2025

# ASSET MANAGEMENT PLAN

*Schedule A to By-Law 2025-68*

This Asset Management Program was prepared by:


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

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# Executive Summary

Municipal infrastructure provides the foundation for the economic, social, and environmental health and growth of a community through the delivery of services. The goal of asset management is to balance delivering critical services in a cost-effective manner. This involves the development and implementation of asset management strategies and long-term financial planning.

The overall replacement cost of the asset categories owned by Black River-Matheson total $378 million. 27% of all assets analysed are in fair or better condition. Assessed condition data was available for all bridge assets, for the remaining assets, assessed condition data was unavailable, and asset age was used to approximate condition. Generally, age misstates the true condition of assets, making assessments essential to accurate asset management planning, and a recurring recommendation.

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

To meet capital replacement and rehabilitation needs for existing infrastructure, prevent future infrastructure backlogs, and achieve long-term sustainability, the Township's average annual capital requirement totals $6.1 million. Based on a historical analysis of sustainable capital funding sources, the Township is committing approximately $1.07 million towards capital projects or reserves per year. As a result, the Township is funding 18% of its annual capital requirements. This creates a total annual funding deficit of $5.0 million.

Addressing annual infrastructure funding shortfalls is a difficult and long-term endeavour for 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 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.

To close annual deficits for capital contributions from tax revenues for asset needs, it is recommended the Township review the feasibility of implementing a 2.6% annual increase in revenues over a 20-year phase-in period, to be allocated in addition to the $764 thousand allocated from tax revenues.

To close annual deficits for capital contributions from water and sanitary revenues for asset needs, it is recommended the Township review the feasibility of implementing a 0.5% and 2.7% annual increase respectively in revenues over a 20-year phase-in period.

In addition to annual needs, there is also an infrastructure backlog of $32.3 million, comprising 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. This makes targeted and consistent condition assessments integral to refining long-term replacement and backlog estimates.

The Township has established risk frameworks and levels of service targets to assist in effectively prioritizing infrastructure projects and select the appropriate lifecycle interventions—such as rehabilitation or replacement—based on asset condition and criticality. Preliminary risk models, integrated with the Township's asset register, generate risk matrices that classify assets by risk profile, supporting informed decision-making.

Proposed levels of service are designed to be realistic and achievable within the planning horizon, balancing community expectations, fiscal capacity, regulatory compliance, corporate goals, and long-term sustainability. Recognizing that asset data was financially driven and not fully aligned with operational needs, the Township has prioritized a workplan to:

- Update the asset inventory to better integrate finance and operations
- Conduct field assessments to improve asset condition data

This ensures levels of service are both data-informed and operationally grounded, creating a robust foundation for continued advancement in asset management.

The Township's asset management program outlines lifecycle activities for each asset class. System-generated capital requirements will inform long-term funding strategies, supporting:

- Effective capital planning
- Financial sustainability
- Reliable delivery of quality community services

# About this Document

The Black River-Matheson Asset Management Plan was developed in accordance with Ontario Regulation 588/17 ("O. Reg 588/17"). It contains a comprehensive analysis of Black River-Matheson's infrastructure portfolio. This is a living document that should be 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 |
|---|---|---|---|---|
| 1. Asset Management Policy | ✓ | | ✓ | |
| 2. 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 document is to identify the current practices and strategies that are in place to manage the public infrastructure and to make recommendations where they can be further refined. Through the implementation of sound asset management strategies, the Township can ensure that public infrastructure is managed to support the sustainable delivery of services.

# Limitations and Constraints

The asset management program development required substantial effort by staff, it was developed based on best-available data, and is subject to the following broad limitations, constrains, and assumptions:

- The analysis 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.
- 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 present day. This approach, while sometimes necessary, can produce inaccurate estimates.
- 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 in-field assessments.
- 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.

These limitations have a direct impact on most of the analysis presented, 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.

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

# An Overview of Asset Management

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

This industry standard, defined by the Institute of Asset Management (IAM), emphasizes the alignment between the corporate strategic plan and various asset management documents.

## Foundational Documents

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. To make a clear distinction between the policy, strategy, and the plan see the following sections for detailed descriptions of the document types.

### Strategic Plan

The strategic plan has a direct, and cascading impact on asset management planning and reporting, making it a foundational element. At the beginning of each term of Council, Council holds strategic planning exercises and discussions to identify major initiatives and administrative improvements it wishes to achieve during its tenure. Staff then identify the scope, resources, timing & other logistical matters associated with proposed initiatives.

### Asset Management Policy

An asset management policy represents a statement of the principles guiding the Township's approach to asset management activities as well as their commitment. It aligns with the organization and provides clear direction to municipal staff on their roles and responsibilities.

### Asset Management Strategy

An asset management strategy outlines the translation of organizational objectives into asset management objectives and provides a strategic overview of the activities required to meet these objectives. It provides greater detail than the policy on how the Township plans to achieve its asset management objectives through planned activities and decision-making criteria.

## 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 asset groups. It is tactical in nature and provides a snapshot in time.

# Key Technical Concepts

Effective asset management integrates several key components, including data management, lifecycle management, risk management, and levels of service.

## Asset Hierarchy and Data Classification

Asset hierarchy illustrates the relationship between individual assets and their components, and a wider, more expansive network and system. How assets are grouped in a hierarchy structure can impact how data is interpreted. Key category details are summarized at the asset segment level.

## Replacement Costs

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

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

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

## Estimated Useful Life and Service Life Remaining

The estimated useful life (EUL) of an asset is the period over which the Township expects the asset to be available for use and remain in service before requiring replacement or disposal. The EUL for each asset was assigned according to the knowledge and expertise of municipal staff and supplemented by existing industry standards when necessary.

By using an asset's in-service date and its EUL, the Township can determine the service life remaining (SLR) for each asset. Using condition data and the asset's SLR, the Township can more accurately forecast when it will require replacement. The SLR is calculated as follows:

Figure 1: Service Life Remaining Calculation

## Reinvestment Rate

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

Figure 2 Target and Actual Reinvestment Calculations


By comparing the actual vs. 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 figure below outlines the condition rating system used to determine asset condition for all assets in Black River-Matheson.

Figure 3: Standard Condition Rating Scale

| | | |
|---|---|---|
| **Very Good** | **Fit for the future** | **90 - 100** |
| •Well maintained, good condition, new or recently rehabilitated | | |
| **Good** | **Adequate for now** | **70 - 90** |
| •Acceptable, generally approaching mid-stage of expected service life | | |
| **Fair** | **Requires attention** | **40 - 70** |
| •Signs of deterioration, some elements exhibit significant deficiencies | | |
| **Poor** | **Increased potential of affecting service** | **10 - 40** |
| •Approaching end of service life, large portion of system exhibits deficiencies | | |
| **Very Poor** | **Unfit for sustained service** | **0 - 10** |
| • Near or beyond expected service life, widespread signs of advanced deterioration | | |

The analysis is based on assessed condition data (only as available). In the absence of assessed condition data, asset age is used as a proxy to determine asset condition. Appendix I: Condition Assessment Guidelines includes additional information on the role of asset condition data and provides basic guidelines for the development of a condition assessment program.

## Lifecycle Management Strategies

The condition or performance of 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.

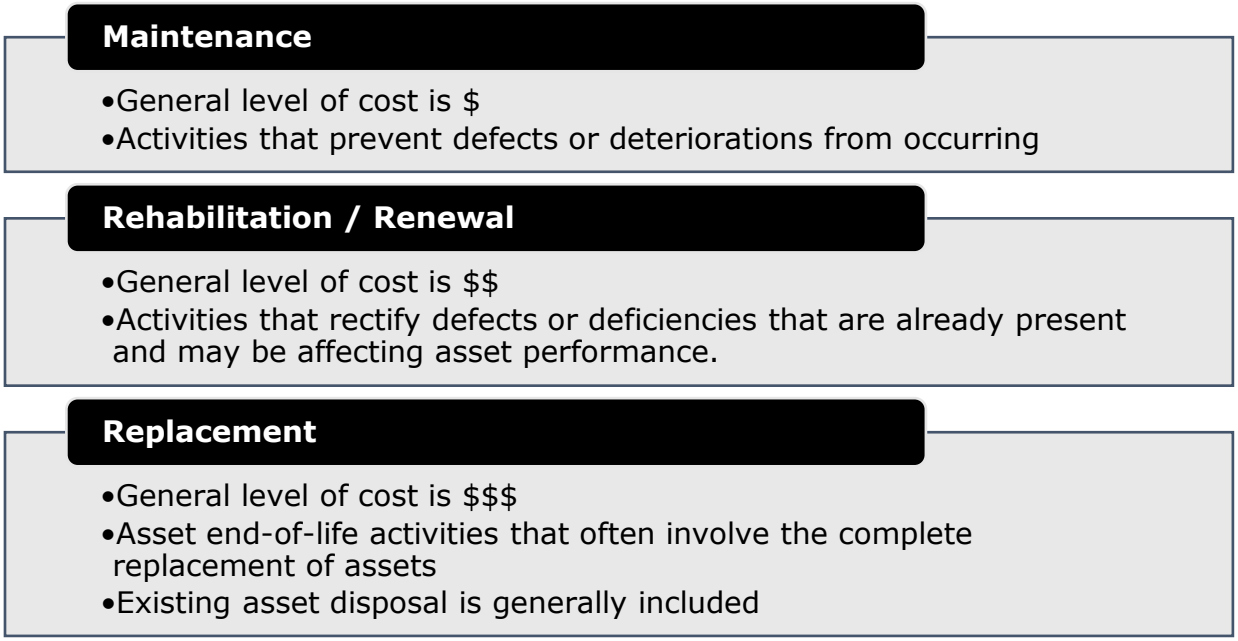
To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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 Figure 4 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.

The Township's approach to lifecycle management is described within each asset category. 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.

Figure 4: Lifecyle Management Typical Interventions



## Risk Management Strategies

Municipalities generally take a 'worst-first' approach to infrastructure spending. Rather than prioritizing assets based on their importance to service delivery, assets in the worst condition are fixed first, regardless of their criticality. However, not all assets are created equal. Some are more important than others, and their failure or disrepair poses more risk to the community. For example, a road with a high volume of traffic that provides access to critical services poses a higher risk than a low volume rural road. These high-value assets should receive funding before others.

By identifying the various impacts of asset failure and the likelihood that it will fail, risk management strategies can identify critical assets, and determine where maintenance efforts, and spending, should be focused. A high-level evaluation of asset risk and criticality through qualitative and quantitative methodologies was performed.

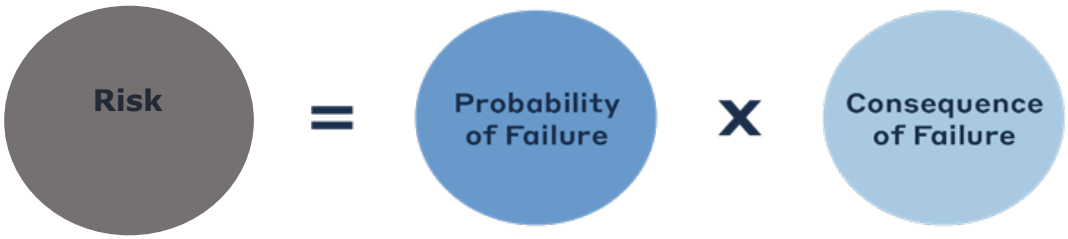
### Qualitative Approach to Risk

The qualitative risk assessment involves the documentation of risks to the delivery of services that the Township faces given the current state of the infrastructure and asset management strategies. These risks can be understood as corporate level risks.

### Quantitative Approach to Risk

Asset risk is defined using the following formula:

Figure 5: Risk Equation




The probability of failure relates to the likelihood that an asset will fail at a given time. The probability of failure focuses on two highly imperative impacts for risk assessment – structural and functional impacts. Structural impacts are related to the structural aspects of an asset such as load carrying capacity, condition, or breaks; whereas the functional impacts can include parameters, slope, traffic count, and other impacts that can affect the performance of an asset.

The consequence of failure describes the overall effect that an asset failure will have on an organization's asset management goals. The consequences of failure can range from non-eventful to impactful.

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. See Appendix J: Risk Rating Criteria for definitions and the developed risk models.

## Climate Change

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

The report revealed that between 1948 and 2016, the average temperature increase across Canada was 1.7°C; moreover, during this period, Northern Canada experienced a 2.3°C increase. The temperature increase in Canada has doubled that of the global average. If emissions are not significantly reduced, the temperature could increase by 6.3°C in Canada by the year 2100 compared to 2005 levels. Observed precipitation changes in Canada include an increase of approximately 20% between 1948 and 2012.

By the late 21st century, the projected increase could reach an additional 24%. During the summer months, some regions in Southern Canada are expected to experience periods of drought at a higher rate. Extreme weather events and climate conditions are more common across Canada. Recorded events include droughts, flooding, cold extremes, warm extremes, wildfires, and record minimum arctic sea ice extent.

The changing climate poses a significant risk to the Canadian economy, society, environment, and infrastructure. Physical infrastructure is vulnerable to damage and increased wear when exposed to these extreme events and climate variabilities. Canadian municipalities are faced with the responsibility to protect their local economy, citizens, environment, and physical assets.

## Impacts of Growth

The demand for infrastructure and services will change over time based on a combination of internal and external factors. Understanding the key drivers of growth and demand will allow the Township to plan for new infrastructure more effectively, and the upgrade or disposal of existing infrastructure. Increases or decreases in demand can affect what assets are needed and what level of service meets the needs of the community.

## Levels of Service

A level of service (LOS) is a measure of the services that Black River-Matheson is providing to the community and the nature and quality of that service. Within each asset category, technical metrics and qualitative descriptions that measure both technical and community levels of service have been established and measured as data is available.

These measures include a combination of those that have been outlined in O. Reg. 588/17 in addition to performance measures identified by the Township. The Township measures the level of service provided at two levels: Community Levels of Service and Technical Levels of Service.

### Community Levels of Service

Community LOS are a simple, plain language description or measure of the service that the community receives. For core asset categories, the Province through O. Reg. 588/17, has provided qualitative descriptions that are required. For non-core

asset categories, the Township has determined the qualitative descriptions that will be used. The community LOS can be found in the Levels of Service subsection within each asset category section.

## Technical Levels of Service

Technical LOS 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, the Province through O. Reg. 588/17, has provided technical metrics that are required. For non-core asset categories, the Township determined the technical metrics that will be used. The metrics can be found in the LOS subsection within each asset category.

## Current and Proposed Levels of Service

In developing an effective asset management plan, it is imperative to establish clear levels of service across key service areas to ensure the efficient and sustainable delivery of municipal services. The Township established current levels of service as well as proposed levels of service, in accordance with O. Reg. 588/17.

Proposed levels of service are realistic and achievable within the timeframe outlined by the Township. They were determined with consideration of a variety of community expectations, fiscal capacity, regulatory requirements, corporate goals, and long-term sustainability. The Township will identify a lifecycle management and financial strategy which will allow these targets to be achieved.

## Annual Review

The annual review must address the Township's progress in implementing its asset management plan, any factors impeding the Township's ability to implement its asset management plan as well as a strategy to address any of the identified factors.

# Community Profile

The Township of Black River-Matheson is a single tier municipality in the Cochrane District within Northeastern Ontario. The Township is located southwest of Lake Abitibi.


In 1912, Black River-Matheson was officially incorporated. The Matheson station was built in 1908 by the Temiskaming and Northern Ontario Railway. The Temiskaming railway contributed to economic growth throughout the province. The Great Fire of 1916 was a forest fire which passed through many municipalities including Black River-Matheson. The fire burned an area of about 2,000 square kilometers which heavily impacted the Township's economy. This natural disaster led to the creation the Ministry of Natural Resources and Forestry and the Forest Fires Prevention Act in Ontario.

