can be made in a timely fashion without catastrophic impacts. Trends and performance are being tracked and monitored for development into lifecycle management activities. The Township is continuing to develop risk matrix and lifecycle strategies to improve on capital budget forecasting.

Forecasted Long-term Replacement Needs

Figure 39 illustrates the forecasted 50-year replacement requirements for the Township's Water Network assets. The average annual requirements (red dotted line) total $1.38 million for all assets in the Water Network. Although actual spending may fluctuate substantially from year to year, this figure is a useful benchmark value for annual capital expenditure targets (or allocations to reserves) to ensure projects are not deferred and replacement needs are met as they arise.

The chart illustrates a backlog of approximately $3.4 million, split between all three segments. Replacement needs are high throughout the forecast horizon, peaking at $15.7 million between 2039 and 2043. These projections and estimates are based on asset replacement costs and age analysis. They are designed to provide a long-term, portfolio-level overview of capital needs and should be used to support improved financial planning over several decades.

Figure 39 Forecasted Capital Replacement Requirements - Water Network: 2024-2073



It is highly unlikely that all water mains that reach the end of their expected design life will require replacement. However, quantifying and monitoring these spikes is essential for long-term financial planning, including establishing dedicated reserves. Break history may help identify mains that may be candidates for further evaluation and/or replacement. Regular maintenance and inspections on the assets within the pumpstations are being recorded and tracked to identify improved lifecycle management strategies. A programmatic approach to condition assessments is underway to help refine the current backlog, but as stated above, much of the assets in within the pumphouse segment of the Water Network operate on a working or not working schedule.

10-Year Replacement Forecast

The table below summarizes the projected cost of lifecycle activities (capital replacement only) that will need to be undertaken over the next 10 years to support current levels of service. These projections are generated in Citywide and rely only on age data.

Table 24 System-generated 10-Year Replacement Forecast - Water Network

Segment	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Distribution Components	$45k	$33.3k	$94.8k	$205.3k	$69.9k	$48.8k	$87.1k	$77k	$89.4k	$4.8k
Mains	$0	$0	$0	$0	$1.8k	$0	$0	$0	$0	$0
Pumphouses	$526k	$318.1k	$734.6k	$388k	$1.1m	$676.3k	$485.2k	$49.5k	$142k	$200.5k
Total	**$571k**	**$351.4k**	**$829.4k**	**$593.3k**	**$1.2m**	**$725.1k**	**$572.3k**	**$126.5m**	**$231.4k**	**$205.3k**

These estimates are developed at the segment level, illustrate replacement needs only, and are built on available asset data, including quantities, replacement costs, and age. They can be different from actual capital forecasts. Consistent data updates, especially condition, and asset acquisitions and disposals will improve the alignment between the system generated expenditure requirements, and the Township's capital expenditure forecasts.

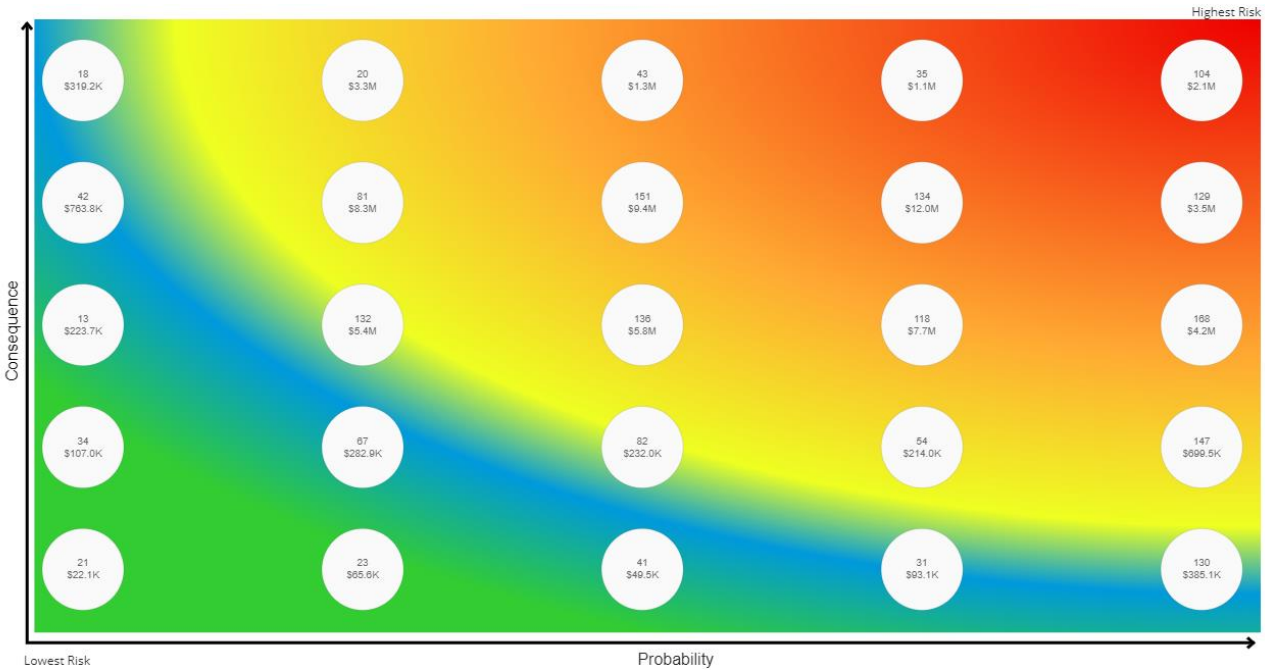
Risk Analysis

The risk matrices below are generated using available asset data, such as service life remaining, replacement costs, and complexity factors.

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

The figure below is a snapshot of where the assets in this category rate. The lower left hand side being assets with the least amount of risk (green), and upper right-hand side being the most amount of risk (red).

Figure 40 Risk Matrix - Water Network



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

- Failure of water distribution assets can lead to severe and adverse consequences, including boil water advisories, service shutoffs, and disruption and damage to other infrastructure services and assets, such as roadways
- Missed opportunities for cost savings and increases in lifecycle costs
- Deferral of vital projects
- Accelerated asset deterioration and premature failure
- 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.

Levels of Service

The tables that follow summarize Tiny's current levels of service with respect to prescribed KPIs under Ontario Regulation 588/17.

Table 25 Ontario Regulation 588/17 Community Levels of Service - Water Network

Service Attribute	Qualitative Description	Current Level of Service	Proposed Level of Service (Same as Current)
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.	The Township of Tiny owns and operates 16 Municipal drinking water systems to provide a safe, reliable supply of potable drinking water to residents and businesses.	The Township of Tiny owns and operates 16 Municipal drinking water systems to provide a safe, reliable supply of potable drinking water to residents and businesses.
Reliability	Description of boil water advisories and service interruptions.	None in 2023	None in 2023

Table 26 Ontario Regulation 588/17 Technical Levels of Service - Water Network

Service Attribute	Qualitative Description	Current Level of Service	Proposed Level of Service (Same as Current)
Scope	1. Percentage of properties connected to the municipal water system.	28.2% (2,733 of 9,699 private dwellings)	28.2% (2,733 of 9,699 private dwellings)
	2. Percentage of properties where fire flow is available.	93% (11,812 of 12,699 properties)	93% (11,812 of 12,699 properties)
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.	0	0
	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.	0	0

Fleet

The Township's Fleet portfolio, with a current replacement cost of more than $14.8 million, includes various administration, fire, and public works-related vehicles to support delivery of critical services and help maintain efficient and effective operations. This portfolio also includes all heavy equipment, lawn mowers, trailers, implements (e.g. flail mower, ball diamond dragging unit) and attachments (e.g. snowplow, dump box)

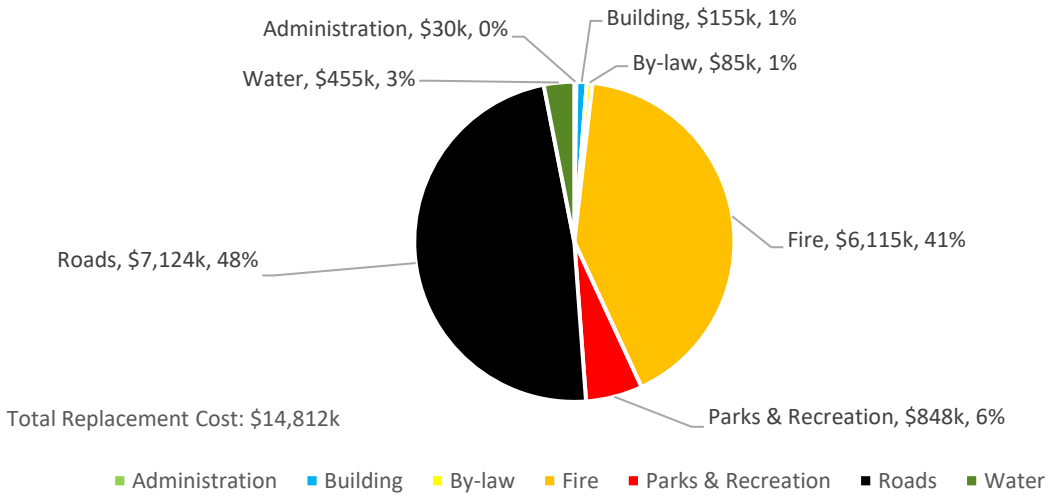
Inventory and Valuation

Table 27 summarizes the quantity and current replacement cost of all fleet assets available in the Township's asset register. Fire and roads fleets comprise nearly 90% of the portfolio, based on replacement cost.

Table 27 Detailed Asset Inventory - Fleet Network

Segment	Quantity	Unit of Measure	Primary Replacement Cost Method	Replacement Cost (in '000)
Administration	1	Assets	User Defined	$30k
Building	4	Assets	User Defined	$155k
By-law	2	Assets	User Defined	$85k
Fire	21	Assets	User Defined	$6,115k
Parks & Recreation	25	Assets	User Defined	$848k
Roads	56	Assets	User Defined	$7,124k
Water	9	Assets	User Defined	$455k
Total	**118**			**$14,812k**

Figure 41 Portfolio Valuation – Vehicles Network



Asset Condition

Based on the Council approved 2023 Fleet Management Strategy, the condition of 60 (non-fire) fleet units are assessed based on five different factors and given a total score out of 30. Table 28 lists the 5 factors and associated point calculation.

Table 28 Points System From Fleet Management Strategy - Fleet Network

Factor	Points
Age	One point for each 20% of the vehicle's estimated service life
Usage	One point for each 20% of the vehicle's estimated service usage (kilometers or hours)
Operation and Maintenance Cost	One point for each 20% of the vehicle's operation and maintenance cost over its life when compared to its purchase price
Condition and reliability	A condition and reliability rating by the mechanics of the vehicle's body, rust, damage, overall reliability, etc. A maximum score of 10 would be given to a vehicle in poor condition with poor reliability.
Consequence of Failure	1 to 5 points assigned based on the consequence of failure of that piece of equipment to the Township's operations. For instance, a tandem plow truck would be given a 5 while a passenger vehicle would be given a 1.

A total score of under 15 points would indicate the equipment is in good standing, a score of 16 to 25 would indicate the equipment should be considered for replacement, and a score above 25 would indicate the equipment should be replaced as soon as possible.

Figure 42 summarizes the replacement cost-weighted condition of the Township's portfolio assessed using the Fleet Management Strategy.

Figure 42 Asset Condition - Units Assessed by the Fleet Strategy – Fleet Network

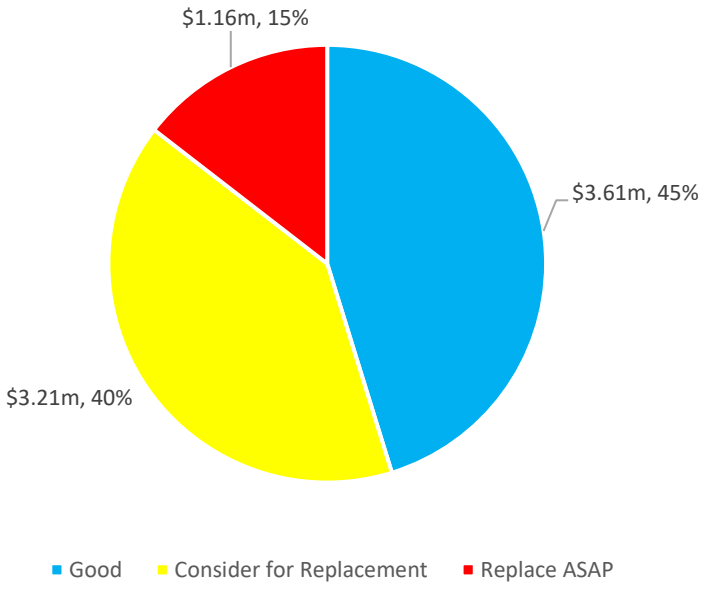


Figure 43 summarizes the cost-weighted age-based condition of the fire department fleet. It should be noted that the fire fleet is currently replaced based on the guidelines within the Fire Underwriters Survey.

Figure 43 Asset Condition – Fire Fleet Age Based Condition – Fleet Network

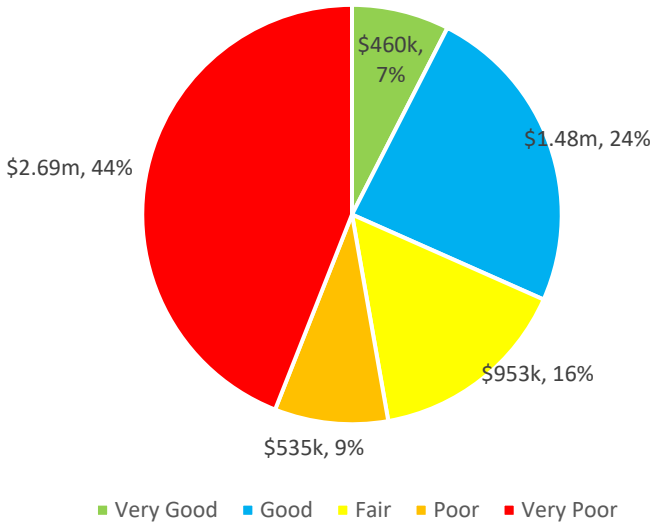


Figure 44 summarizes the cost-weighted condition of all other units in the fleet network. This is a combination of condition assessments, and age-based assessment.

Figure 44 Asset Condition – All Other Units - Fleet Network

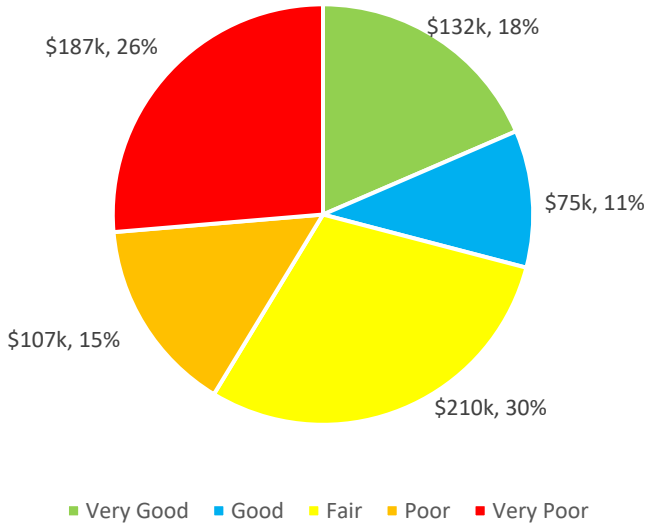


Figure 45 summarizes the percentage of assets by condition, assessed using the Fleet Management Strategy, displayed by segment.