The Township has an abundance of natural resources within the mining, forestry, and farming industry. These are the primary economic drivers for the Township. The Croesus Mine, one of the richest mines in Canada, is in the Abitibi Greenstone Belt and hosts several deposits of rich minerals. The Township attracts seasonal tourists with activities such as fishing, hunting, canoeing, and camping in the summer, and activities such as ice fishing, cross country skiing, skating, and hockey in the winter.

After years of steady population decline, Black River-Matheson has experienced moderate population growth since 2011, with a growth rate of 5.5% between 2016 and 2021. The Township has an aging population above the provincial average.

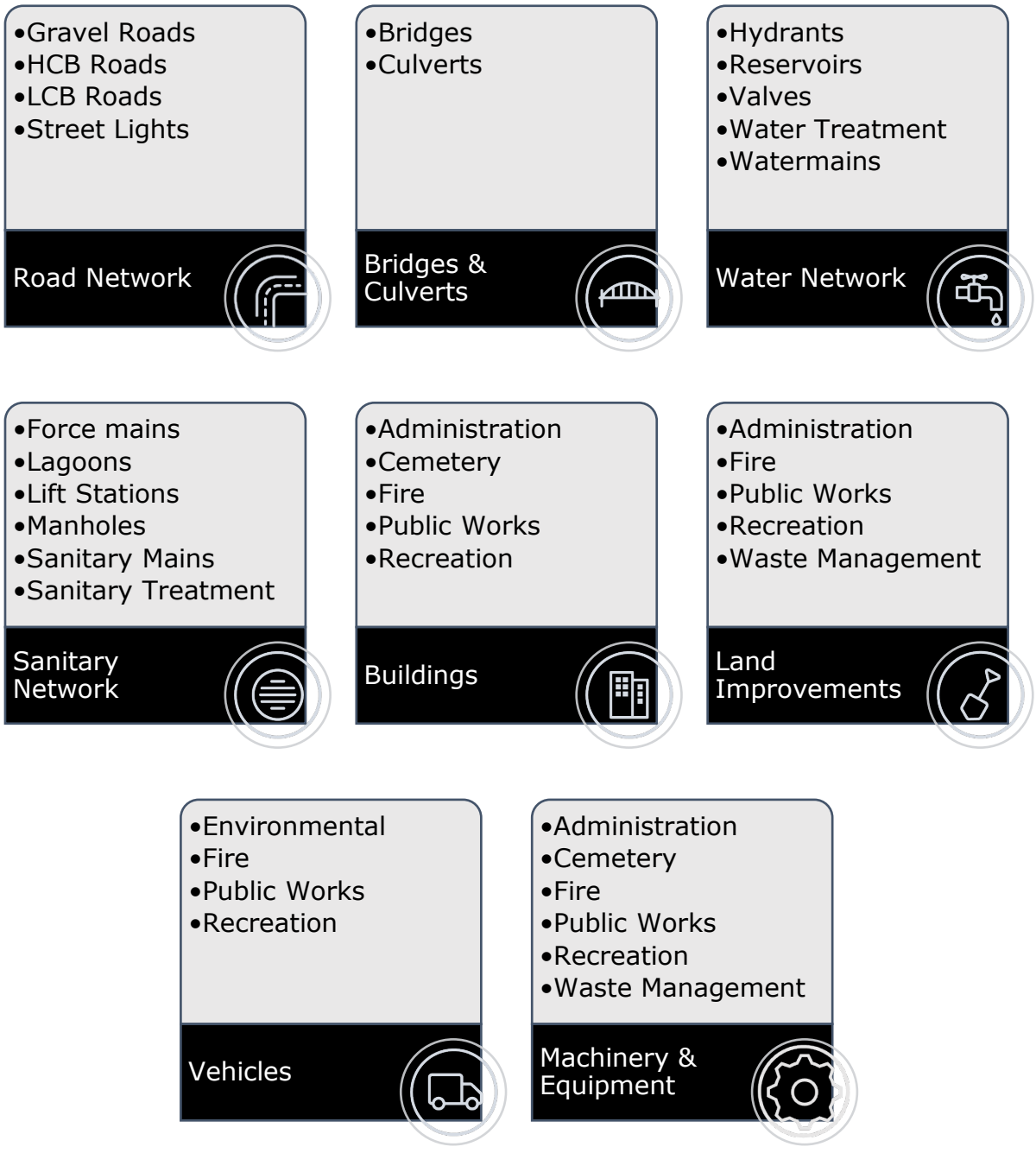
Table 2 Black River-Matheson & Ontario Census Information

| Census Characteristic | Black River-Matheson | Ontario |
|---|---|---|
| Population 2021 | 2,572 | 14,223,942 |
| Population Change 2016-2021 | 5.5% | 5.8% |
| Total Private Dwellings | 1,403 | 5,929,250 |
| Population Density | 2.2/km$^2$ | 15.9/km$^2$ |
| Land Area | 1.16 km$^2$ | 892,411.76 km$^2$ |

# Inventory & Valuation

The Township's inventory has an asset hierarchy of categories and segments as outlined below where the dark blue headings are the categories and the listings in grey are the segments.

Figure 6 Asset Hierarchy



# State of the Infrastructure

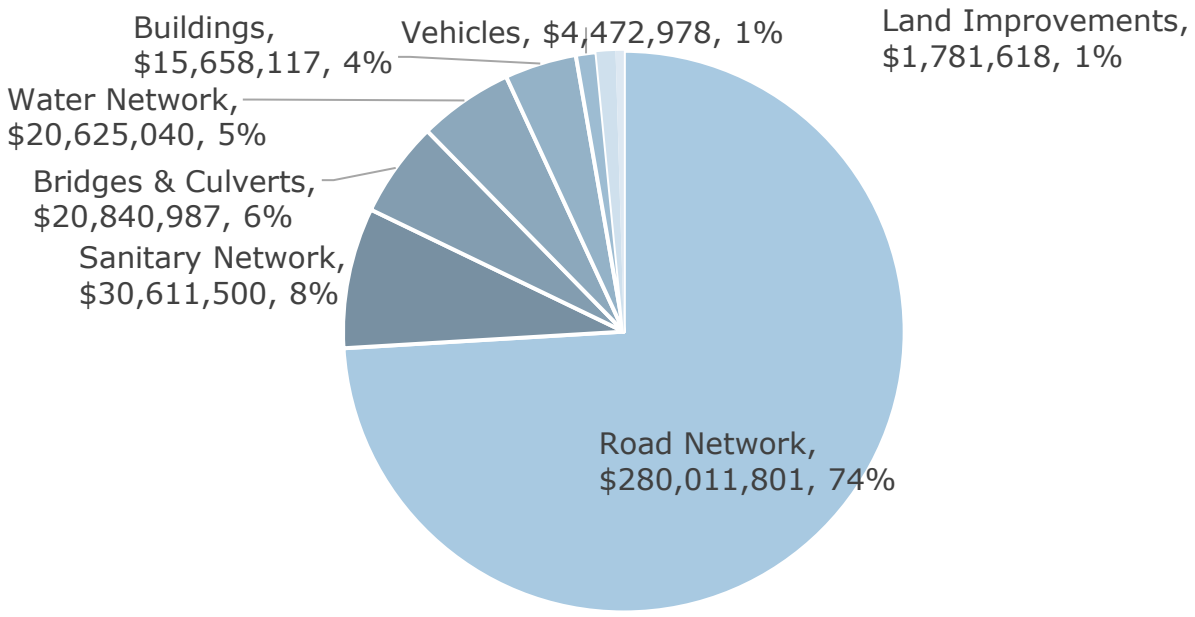
Table 3 Black River-Matheson State of the Infrastructure

| Asset Category | Replacement Cost | Asset Condition | Service Trend |
|---|---|---|---|
| Road Network | $280,011,801 | Very Poor (4.5%) | ↓ |
| Bridges & Culverts | $20,840,987 | Fair (47%) | ↓ |
| Buildings | $15,658,117 | Poor (31%) | ↓ |
| Land Improvements | $1,781,618 | Fair (57%) | ↓ |
| Vehicles | $4,472,978 | Poor (38%) | ↓ |
| Machinery & Equipment | $4,105,458 | Poor (27.5%) | ↓ |
| Water Network | $20,625,040 | Poor (24%) | ↓ |
| Sanitary Network | $30,611,500 | Fair (48%) | ↓ |
| Overall | $378,107,499 | Very Poor (13%) | ↓ |

# Replacement Cost

All Black River-Matheson's asset categories have a total replacement cost of $378 million based on available inventory data. This total was determined based on a combination of user-defined costs and historical cost inflation. This estimate reflects replacement of historical assets with similar, not necessarily identical, assets available for procurement today.

Figure 7: Portfolio Replacement Value



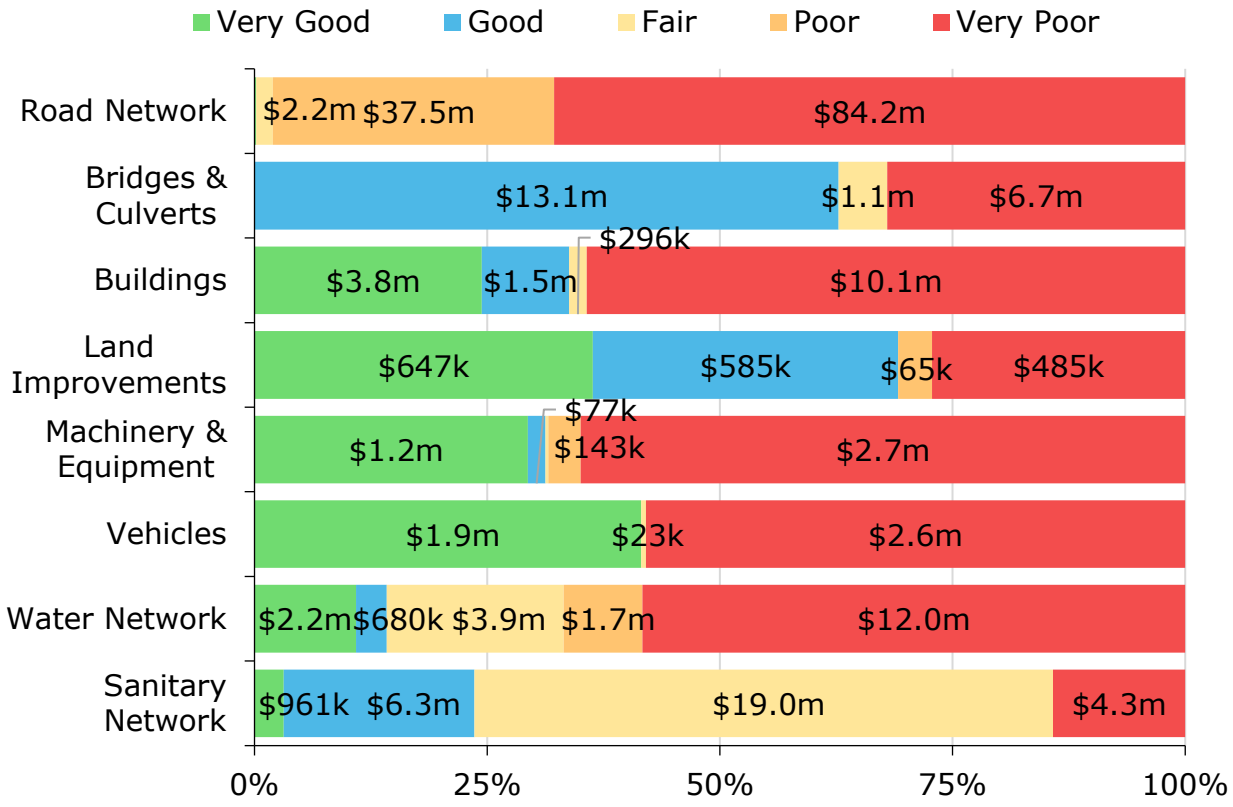
# Condition & Age

## Condition of Asset Portfolio

The current condition of the assets is central to all asset management planning. Collectively, 27% of assets in Black River-Matheson are in fair or better condition. This estimate relies on mostly age-based condition data.

Assessed condition data is available for bridges and culverts; for the remaining portfolio, age is used as an approximation of condition. Assessed condition data is invaluable in asset management planning as it reflects the true condition of the asset and its ability to perform its functions. The breakdown of the condition of each asset category is shown in the figure below.

Figure 8 Overall Condition Breakdown by Asset Category




## Service Life Remaining

Based on asset age, available assessed condition data and estimated useful life, 85% of the Township's assets will require rehabilitation / replacement within the next 10 years. Details of the capital requirements are identified in each asset section.

# Risk & Criticality

## Qualitative Risk

Black River-Matheson has noted key trends, challenges, and risks to service delivery that they are currently facing:

**Funding & Staff Capacity**

Staff capacity and expertise are sometimes insufficient to deploy optimal maintenance and assessment strategies. Major capital rehabilitation projects may also be deferred depending on the availability of grant funding opportunities.

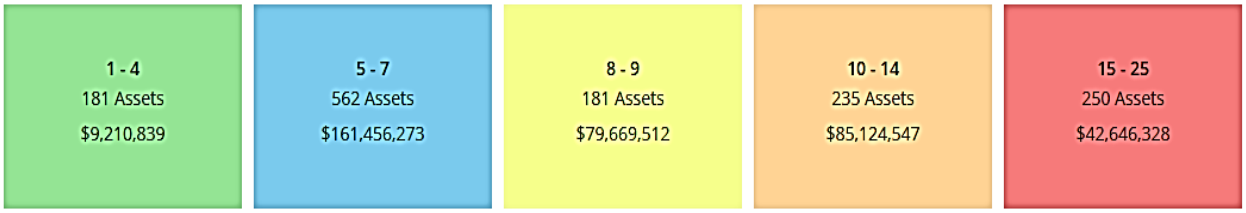
**Aging Infrastructure**

The lifecycle management strategy has been reactive. In recent years staff have focused on replacing poor condition assets but are still playing catch up on deferred lifecycle activities. Staff plan to pivot from build/replace strategy towards the implementation of a proactive maintenance and capital rehabilitation strategy to extend the service life at a lower cost.

## Quantitative Risk

The overall asset risk breakdown for Black River-Matheson's asset inventory is portrayed in the figure below.

Figure 9: Overall Asset Risk Breakdown




Reviewing the list of very high-risk assets to evaluate how best to mitigate the level of risk the Township is experiencing will help advance Black River-Matheson's asset management program.

# Climate & Growth

## Black River-Matheson Climate Profile

The Township of Black River-Matheson is in Northeastern Ontario along the shore of Hudson Bay. The Township is expected to experience notable effects of climate change which include higher average annual temperatures, an increase in total annual precipitation, and an increase in the frequency and severity of extreme events. According to Climatedata.ca – a collaboration supported by Environment and Climate Change Canada (ECCC) – the Township of Black River-Matheson may experience the following trends:

**Higher Average Annual Temperature:**

- Between the years 1971 and 2000 the annual average temperature was 1.3 ºC
- Under a high emissions scenario, the annual average temperatures are projected to increase by 2.6 ºC by the year 2050 and over 6.9 ºC by the end of the century.

**Increase in Total Annual Precipitation:**

- Under a high emissions scenario, Black River-Matheson is projected to experience a 15% increase in precipitation by the year 2050 and a 20% increase by the end of the century.

**Increase in Frequency of Extreme Weather Events:**

- It is expected that the frequency and severity of extreme weather events will change.
- In some areas, extreme weather events will occur with greater frequency and severity than others especially those impacted by Black River watershed.

## Integration Climate Change and Asset Management

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

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

## Impacts of Growth

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

infrastructure. Increases or decreases in demand can affect what assets are needed and what level of service meets the needs of the community.

## *Black River-Matheson Official Plan (August 2003)*

The Township of Black River-Matheson adopted their Official Plan in 2017 which bases its projections on the Growth Plan for Northern Ontario and reflects the goals of the Planning Act.

The purpose of the Official Plan is to guide the physical development for the community over the next 20 years. It establishes a vision, guiding principles and objectives to manage physical development, and their effects on physical, social, cultural, economic, and natural environments. The Township will prioritize industries such as mining and mineral exploration, residential construction, and agriculture for future growth and development.

The settlement area will be the focus of residential and employment growth. There is a sufficient supply of vacant land available in the Township's designated settlement areas to meet the predicted needs for housing and employment and even allow for additional supply in case the demand rises in the future. The emphasis of the development will be on settlement areas where there is an appropriate level of public infrastructure that is presently accessible or can be made available at a reasonable cost. The rural area will maintain its' focus for agricultural activities, as well as mining and mineral exploration.

The Official Plan projects a steady population decrease until 2036 based on 2011 census data. However, census data over the past 10 years has indicated moderate population growth, which may indicate a potential population increase in the future. The following table was developed using census data from 1996 to 2021.

| Historical Figures | 1996 | 2001 | 2006 | 2011 | 2016 | 2021 |
|---|---|---|---|---|---|---|
| Population | 3,222 | 2,886 | 2,619 | 2,410 | 2,438 | 2,572 |
| Population Change | N/A | -10% | -9% | -8% | 1% | 5% |
| Private Dwellings | N/A | 1,489 | 1,249 | 1,172 | 1,149 | 1,403 |

The population of Black River-Matheson ranged from 3,222 in 1996 to 2,572 in 2021. Between the years of 1996 and 2011 there were significant drops in population. However, 2016 saw a slight increase in population, which could indicate population growth or stability for the Township.

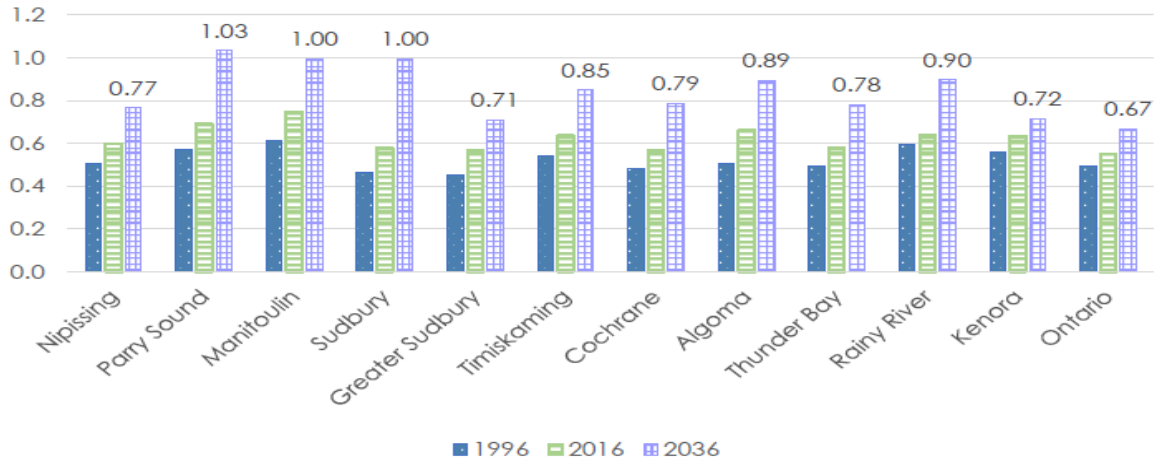
## Regional Growth

In 2021 the Come North Conference Report was produced by FedNor and Government of Canada. The document describes short, medium, and long-term objectives for all communities in Northern Ontario as it relates to population growth.

According to the report all 11 Census Districts in Northern Ontario (Nipissing, Parry Sound, Manitoulin, Sudbury, Greater Sudbury, Timiskaming, Cochrane, Algoma, Thunder Bay, Rainy River, Kenora) are currently experiencing the following trends: population decline, population aging, or labour shortages. The report highlights a risk of these communities becoming economically unsustainable unless population

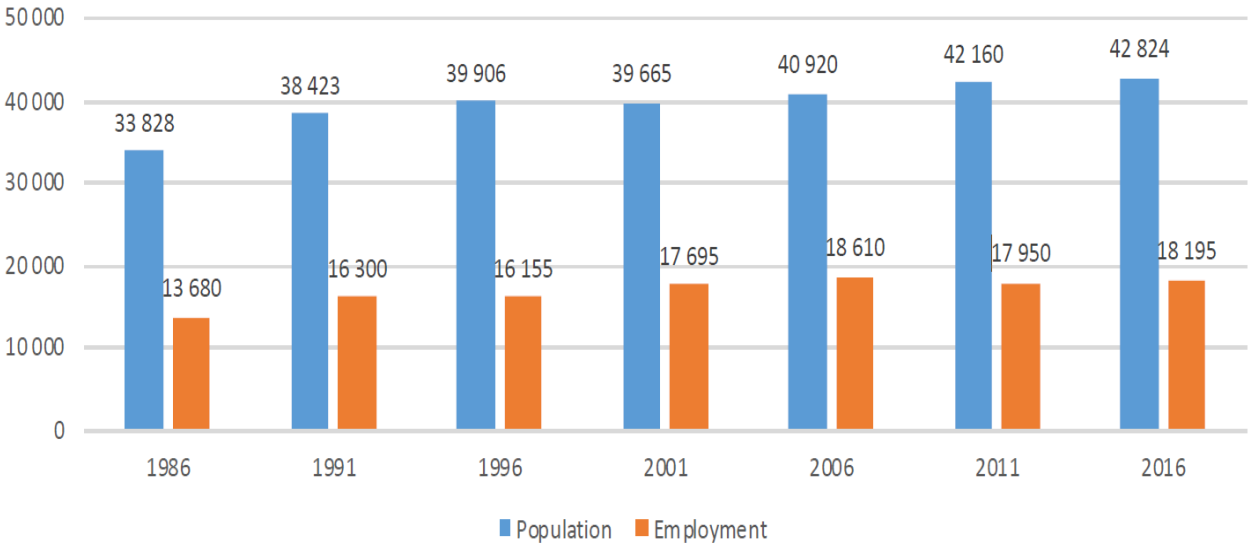
retention and attraction numbers improve. The risk is the result of the dependency ratio increasing. The dependency ratio is the ratio of people unable to support themselves without assistance; people between the ages of 0 and 14 and 64 and older.

The goal is to achieve a dependency ratio of 0.5. In 1996, every Census District was at or near the goal but by 2016, none were below and more than half had a ratio more than 0.6. The following graph displays the dependency ratio for each Census District in 1996 and 2016 along with a projected ratio for the year 2036.




The Township of Black River-Matheson is found in the Cochrane district, which is expected to reach a dependency ratio of 0.79.

The population trends overall in the Cochrane District are in decline. The following graph from the 2019 Northern Projections Cochrane District Human Capital Series report by the Northern Policy Institute, displays the population trends from 1986 to 2016.




The following table, found in the same report, shows population projections in the Cochrane District for the years 2021 to 2041.

| Year | Ages 0-19 | Ages 20-64 | Ages 65+ | Total |
|---|---|---|---|---|
| 2021 | 17,163 | 45,475 | 15,951 | 78,589 |
| 2026 | 16,627 | 41,520 | 18,681 | 76,828 |
| 2031 | 15,892 | 38,676 | 20,566 | 75,134 |
| 2036 | 15,260 | 37,319 | 20,962 | 73,541 |
| 2041 | 14,894 | 36,535 | 20,669 | 72,098 |

The most recent census data from 2021, shows a slight decrease in the population, reaching a total of 77,963. According to census data, the population increase is entirely restricted to the population of 65 and older; thus, further increasing the dependency ratio.

## Impact of Growth on Lifecycle Activities

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

As the municipality's population is expected to remain the same with potential moderate increases and declines in the coming years, demand will evolve, and it is likely that funding will need to be reprioritized. As growth-related assets are constructed, retired, or acquired, they should be integrated into the AMP. Furthermore, the municipality will need to review the lifecycle costs of growth-related infrastructure. These costs should be considered in long-term funding strategies that are designed to, at a minimum, to maintain the current level of service.

# Levels of Service

Levels of service are a measure of the quality and scope of the services that municipal infrastructure provides to the community. Both quantitative and qualitative metrics are used to measure levels of service.

## Strategic Plan

The strategic plan has a direct, and cascading impact on asset management planning and reporting, making it a foundational element.

### Collective Vision

The Township of Black River-Matheson aspires to be an inclusive, thriving, and sustainable community, harmonizing rural and urban areas while creating opportunities for present and future generations. We are dedicated to nurturing and enriching our economic landscape through the promotion of a sustainable economy. Our commitment extends to developing a resilient strategy for economic development, fostering economic health and vitality for all stakeholders in Black River-Matheson. Recognized for its exceptional quality of life, vibrant entrepreneurial spirit, responsible resource management, and deep sense of pride, our community stands as a beacon of progress and prosperity.

### Mission Statement

Our mission is to deliver effective, efficient municipal services grounded in prudent planning, accountability, and good governance, guided by democratic principles. We are dedicated to fostering a prosperous future for all citizens of Black River-Matheson. We strive to advise Council, organizations, and committees on a comprehensive spectrum of economic issues and policies aimed at ensuring the success and well-being of our community.

### Core Values

As the moral compass guiding decision-making and actions within the Township, our Values embody the core principles essential for shaping the culture and direction of both the Township and its Council and employees:

- **Leadership:** Encouraging innovation, creativity, and initiative.
- Reputation: Stressing excellence, integrity, accountability, honesty, and transparency.
- **Service:** Fair, friendly, helpful, caring, and supportive.
- **Community:** Respect and promote our community.
- **Stewardship:** Consider the long-term consequences of actions, think broadly across issues, disciplines and boundaries and act accordingly.
- **Innovation & Excellence:** A philosophy of the workplace where problem-solving, teamwork, and leadership results in a continuous improvement in the Township by developing solutions that address unmet ratepayer needs.
- **Human Resources:** Recognizing that our staff are our most valuable resource.

## Level of Service Statement

Utilizing the strategic plan as a guide for determining the Township's levels of service, the corporate service statement was developed by staff as follows:

"The Township of Black River-Matheson is committed to providing **cost efficient**, **safe**, and **sustainable** municipal services and infrastructure, ensuring their longevity for the benefit of our residents and future generations."

# Stakeholder Engagement

It is considered best practice for municipalities across Canada to conduct regular resident satisfaction surveys to guide service delivery and strategic planning. The Township is committed to fostering accessible and inclusive opportunities for all residents to engage meaningfully in municipal decision-making. This includes participation in key initiatives such as master plans, the strategic plan, and other collaborative processes. Feedback and insights gathered through these engagement efforts are integral to the Township's continuous improvement approach and will continue to inform planning, operations, and investment decisions moving forward.

# Current Levels of Service

The Township has defined their current levels of service for each infrastructure category by breaking it down into service attributes such as scope, reliability, quality, accessibility, utilization, safety and performance. Each of these attributes are defined as follows:

**Sustainable** – the standard of which services are maintained. Is a description of how the condition is measured as well as the current average condition of the assets utilized to provide the services

**Safe** – Services are safe for residents to use

**Cost Efficient** – Is a description of how the Township will ensure long-term financial sustainability and is measured utilizing risk and financial parameters.

Based on an analysis of each asset category the current level of service is provided in each asset section. All the community and technical levels of service will be directly linked to the service attributes for each asset category.

# Proposed Levels of Service

Proposed levels of service must be realistic and achievable within the timeframe defined by the Township. These levels were developed with careful consideration of community expectations, fiscal capacity, regulatory requirements, corporate goals, and the overarching goal of long-term sustainability.

The Township has prioritized the development of its asset management program. While the intention was to fully leverage available data to define proposed levels of service, it became evident that further work is required to align existing asset data—originally developed with a financial focus—with operational plans and current

work practices. To address this, the Township has determined that the workplan for the next number of years will be focused on:

1. **Inventory Update** - Finance and Operations will collaborate to ensure that the inventory is up to date and accurately reflects assets from both functional perspectives.
2. **Field Assessments** - Maintaining up-to-date asset condition information is a foundational element of effective asset management, ensuring that the Township's decisions accurately reflect the state of the assets being managed. Field assessments will be conducted through a combination of internal staff and external experts to develop a program tailored specifically to the needs of Black River-Matheson.
3. **Lifecycle Strategy Review / Program Development** - As the Township works through the first two phases, it will review the current lifecycle assumptions within the Citywide Asset Management System to ensure they align with actual practices. Particular attention will be given to the roads network, with the goal of establishing preventative maintenance programs that will help reduce long-term asset management costs.

This approach ensures that the Township's levels of service are both data-informed and operationally grounded, establishing a strong foundation for continued progress in asset management planning. The Township's asset management program outlines the current lifecycle activities undertaken for each asset category. System-generated annual capital requirements will continue to guide the development of long-term funding strategies.

The program is being further developed to fully operationalize asset data and management practices. This will enhance alignment between Finance and Operations, support more accurate forecasting of asset needs, and strengthen evidence-based decision-making. A comprehensive review of the program is scheduled in conjunction with the 2030 Asset Management Plan update. This review will validate the integrity of asset data and operational processes, setting the stage for a more detailed assessment of service levels and service delivery.

This foundational work is critical to supporting effective capital planning, long-term financial sustainability, and the continued delivery of quality services to the community.

# Financial Management

## Financial Strategy Overview

Each year, the Township of Black River-Matheson 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. In fact, most municipalities continue to struggle with annual infrastructure deficits. Achieving full-funding for infrastructure programs will take many years and should be phased-in gradually to reduce burden on the community.

This financial strategy is designed for the Township's existing asset portfolio and is premised on two key inputs: the average annual capital requirements and the average annual funding typically available for capital purposes. The annual requirements are based on the replacement cost of assets and their serviceable life, and where available, lifecycle modeling. This figure is calculated for each individual asset and aggregated to develop category-level values.

The annual funding typically available is determined by reviewing historical capital expenditures on infrastructure, inclusive of any allocations to reserves for capital purposes.

Only reliable and predictable sources of funding are used to benchmark funds that may be available on any given year. The funding sources include:

- Revenue from taxation allocated to reserves for capital purposes
- Revenue from water and wastewater rates allocated to capital reserves
- The Canada Community Building Fund (CCBF), formerly the Federal Gas Tax Fund
- The Ontario Community Infrastructure Fund (OCIF)
- Northern Ontario Resource Development Support Fund (NORDS)

Although provincial and federal infrastructure programs can change with evolving policy, CCBF and OCIF are considered as permanent and predictable.

## Annual Capital Requirements

The annual requirements represent the amount the Township should allocate annually to each asset category to meet replacement needs as they arise, prevent infrastructure backlogs, and achieve long-term sustainability.

Table 4 outlines the total average annual capital requirements for existing assets in each asset category. Based on a replacement cost of $378 million, annual capital requirements total approximately $6.1 million for all the asset categories analysed.

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 categories is estimated at 1.62%.

Table 4 Average Annual Capital Requirements

| Asset Category | Replacement Cost | Annual Capital Requirements | Target Reinvestment Rate |
|---|---|---|---|
| Road Network | $280,011,801 | $4,160,466 | 1.5% |
| Bridges & Culverts | $20,840,987 | $328,055 | 1.6% |
| Buildings | $15,658,117 | $314,967 | 2.0% |
| Land Improvements | $1,781,618 | $71,613 | 4.0% |
| Machinery & Equipment | $4,105,458 | $273,296 | 6.7% |
| Vehicles | $4,472,978 | $225,536 | 5.0% |
| Water Network | $20,625,040 | $302,550 | 1.5% |
| Sanitary Network | $30,611,500 | $444,162 | 1.5% |
| **Total** | **$378,107,499** | **$6,120,644** | **1.62%** |

Although there is no industry standard guide on optimal annual investment in infrastructure, the Target Reinvestment Rates above 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).