Figure 45 Asset Condition - Fleet Network – By Segment - Fleet Management Strategy

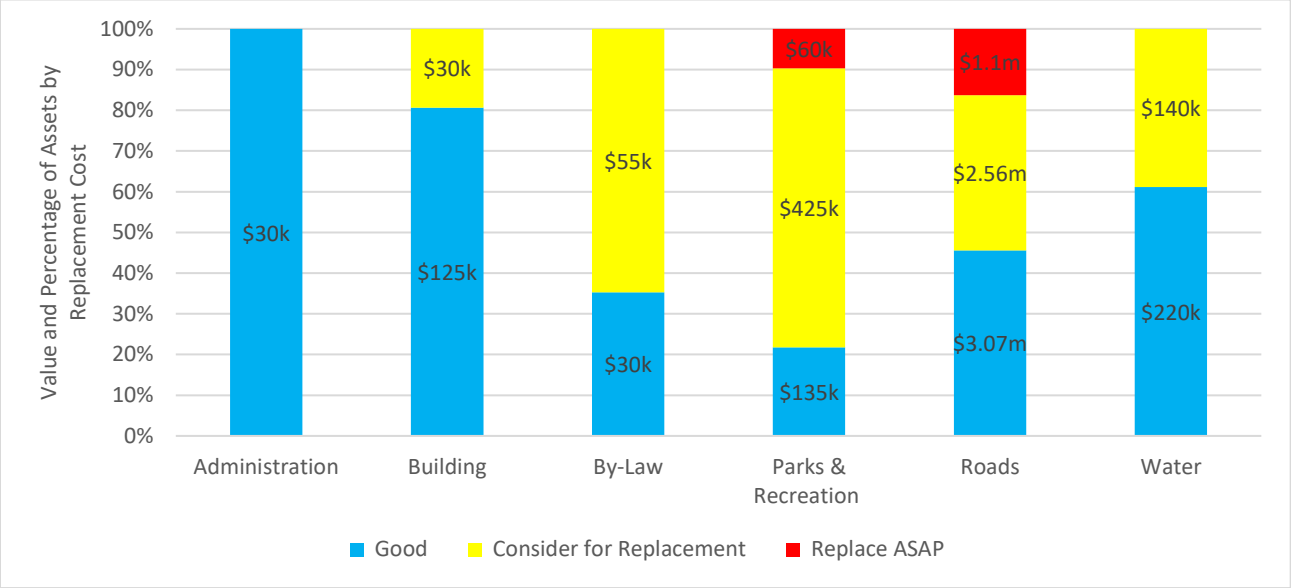
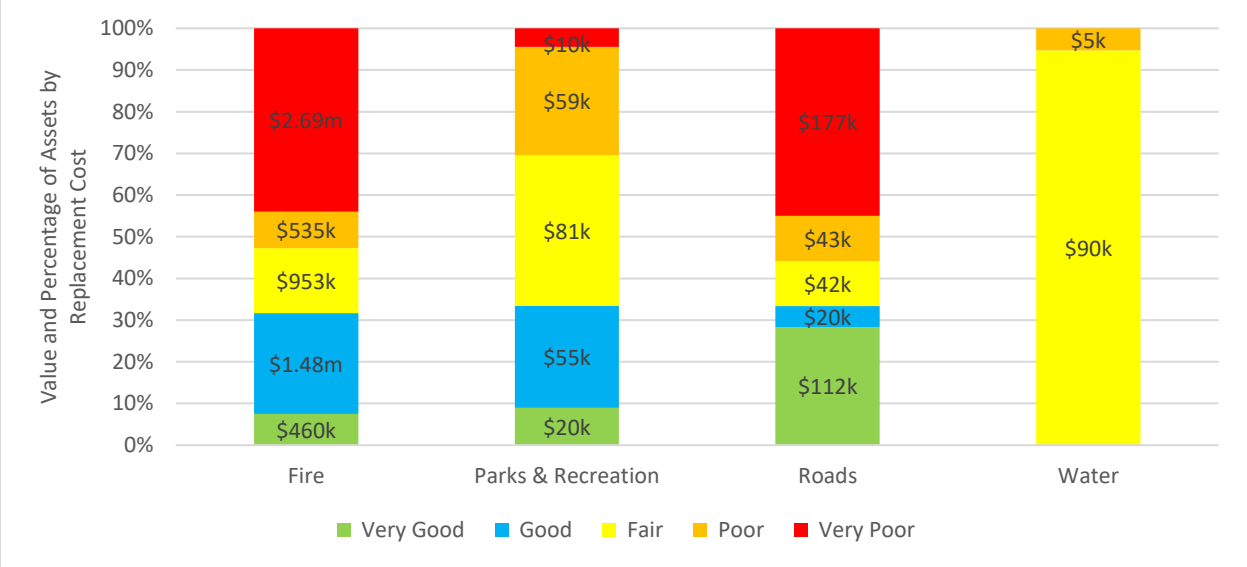


Figure 46 summarizes the percentage of assets by condition, displayed by segment. This is all other fleet assets that are not captured in the Fleet Management Strategy.

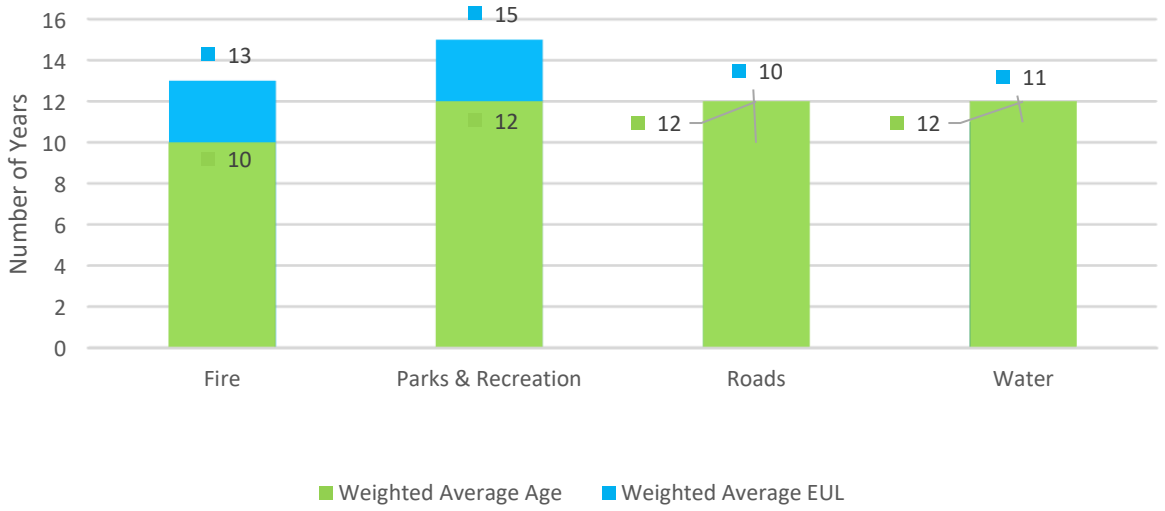
Figure 46 Asset Condition - Fleet Network – By Segment - All Other Fleet



Age Profile

The age profile is only used for assets in the fleet network that have not been scored using the Fleet Management Strategy. This includes fire fleet, trailers, mowers, and the attachments and implements in each segment. Figure 47 illustrates the weighted average age and the weighted average estimated useful life.

Figure 47 Estimated Useful Life vs. Asset Age – Fleet Network



The data reveals that, based on the weighted average age, and weighted average estimated useful life, the fire and parks & recreation assets are in the latter stages of their lifecycle, having consumed on average, more than 75% of the design-life. The weighted average age of the assets in the roads and water segments have surpassed their weighted average EUL but remain in service.

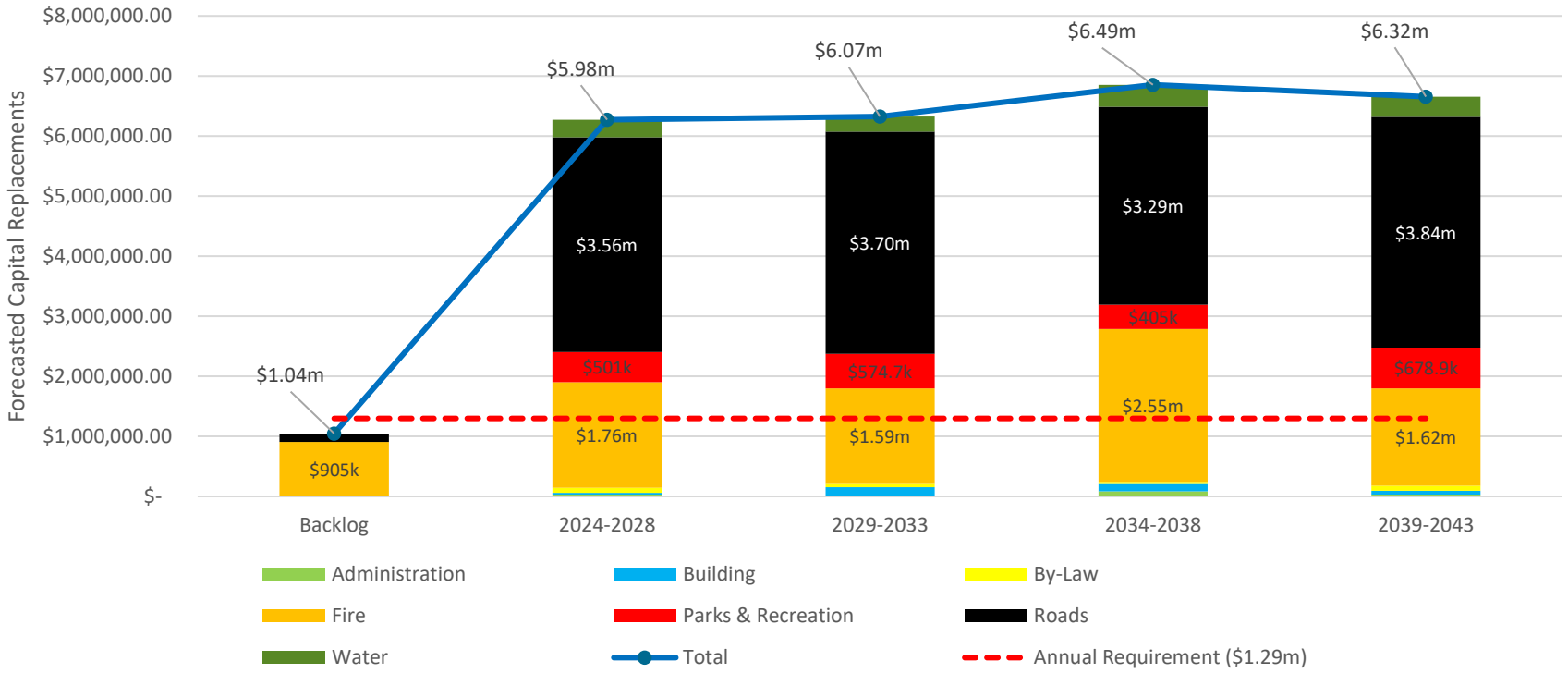
Assets scored using the fleet management strategy are not included in figure 47 as age is already a factor built into their overall condition.

Forecasted Long-term Replacement Needs

Figure 48 illustrates the forecasted 20-year replacement requirements for the Township's Fleet. This projection is based on the longest projected service life of a single unit in the Fleet portfolio.
The average annual requirements (red dotted line) total $1.29 million for all fleet. Although actual spending may fluctuate substantially from year to year, this figure is a useful benchmark value for annual capital expenditure targets (or allocations to reserves) to ensure fleet are replaced as needed.

Replacement needs are relatively consistent across the 20-year projected future. These projections and estimates are based on asset replacement costs and condition analysis. They are designed to provide a long-term, portfolio-level overview of capital needs and should be used to support financial planning over several decades.

Figure 48 Forecasted Capital Replacement Requirements – Fleet : 2024-2043



Although not all fleet that are forecasted for replacement will require it, utilizing tools like the Fleet Management Strategy and building out historical patterns will ensure improved long-term forecasting is achieved.

10-Year Replacement Forecast

The table below summarizes the projected cost of lifecycle activities (capital replacement only) that will need to be undertaken over the next 10 years to support current levels of service. These projections are generated in Citywide.

Table 29 System-generated 10-Year Replacement Forecast - Vehicles Network

Segment	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Administration	$0	$0	$0	$0	$30k	$0	$0	$0	$0	$0
Building	$0	$30k	$0	$0	$0	$35k	$90k	$0	$30k	$0
By-law	$0	$0	$55k	$0	$30k	$0	$0	$0	$0	$55k
Fire	$0	$520k	$688.1k	$548.8k	$0	$125k	$30k	$423k	$0	$1.01m
Parks & Recreation	$0	$110k	$248.5k	$50k	$92.5k	$185k	$3.8k	$36k	$110k	$240k
Roads	$825k	$595k	$992.9k	$170k	$995k	$802.1k	$621.1k	$30.8k	$1.3m	$946.9k
Water	$5k	$55k	$30k	$145k	$55k	$50k	$115k	$0	$55k	$30k
Total	**$830k**	**$1.31m**	**$2.01m**	**$913.8k**	**$1.20m**	**$1.197m**	**$859.9k**	**$489.8k**	**$1.495m**	**$2.282m**

These estimates are developed at the portfolio level, illustrate replacement needs only, and are built on available asset data, including fleet management scoring, quantities, replacement costs, condition, and age. They can be different from actual capital forecasts. Consistent data updates and accurate fleet scoring, will improve the alignment between the system generated expenditure requirements, and the Township's capital expenditure forecasts.

Risk Analysis

As part of the Township's Fleet Management Strategy, the risk analysis has been built in as a factor of the assessment and overall scoring for priority replacement. The risk analysis module in PSD Citywide is not used for the Fleet portfolio.

As stated previously, the fire department fleet is replaced using age only data based on the Fire Underwriters Survey guidelines. With respect to a risk analysis, all fire fleet have the highest score for consequence of failure, and probability of failure is only based on age. As these are fixed metrics, the risk modelling will not be used for the Fleet network.

Levels of Service

Levels of service for Fleet have been qualified in the community level of service and technical level of service rankings below.

Table 30 Ontario Regulation 588/17 Community Levels of Service – Fleet

Service Attribute	Qualitative Description	Current Level of Service Based on 2024 Data	Proposed Level of Service (Same as Current)
Scope	The Fleet Management Strategy condition rating range from 2-28	Current number of fleet listed as 'Replace ASAP' = 5 Current number of fleet listed as 'Consider for Replacement' = 30 Current number of fleet listed as 'Good' = 25	Current number of fleet listed as 'Replace ASAP' = 5 Current number of fleet listed as 'Consider for Replacement' = 30 Current number of fleet listed as 'Good' = 25

Table 31 Ontario Regulation 588/17 Technical Levels of Service – Fleet

Service Attribute	Qualitative Description	Current Level of Service Based on 2024 Data	Proposed Level of Service (Same as Current)
Scope	Fleet replacements are formally and publicly identified in the annual capital budget.	Current vs Target capital Reinvestment Rate: 7.31% vs 8.77% 83.4% of the target reinvestment rate	Current vs Target capital Reinvestment Rate: 7.31% vs 8.77% 83.4% of the target reinvestment rate

Land Improvements

The Township of Tiny's Land Improvements category includes parking lots, playground equipment, and sports fields & equipment, with a total replacement cost of over $3.8 million.

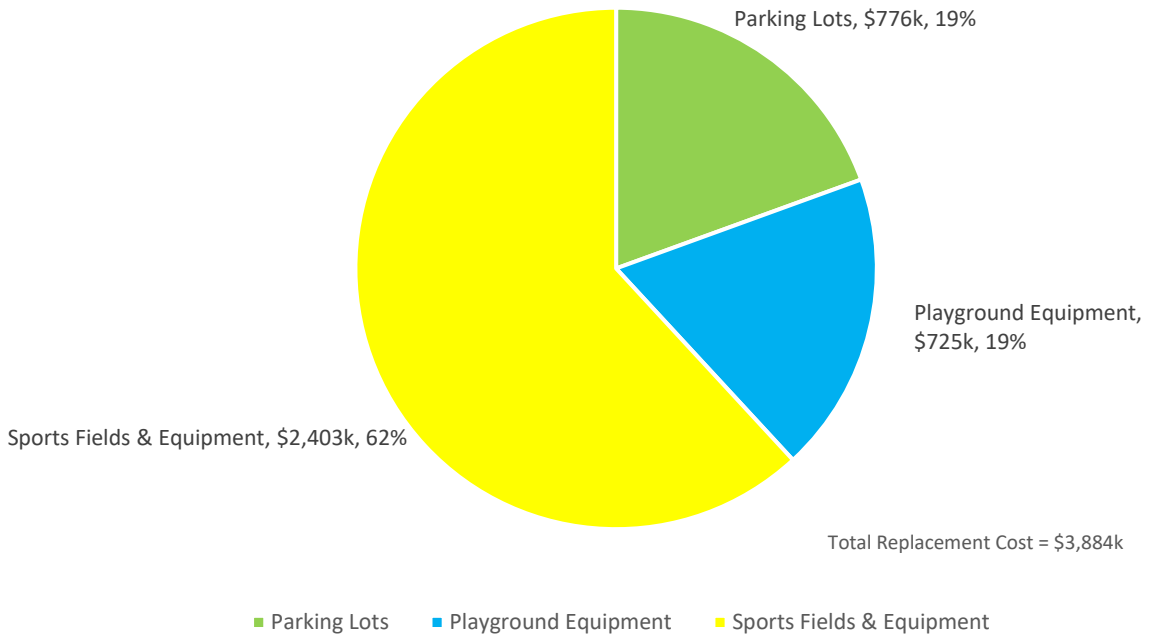
Inventory and Valuation

Table 32 summarizes the quantity and current replacement cost of the Land Improvement assets available in the Township's asset register.

Table 32 Detailed Asset Inventory – Land Improvements

Segment	Quantity	Unit of Measure	Primary Replacement Cost Method	Replacement Cost (in '000)
Parking Lots	37	Assets	User Defined	$756k
Playground Equipment	23	Assets	User Defined	$725k
Sports Fields & Equipment	35	Assets	User Defined	$2,403k
Total	**95**			**$3,884k**

Figure 49 Portfolio Valuation – Land Improvements



Asset Condition

Figure 50 summarizes the replacement cost-weighted condition of the Township's Land Improvement assets. Based on age data only, more than 70% of the assets are in poor to very poor condition. These assets may be candidates for replacement in the short term.