The 2016 version of the report card also contained recommended reinvestment rates that can also serve as benchmarks for municipalities. The CIRC suggest that, if increased, these reinvestment rates can "stop the deterioration of municipal infrastructure." The report card contains both a range for reinvestment rates that outlines the lower and upper recommended levels, as well as current municipal averages.

## Current Funding Levels

Table 5 summarizes how current capital funding levels compare with funding required for each asset category. At existing levels, the Township is funding 18% of its annual capital requirements for all infrastructure analyzed. This creates a total annual funding deficit of $5.0 million.

Table 5 Current Funding Position vs Required Funding

| Asset Category | Annual Capital Requirements | Annual Funding Available | Annual Infrastructure Deficit | Funding Level |
|---|---|---|---|---|
| Road Network | $4,160,466 | $707,742 | $3,452,724 | 17% |
| Bridges & Culverts | $328,055 | $15,198 | $312,857 | 5% |
| Buildings | $314,967 | $14,591 | $300,376 | 5% |
| Land Improvements | $71,613 | $3,318 | $68,295 | 5% |
| Machinery & Equipment | $273,296 | $12,661 | $260,635 | 5% |
| Vehicles | $225,536 | $10,448 | $215,088 | 5% |
| **Tax Funded Total** | **$5,373,933** | **$763,958** | $4,609,975 | 14% |
| Water Network | $302,550 | $248,601 | $53,949 | 82% |
| Sanitary Network | $444,162 | $110,995 | $333,167 | 25% |
| **Rate Funded Total** | **$746,712** | **$305,470** | **$387,116** | **48%** |
| **Overall Total** | **$6,120,645** | **$1,069,428** | **$4,997,091** | **18%** |

# Closing the Gap

Eliminating annual infrastructure funding shortfalls is a difficult and long-term endeavor for municipalities. Considering the Township's current funding position, it will require many years to reach full funding for current assets.

This section outlines how Black River-Matheson can close the annual funding deficits using own-source revenue streams, i.e., property taxation and utility rates, and without the use of additional debt for existing assets.

## Full Funding Requirements Tax Revenues

In 2025, Black River-Matheson will have an annual tax revenue of $6,915,492. As illustrated in the following table, without consideration of any other sources of revenue or cost containment strategies, full funding would require an 66.7% tax change over time.

To achieve this increase, several scenarios have been developed using phase-in periods ranging from five to twenty years. 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 6 Phasing in Annual Tax Increases

| Total % Increase Needed in Annual Property Taxation Revenues | Phase-in Period | | | |
|---|---|---|---|---|
| | 5 Years | 10 Years | 15 Years | 20 Years |
| 66.7% | 10.8% | 5.2% | 3.5% | 2.6% |

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

## Full Funding Requirements Utility Rate Revenues

Annual capital requirements for both the water and sanitary network total $1,149,591, against available funding of $360 thousands. This creates a funding deficit of $387 thousand. To close this annual gap, the Township's total utility revenues would need to increase by 42.2%.

To achieve this increase, several scenarios have been developed using phase-in periods ranging from five to twenty years. As with tax revenues, short phase-in periods may require excessive rate increases, whereas more extended timeframes may lead to larger backlogs and more unpredictable spending on emergency repairs and replacements.

Table 7 Phasing in Rate Increases

| Category | Phase-in Period | | | |
|---|---|---|---|---|
| | 5 Years | 10 Years | 15 Years | 20 Years |
| Water Network (11.1%) | 2.1% | 1.1% | 0.7% | 0.5% |
| Sanitary Network (76.9%) | 11.0% | 5.4% | 3.6% | 2.7% |

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

# Recommendations

The Township is reviewing the feasibility of adopting a full-funding scenario that would enable it to meet 100% of the Average Annual Requirements (AAR) for the asset categories analyzed. This scenario is structured around a phased-in approach and assumes full reinvestment of revenue increases into capital funding. The key components of the strategy include:

- **Tax-Supported Assets:** Implement a 2.6% annual property tax increase over a 20-year phase-in period and allocate the full increase in tax revenue exclusively to capital infrastructure funding.
- **Water and Sanitary Services:** Implement a 0.5% annual water rate increase and a 2.7% annual sanitary rate increase, and phase in both increases over a 20-year period, as well as allocate the full increase in revenues directly to capital reinvestment for these services.
- **Grant Funding:** Maintain ongoing allocation of funding from OCIF (Ontario Community Infrastructure Fund), NORDS (Northern Ontario Resource Development Support Fund), and CCBF (Canada Community-Building Fund) as previously outlined in the Township's financial strategy.

This approach will help the Township address the infrastructure funding gap systematically over time, ensuring that service levels are maintained and assets are managed sustainably. The feasibility assessment will evaluate financial impacts on ratepayers, long-term benefits to infrastructure health, and alignment with regulatory asset management planning requirements.

# Ten-Year Financial Plan

The Township is implementing a clear long-term financial strategy aimed at achieving sustainable funding levels for its infrastructure services. The proposed levels of service are supported by a workplan focused on three key areas:

- Inventory Update
- Field Assessments
- Lifecycle Strategy Review and Program Development

The Township of Black River-Matheson is committed to operationalizing its asset management program to strengthen financial and operational alignment and collaboration over the next five years. A comprehensive review of the asset management program is planned to coincide with the 2030 Asset Management Plan update. This review will validate the accuracy of asset data and the effectiveness of operational processes, laying the groundwork for a more detailed evaluation of service levels.

# Appendix A: Road Network

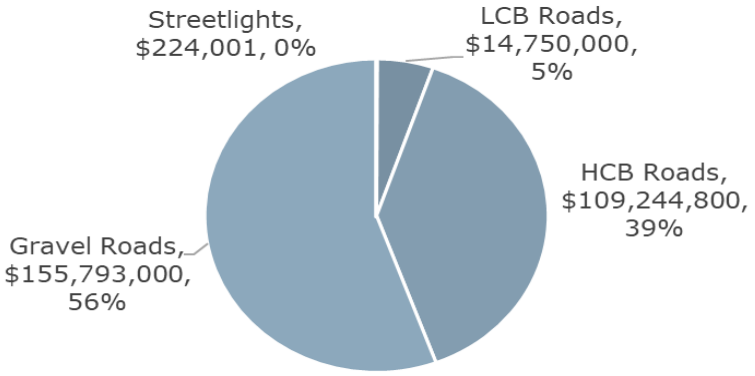
Black River-Matheson's road network comprises the second largest share of its infrastructure portfolio, with a current replacement cost of $280 million, distributed primarily between HCB, LCB and gravel roads.

The Township also owns and manages other supporting infrastructure and capital assets, including streetlights.

## Inventory & Valuation

The figure below displays the replacement cost of each asset segment in the Township's Road inventory.

Figure 10: Road Network Replacement Value

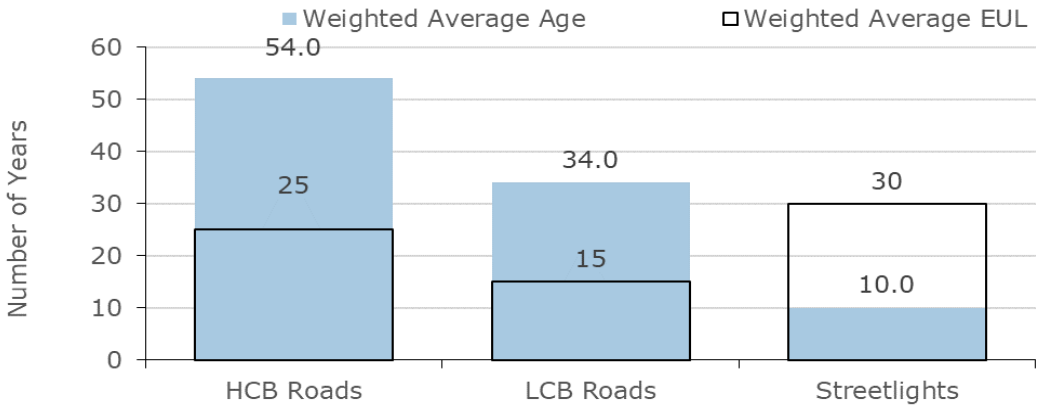



Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

## Asset Condition & Age

The graph below identifies the average age, and the estimated useful life for each asset segment. It is all weighted by replacement cost.

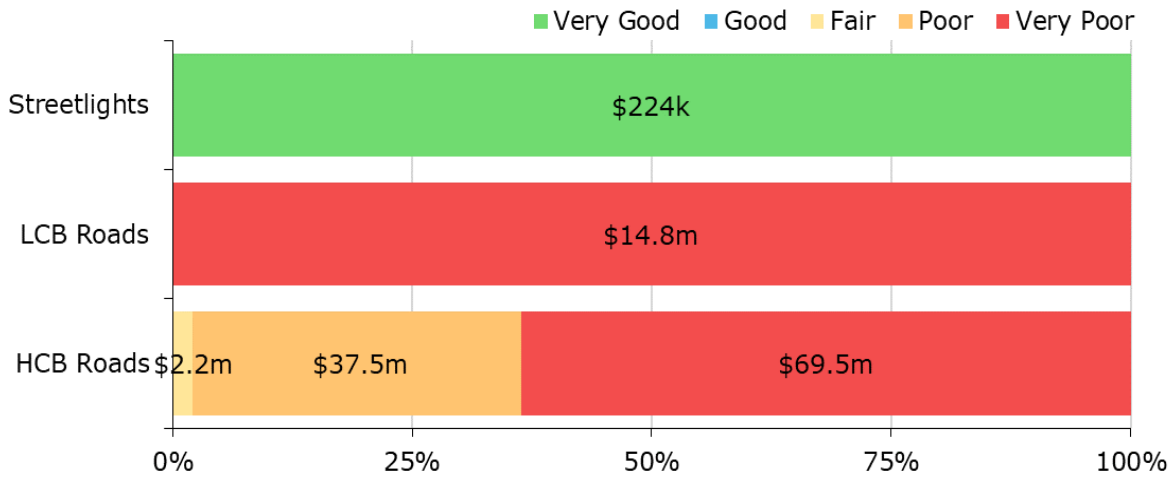
Figure 11: Road Network Average Age vs Average EUL



The analysis shows that, based on in-service dates, roads continue to remain in operation beyond their expected useful life. This is due to the life cycle management strategies currently being utilized.

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

Figure 12: Road Network Condition Breakdown




To address the challenges posed by the deteriorating condition of Black River-Matheson's roads, the Township must implement proactive measures to enhance the level of service provided by its road infrastructure.

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

## Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets. At present, the Township is in the process of exploring options for implementing a comprehensive asset condition assessment strategy.

# Lifecycle Management Strategy

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

The following lifecycle strategies shown in Figure 13 have been developed as a proactive approach to managing the lifecycle of municipally owned roads. Instead of allowing the roads to deteriorate until replacement is required, strategic rehabilitation is expected to extend the service life of roads at a lower total cost.

Figure 13: Road Network Current Lifecycle Strategy

**Maintenance**

- deficiency repairs as required from patrols for minimum maintenance standards such as patching, shoulder grading, etc.
- winter control

**Rehabilitation / Renewal / Replacement**

- activities are conducted in response to immediate needs rather than as part of a proactive strategy

PCI scores, staff judgment, traffic loads, and opportunity to bundle projects help inform the optimal lifecycle intervention, ranging from pothole repairs to overlays and potential replacements. Lifecycle models used to estimate the savings to annual capital requirement are shown below in Figure 14 for Paved (LCB) roads, Figure 15 for Asphalt (HCB) Roads, and Figure 16 for Gravel Roads.

Figure 14: Paved Roads (LCB) Road Lifecycle Model

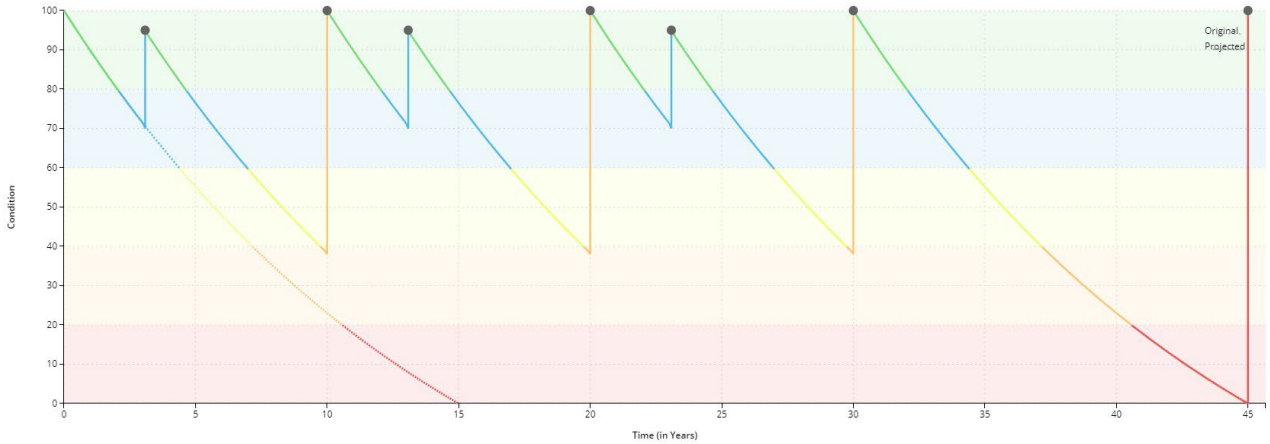



Figure 15: Asphalt Roads (HCB) Road Lifecycle Model

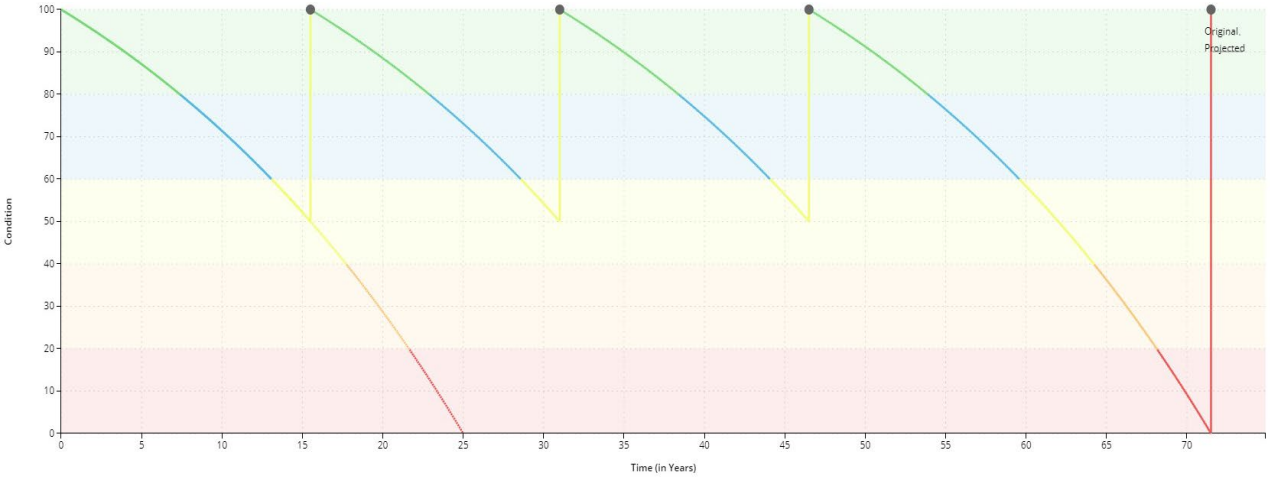
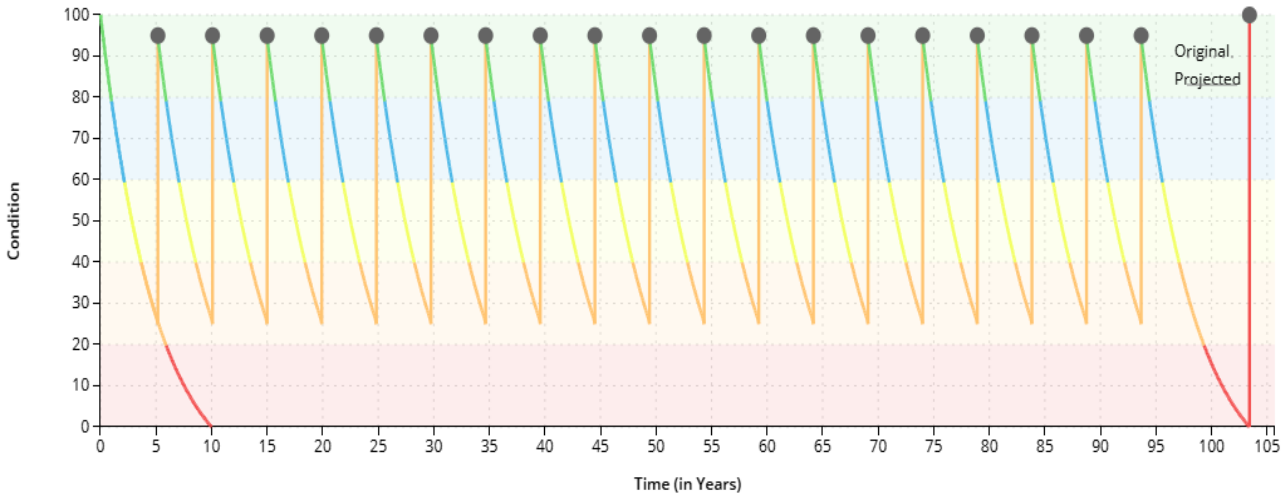


Figure 16 Gravel Roads Lifecycle Model




# Risk & Criticality

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on available inventory data. See Appendix J: Risk Rating Criteria for the criteria used to determine the risk rating of each asset.