Figure 50 Asset Condition – Land Improvements: Overall

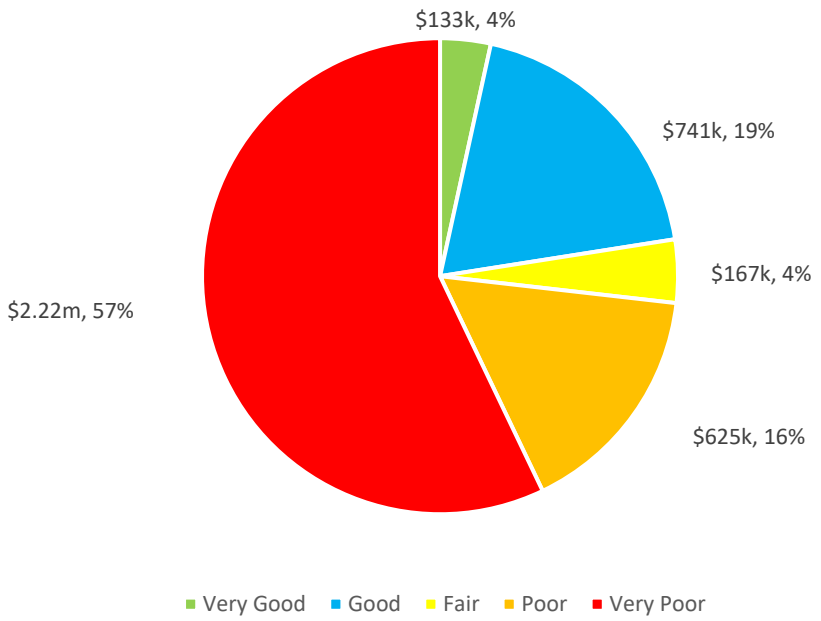
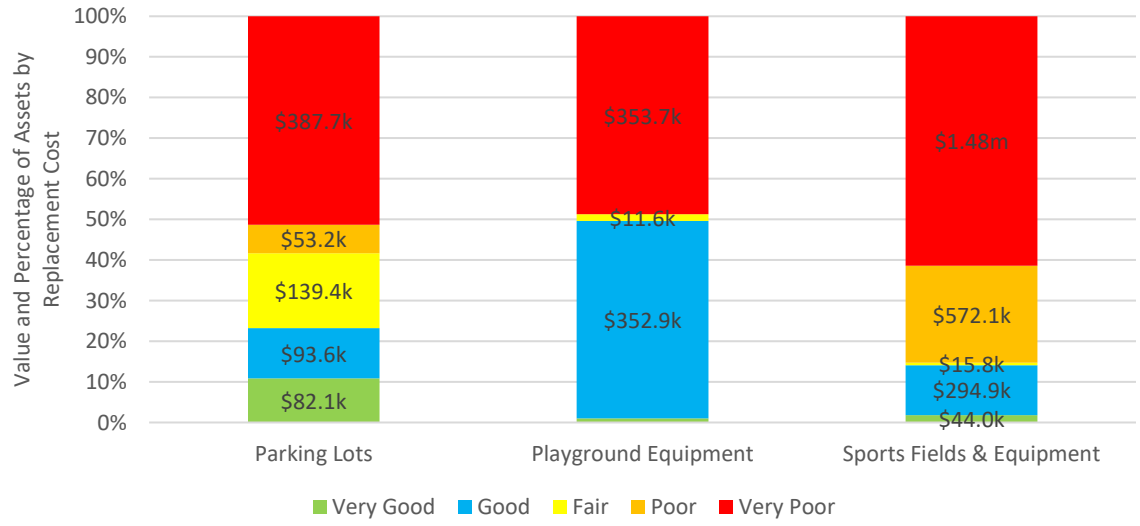


Figure 51 further details the condition of Land Improvements by segment type.

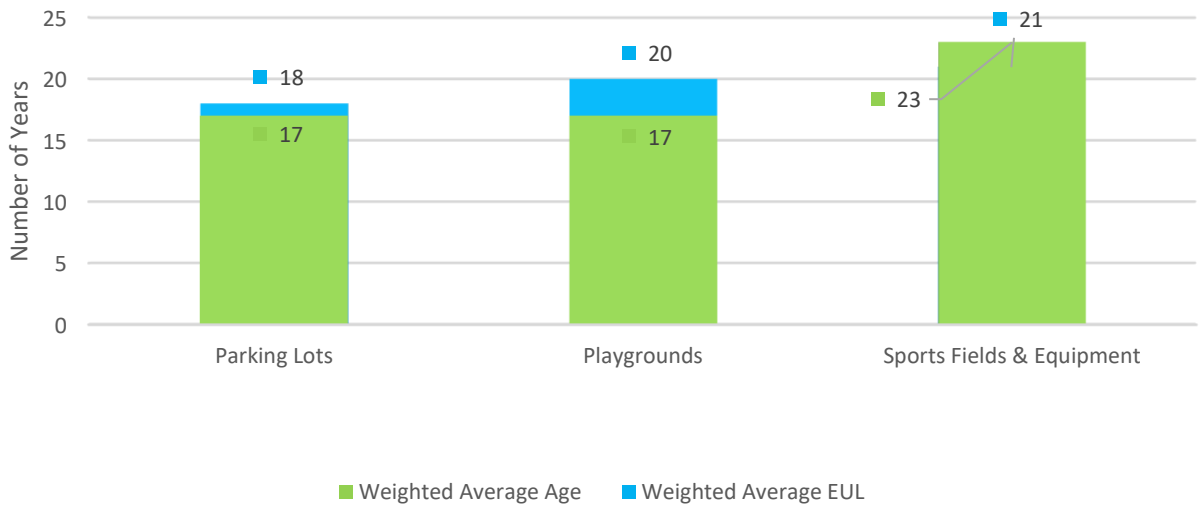
Figure 51 Asset Condition – Land Improvements: By Segment



Age Profile

Figure 52 illustrates the average current age of each segment type and the average estimated useful life. Both values are weighted by the replacement cost of individual assets.

Figure 52 Estimated Useful Life vs. Asset Age – Land Improvements



Age analysis reveals that on average, all three Land Improvement segments are in the latter stages of the lifecycle. On average, sports fields & equipment have surpassed their weighted average EUL based on age only. Parking lots and playgrounds are within the final 15% based on age only.

Current Approach to Lifecycle Management

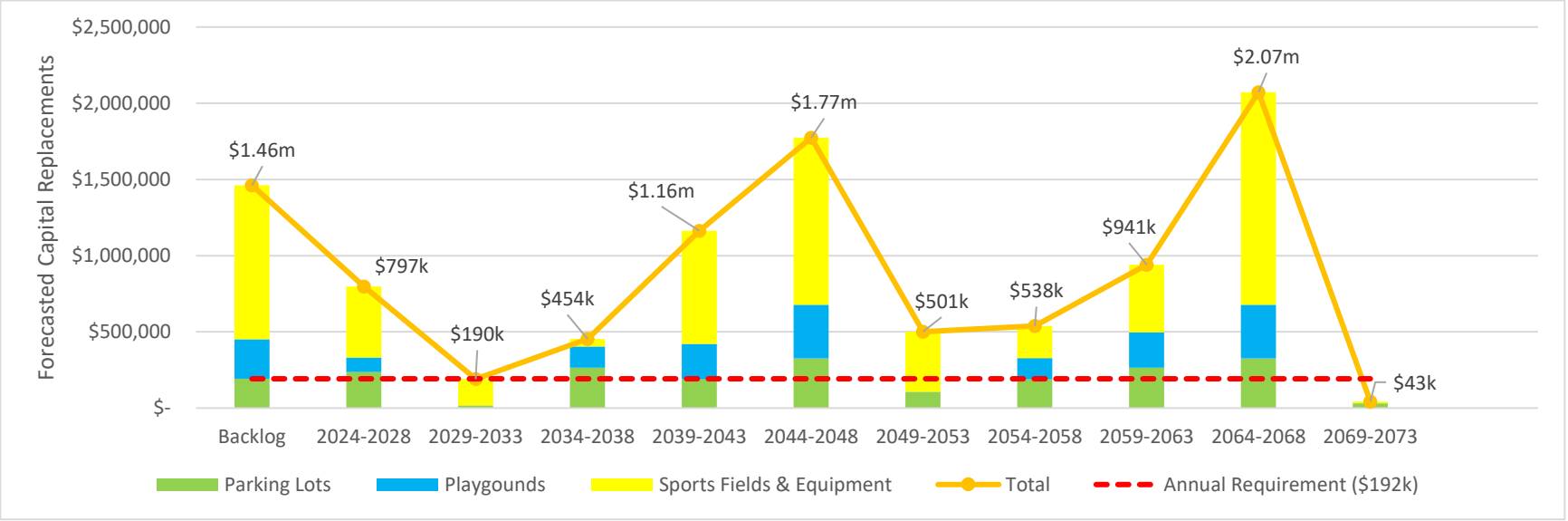
The Township currently does not have a programmatic approach to assessing the condition of the Land Improvements infrastructure. Staff monitor all assets and conduct regular health and safety inspections. Dedicated annual condition assessments are planned to start in 2025, with lifecycle activities to be added if applicable.

Forecasted Long-term Replacement Needs

Figure 53 illustrates the 50-year forecasted replacement requirements for the Township's Land Improvement assets. Tiny's average annual requirements (red dotted line) for land improvements total $192k. Although actual spending may fluctuate substantially from year to year, this figure is a useful benchmark value for annual capital expenditure targets (or allocations to reserves) to ensure projects are not deferred and replacement needs are met as they arise.

The chart illustrates a backlog of $1.46 million, comprising mostly of sports fields & equipment. This is based only on age-based data. These projections and estimates are based on asset replacement costs, and age analysis. They are designed to provide a long-term, portfolio-level overview of capital needs and should be used to support improved financial planning over several decades.

Figure 53 Forecasted Capital Replacement Requirements – Land Improvements: 2024-2073



10-Year Replacement Needs

The table below summarizes the projected cost of lifecycle activities (capital replacement only) that will need to be undertaken over the next 10 years to support current levels of service. These projections are generated in Citywide and are based on age data.

Table 33 System-generated 10-Year Capital Replacement Forecast – Land Improvements

Segment	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Parking Lots	$36k	$0	$19.4k	$92.2k	$88.3k	$12.9k	$0	$0	$0	$5k
Playgrounds	$70k	$0	$0	$25k	$0	$0	$0	$0	$0	$0
Sports Fields & Equipment	$10.8k	$411k	$16.4k	$0	$28.5k	$0	$71.2k	$101k	$0	$0
Total	**$116.8k**	**$411k**	**$35.8k**	**$117.2k**	**$116.8k**	**$12.9k**	**$71.2k**	**$101k**	**$0**	**$5k**

Extending asset useful life based on historical performance is being developed to be implemented into lifecycle management. This will help improve the alignment between the system generated expenditure requirements, and the Township's capital expenditure forecasts, including long-term capital plans.

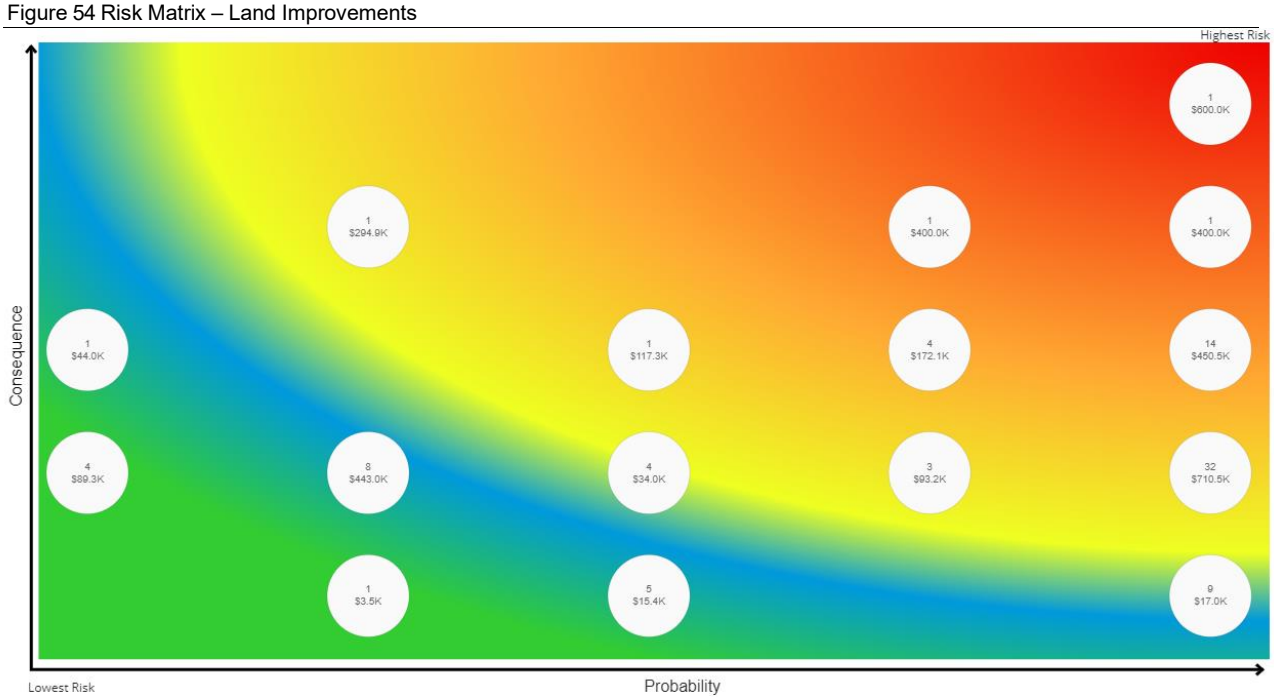
Risk Analysis

The risk matrices below are generated using available asset data, such as service life remaining (%), and replacement cost.

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

The figure below is a snapshot of where the assets in this category rate. The lower left hand side being assets with the least amount of risk (green), and upper right-hand side being the most amount of risk (red).

Figure 54 Risk Matrix – Land Improvements



Levels of Service

Current levels of service metric are not prescribed under Ontario Regulation 588/17. The current community and technical level of service have been identified per the KPI's below.

Table 34 Ontario Regulation 588/17 Community Levels of Service – Land Improvements

Service Attribute	Qualitative Description	Current Level of Service Based on 2024 Data	Proposed Level of Service (Same as Current)
Scope	The age-based condition of the land improvement assets range from very poor (0) to very good (87.5)	Weighted average age-based condition of assets, Poor (22.8)	Weighted average age-based condition of assets, Poor (22.8)

Table 35 Ontario Regulation 588/17 Technical Levels of Service – Land Improvements

Service Attribute	Qualitative Description	Current Level of Service Based on 2024 Data	Proposed Level of Service (Same as Current)
Scope	Land improvement capital projects are formally and publicly identified in the annual capital budget.	Current vs Target capital Reinvestment Rate: 6.16% vs 4.95%	Current vs Target capital Reinvestment Rate: 6.16% vs 4.95%
	Number of green parks with a score greater than the average of 2.30 (from the PRAC Master Plan)	2 out of 6	2 out of 6
	Number of beach parks with a score greater than the 2.61 average (from the PRAC Master Plan)	3 out of 5	3 out of 5

Equipment & Reports

As part of the overall Township Asset Management Program, for this 2024 AMP, this category (previously Machinery & Equipment) has been updated to Equipment & Reports. This captures all report types, e.g., updated master plans, studies, as well as all equipment. This category is segmented by staff department. The combined total replacement Equipment & Report assets is over $4.8 million.

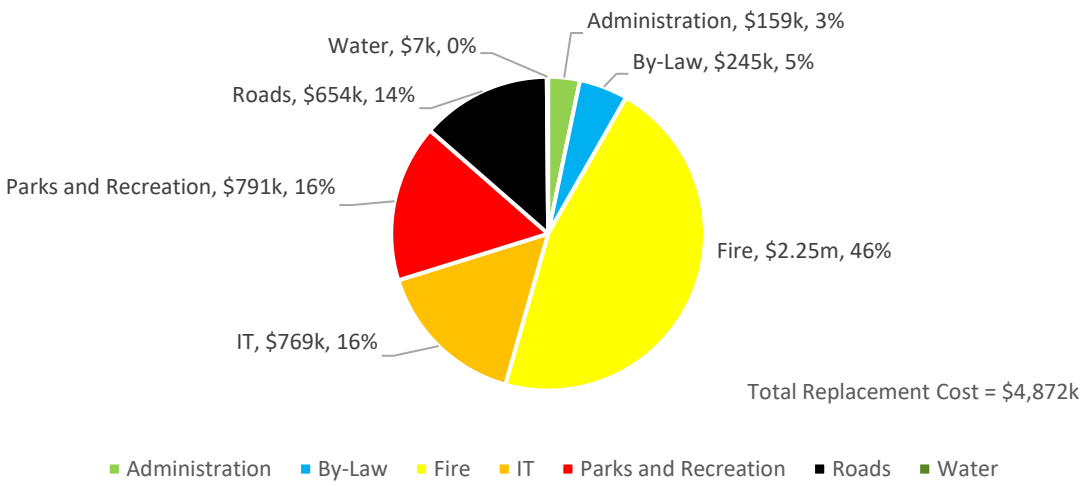
Inventory and Valuation

Table 36 summarizes the quantity and current replacement cost of Equipment & Reports by department.

Table 36 Detailed Asset Inventory –Equipment & Reports

Segment	Quantity	Unit of Measure	Primary Replacement Cost Method	Replacement Cost (in '000)
Administration	11	Assets	CPI Tables	$159k
By-Law	34	Assets	CPI Tables	$245k
Fire	1291	Assets	CPI Tables, Cost/Unit	$2,247k
IT	177	Assets	CPI Tables, Cost/Unit	$769k
Parks and Recreation	95	Assets	CPI Tables, Cost/Unit	$791k
Roads	47	Assets	CPI Tables	$654k
Water	1	Asset	User Defined	$7k
Total	**1656**			**$4,872k**

Figure 55 Portfolio Valuation – Equipment & Reports



Asset Condition

Figure 56 summarizes the replacement cost-weighted condition of the Township's Equipment & Reports assets. Based on age and condition assessments, more than 50% of the assets in this category are in very poor condition.