Figure 17: Road Network Risk Matrix


This is a high-level model developed by municipal staff and it should be reviewed and adjusted to reflect an evolving understanding of both the probability and consequences of asset failure.

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

# Levels of Service

The framework created by the Township for levels of service is a valuable tool for assessing and managing the performance of their assets and/or services provided by their assets. Proposed levels of service for the Township have been developed through engagement with Township staff.

## Current Levels of Service

The following tables identify the Township's current level of service for the road network. These metrics include the technical and community level of service

metrics that are required as part of O. Reg. 588/17 as well as any additional performance measures that the Township has selected.

### Community Levels of Service

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

Table 8 Road Network Community Levels of Service

| Values | Qualitative Description | Current LOS |
|---|---|---|
| Cost Efficient | Description, which may include maps, of the road network in the Township and its level of connectivity | See Figure 18 |
| Sustainable | Description or images that illustrate the different levels of road class pavement condition | See Figure 3 for the description of road condition |

### Technical Levels of Service

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

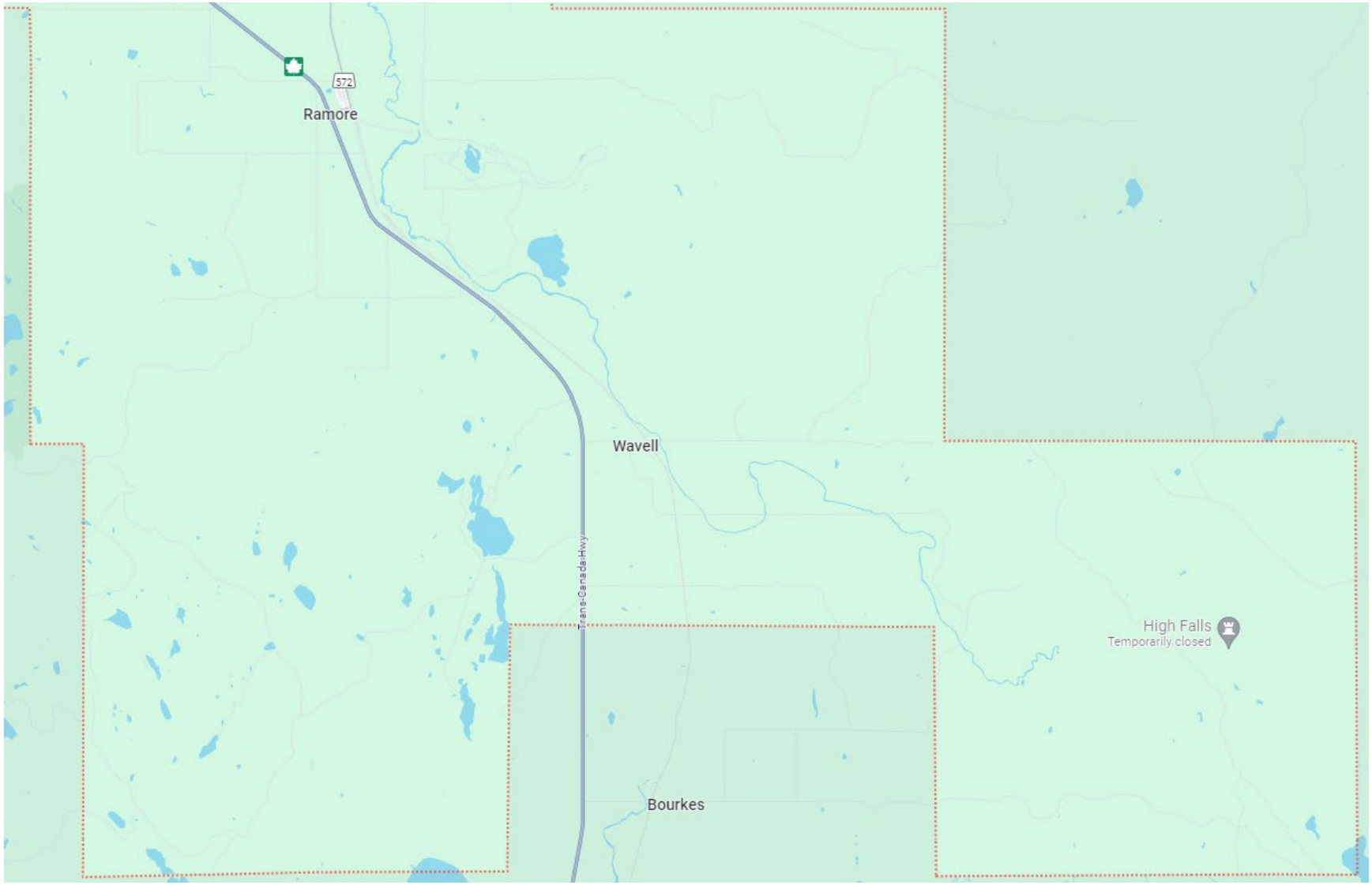
Table 9 Road Network Technical Levels of Service

| Values | Technical Metric | Curent LOS |
|---|---|---|
| Sustainable | Lane-km of arterial roads (MMS classes 1 and 2) per land area in the municipality (km/km$^2$) | 18.46 lane km/km$^2$ |
| | Lane-km of collector roads (MMS classes 3 and 4) per land area in the municipality (km/km$^2$) | 54.01 lane km/km$^2$ |
| | Lane-km of local roads (MMS classes 5 and 6) per land area in the municipality (km/km$^2$) | 275.9 lane km/km$^2$ |
| | Average pavement condition index for paved roads in the municipality | 11.9 |
| | Average surface condition for unpaved roads in the municipality | Very Poor |
| Cost Efficient | Actual Capital Reinvestment Rate (Annual) – Target Reinvestment Rate (Annual) | 0.2% - 1.5% |
| Safe | Average Risk Rating | High (10.2) |

## Proposed Levels of Service

Proposed levels of service are established at the Township-wide level to ensure a strong foundational approach to managing the road network. This includes a recommended increase in capital funding, improvements in asset data, and the development of condition information through targeted field assessments

Figure 18: Map of Roads


572
Ramore
Wavell
Trans-Canada Hwy
High Falls
Temporarily closed
Bourkes

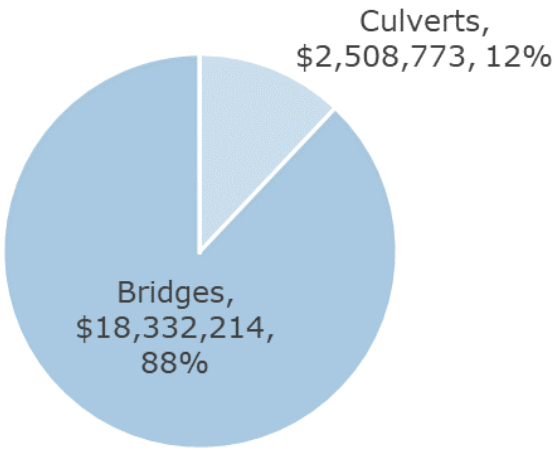
# Appendix B: Bridges & Culverts

Bridges and culverts (B&C) represent a critical portion of the transportation services provided to the community.

## Inventory & Valuation

Figure 19 below displays the replacement cost of each asset segment in the Township's bridges and culverts inventory.

Figure 19 B&C Replacement Cost

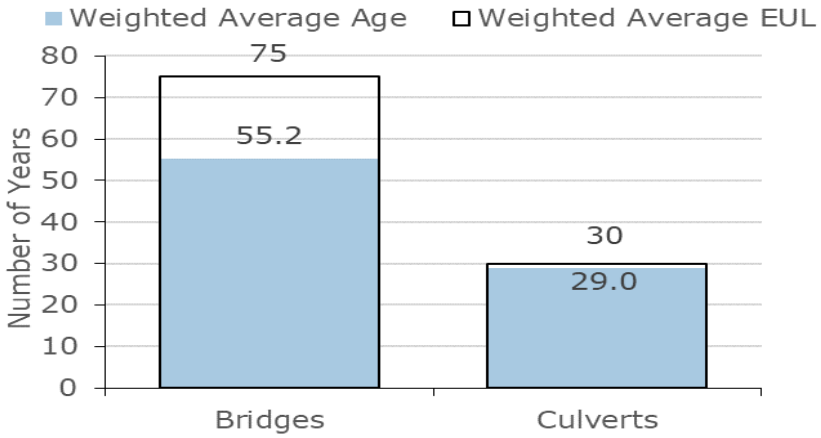



Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed. This can be included in the Ontario Structures Inspection Manual (OSIM) inspections as the replacement cost is part of the calculation for the bridge condition index (BCI).

## Asset Condition & Age

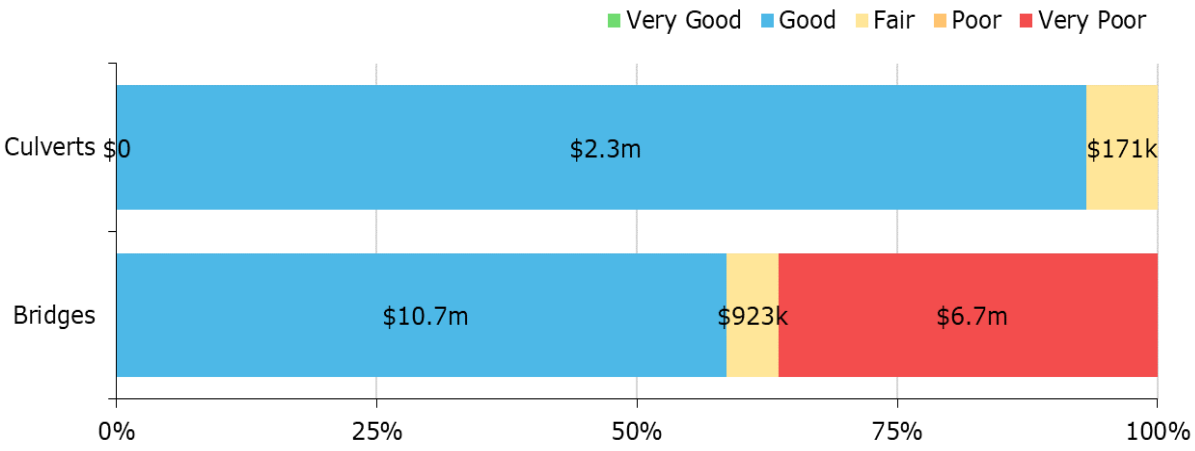
The graph below identifies the average age and the estimated useful life for each asset segment. The values are weighted based on replacement cost.

Figure 20: B&C Average Age vs Average EUL



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

Figure 21: B&C Condition Breakdown




To ensure that the Township's bridges and culverts continue to provide an acceptable level of service, the staff should monitor the average condition of all assets. Each asset's estimated useful life should also be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

## Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets. Black River-Matheson's current approach is to assess the 20 bridges and culverts every 2 years in accordance with the Ontario Structure Inspection Manual (OSIM). The most recent assessment was completed in 2023 by McIntosh Perry Consulting Engineers.

The condition scale for bridges and culverts utilized is from 0 to 100 from Very Poor to Very Good. See the following images as examples of a bridge and structural culvert in Good condition, as well as a bridge and structural culvert in Fair condition.

Figure 22: B&C Condition Images

Lava Mountain Road Bridge (BCI=74.4 Good)

Cardinal Road West Culvert (BCI=71.1 Good)

Pine Road Bridge (BCI=59.8 Fair)

Burton Road South Culvert (BCI=49.2 Fair)

## Lifecycle Management Strategy

The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration. Figure 23 outlines Black River-Matheson's current lifecycle management strategy.

Figure 23: B&C Current Lifecycle Strategy

**Maintenance**

- All maintenance and repair activities are driven by the results of inspections competed according to the Ontario Structure Inspection Manual (OSIM)

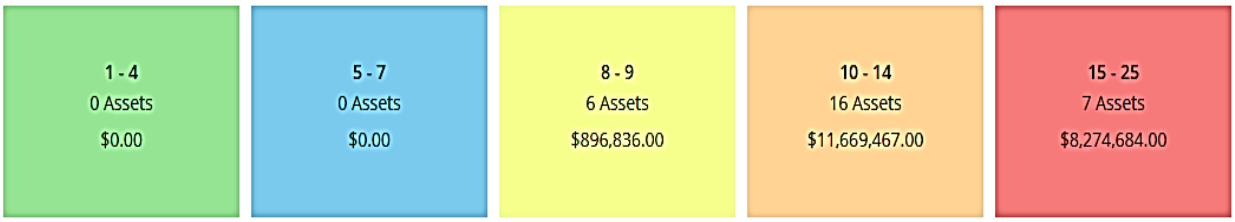
**Rehabilitation / Renewal / Replacement**

- Replacement occurs upon OSIM inspection recommendation and is subject to the availability of funding

## Risk & Criticality

The risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on available inventory data. See Appendix J: Risk Rating Criteria for the criteria used to determine the risk rating of each asset.

Figure 24: B&C Risk Matrix




This is a high-level model developed by municipal staff and should be reviewed and adjusted to reflect an evolving understanding of both the probability and consequences of asset failure.

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

## Levels of Service

The framework created by the Township for levels of service is a valuable tool for assessing and managing the performance of their assets and/or services provided by their assets. Proposed levels of service for the Township have been developed through engagement with Township staff.

# Current Levels of Service

The following tables identify the Township's current level of service for the road network. These metrics include the technical and community level of service metrics that are required as part of O. Reg. 588/17 as well as any additional performance measures that the Township has selected.