Figure 56 Asset Condition – Equipment & Reports: Overall

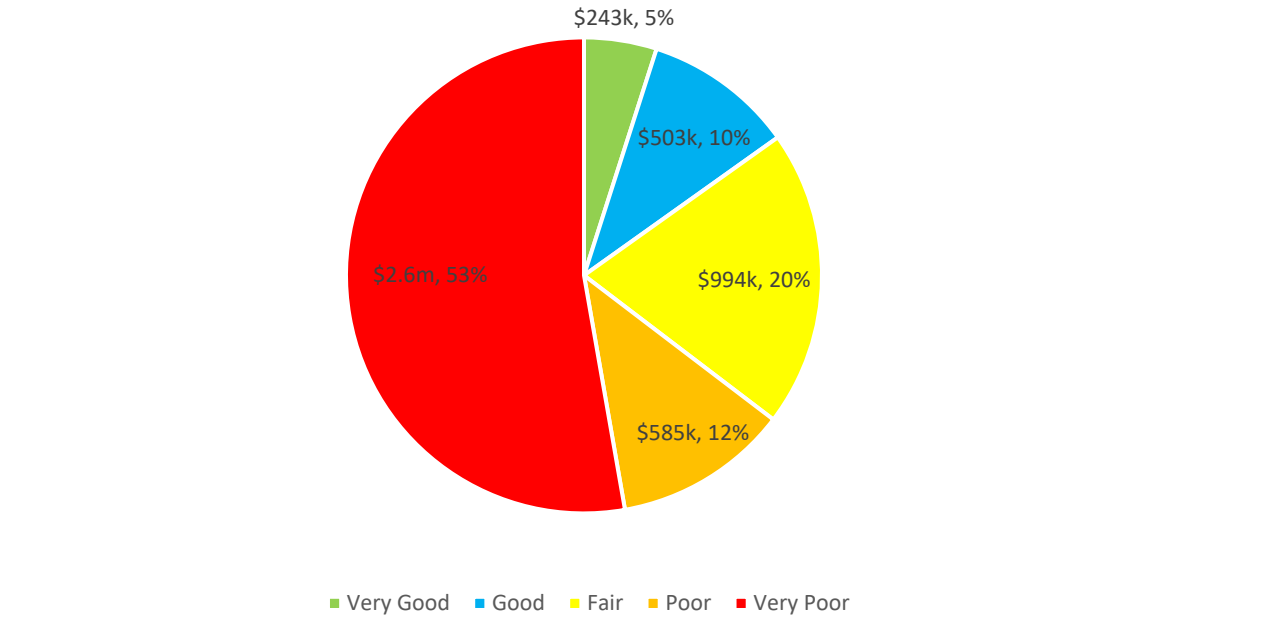
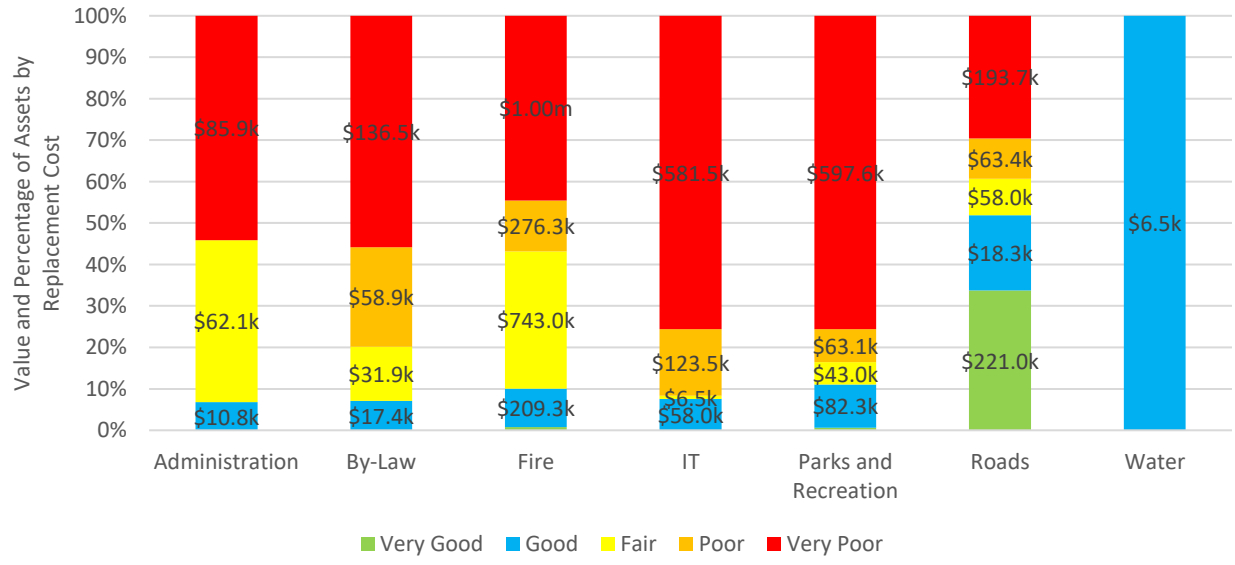


Figure 57 further details the condition of Equipment & Reports segmented by department.

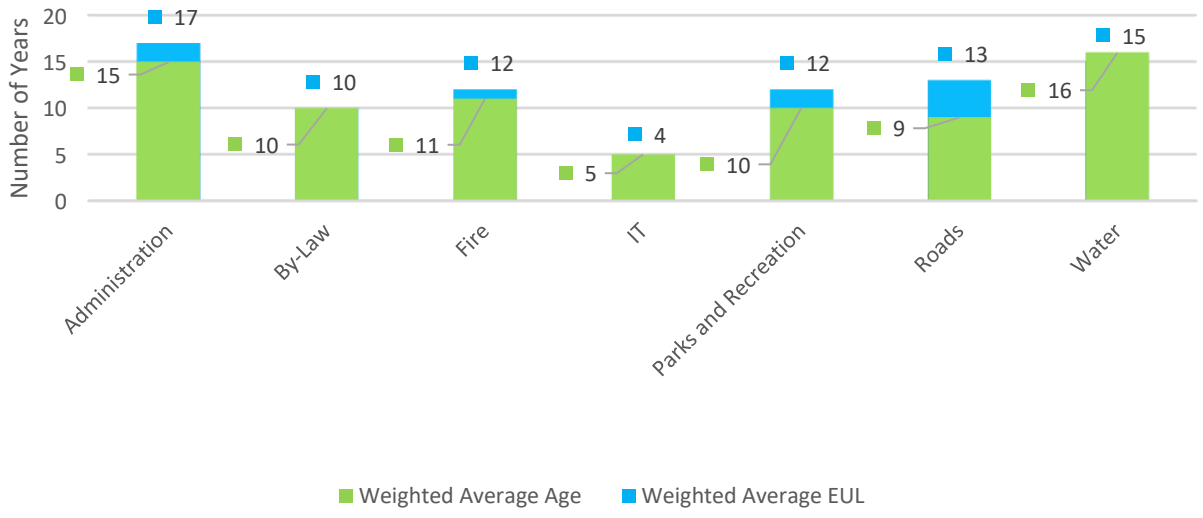
Figure 57 Asset Condition – Equipment & Reports: By Segment



Age Profile

Figure 58 illustrates the average current age of each asset type and its average estimated useful life. Both values are weighted by the replacement cost of individual assets.

Figure 58 Estimated Useful Life vs. Asset Age – Equipment and Reports



Age analysis reveals that on average, all departmental equipment and report assets are in the latter stage or have surpassed their weighted average estimated useful life.

Current Approach to Lifecycle Management

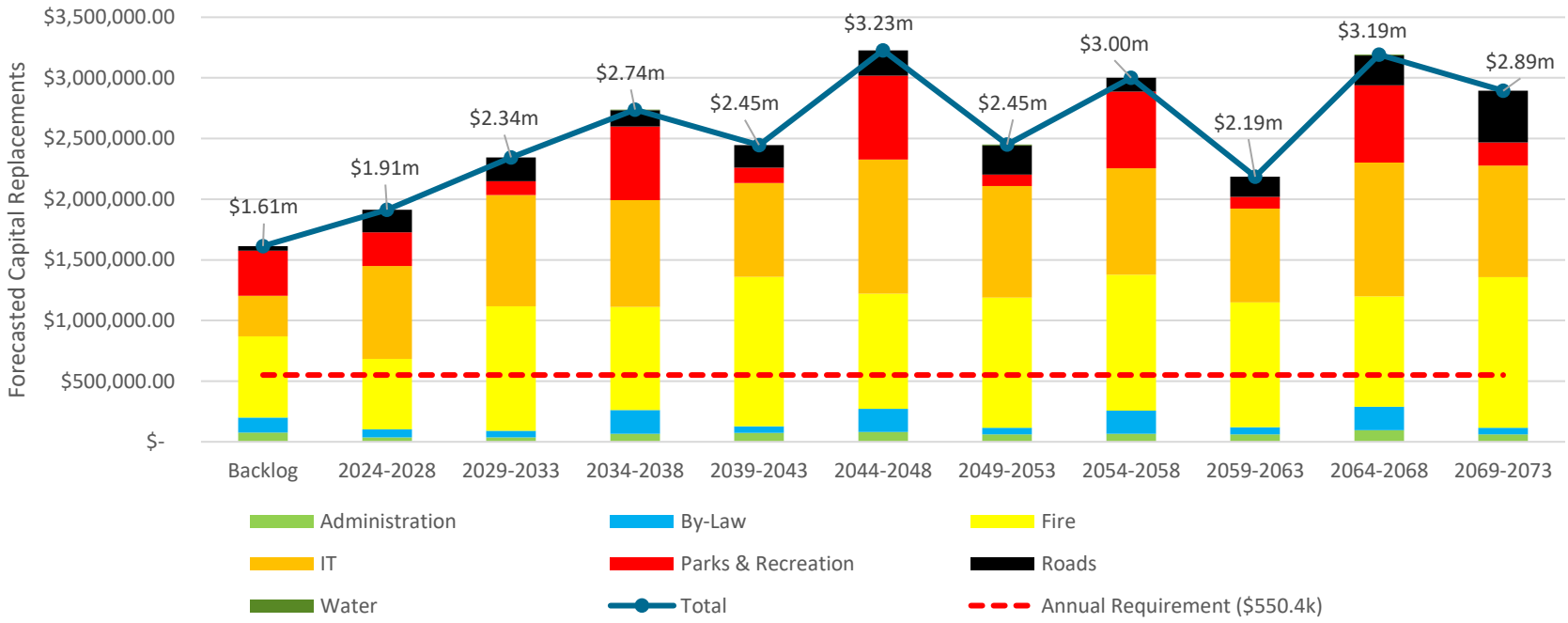
The Township currently does not have a programmatic approach to assessing condition of the Equipment & Reports assets. Staff monitor and utilize all assets and identify when something is approaching its end of useful life.

Forecasted Long-term Replacement Needs

Figure 59 illustrates the 50-year forecasted replacement requirements for the Township's Equipment and Reports assets. The average annual requirements (red dotted line) for equipment and reports totals $550.4k. Although actual spending may fluctuate substantially from year to year, this figure is a useful benchmark value for annual capital expenditure targets (or allocations to reserves) to ensure projects are not deferred and replacement needs are met as they arise.

Although no major replacement spikes are anticipated for the next five decades, capital needs will rise steadily to and peak at $3.23 million between 2044 and 2048. These projections and estimates are based on asset replacement costs, age analysis, and condition data. They are designed to provide a long-term, portfolio-level overview of capital needs and should be used to support improved financial planning over several decades.

Figure 59 Forecasted Capital Replacement Requirements – Equipment & Reports: 2024-2073



10-Year Replacement Needs

The table below summarizes the projected cost of lifecycle activities (capital replacement only) that will need to be undertaken over the next 10 years to support current levels of service. These projections are generated in Citywide and are based on age data.

Table 37 System-generated 10-Year Capital Replacement Forecast – Equipment & Reports

Segment	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Administration	$0	$0	$0	$0	$35.9k	$0	$37.2k	$0	$0	$0
By-Law	$9.4k	$2.8k	$0	$54.7k	$0	$5.3k	$31.9k	$17.4k	$0	$0
Fire	$80.5k	$99.9k	$108.6k	$137.2k	$153.2k	$767.9k	$45.8k	$91.4k	$100.2k	$18.8k
IT	$55.5k	$151.9k	$164.5k	$6.5k	$389.6k	$151.9k	$164.5k	$6.5k	$444.6k	$151.9k
Parks & Recreation	$22.7k	$30.4k	$165.5k	$58.7k	$0	$51.0k	$2.6k	$21.5k	$36.9k	$0
Roads	$0	$37.3k	$18.2k	$112.2k	$18.2	$51.5k	$28.9k	$117.2k	$0	$0
Water	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$168.1k**	**$322.3k**	**$456.8k**	**$369.3k**	**$596.9k**	**$1.03m**	**$310.9k**	**$254.0k**	**$581.7k**	**$170.7k**

Consistent data updates with accurate condition assessments will continue to improve the alignment between the system generated expenditure requirements, and the Township's capital expenditure forecasts and long-term capital planning.

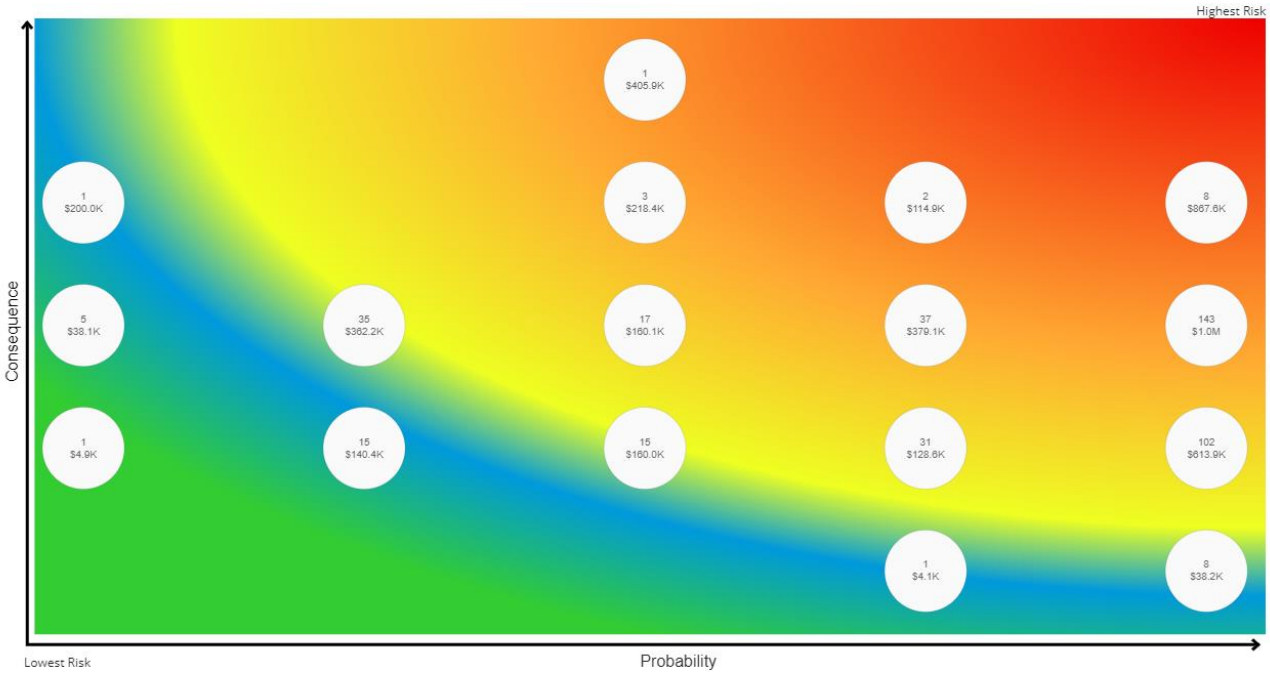
Risk Analysis

The risk matrices below are generated using available asset data, such as service life remaining (%), and replacement cost.

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

The figure below is a snapshot of where the assets in this category rate. The lower left hand side being assets with the least amount of risk (green), and upper right-hand side being the most amount of risk (red).

Figure 60 Risk Matrix –Equipment & Reports



In addition to asset level risk, the Township may also face risk associated with not executing key lifecycle activities, including repairs, rehabilitation, and replacement 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, which 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 can assist in optimizing limited funds.

Levels of Service

Current levels of service metric are not prescribed under Ontario Regulation 588/17. The current community and technical level of service have been identified per the KPI's below.

Table 38 Township Defined Community Levels of Service – Equipment & Reports

Service Attribute	Qualitative Description	Current Level of Service Based on 2024 Data	Proposed Level of Service (Same as Current)
Scope	Based on assessed condition data as available. And age-based conditions, the equipment & reports assets range in projected condition from very poor (0) to very good (95).	Weighted Average Condition of Assets: Poor 20.6	Weighted Average Condition of Assets: Poor 20.6

Table 39 Township Defined Technical Levels of Service –Equipment & Reports

Service Attribute	Qualitative Description	Current Level of Service Based on 2024 Data	Proposed Level of Service (Same as Current)
Scope	Equipment & reports asset replacement decisions predominantly consider functionality, asset age, condition, and legislative compliance.	Current vs Target capital Reinvestment Rate: 18.6% vs 11.3% 164.6% of the target reinvestment rate	Current vs Target capital Reinvestment Rate: 18.6% vs 11.3% 164.6% of the target reinvestment rate

Trails & Boardwalks

The Trails & Boardwalks category includes trail and boardwalk segments for a combined replacement total of over $11.1 million.

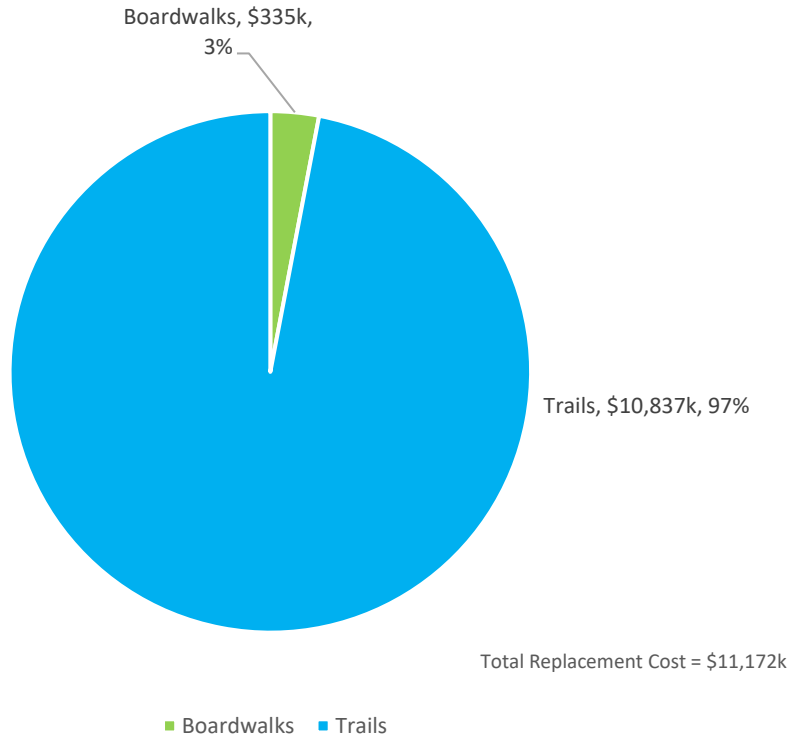
Inventory and Valuation

Table 40 summarizes the quantity and current replacement cost of the Township's Trails & Boardwalk portfolio.

Table 40 Detailed Asset Inventory – Trails & Boardwalks

Segment	Quantity	Unit of Measure	Primary Replacement Cost Method	Replacement Cost (in '000)
Boardwalks	9	Assets	CPI Tables, Cost/Unit	$335k
Trails	27	Assets	CPI Tables, User Defined	$10,837k
Total	**36**			**$11,172k**

Figure 61 Portfolio Valuation – Trails & Boardwalks



Asset Condition

Figure 62 summarizes the replacement cost-weighted condition of the Township's trails and boardwalks network. A combination of the Township's recent Ontario Structures Inspection Manual (OSIM) assessments, and age-based data was used to determine the asset conditions.

Figure 62 Asset Condition – Trails & Boardwalks: Overall

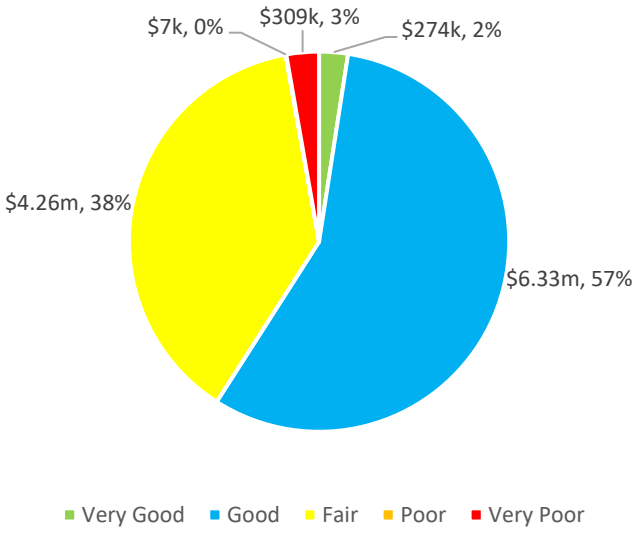
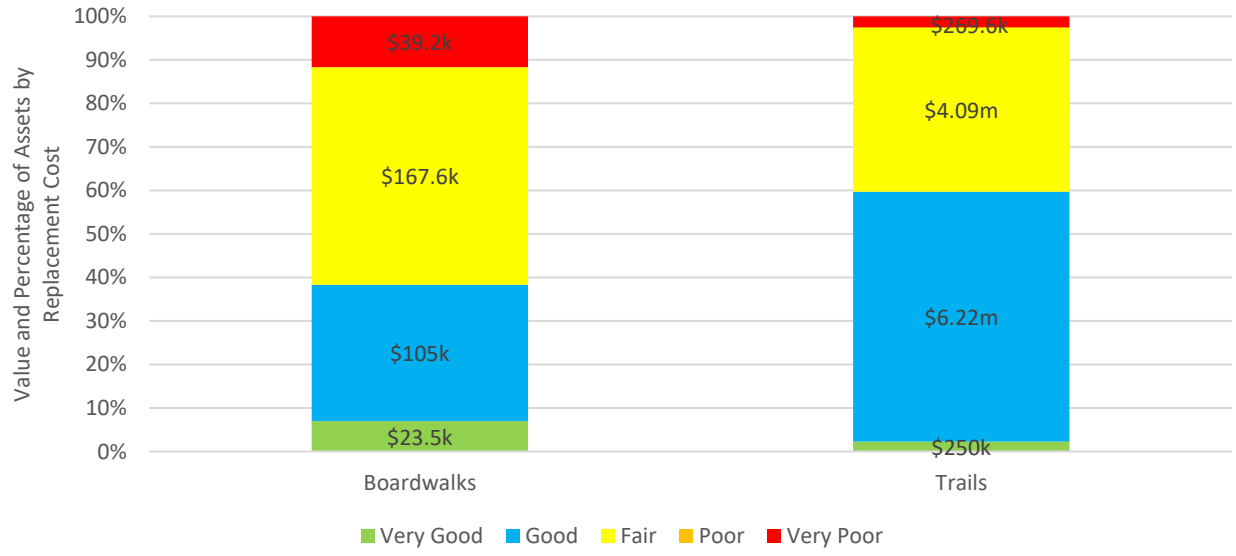


Figure 63 further details the condition of trails and boardwalks by segment type.

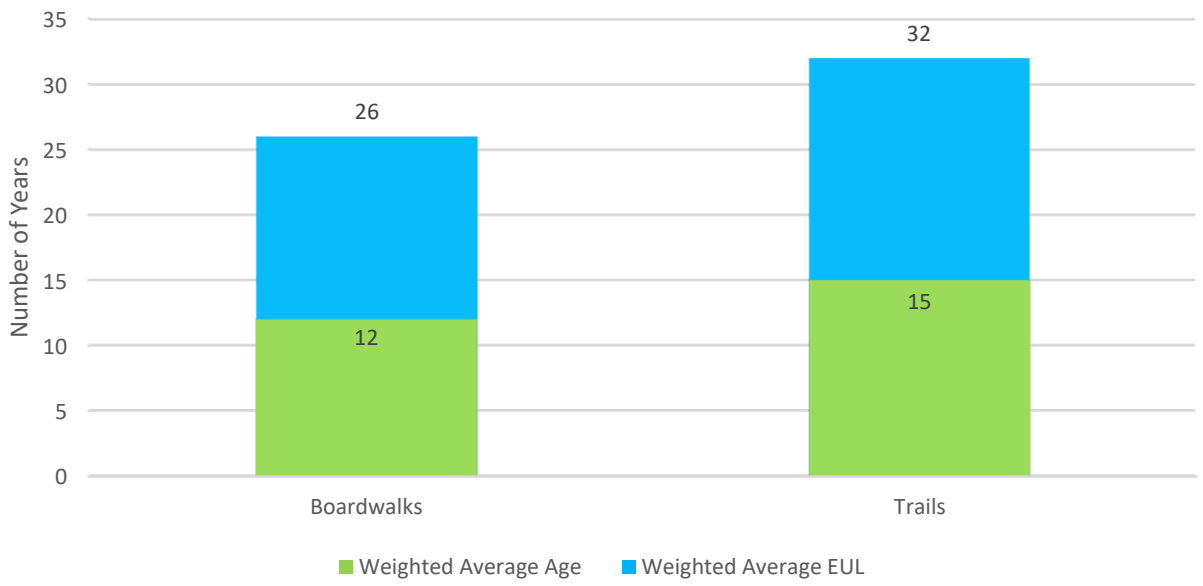
Figure 63 Asset Condition – Trails & Boardwalks: By Segment



Age Profile

Figure 64 illustrates the average current age of each segment type and its average estimated useful life. Both values are weighted by the replacement cost of individual assets.

Figure 64 Estimated Useful Life vs. Asset Age – Trails & Boardwalks



Age analysis reveals that on average, all trails and boardwalk assets are just below the half-way point of their weighted average estimated useful lives.

Current Approach to Lifecycle Management

The Township currently has a by-annual OSIM inspection done on the trail bridges. This data is used for assessing the condition of these assets and has been built in as a lifecycle event into the asset management software.
Trails are inspected by-weekly to ensure the trails can be enjoyed unobstructed and safely. Trends are being monitored to identify if lifecycle activities can be built into the trail segment.

Regular inspections and maintenance are completed on both permanent and mobile boardwalks and are tracked as part of operations. Historical data and trends will be used to identify trends in maintenance to allow lifecycle activities to be built into the boardwalk segment.

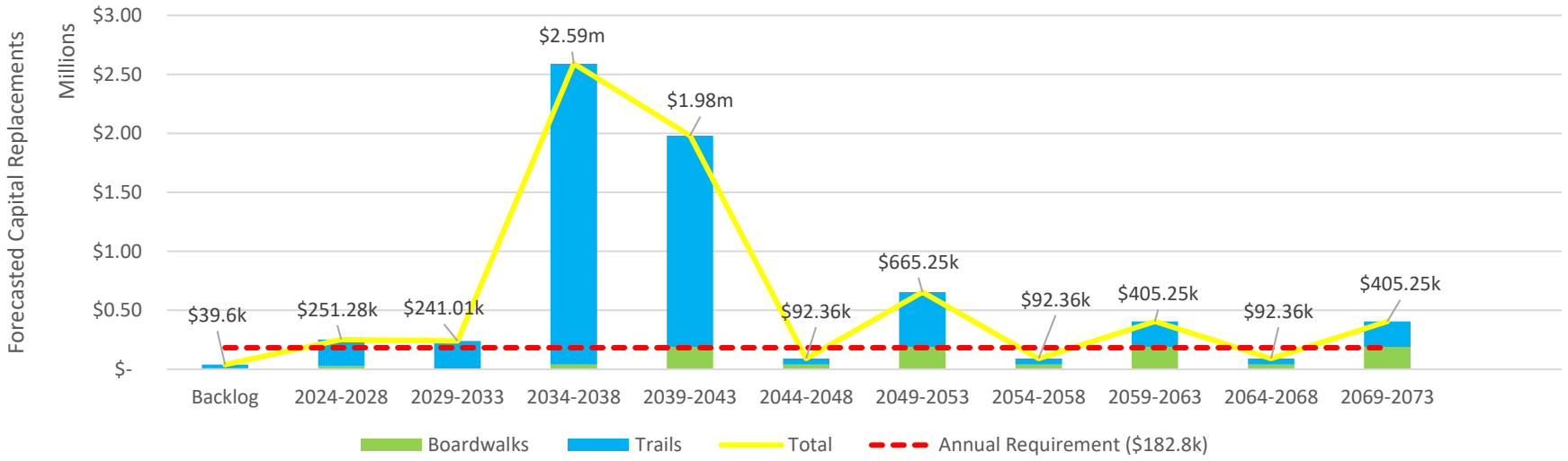
Forecasted Long-term Replacement Needs

Figure 65 illustrates the 50-year projected replacement requirements for the Township's Trails & Boardwalks portfolio. The average annual requirements (red dotted line) for trails and boardwalks total $182.8k. Although actual spending may fluctuate substantially from year to year, this figure is a useful benchmark value for annual capital expenditure targets (or allocations to reserves) to ensure projects are not deferred and replacement needs are met as they arise.

The major replacement needs are in the 10-20-year range. Note that this spike is the result of the vast majority of trail bridges coming to end of life in that time frame. Over the years, as we continue to perform regular maintenance activities, and OSIM condition assessment reports, it would be reasonable to suggest that the actual replacement time of these assets will be further spread out.

These projections and estimates are based on asset replacement costs, age analysis, and condition data. They are designed to provide a long-term, portfolio-level overview of capital needs and should be used to support improved financial planning over several decades. The Township's OSIM inspections includes rehabilitation and repair needs for the trail bridges, totaling $451k within the next five years. These recommendations should be used in conjunction with long-term replacement needs to stay current with major capital investments.

Figure 65 Forecasted Capital Replacement Requirements – Trails & Boardwalks: 2024-2073



10-Year Replacement Needs

The table below summarizes the projected cost of lifecycle activities (capital replacement only) that will need to be undertaken over the next 10 years to support current levels of service. These projections are generated in Citywide and are based on condition and age data.

Table 41 System-generated 10-Year Capital Replacement Forecast – Trails & Boardwalks

Segment	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Boardwalks	$0	$12.7k	$17.6k	$0	$0	$0	$1.0k	$0	$0	$0
Trails	$0	$0	$13.9k	$7.1k	$200k	$153.2k	$87.3k	$0	$0	$0
Total	**$0**	**$12.7k**	**$31.5k**	**$7.1k**	**$200k**	**$153.2k**	**$88.3k**	**$0**	**$0**	**$0**

These estimates are developed at the portfolio level, illustrate replacement needs only, and are built on available asset data, including quantities, the extent to which elements are componentized, replacement costs, age, or assessed condition. They can be different from actual capital forecasts as outlined in OSIM inspections and recommended workplans, as outlined below.

Table 42 OSIM Workplan – Trails & Boardwalks

Timeframe for recommended repairs, renewals, and replacements	Cost (in '000)
Within 1 year	$35k
Within 1-5 years	$409k
Within 2-3 years	$2k
Within 3-4 years	$5k
Total	**$451k**

Consistent data updates, especially condition, and asset acquisitions and disposals will improve the alignment between the system generated expenditure requirements, and the Township's capital expenditure forecasts, including long-term capital plans.

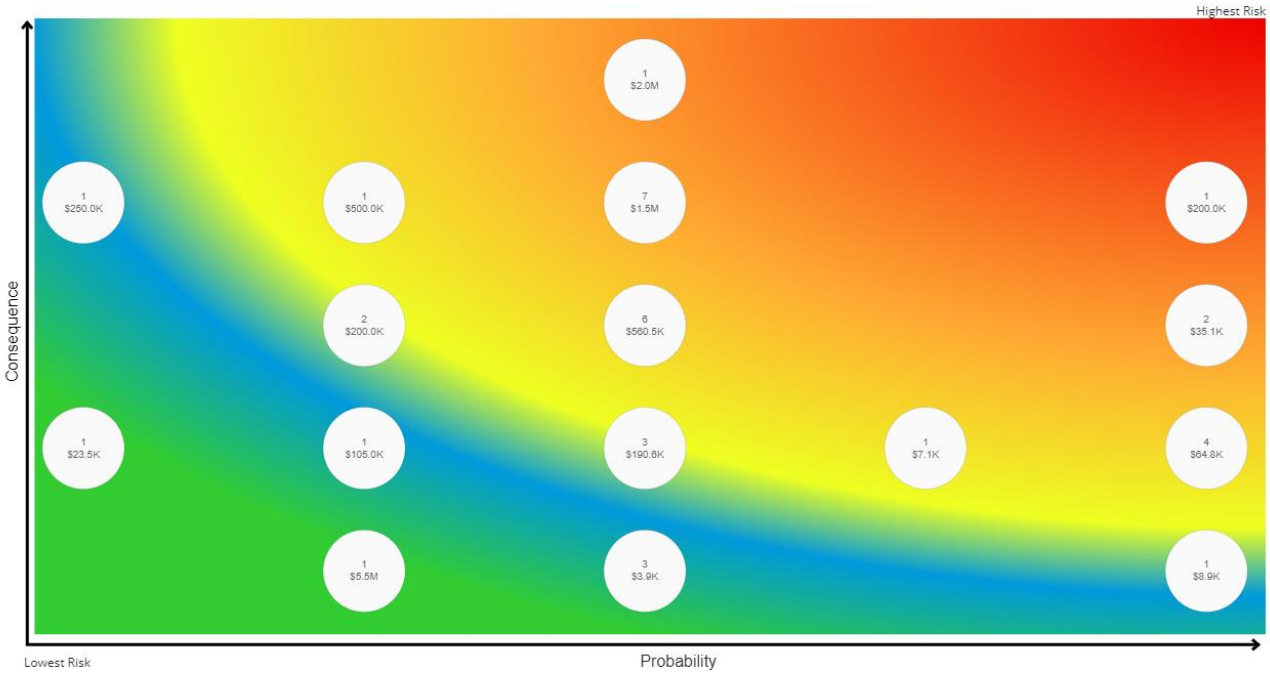
Risk Analysis

The risk matrices below are generated using available asset data, such as service life remaining (%), and replacement cost.

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

The figure below is a snapshot of where the assets in this category rate. The lower left-hand side being assets with the least amount of risk (green), and upper right-hand side being the most amount of risk (red).

Figure 66 Risk Matrix – Trails & Boardwalks



In addition to asset level risk, the Township may also face risk associated with not executing key lifecycle activities, including repairs, rehabilitation, and replacement 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, which 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 can assist in optimizing limited funds.

Levels of Service

Current levels of service metric are not prescribed under Ontario Regulation 588/17. The current community and technical level of service have been identified per the KPI's below.

Table 43 Township Defined Community Levels of Service – Trails & Boardwalks

Service Attribute	Qualitative Description	Current Level of Service Based on 2024 data	Proposed Level of Service (Same as Current)
Scope	Total length (kilometers) of paved trails	1 km	1 km
	Total length (kilometers) of non-paved trails	23 kms	23 kms
	Dedicated trail links to the beaches from the Tiny Trail.	0	0
	Boardwalks that meet the Accessibility for Ontarians with Disabilities Act (AODA) requirements	0	0

Table 44 Township Defined Technical Levels of Service – Trails & Boardwalks

Service Attribute	Qualitative Description	Current Level of Service Based on 2024 data	Proposed Level of Service (Same as Current)
Scope	Trails & Boardwalks capital projects are formally and publicly identified in the annual capital budget.	Current vs Target capital reinvestment rate: 0.68% vs 1.7%	Current vs Target capital reinvestment rate: 0.68% vs 1.7%

Other Non-core Assets

This section provides a brief overview of Other Non-Core assets. Given the relatively low data confidence, information is presented at a high level—.e.g., by asset category rather than asset segments. In future iterations of this AMP, as the quality of data gradually improves, these asset categories will be expanded into their own respective state of the infrastructure sections and all analytics will be presented at the segment level. Currently shown are buildings, and other non-core. Included in other non-core are assets like Township signage (not Ministry of Transportation Ontario (MTO)), fencing, and shoreline features)

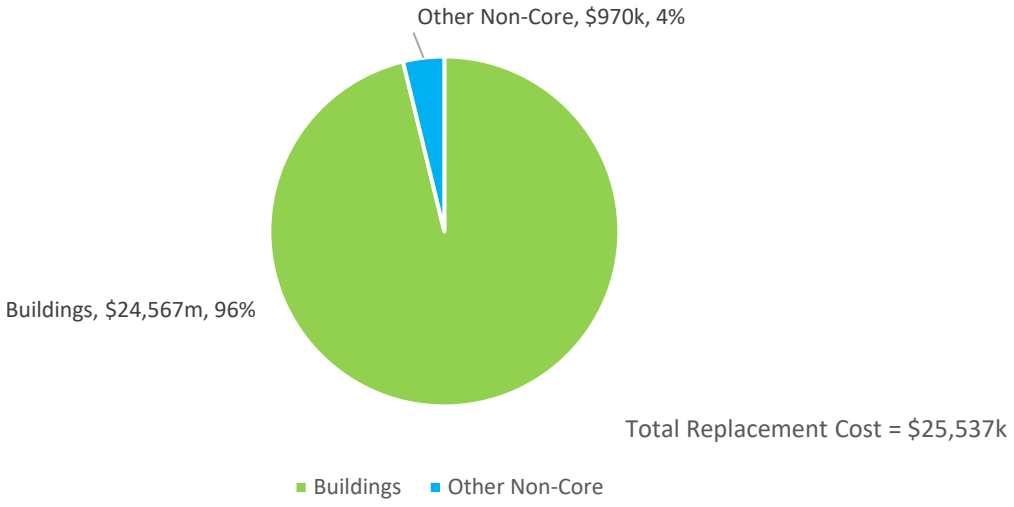
Inventory and Valuation

Table 45 summarizes the quantity and current replacement cost of Township's buildings, and other non-core assets. Note that in this update of the AMP, buildings are still listed only as singular assets, i.e., 'Municipal Office' and 'Fire Station', rather than componentized into individual major elements and components, e.g., structure, shell, roofing, HVAC systems, conveyance systems, etc. The number of assets will increase dramatically following more complete componentization using the Uniformat II Code classification system. This will also improve replacement cost estimates. This detailed information will be available following the completion of the facility condition inspection report.