## Community Levels of Service

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

Table 10 Community Levels of Service

| Values | Qualitative Description | Current LOS |
|---|---|---|
| Safe | Description of the traffic that is supported by municipal bridges (e.g. heavy transport, motor, emergency vehicles, pedestrians, cyclists) | The traffic supported by the municipal bridges is varied. Large agricultural equipment, heavy transport vehicles, motor and emergency vehicles, cyclists, pedestrians all utilize the bridges throughout the Township. |
| Sustainable | Description or images of the condition of bridges and culverts and how this would affect use of the bridges and culverts | See Figure 22: B&C Condition Images<br>Lava Mountain Road Bridge (BCI=74.4 Good) |

## Technical Levels of Service

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

Table 11 B&C Technical Levels of Service

| Values | Technical Metric | Current LOS |
|---|---|---|
| Cost Efficient | Actual Capital Reinvestment Rate (Annual) – Target Reinvestment Rate (Annual) | 0% - 1.6% |
| Sustainable | Average bridge condition index value for bridges in the municipality | 45 |
| | Average bridge condition index value for structural culverts in the municipality | 69 |
| Safe | % of bridges in the municipality with loading or dimensional restrictions | 0% |
| | Average Risk Rating | Very High (15.11) |

# Proposed Levels of Service

Proposed levels of service are established at the Township-wide level to ensure a strong foundational approach to managing the Township bridges and culverts. This includes a recommended increase in capital funding, improvements in asset data, and the development of condition information through targeted field assessments

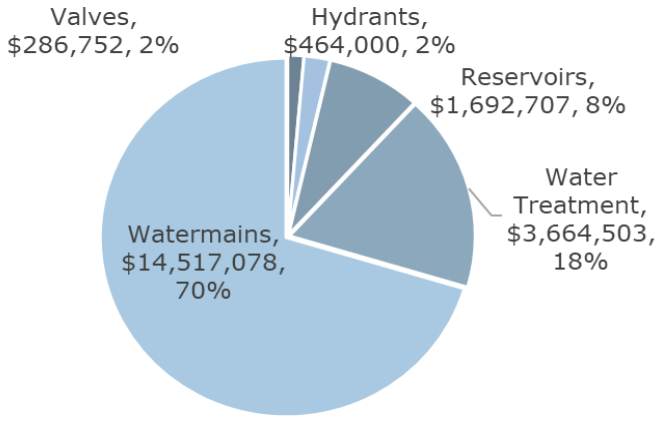
# Appendix C: Water Network

The Township owns water distribution infrastructure in four separate communities of Matheson, Holtyre, Ramore, and Val Gagne.

## Inventory & Valuation

The graph below displays the total replacement cost of each asset segment in Black River-Matheson's water network inventory.

Figure 25: Water Network Replacement Cost

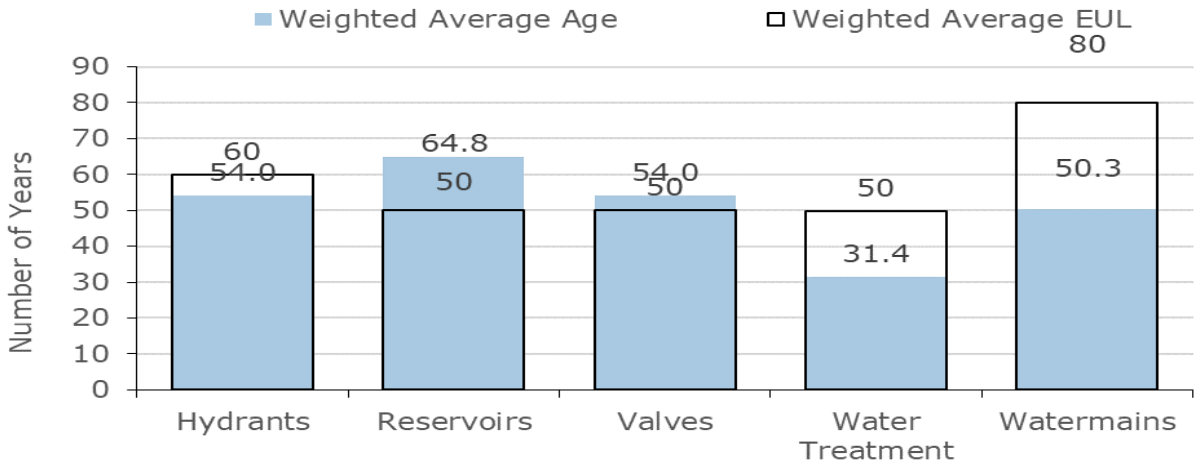



Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

## Asset Condition & Age

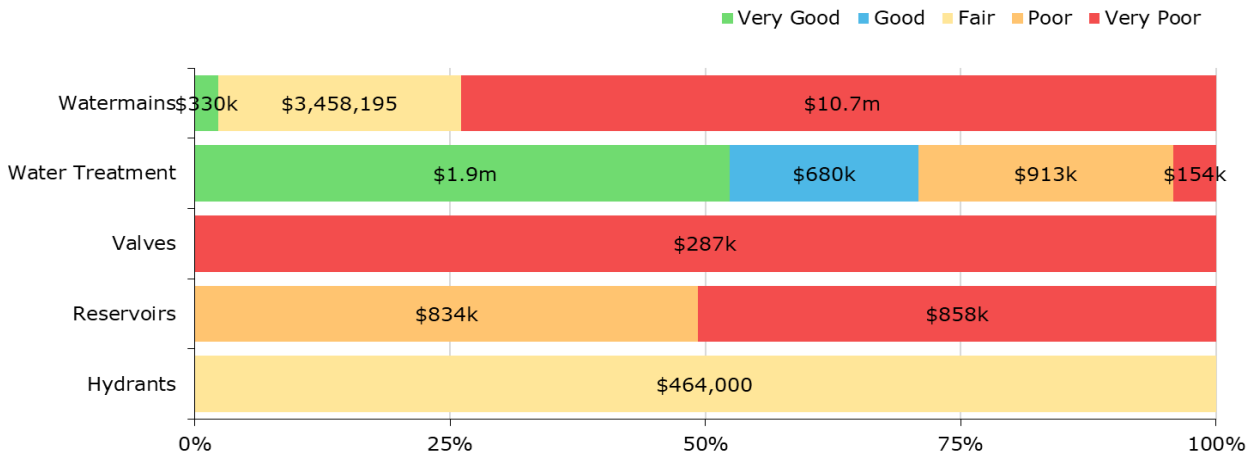
The table below identifies the current average condition, the average age, and the estimated useful life for each asset segment. The average condition (%) is a weighted value based on replacement cost.

Figure 26: Water Network Average Age vs Average EUL



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

Figure 27: Water Network Condition Breakdown




To ensure that the municipal water network continues to provide an acceptable level of service, the Township should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of maintenance, rehabilitation and replacement activities is required to increase the overall condition of the water network.

Each asset's estimated useful life should also be reviewed to determine whether adjustments need to be made to better align with the observed service life.

## Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets. At present, the Township is in the process of exploring options for implementing a comprehensive asset condition assessment strategy.

# Lifecycle Management Strategy

To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration. The following table outlines the Township's current lifecycle management strategy.

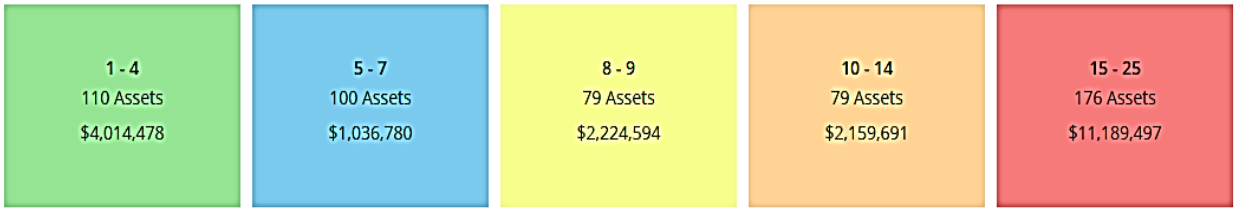
Figure 28: Water Network Current Lifecycle Strategy

| Maintenance / Rehabilitation / Replacement |
| --- |
| •Main flushing and valve exercising is completed on the water network on an as-needed basis<br>•Replacement activities are identified based on an analysis of breakdown rates as well as any issues identified during regular maintenance activities |

# Risk & Criticality

The risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on available inventory data. See Appendix J: Risk Rating Criteria for the criteria used to determine the risk rating of each asset.

Figure 29: Water Network Risk Matrix




This is a high-level model that has been developed based on information currently available and should be reviewed and adjusted to reflect an evolving understanding of both the probability and consequences of asset failure.

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

# Levels of Service

The framework created by the Township for levels of service is a valuable tool for assessing and managing the performance of their assets and/or services provided by their assets. Proposed levels of service for the Township have been developed through engagement with Township staff.

## Current Levels of Service

The following tables identify the Township's current level of service for the road network. These metrics include the technical and community level of service metrics that are required as part of O. Reg. 588/17 as well as any additional performance measures that the Township has selected.

### Community Levels of Service

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

Table 12 Water Network Community Levels of Service

| Values | Qualitative Description | Current LOS |
|---|---|---|
| Sustainable | Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal water system | The Black River-Matheson water system serves four separate communities:<br>• Holtyre - This system is comprised of 2 wells and one treatment plant. The water plant serves approximately 255 residents of Holtyre.<br>• Matheson – This system is comprised of 4 wells, 1 treatment plant and 1 reservoir. The water treatment system is located on the northwest shore of Lake Belleck, two kilometers east of the Town of Matheson.<br>• Raemore – the Raemore system has 3 wells and 1 treatment plant. The water treatment plant is located in the Town of Raemore.<br>• Val Gagne – 3 wells and 1 treatment plant. The Val Gagne water treatment plant is located in the community of Val Gagne and provides drinking water to approximately 175 residents.<br>All of the systems are served by a network of water mains, hydrants, curb stops and other appurtenances |
| Safe | Description of boil water advisories and service interruptions | Boil water advisories are issued to inform consumers that they need to boil their water to protect their health.<br>Water interruption means any anticipated and unanticipated interruptions in the supply of potable water. |

### Technical Levels of Service

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

Table 13 Water Network Technical Levels of Service

| Values | Technical Metric | Current LOS |
|---|---|---|
| Cost Efficient | Actual Capital Reinvestment Rate (Annual) – Target Reinvestment Rate (Annual) | 1% - 1.5% |
| | % of properties connected to the municipal water system | 64% |
| Sustainable | Average Condition Rating | Poor (23.9) |
| | % of properties where fire flow is available | 100% |
| Safe | # of connection-days per year due to water main breaks compared to the total number of properties connected to the municipal water system | UNK |
| | # 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 | UNK |
| | Average Risk Rating | High (12.06) |

Note: The Township is currently in a complete staff turnover and are working on determining the technical levels of service numbers.

## Proposed Levels of Service

Proposed levels of service are established at the Township-wide level to ensure a strong foundational approach to managing the water network. This includes a recommended increase in capital funding, improvements in asset data, and the development of condition information through targeted field assessments

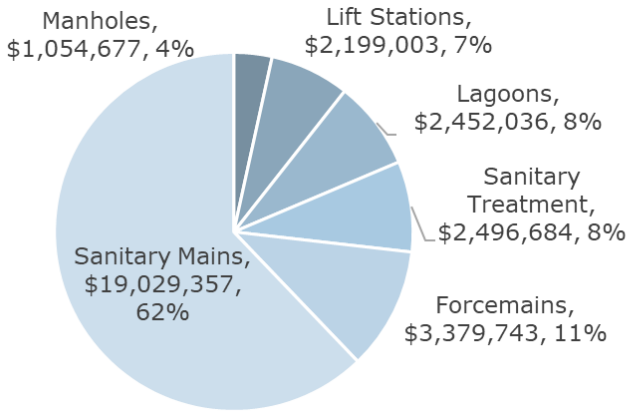
# Appendix D: Sanitary Network

The Township owns Sanitary Network infrastructure for collection, conveyance, treatment, and disposal.

## Inventory & Valuation

The graph below displays the total replacement cost of each asset segment in Black River-Matheson's sanitary network inventory. As the Township has not had a complete componentization of their buildings their inventory tracks buildings as a main asset with some small as replaced componentization.

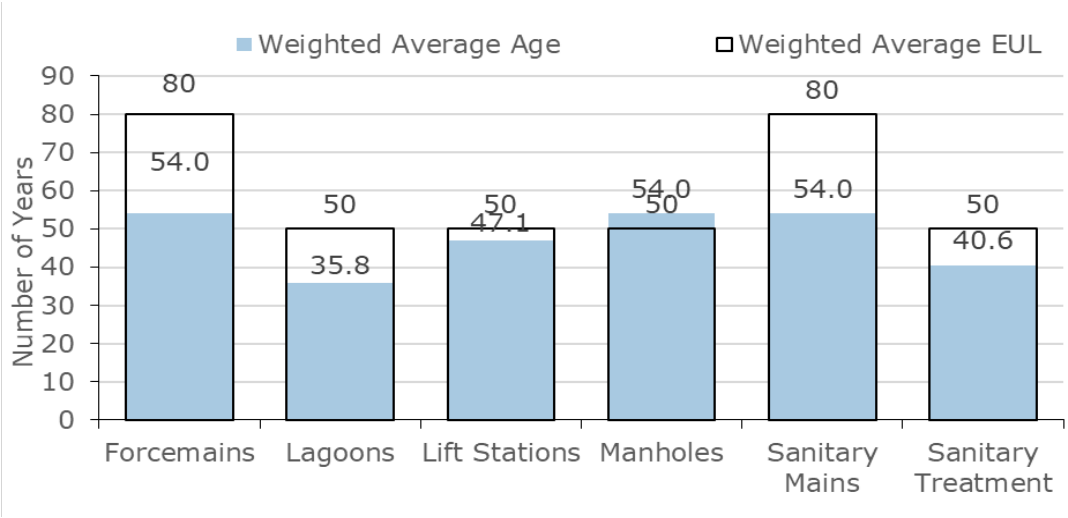
Figure 30: Sanitary Network Replacement Cost




## Asset Condition & Age

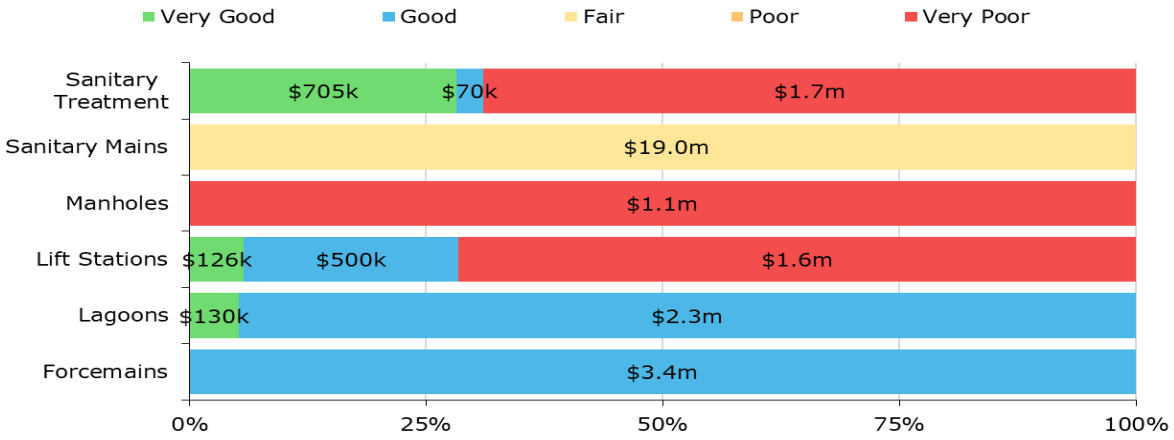
The table below identifies the current average condition, the average age, and the estimated useful life for each asset segment. The average condition (%) is a weighted value based on replacement cost.

Figure 31: Sanitary Network Average Age vs Average EUL




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

Figure 32: Sanitary Network Condition Breakdown




To ensure that the municipal sanitary network continues to provide an acceptable level of service, the Township should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of maintenance, rehabilitation and replacement activities is required to increase the overall condition of the water network.

Each asset's estimated useful life should also be reviewed to determine whether adjustments need to be made to better align with the observed service life.

## Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets. At present, the Township is in the process of exploring options for implementing a comprehensive asset condition assessment strategy.

# Lifecycle Management Strategy

To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration. The following table outlines the Township's current lifecycle management strategy.

Figure 33: Sanitary Network Current Lifecycle Strategy

**Maintenance / Rehabilitation / Replacement**

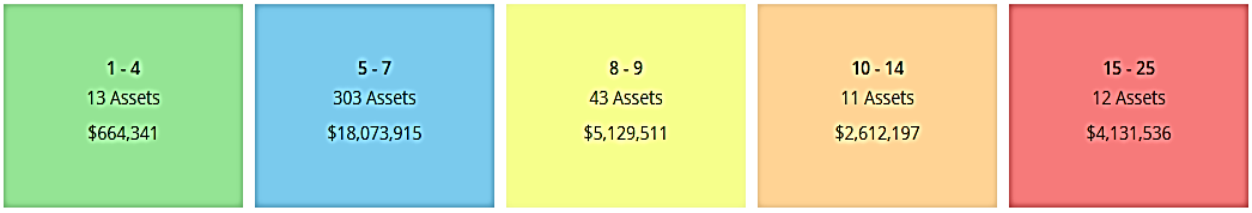
- Repairs to sanitary mains and manholes are completed on an as-needed basis
- Replacement activities are identified based on an analysis of breakdown rates as well as any issues identified during regular maintenance activities

# Risk & Criticality

The risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset

category based on available inventory data. See Appendix J: Risk Rating Criteria for the criteria used to determine the risk rating of each asset.

Figure 34: Sanitary Network Risk Matrix




This is a high-level model that has been developed based on information currently available and should be reviewed and adjusted to reflect an evolving understanding of both the probability and consequences of asset failure.

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

# Levels of Service

The framework created by the Township for levels of service is a valuable tool for assessing and managing the performance of their assets and/or services provided by their assets. Proposed levels of service for the Township have been developed through engagement with Township staff.

## Current Levels of Service

The following tables identify the Township's current level of service for the road network. These metrics include the technical and community level of service metrics that are required as part of O. Reg. 588/17 as well as any additional performance measures that the Township has selected.

### Community Levels of Service

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

Table 14 Sanitary Network Community Levels of Service

| Values | Qualitative Description | Current LOS |
|---|---|---|
| Sustainable | Description, which may include maps, areas of the municipality that are connected to the municipal wastewater system | Matheson Sewage Treatment Plant with 16.8 km of main and 145 manholes and 3 km of forcemains |
| Safe | Description of how sanitary sewers in the municipal wastewater system are designed to be resilient to avoid stormwater infiltration | The design and construction of sanitary and storm sewers is in accordance with the latest design standards issued by the MECP to eliminate or minimize inflow and infiltration within the sanitary sewer system. |

### Technical Levels of Service

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

Table 15 Sanitary Network Technical Levels of Service

| Values | Technical Metric | Current LOS |
|---|---|---|
| Cost Efficient | % of properties connected to the municipal wastewater systems | 64% |
| | Actual Capital Reinvestment Rate (Annual) – Target Reinvestment Rate (Annual) | 0.4% - 1.5% |
| Sustainable | Average Condition Rating | Fair (48.3) |
| | # of events per year where combined sewer flow in the municipal wastewater system exceeds system capacity compared to the total number of properties connected to the municipal wastewater system | No combined sewer |
| Safe | # of connection-days per year with sanitary main backups compared to the total number of properties connected to the municipal wastewater system | TBD |
| | # of connection-days per year with sanitary service backups compared to the total number of properties connected to the municipal wastewater system | TBD |
| | Average Risk Rating | Moderate (9.7) |
| | # of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system | TBD |

Note: The Township is currently in a complete staff turnover and are working on determining the technical levels of service numbers.

## Proposed Levels of Service

Proposed levels of service are established at the Township-wide level to ensure a strong foundational approach to managing the sanitary network. This includes a recommended increase in capital funding, improvements in asset data, and the development of condition information through targeted field assessments

# Appendix E: Buildings

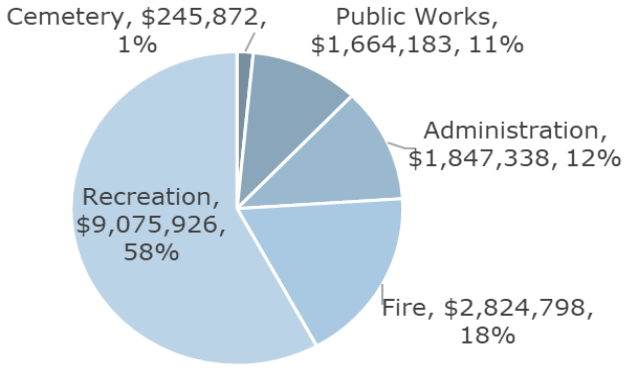
Black River-Matheson owns and maintains several facilities that provide key services to the community. These include:

- administrative offices
- cemeteries
- fire stations
- public works garages and storage sheds
- recreation facilities

## Inventory & Valuation

The graph below displays the total replacement cost of each asset segment in Black River-Matheson's buildings inventory. As the Township has not had a complete componentization of their buildings their inventory tracks buildings as a main asset with some small as replaced componentization.

Figure 35: Buildings Replacement Cost

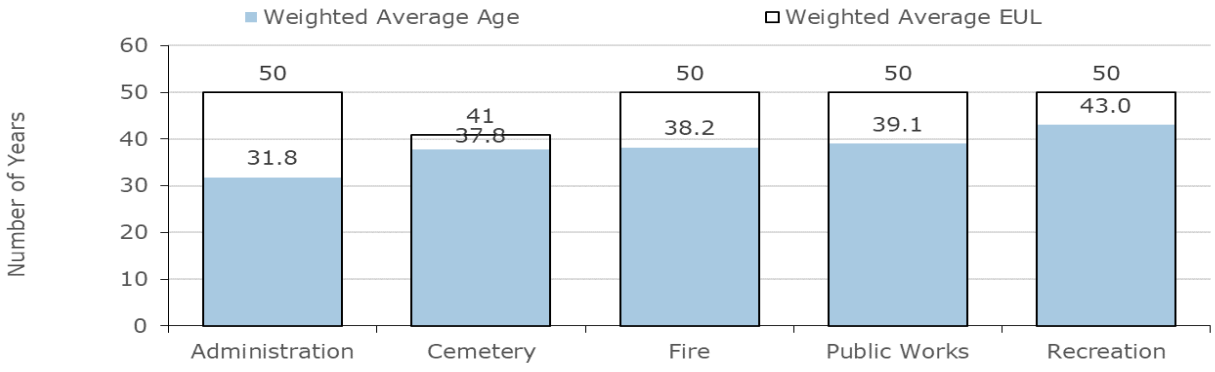



Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to represent capital requirements more accurately.

## Asset Condition & Age

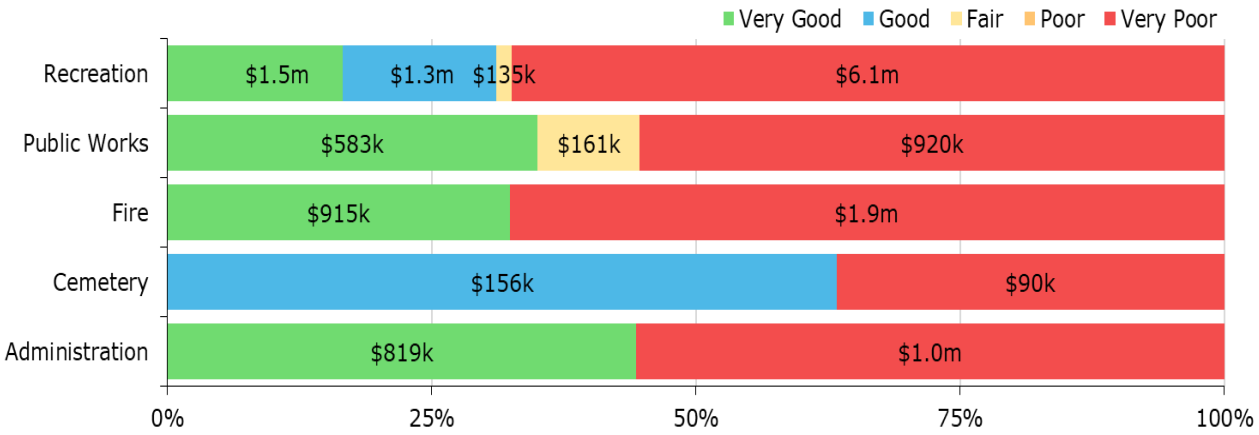
The graph below identifies the average age, and the estimated useful life for each asset segment. The values are weighted based on replacement cost.

Figure 36: Buildings Average Age vs Average EUL



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

Figure 37: Buildings Condition Breakdown




To ensure that the municipal buildings continue to provide an acceptable level of service, the Township should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of maintenance, rehabilitation and replacement activities is required to increase the overall condition of the buildings.

Each asset's estimated useful life should also be reviewed to determine whether adjustments need to be made to better align with the observed service life.

## Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets. Buildings are repaired as required based on deficiencies identified by outside experts, staff, or residents.

# Lifecycle Management Strategy

To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration. The following table outlines the Township's current lifecycle management strategy.

Figure 38: Buildings Current Lifecycle Strategy

**Maintenance / Rehabilitation / Replacement**

- Staff identify building maintenance needs in reaction to breakdowns

# Risk & Criticality

The risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset

category based on available inventory data. See Appendix J: Risk Rating Criteria for the criteria used to determine the risk rating of each asset.

Figure 39: Buildings Risk Matrix


This is a high-level model that has been developed based on information currently available and should be reviewed and adjusted to reflect an evolving understanding of both the probability and consequences of asset failure.

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

# Levels of Service

The framework created by the Township for levels of service is a valuable tool for assessing and managing the performance of their assets and/or services provided by their assets. Proposed levels of service for the Township have been developed through engagement with Township staff.

## Current Levels of Service

The following tables identify the Township's current level of service for the road network. These metrics include the technical and community level of service metrics that are required as part of O. Reg. 588/17 as well as any additional performance measures that the Township has selected.

### Community Levels of Service

The qualitative descriptions that determine the community levels of service provided by municipal buildings are based on the types of facilities outlined below:

- administrative offices
- cemeteries
- public works garages and storage sheds
- fire stations
- recreation facilities

### Technical Levels of Service

The quantitative metrics that determine the technical level of service provided by the buildings in Black River-Matheson are going to be the analysis of reinvestment rates, asset performance (condition breakdown) and asset risk levels.

Table 16 Buildings Technical Levels of Service

| Values | Technical Metric | Current LOS |
|---|---|---|
| Cost Efficient | Actual Capital Reinvestment Rate (Annual) – Target Reinvestment Rate (Annual) | 0% - 2.0% |
| Sustainable | Average Condition Rating | Fair (31) |
| Safe | Average Risk Rating | Very High (18.06) |

## Proposed Levels of Service

Proposed levels of service are established at the Township-wide level to ensure a strong foundational approach to managing the Township owned buildings. This includes a recommended increase in capital funding, improvements in asset data, and the development of condition information through targeted field assessments

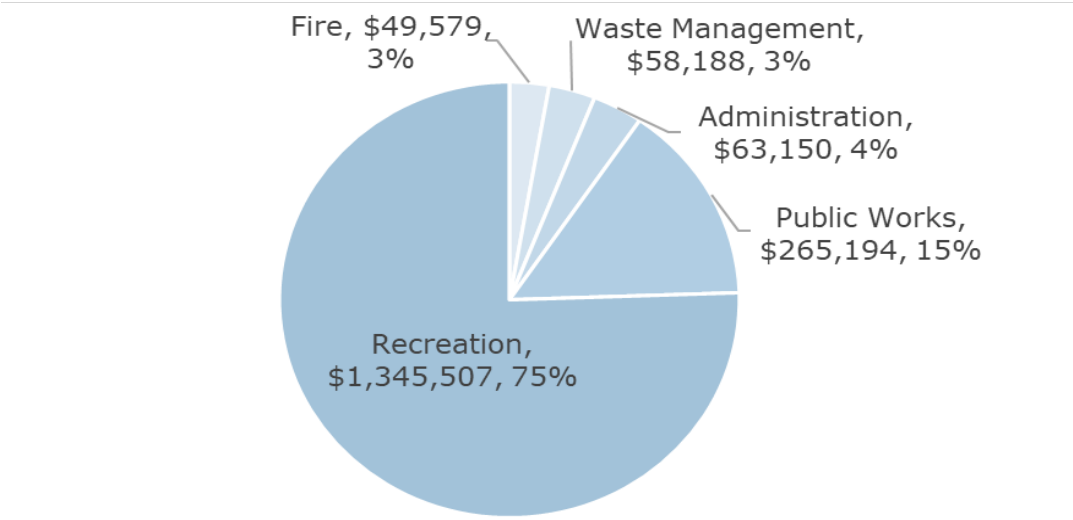
# Appendix F: Land Improvements

Black River-Matheson's land improvement infrastructure is made up of playground equipment, general improvements such as fencing as well as parking lots.

## Asset Inventory & Valuation

The graph below displays the replacement cost of each asset segment in the Township's land improvement inventory.

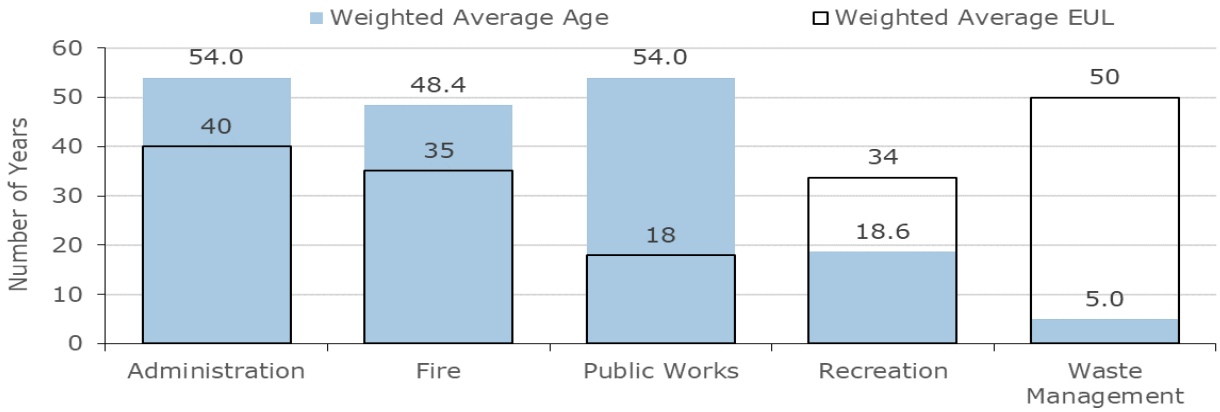
Figure 40: Land Improvements Replacement Cost




## Asset Condition & Age

The graph below identifies the average age, and the estimated useful life for each asset segment. The values are weighted based on replacement cost.