Table 45 Detailed Asset Inventory – Other Non-core Assets

Category	Quantity	Unit of Measure	Primary Replacement Cost Method	Replacement Cost (in '000)
Buildings	59	Assets	CPI Tables, User Defined	$24,567k
Other Non-Core	44	Assets	CPI Tables	$970k
Total	**103**			**$25,537k**

Figure 67 Portfolio Valuation – Other Non-core Assets



Asset Condition

Figure 68 summarizes the replacement cost-weighted condition of the two remaining non-core asset categories. Based on age data only, 97% of assets are in poor to very poor condition. Once again, we do note that given the lack of effective componentization of buildings assets, age-based condition of major building components could not be estimated. This limitation persists in most of the remaining analysis contained in this section.

Figure 68 Asset Condition - Other Non-core Assets

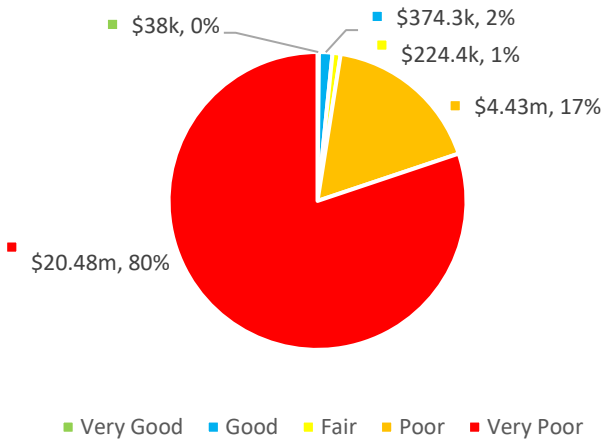
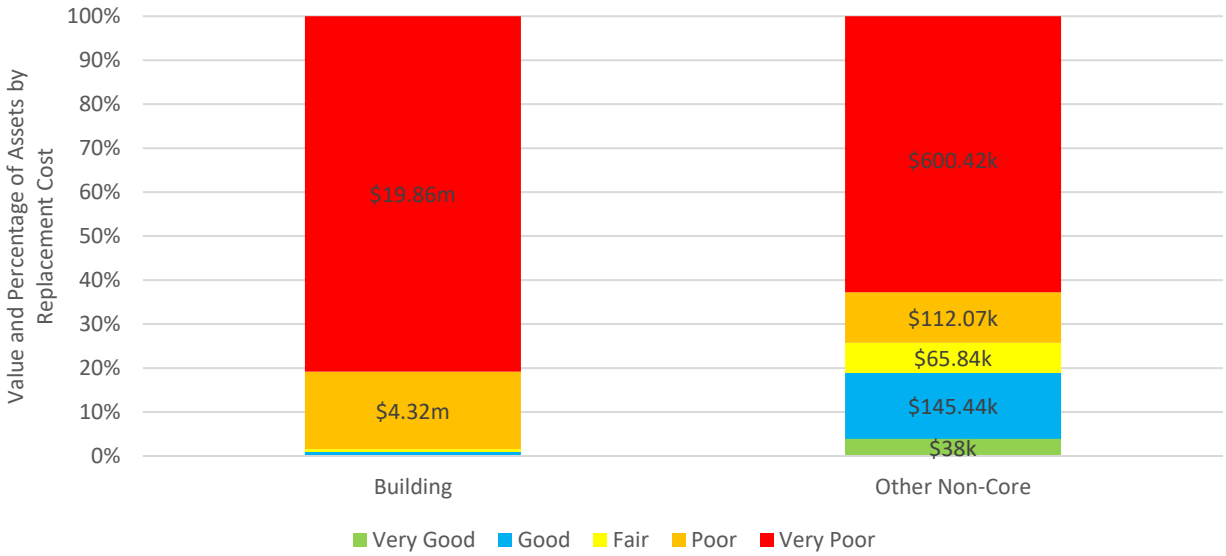


Figure 69 summarizes the age-based condition of each category. Based on in-service dates and useful life estimates, most buildings (site-level only) are in very poor condition. Similarly, the majority of other non-core assets are also in poor to very poor condition.

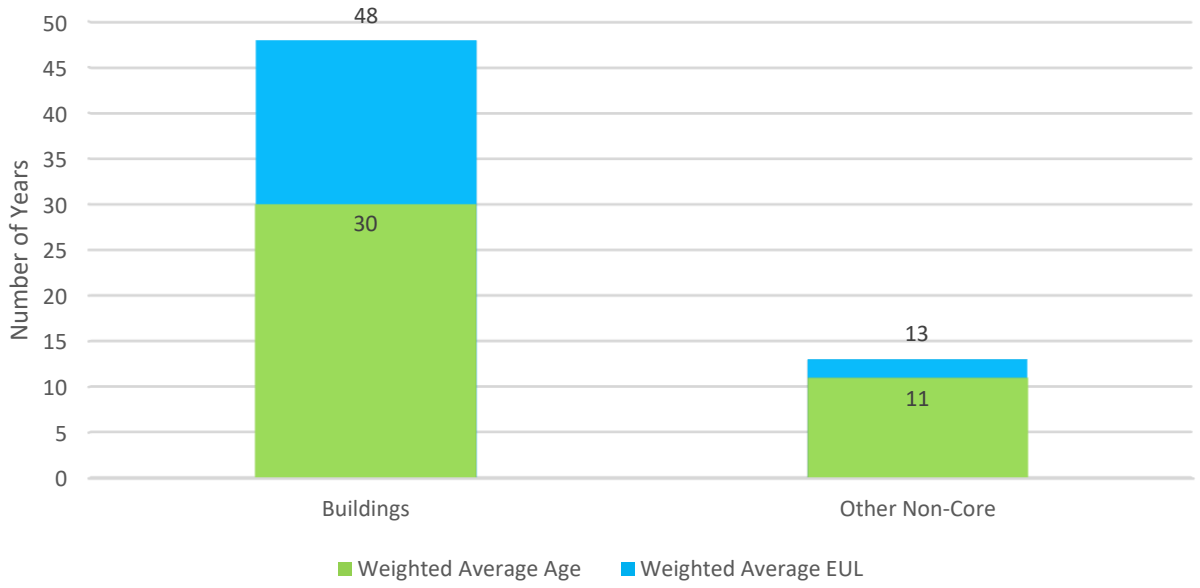
Figure 69 Asset Condition - Other Non-core Assets



Age Profile

Figure 70 illustrates the average current age of each category type and its average estimated useful life. Both values are weighted by the replacement cost of individual assets.

Figure 70 Estimated Useful Life vs. Asset Age – Other Non-core Assets



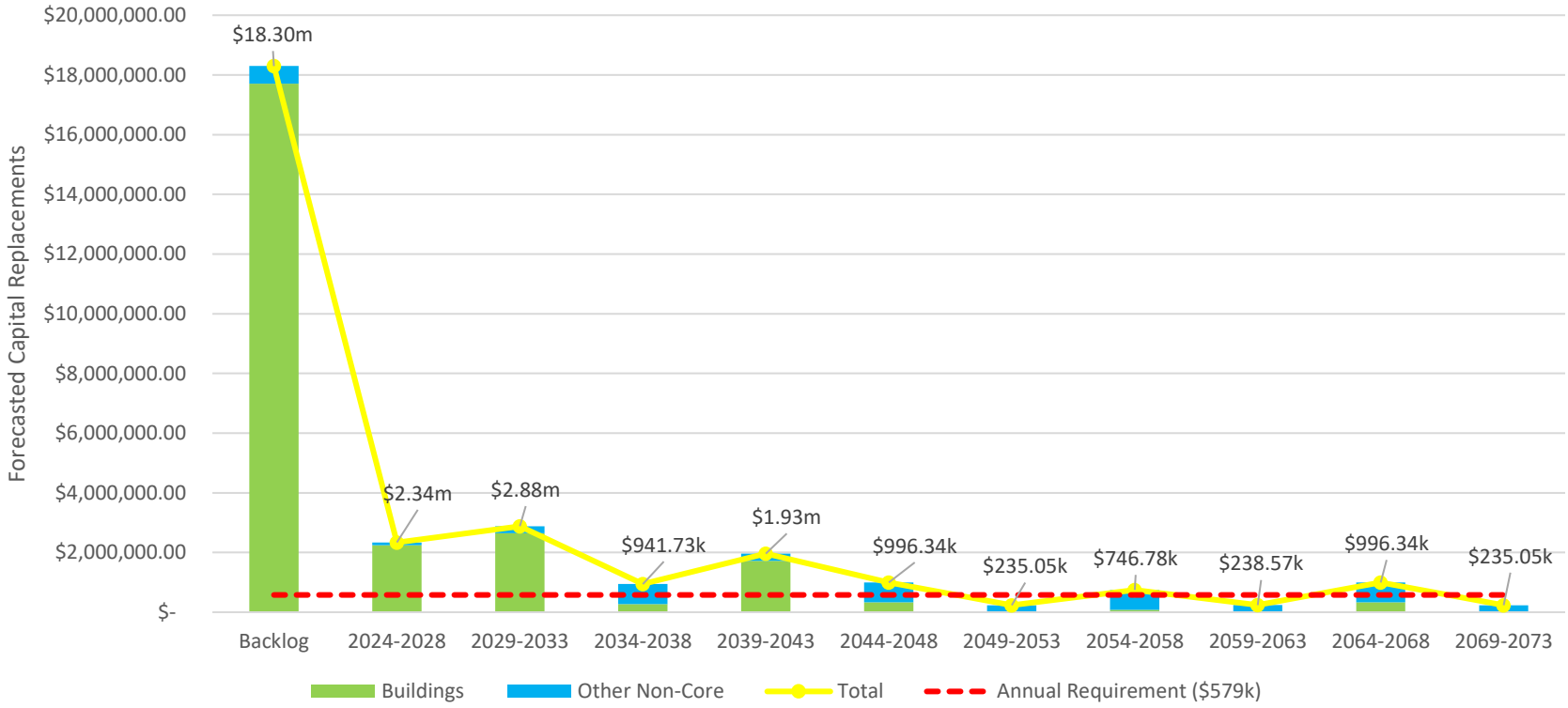
Age analysis for buildings, and other non-core assets mirrors the age-based condition data presented previously. On average, most buildings remain in service beyond their established design-life. However, without component-level detail, this analysis has limited value. Other Non-Core assets are also in the latter or final stages of their established design-life, on average.

Forecasted Long-term Replacement Needs

Figure 71 illustrates the 50-year forecasted replacement requirements for the Township's Other Non-Core assets. The average annual requirements (red dotted line) total $579k for this category. It again should be noted that the data confidence here is low. Although actual spending may fluctuate substantially from year to year, this figure is a useful benchmark value for annual capital expenditure targets (or allocations to reserves) to ensure projects are not deferred and replacement needs are met as they arise.

The chart illustrates a backlog of $18.30 million, dominated by buildings. However, in the absence of componentization for buildings, an accurate estimate of backlog and on-going replacement needs cannot be reliably estimated.

Figure 71 Forecasted Capital Replacement Requirements - Other Non-core Assets: 2024-2073



10-Year Replacement Forecast

The table below summarizes the projected cost of lifecycle activities (capital replacement only) that will need to be undertaken over the next 10 years to support current levels of service. These projections are generated in Citywide and rely only on age data. For buildings, given the absence of componentization, projections are shown primarily at the site-level rather than individual components and elements. This results in forecasts that are likely to be inaccurate.

Table 46 System-generated 10-Year Replacement Forecast - Other Non-core Assets

Category	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Buildings	$2.1m	$81.1k	$0	$0	$91.1k	$355k	$1.8m	$122.1k	$320.4k	$89.6k
Other Non-Core	$7.3k	$0	$0	$0	$86.9k	$75.1k	$7.2k	$52.8k	$99.9k	$0
Total	**$2.11m**	**$81.1k**	**$0**	**$0**	**$178.0k**	**$430.1k**	**$1.81m**	**$174.9k**	**$420.3k**	**$89.6k**

These estimates are developed at the category level, illustrate replacement needs only, and are built on available asset data, including quantities, replacement costs, and age. They can be different from actual capital forecasts. Consistent data updates, especially condition, componentization, and asset acquisitions and disposals will improve the alignment between the system generated expenditure requirements, and the Township’s capital expenditure forecasts.

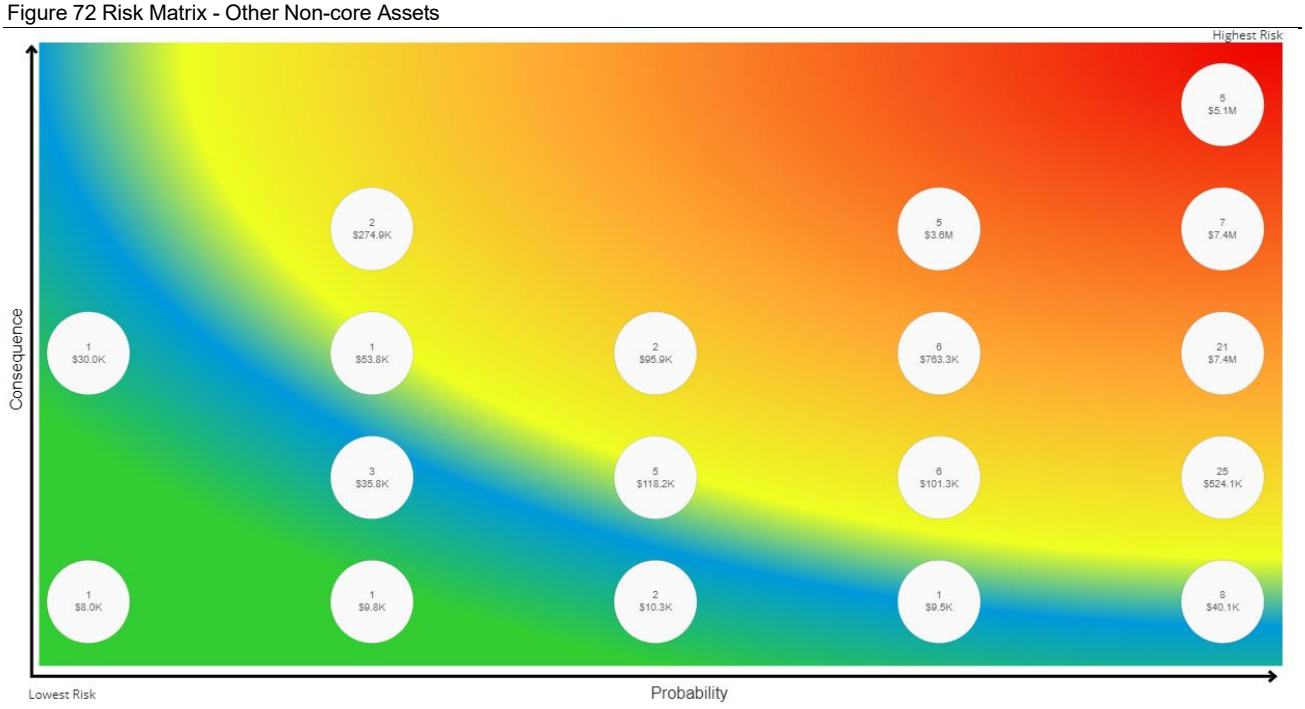
Risk Analysis

The risk matrices below are generated using available asset data, such as service life remaining, replacement costs, and service area or department. The risk ratings for assets without useful attribute data were calculated using only age, service life remaining, and their replacement costs.

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

The figure below is a snapshot of where the assets in this category rate. The lower left-hand side being assets with the least amount of risk (green), and upper right-hand side being the most amount of risk (red).

Figure 72 Risk Matrix - Other Non-core Assets



Levels of Service

Levels of service metrics for the Other Non-Core asset categories have been established to identify the current level of service. Based on low data confidence, these level of service metrics may be built out or revised when new data becomes available.

Table 47 Township Defined Community Levels of Service – Other Non-Core

Service Attribute	Qualitative Description	Current Level of Service Based on 2024 Data	Proposed Level of Service (Same as Current)
Scope	The condition of other non-core assets range from very poor (0) to very good (87.5)	Weighted average condition of assets Very Poor (7)	Weighted average condition of assets Very Poor (7)

Table 48 Township Defined Technical Levels of Service – Other Non-Core

Service Attribute	Qualitative Description	Current Level of Service Based on 2024 Data	Proposed Level of Service (Same as Current)
Scope	Other Non-Core capital projects are formally and publicly identified in the annual capital budget.	Current vs Target capital Reinvestment Rate: 6.7% vs 2.3%	Current vs Target capital Reinvestment Rate: 6.7% vs 2.3%

Growth

Based on Census 2021, the Township of Tiny's current population is 12,966 permanent residents, a growth of 10% from the 2016 Census period. The Township's growth strategy as outlined in Township of Tiny *Strategic Plan 2022-2026 Term of Council* committed to ensuring growth across the Township be sustainable and in keeping with existing rural character and charm. Based on the County of Simcoe's forecasts, the Township is expected to grow to 14,149 permanent residents by 2031.

Key Considerations

- During summer months, Tiny's population more than doubles to 27,000, causing seasonal but substantial added strain on infrastructure. This can accelerate asset deterioration, requiring more frequent lifecycle interventions, and additional costs to the municipality.
- If the population grows from what was once seasonal residents to more permanent residents, it will create a permanent strain on the capacity of asset networks. This will be considered when tracking historical data and forecasting future needs.
- Seasonal growth can also require communities to own and maintain infrastructure that typically exceeds the capacity and functionality required for its permanent population.
- Both the magnitude and the demographic profile of growth will determine the level of investment that the Township will need to make in different infrastructure assets.

Financial Strategy

Each year, the Township of Tiny makes important investments in its infrastructure's maintenance, renewal, rehabilitation, and replacement to ensure assets remain in a state of good repair. However, spending needs typically exceed fiscal capacity. Achieving full-funding for infrastructure programs will take many years and should be phased-in gradually to reduce the burden on taxpayers.

This financial strategy focuses on the asset categories where the data confidence is high. Asset categories that require additional inspections and data refinement have been included for demonstration purposes only, and should not be considered as part of the long-term planning.

This strategy and analysis are premised on two key inputs: the average annual capital requirements and the annual funding reinvested. The annual requirements are based on the replacement cost of assets and their serviceable life, and where available, lifecycle modeling. The annual funding reinvested is based on actual investments based on actual average spending from the years 2020 to 2023.

The financial strategy is based solely on like-for-like replacement of existing assets, and does not include inflation at this time.

Annual Capital Requirements and Reinvestments

Although there is no industry standard guide on optimal annual investment in infrastructure, the target reinvestment rates (TRR) provide a useful benchmark for organizations. In 2016, the Canadian Infrastructure Report Card (CIRC) produced an assessment of the health of municipal infrastructure as reported by cities and communities across Canada. The CIRC remains a joint project produced by several organizations, including the Federation of Canadian Municipalities (FCM), the Canadian Society of Civil Engineers (CSCE), the Canadian Network of Asset Managers (CNAM), and the Canadian Public Works Association (CPWA).

Table 49 outlines the total average annual capital requirements for existing assets in each asset category. This is based on a replacement cost of $342 million, and the annual capital requirements of $11.6 million for the nine asset categories analyzed in this report. The table also illustrates the system-generated, equivalent target reinvestment rate (TRR), calculated by dividing the annual capital requirements by the total replacement cost of each category. The cumulative target reinvestment for these nine categories is estimated at 3.4%. The table also shows, where applicable, the Township's equivalent target reinvestment rate is above the Canadian Municipal Average in 2016.

Table 49 System Generated Average Annual Capital Requirements, TRR, and Canadian Municipal Average

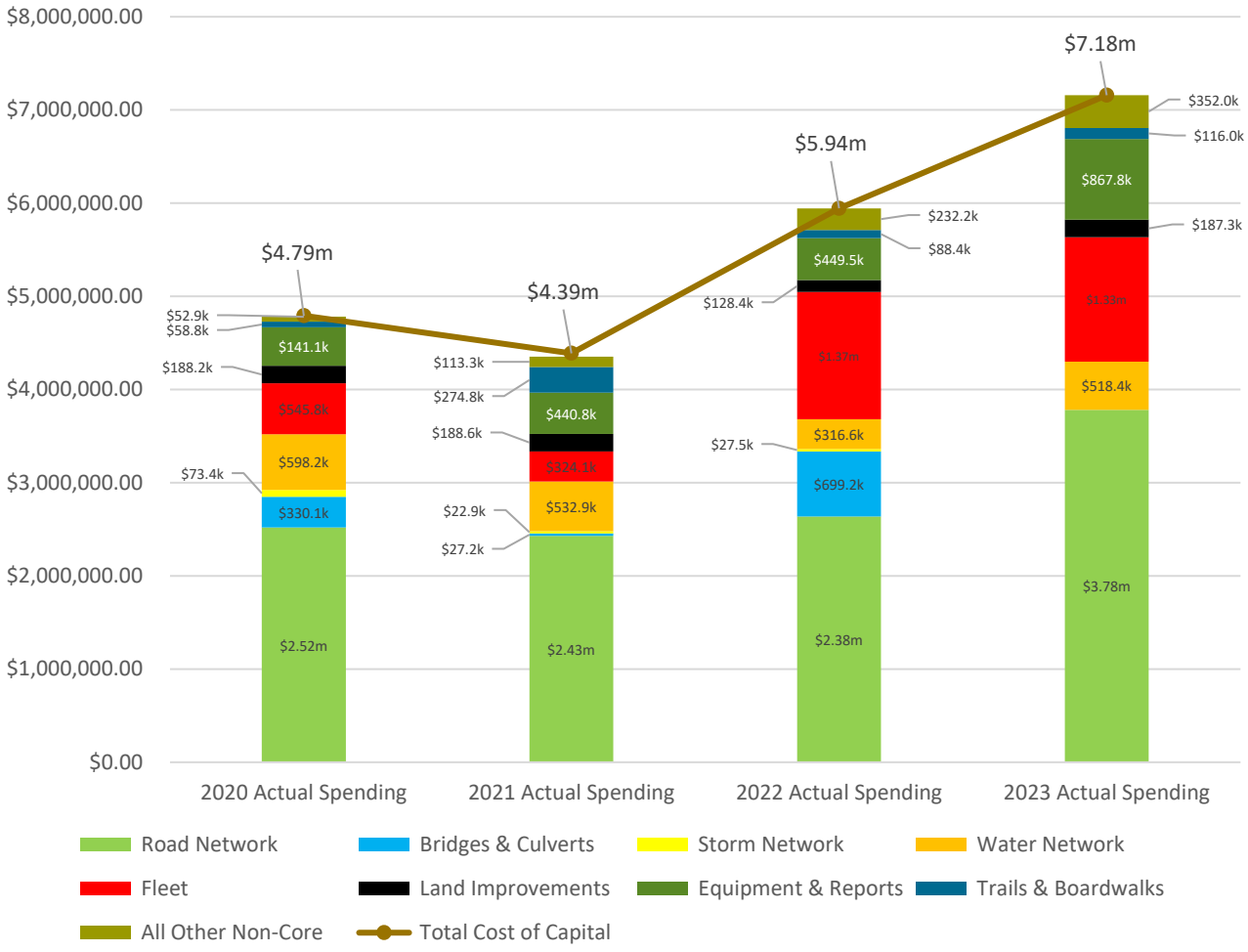
Asset Category	Replacement Cost	Annual Capital Requirements	Equivalent Target Reinvestment Rate (TRR)	Canadian Municipal Average in 2016
Road Network	$184.86m	$6.92m	3.7%	1.1%
Bridges & Culverts	$23.43m	$377k	1.6%	0.8%
Stormwater Network *	$6.05m	$109k	1.8%	0.3%
Water Network	$67.56m	$1.38m	2.0%	0.9%-1.1%
Fleet	$14.81m	$1.29m	8.7%	NA
Land Improvements	$3.88m	$192k	5.0%	NA
Equipment & Reports	$4.88m	$550k	11.3%	NA
Trails & Boardwalks	$11.17m	$183k	1.7%	NA
Other Non-Core Assets *	$25.54m	$579k	2.3%	1.7% (Buildings Only)
Total	**$342.18m**	**$11.58m**	**3.4%**	

*Data confidence is low in these categories due to unverified inventory, and lack of condition assessments.

Current Infrastructure Funding Framework

The figures below show the actual expenditures on capital separated by asset category over the past 4 years. It is important to note, that often the Township's annual budget will plan for a higher investment in capital but the reality of project delays and change in plans occurs annually resulting in cancelled, deferred or carry-over of projects into following years.

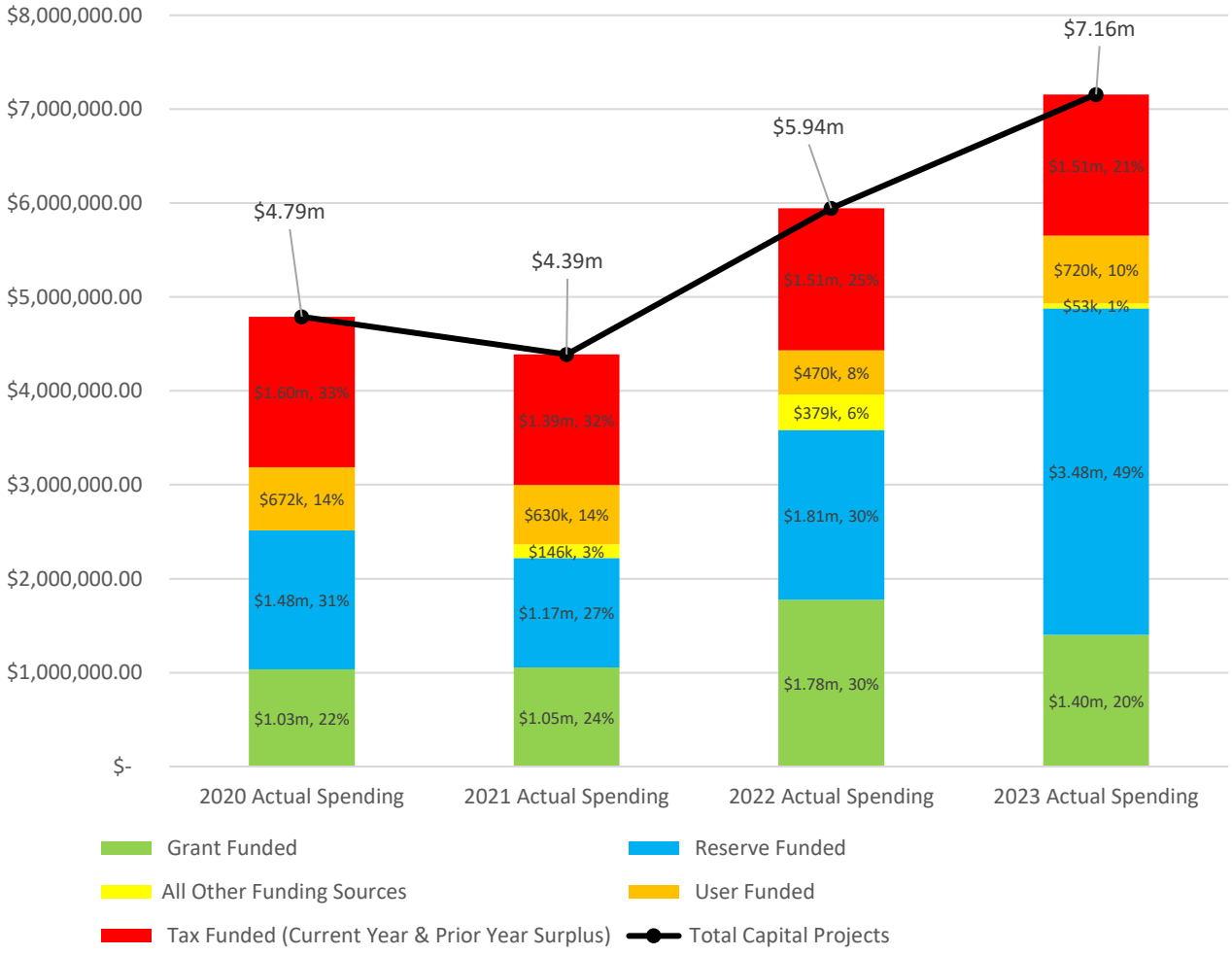
Figure 73 Actual Historical Expenditures 2020-2023 – By Asset Category



The 4-year average (2020-2023) actual expenditure on capital projects from all funding sources was $5.58 million.

Figure 74 builds off Figure 73 showing how the capital projects were funded. How much was funded by grants, reserves, other funding sources, user rates, and by taxation.

Figure 74 Actual Historical Expenditures 2020-2023 – Funding Sources



Over the past four years, on average, property taxation funded 28% of the Township's total capital projects. Grant funding funded 24% of the Township's capital projects, and discretionary reserves funded 34% (reserves not funded by user fees for example water, building and STR as these are captured under user funded category).

Discretionary reserve funding (depending on levels available), grant funding, Building Reserves (funded by Building permit fees), Short-term Rental Reserve (funded by STR Fees) and all other funding sources (for example, municipal agreements for shared assets) are considered unpredictable and uncertain funding sources as they depend on the demand for services and/or external grant services or municipal agreements. Many capital projects completed between 2020-2023 were only given approval to proceed after project specific grant funding had been awarded. Given the inconsistency in these revenue streams, they are not taken into consideration when looking at long-term planning and only reliable and predictable sources of funding are used when looking at available funding from a forecasting and capital planning perspective.

As displayed in tables below, the actual investment of stable and predictable funding sources are shown by asset category for each year.

Table 50 summarizes the actual stable and predictable funding spent in 2020.

Table 50 Allocation of **2020** Infrastructure Funding by Asset Category

Asset Category	Taxation Funded (in '000)	User Paid Fees (Water Dept) (in '000)	CCBF (in '000)	OCIF (in '000)	Total Stable and Predictable Source Funding Spent (in '000)
Road Network	$886k	$0	$428k	$320k	$1,634k
Bridges & Culverts	$61k	$0	$45k	$0	$106k
Stormwater Network	$69k	$0	$0	$0	$69k
Water Network	$0	$598k	$0	$0	$598k
Equipment & Reports	$156k	$0	$0	$0	$156k
Fleet	$286k	$46k	$0	$0	$332k
Land Improvements	$90k	$0	$0	$0	$90k
Trails & Boardwalks	$29k	$0	$0	$0	$29k
All Other Non-Core	$55k	$0	$0	$0	$55k
Total	**$1,632k**	**$644k**	**$473k**	**$320k**	**$3,069k**

Table 51 summarizes the actual stable and predictable funding spent in 2021.

Table 51 Allocation of **2021** Infrastructure Funding by Asset Category

Asset Category	Taxation Funded (in '000)	User Paid Fees (Water Dept) (in '000)	CCBF (in '000)	OCIF (in '000)	Total Stable and Predictable Source Funding Spent (in '000)
Road Network	$731k	$0	$551k	$280k	$1,562k
Bridges & Culverts	$10k	$0	$6k	$0	$16k
Stormwater Network	$0	$0	$0	$0	$0
Water Network	$0	$533k	$0	$0	$533k
Equipment & Reports	$235k	$18k	$0	$40k	$293k
Fleet	$13k	$46k	$0	$0	$59k
Land Improvements	$185k	$0	$0	$0	$185k
Trails & Boardwalks	$182k	$0	$0	$0	$182k
All Other Non-Core	$34k	$0	$0	$0	$34k
Total	**$1,390k**	**$597k**	**$557k**	**$320k**	**$2,864k**

Table 52 summarizes the actual stable and predictable funding spent in 2022

Table 52 Allocation of **2022** Infrastructure Funding by Asset Category

Asset Category	Taxation Funded (in '000)	User Paid Fees (Water Dept) (in '000)	CCBF (in '000)	OCIF (in '000)	Total Stable and Predictable Source Funding Spent (in '000)
Road Network	$613k	$0	$663k	$771k	$2,047k
Bridges & Culverts	$130k	$0	$0	$0	$130k
Stormwater Network	$0	$0	$0	$0	$0
Water Network	$0	$317k	$0	$0	$317k
Equipment & Reports	$230k	$3k	$28k	$12k	$273k
Fleet	$398k	$108k	$0	$0	$506k
Land Improvements	$86k	$0	$0	$0	$86k
Trails & Boardwalks	$0	$0	$0	$0	$0
All Other Non-Core	$112k	$5k	$0	$0	$117k
Total	**$1,569k**	**$433k**	**$691k**	**$783k**	**$3,476k**

Table 53 summarizes the actual stable and predictable funding spent in 2023.

Table 53 Allocation of **2023** Infrastructure Funding by Asset Category

Asset Category	Taxation Funded (in '000)	User Paid Fees (Water Dept) (in '000)	CCBF (in '000)	OCIF (in '000)	Total Stable and Predictable Source Funding Spent (in '000)
Road Network	$355k	$0	$306k	$814k	$1,475k
Bridges & Culverts	$0	$0	$0	$0	$0
Stormwater Network	$0	$0	$0	$0	$0
Water Network	$0	$518k	$0	$0	$518k
Equipment & Reports	$0	$73k	$0	$48k	$121k
Fleet	$1,025k	$0	$0	$0	$1,025k
Land Improvements	$132k	$0	$0	$0	$132k
Trails & Boardwalks	$76k	$0	$0	$0	$76k
All Other Non-Core	$9k	$89k	$0	$0	$98k
Total	**$1,597k**	**$680k**	**$306k**	**$862k**	**$3,445k**

Based on the total stable and predictable source funding spent over the past four years, an average of $3.21 million was spent each year. This will be used as the benchmark for average annual available funding.

To detail this further, Table 54 shows the average annual available funding for taxation funded assets, and user funded assets.

Table 54 Average Funding Available for Taxation & User Funded Assets

Year	Actual Total Stable and Predictable Source Funding Spent for Taxation Funded Assets (in '000)	Funding Spent for User Funded Assets Actuals (Water Department) (in '000)
2020	$2,425k	$644k
2021	$2,267k	$597k
2022	$3,403k	$433k
2023	$2,765k	$680k
4-Year Average	**$2,715k**	**$589k**

Current Funding Levels and Infrastructure Deficits

Table 55 summarizes how current funding requirements compare with historical funding actuals over the past four years. Actuals are based on data from 2020-2023 and are from all available funding sources, not just stable sources of funding.

Based on actual financial data from 2020 to 2023, the Township has historically underfunded 51% of its AMP targeted annual capital requirements for all infrastructure analyzed in this, resulting in an average annual funding deficit of $5.9 million.

Table 55 Current Funding Position vs. Required Funding

Asset Category	Tiny's Average Annual Capital Requirements Per Updated 2024 AMP (in '000)	Tiny's Actual Annual Funding (Average 2020-2023) (in '000)	Average Annual Infrastructure Deficit (2020-2023) (in '000)	Average Annual Infrastructure Deficit (2020-2023)
Road Network	$6,915k	$2,841k	$4,074k	59%
Bridges & Culverts	$377k	$352k	$25k	7%
Stormwater Network*	$109k	$41k	$68k	62%
Water Network	$1,383k	$492k	$891k	64%
Fleet	$1,298k	$893k	$405k	31%
Equipment & Reports	$550k	$543k	$7k	1%
Land Improvements	$192k	$173k	$19k	10%
Trails & Boardwalks	$183k	$135k	$48k	26%
All Other Non-Core*	$579k	$199k	$380k	66%
Total	**$11,586k**	**$5,669k**	**$5,917k**	**51%**

*Data confidence is low in these categories due to unverified inventory, and lack of condition assessments.

It is important to note, that often the township's annual budget will plan for a higher investment in capital but the reality of project delays and change in plans occurs annually resulting in cancelled, deferred or carry-over of projects into following years.

As noted throughout this report, the Stormwater Network and all Other Non-Core (which currently includes buildings), lack data confidence due to inventory and condition assessments. As the data confidence in these categories is currently low, so is the average annual capital requirements suggested for these categories and its resulting infrastructure deficit (shown in Table 55).

It is important to note that the Road Network and Water Network categories which have a four-year historical infrastructure deficit of 59% and 64% respectively, compared to the target.

The Road Network funding target should continue to be a target to reduce the costs with operations and maintenance, and reduce the backlog.

The Water Network underfunding will be addressed in the upcoming Water Master and Water Financial Plan to ensure adequate funds are planned for investment into the Water Reserve in preparation for asset rehabilitation and replacements.

Table 56 compares Tiny's target vs. actual average reinvestment rates for the period 2020-2023. It shows that the Township's reinvestment rates are below target, but typically in line with other Canadian municipalities in CIRC's 2016 review.

Table 56 Target vs. Actual Reinvestment Rates

Asset Category	Tiny's Target Reinvestment Rate	Tiny's Actual Reinvestment Rate	CIRC 2016 Canadian Municipal Average
Road Network	3.7%	1.5%	1.1%
Bridges & Culverts	1.6%	1.5%	0.8%
Stormwater Network*	1.8%	0.7%	0.3%
Water Network	2.0%	0.7%	0.9%-1.1%
Fleet	8.7%	6%	NA
Land Improvements	5.0%	4.5%	NA
Equipment & Reports	11.3%	11.1%	NA
Trails & Boardwalks	1.7%	1.2%	NA
Other Non-core Assets*	2.3%	0.8%	1.7% (Buildings only)
Average	**Overall 3.4%**	**1.7%**	**NA**

*Data confidence is low in these categories due to unverified inventory, and lack of condition assessments.

Closing the Infrastructure Gap

Eliminating annual infrastructure funding shortfalls is a difficult and long-term endeavour for all municipalities. Considering the Township's current infrastructure deficit position, it will require many years to close the infrastructure gap and fully fund asset replacements and improvements.

This section provides a framework on how the Township of Tiny can plan to close its annual funding deficits using own-source reliable and predictable revenue streams (Taxation, User Fees, OCIF, CCFB) without the use of additional debt for existing assets. Note the following framework does not include the infrastructure backlog from prior years which is addressed further in the report on page 129.

Tax-Funded Assets

For 2024, the Township of Tiny's total budgeted property tax revenue totals **$15.7 million (based on a 0% tax rate increase over 2023 but includes for the increase in the total property assessment value). The Township's average annual capital requirements (page 117) for tax-funded categories (not including Water Network assets) total $10.2 million against available capital tax dollar funding (page 122) of $2.7 million. This creates a tax dollar funding deficit of $7.5 million for 2024. It is important to note that other revenue streams (one-time grants, discretionary reserves) were available to help offset the annual capital tax dollar deficit in previous years. Assuming the same level of taxation was available in future years, and if the Township were to only rely on taxation dollars to fund its annual capital funding deficit of $7.5m, a total taxation increase of 47.8% (based on **2023 tax rate with assessment increase) would be required to close the deficit (not including inflationary impacts).

**Table 57 Increase Needed in Property Taxation Revenue to Meet Annual Infrastructure Needs

2024 Property Taxation Revenue	Additional Revenue Needed for Capital Investment	% Increase Needed
$15.7 million	$7.5 million	47.8%

**Corrected.

To close the gap, several scenarios have been developed using phase-in periods ranging from 5 to 20 years for a cumulative tax rate increase. Shorter phase-in periods may place too high a burden on taxpayers, whereas a phase-in period beyond 20 years may see a continued deterioration of infrastructure, leading to larger backlogs.

Table 58 Cumulative % Tax Rate Increase Scenarios to Address Annual Capital Funding Deficit: Tax Funded Assets

Cumulative % Tax Rate Increase Scenarios to Fund Deficit	Phase-in Period			
	5 Years	10 Years	15 Years	20 Years
47.8%	9.56%	4.78%	3.19%	2.39%

Funding 100% of annual capital requirements ensures that major capital events, including replacements, are completed as suggested. Under this scenario, projects are unlikely to be deferred to future years. This delivers the highest asset performance and customer levels of service.

Rate-Funded Assets

For 2024, the Township of Tiny's forecasted water rate revenues total $3.13 million. As the Water Network is fully user funded, the available capital funding invested into the water reserve for future capital investments is the balance between user fees ($3.13m - 2024) and operations costs ($2.40m - 2024). For 2024, the capital investment to the water reserve is estimated at $730k. Average annual capital requirements for the Water Network total $1.38 million (page 117) which equates to a funding deficit of $650k. To close the water funding gap, the Township's water revenues would need to increase by 20.7%. This will allow Tiny to meet its average annual requirements of $1.38 million.

Table 59 Increase Needed in Water Rate Revenues to Meet Annual Infrastructure Needs

2024 Budget Water Rate Revenues	Additional Revenue Needed for Infrastructure	% Increase Needed
$3.13 million	$650k	20.7%

To achieve these increases, several scenarios have been developed using phase-in periods ranging from 5 to 20 years for a cumulative rate revenue increase. As with tax-funded assets, short phase-in periods may require excessive rate increases, whereas more prolonged timeframes may lead to larger backlogs and more unpredictable spending on emergency repairs and replacements.

Table 60 Cumulative % Rate Revenue Increase Scenarios to Address Capital Funding Deficit: Rate Funded Assets

Cumulative % Rate Revenue Increase Scenarios to Fund Deficit	Phase-in Period			
	5 Years	10 Years	15 Years	20 Years
20.7%	4.14%	2.07%	1.38%	1.04%

Lowering Target Funding Levels

The scenarios noted in Table 58 and Table 60 assume that the Township is targeting full funding for all asset classes. That is, it is striving to meet 100% of its average annual requirements of $11.6 million. If this target funding level is reduced, the required property tax and water rate increases would also decrease. Reducing the Township's financial capacity to maintain its infrastructure in a state of good repair, yields the following potential consequences:

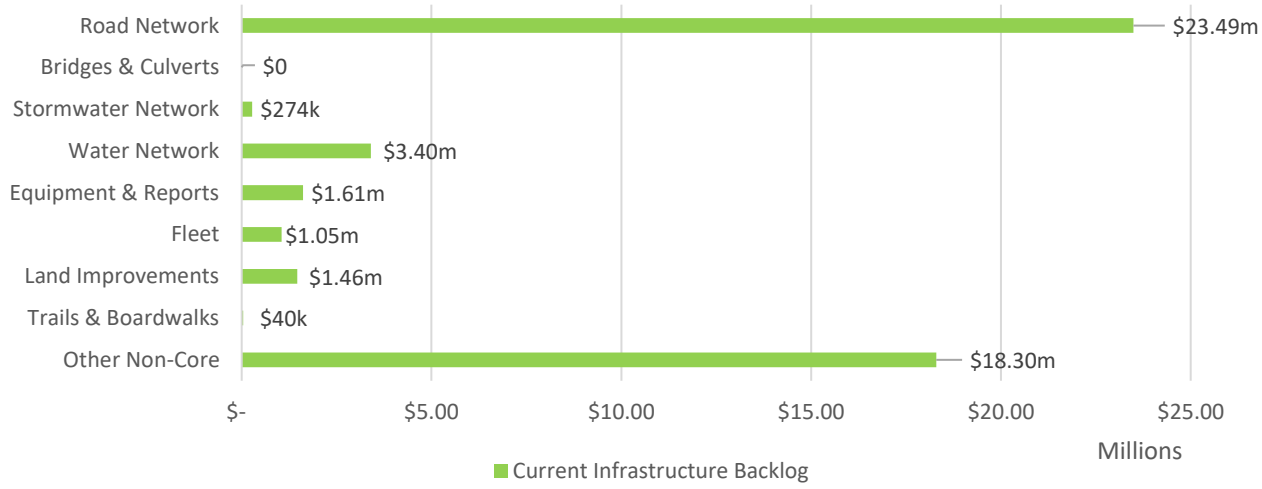
- reduced asset performance and increased rate of asset failures; with a longer replacement cycle, assets may remain in service beyond their useful life;
- continuation of the 'worst-first' or reactive approach to infrastructure management and project selection;
- reduced customer service levels and 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.

Infrastructure Backlogs

The scenarios provided in Table 58 and Table 60 for annual tax and water rate increases are designed to eliminate 100% of the Township's annual infrastructure deficit, however, it does not address existing backlogs. As many assets have outdated, or no condition assessment data available, age was used to estimate backlog values. These totals will change as condition assessments are completed. Condition data is essential in developing more accurate and credible estimates. As a result, the current totals may be an under- or overstatement of actual asset needs.

Figure 75 shows that the current infrastructure backlog totaling $49.6 million across all asset categories analyzed.

Figure 75 Current Infrastructure Backlog by Asset Category



Reserve Levels and Use of Debt

Table 61 summarizes the closing (unaudited) 2023 balance of the Township's reserves (not including the Township's Operating Reserve). Across all asset categories in this updated AMP, 2023 closing reserve balances total $10.166 million, which is approximately 3.0% of the total current replacement value of all Township assets. The reserves are made up of discretionary, obligatory, and reserve funds specific to legislative uses and are available for use for various capital investment initiatives.

Table 61 Reserve Levels

Reserve	Historical AMP Category Investment	Closing Balance on December 31, 2023 (unaudited) (in '000)
Capital-Corporate	Other Non-Core, Equipment & Reports	$569k
Capital-Fire	Fleet, Equipment & Reports	$802k
Capital-Parks	Land Improvements	-$101k
Capital-Roads	Roads	$11k
Capital-By-law	Equipment & Reports	$79k
Capital - Planning	Equipment & Reports	$10k
Computer Reserve	Equipment & Reports	$72k
Development Charge Reserve	Various – Only growth projects approved in the DC study	$534k
Infrastructure Reserve	Various – at Council's discretion	$464k
Short Term Rental Reserve	Various - STR only	-$127k
Water	Various –water department only	$4,504k
CCBF (Gas Tax)	Various – follow funding requirements	$244k
H&H Reserve	Other Non-Core	$27k
Access Reserve	Various – Only accessibility related work	$88k
Parkland Reserve	Land Improvements – Only parkland related	$434k
Building Reserve (Operating and Capital)	Fleet, Other Non-Core – Only Building Department	$2,556k
Total		**$10,166k**

There is considerable debate in the municipal sector on the appropriate level of reserves that an organization should have on hand. No clear guideline has gained widespread acceptance. Factors to consider when determining capital reserve requirements include scope of services provided; age and condition of infrastructure; use and level of debt; economic condition and outlook; and internal reserve and debt policies.

Currently, the Township is free of any infrastructure debt, providing an opportunity for financing should the need arise. Utilizing debt could expedite the closure of infrastructure gap and enable a more gradual impact on taxpayers' rates if a shorter phase-in period is approved by Council. Balancing the expense of financing asset replacements and improvements against delaying investments in assets in future years is crucial, as earlier replacements generally incur lower costs compared to delaying them.

The scenarios below expand on how using debt to invest in earlier replacements can result in lower costs. Table 62 is a demonstration of this theory.

Assumptions in the table below are

1. Inflation rate is 6.1% based on the 10-year average of the non-residential construction price index (Toronto) 2014-2023.
2. Amortizer debenture, term 5 years at sample rate of 4.71%

Table 62 – 5-year Inflation Rate and Debenture Scenarios

Example Capital Costs for Asset Replacement (Principal Amount)	Year 1	Year 5 Total Costs Compounded at 6.1% Inflation	Total Debenture Cost	Variance (Savings)	Estimated Annual Debt Repayment
$5 Million	$5m	$6.34m	$5.21m	$715k	$1.12m
$10 Million	$10m	$12.67m	$11.24m	$1.43m	$2.14m
$15 Million	$15m	$19.01m	$16.84m	$2.14m	$3.37m

Prioritizing Capital Replacements Based on Risk Ratings

The table below is a high-level summary of each asset category, showing the total percentage, and total replacement costs of assets with risk ratings of very high (score between 20-25 points). As defined in each asset category section of this report (page 42, 52, 61, 70, 88, 96, 105, 113), the risk metrics have been developed based on the best available data in each asset category. Additional analysis is required to compare the risk ratings between categories, as they are weighted and analyzed differently.

Table 63 Highest Risk Assets by Asset Category

Asset Category	Total Replacement Cost of Assets with a Risk Rating of Very High (between 20-25)	Percentage of Category with a Risk Rating of Very High (between 20-25) (based on replacement cost)
Road Network	$11.87m	6.4%
Bridges & Culverts	$0	0%
Stormwater Network*	$151.3k	2.5%
Water Network	$7.07m	5.8%
Fleet**	$4.17m	28%
Land Improvements	$1.00m	25.7%
Equipment & Reports	$867.6k	17.8%
Trails & Boardwalks	$200.0k	1.8%
Other Non-Core*	$12.51m	49.0%
Total	**$37.84m**	**11.1%**

*Data confidence low in these categories.
**As defined in the Fleet category (page 67) risk has been built in as a factor in the overall score based on the fleet management strategy. This data has been pulled from the fleet management strategy.

When considering spending of limited capital funds, consideration should be given to prioritizing replacements with the highest risk ratings.

Recommendations and Key Considerations

Financial Strategies

Review feasibility of adopting a full-funding scenario that achieves 100% of average annual requirements for the asset categories analyzed in this AMP. This involves:

1. implementing a 2.39% annual 'asset management infrastructure' tax increase over a 20-year phase-in period and allocating the full increase in revenue toward tax-funded asset categories, and/or investment into reserves.
2. implementing a 2.07% rate increase for water users over a 10-year phase-in period *dependent on updated Water Financial Plan
3. Consider debt financing to close the gap sooner at a lower investment cost verses delaying.

Although difficult to capture, inflation costs, supply chain issues, and fluctuations in commodity prices will also influence capital expenditures. Note that these recommendations reflect the needs associated with the Township's existing assets, assume a like-for-like replacement, and do not account for any upgrades to existing infrastructure to meet higher capacity needs.

Better Asset Management Through Better Asset Data

As noted in the Township Strategic Plan (2022-2026), the asset management plan and financial planning was noted as the top priority. The objectives by end of 2025 include the following;

1. Stay on course with Asset Management Plan. Meet legislative requirements by 2025 and complete all core and non-core condition assessments
2. Develop a long-term financial plan for the next 20 years by end of 2025 with includes a five-year budget outlook, reserves, reserve investments
3. Multi-year capital budgeting in place by 2025 (Council decision point)

The priority and objectives noted in the Strategic Plan support better asset management through better asset data. The following should also be considered.

1. Work to improve asset inventory and related data, particularly for storm network and all other non-core assets, which includes buildings.

2. Componentize all buildings in accordance with Uniformat II Code standard for data classifications. This can be accomplished during building condition assessments. This will improve long-term replacement projections and better align system-generated forecasts with capital budgets.

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

4. Asset management planning is highly sensitive to replacement costs. Periodically update replacement costs based on recent projects, invoices, or estimates, as well as condition assessments, or any other technical reports and studies. Material and labour costs can fluctuate due to local, regional, and broader market trends, and substantially so during major world events. As a result, accurately estimating the replacement cost of like-for-like assets can be challenging. Ideally, several recent projects over multiple years should be used. Staff judgement and historical data can help attenuate extreme and temporary fluctuations in cost estimates and keep them realistic.
5. Similar to replacement costs, an asset's established serviceable life can have dramatic impacts on all projections and analyses, including condition, long-range forecasting, and financial recommendations. Periodically reviewing and updating these values to better reflect in-field performance and staff judgement is recommended.

Risk and Levels of Service

1. Risk models and matrices can play an important role in identifying high-value assets, and developing an action plan which may include repair, rehabilitation, replacement, or further evaluation through condition assessments. As a result, project selection and the development of multi-year capital plans can become more strategic and supported by this modelling. The risk models that have been built for each asset category reflect current available data. As the data evolves and new attribute information is obtained, these models will be refined and updated.

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