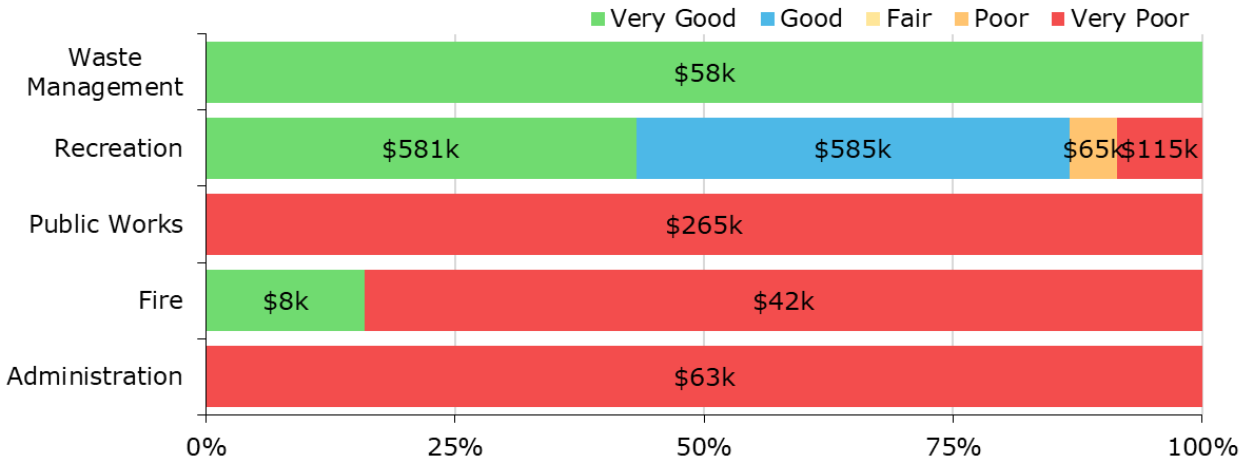
Figure 41: Land Improvements Average Age vs Average EUL



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

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

Figure 42: Land Improvement Condition Breakdown




To ensure that the Township's land improvements continue to provide an acceptable level of service, the Township should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination activities is required to increase the overall condition of the land improvements.

## Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets. Due to the varied nature of the asset category the assets are managed individually.

# Lifecycle Management Strategy

To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration. The following figures outline Black River-Matheson's current lifecycle management strategy.

Figure 43: Land Improvements Current Lifecycle Strategy

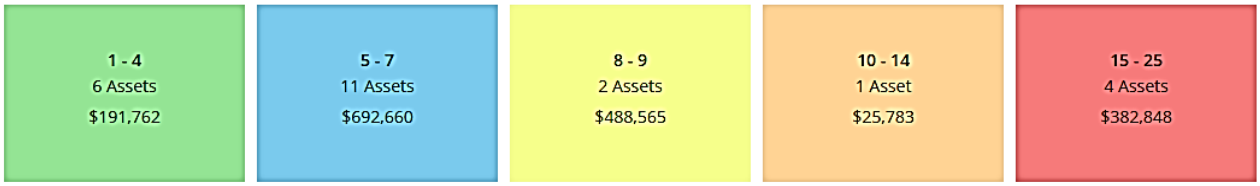
**Maintenance / Rehabilitation / Replacement**

- Similar to condition, lifecycle management activities are dependent on equipment type and department

# Risk & Criticality

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on available inventory data. See Appendix J: Risk Rating Criteria for the criteria used to determine the risk rating of each asset.

Figure 44: Land Improvement Risk Matrix




This is a high-level model developed by municipal staff and should be reviewed and adjusted to reflect an evolving understanding of both the probability and consequences of asset failure. The identification of critical assets allows the Township to determine appropriate risk mitigation strategies and treatment options.

# Levels of Service

The framework created by the Township for levels of service is a valuable tool for assessing and managing the performance of their assets and/or services provided by their assets. Proposed levels of service for the Township have been developed through engagement with Township staff.

## Current Levels of Service

The following tables identify the Township's current level of service for the road network. These metrics include the technical and community level of service metrics that are required as part of O. Reg. 588/17 as well as any additional performance measures that the Township has selected.

### Community Levels of Service

The qualitative descriptions that determine the community levels of service provided by municipal land improvements are based on the types of facilities outlined below:

- Administration building parking lots
- Fire – Ramore, Matheson, Val Gagne, and Holtyre parking lots and fences
- Public works parking lots
- Recreation parks, playgrounds, parking lots and fencing

### Technical Levels of Service

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

Table 17 Land Improvements Technical Levels of Service

| Values | Technical Metric | Current LOS |
|---|---|---|
| Cost Efficient | Actual Capital Reinvestment Rate (Annual) – Target Reinvestment Rate (Annual) | 0% - 4.0% |
| Sustainable | Average Condition Rating | Fair (41.89) |
| Safe | Average Risk Rating | Moderate (8.36) |

## Proposed Levels of Service

Proposed levels of service are established at the Township-wide level to ensure a strong foundational approach to managing the Township owned land improvement assets. This includes a recommended increase in capital funding, improvements in asset data, and the development of condition information through targeted field assessments

# Appendix G: Machinery & Equipment

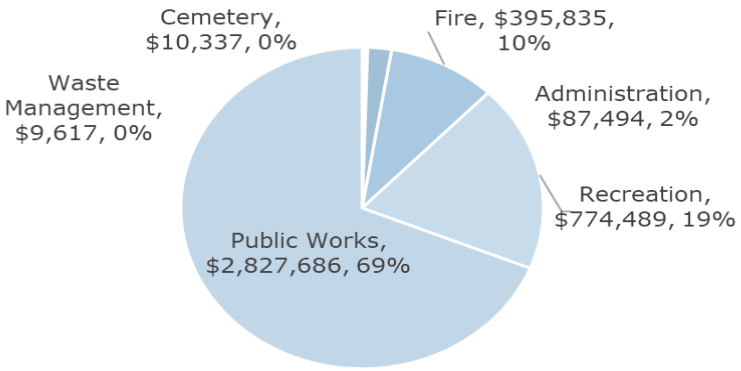
To maintain the quality stewardship of Black River-Matheson's infrastructure and support the delivery of services, municipal staff own and employ various types of equipment. This includes:

- Computers, furniture and phone systems to support all municipal services
- Roads equipment to support roadway maintenance
- Equipment for the fire department to effectively respond to emergencies
- Landfill equipment to support solid waste disposal management
- Lawn, arena and gym equipment for recreational services

## Inventory & Valuation

The graph below displays the total replacement cost of each asset segment in the Black River-Matheson's equipment inventory.

Figure 45: Machinery & Equipment Replacement Costs

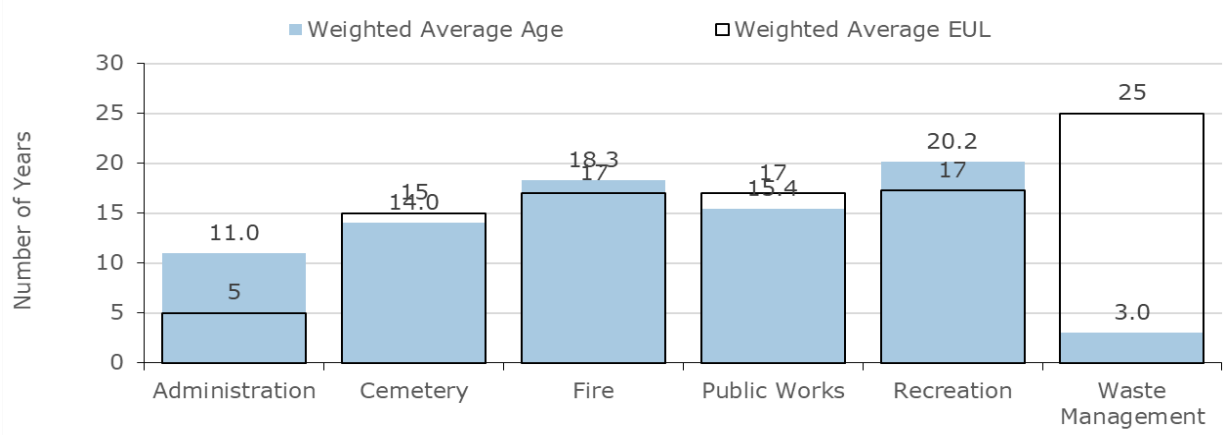



Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent capital requirements.

## Asset Condition & Age

The graph below identifies the average age and the estimated useful life for each asset segment. The values are weighted based on replacement cost.

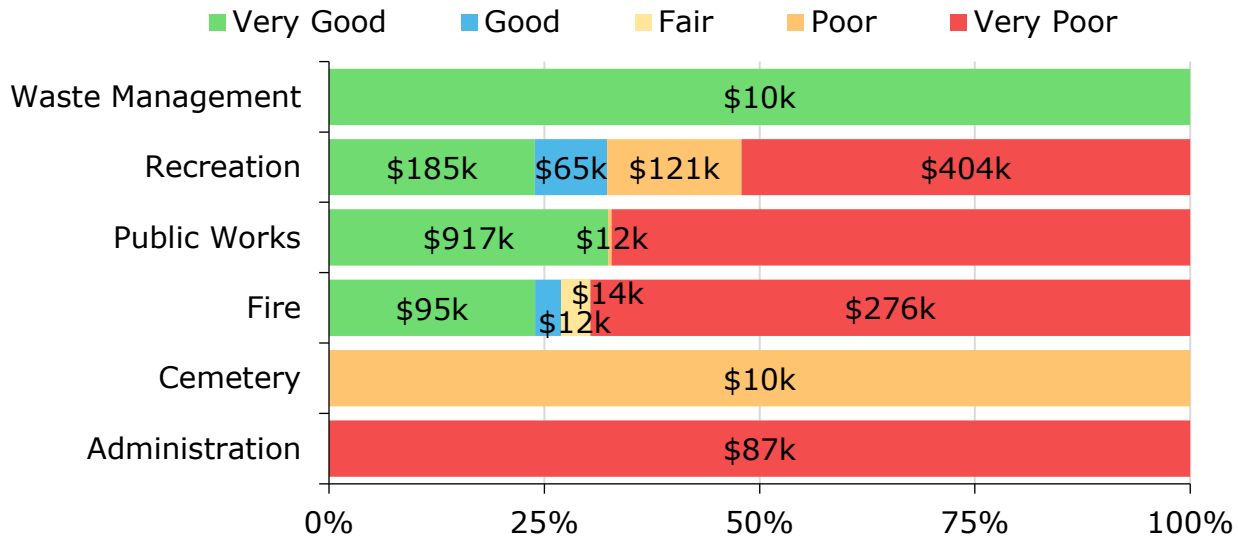
Figure 46: Machinery & Equipment Average Age vs Average EUL



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

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

Figure 47: Machinery & Equipment Condition Breakdown




To ensure that the Township's equipment continues to provide an acceptable level of service, Black River-Matheson should continue to monitor the average condition. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of maintenance, rehabilitation and replacement activities is required to increase the overall condition.

### Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The current approach is varied because of the broad range of types of equipment included in this category.

## Lifecycle Management Strategy

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

Figure 48: Machinery & Equipment Current Lifecycle Strategy

**Maintenance / Rehabilitation / Replacement**

- Lifecycle activities are tailored to the specific characteristics, needs and priorities of each equipment type and department.

# Risk & Criticality

The risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on available inventory data. See Appendix J: Risk Rating Criteria for the criteria used to determine the risk rating of each asset.

This is a high-level model that has been developed based on information currently available and should be reviewed and adjusted to reflect an evolving understanding of both the probability and consequences of asset failure.

Figure 49: Machinery & Equipment Risk Breakdown


# Levels of Service

The framework created by the Township for levels of service is a valuable tool for assessing and managing the performance of their assets and/or services provided by their assets. Proposed levels of service for the Township have been developed through engagement with Township staff.

## Current Levels of Service

The following tables identify the Township's current level of service for the road network. These metrics include the technical and community level of service metrics that are required as part of O. Reg. 588/17 as well as any additional performance measures that the Township has selected.

### Community Levels of Service

The qualitative descriptions that determine the community levels of service provided by municipal machinery & equipment are based on the types of equipment outlined below:

- Administration equipment
- Fire equipment
- Public works equipment
- Recreation equipment
- Waste management equipment
- Cemetery equipment

### Technical Levels of Service

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

Table 18 Machinery & Equipment Technical Levels of Service

| Values | Technical Metric | Current LOS |
|---|---|---|
| Cost Efficient | Actual Capital Reinvestment Rate (Annual) – Target Reinvestment Rate (Annual) | 0% - 6.7% |
| Sustainable | Average Condition Rating | Fair (50.40) |
| Safe | Average Risk Rating | High (14.83) |

## Proposed Levels of Service

Proposed levels of service are established at the Township-wide level to ensure a strong foundational approach to managing Township owned machinery and equipment. This includes a recommended increase in capital funding, improvements in asset data, and the development of condition information through targeted field assessments

# Appendix H: Vehicles

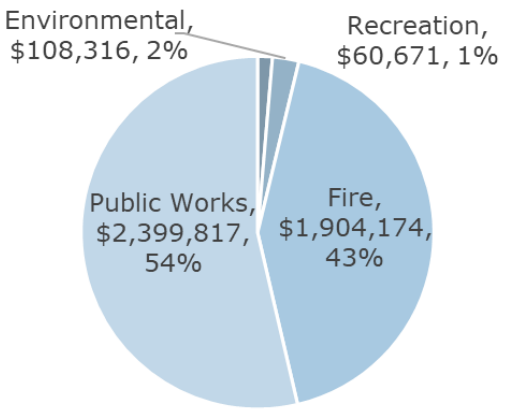
Vehicles allow staff to efficiently deliver municipal services and personnel. Municipal vehicles are used to support several service areas, including:

- Roads vehicles for road maintenance and winter control activities
- Fire vehicles for emergency services
- Environmental services vehicles for equipment transportation
- Recreation services vehicles for equipment transportation

## Inventory & Valuation

The graph below displays the total replacement cost of each asset segment in the vehicle inventory.

Figure 50: Vehicle Replacement Costs

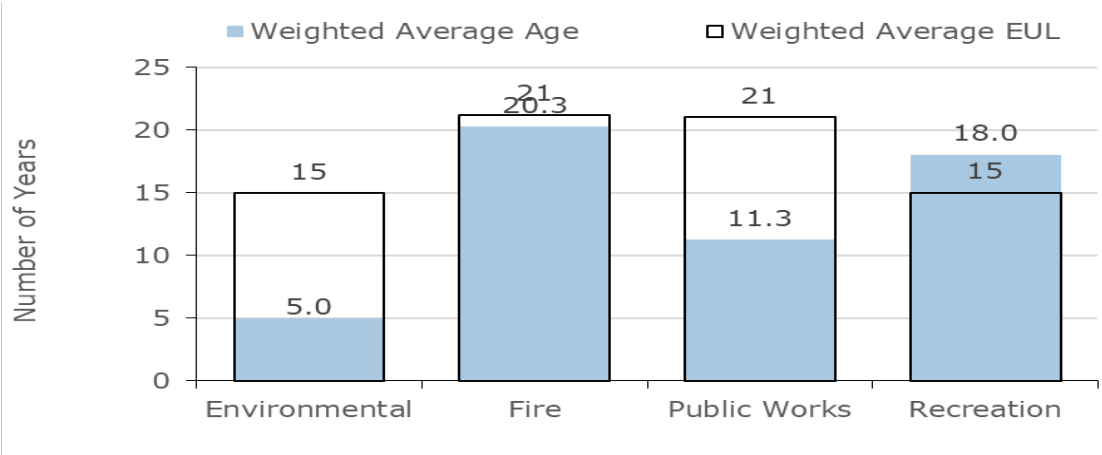



Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to represent capital requirements more accurately.

## Asset Condition & Age

The graph below identifies the average age and the estimated useful life for each asset segment. The values are weighted based on replacement cost.

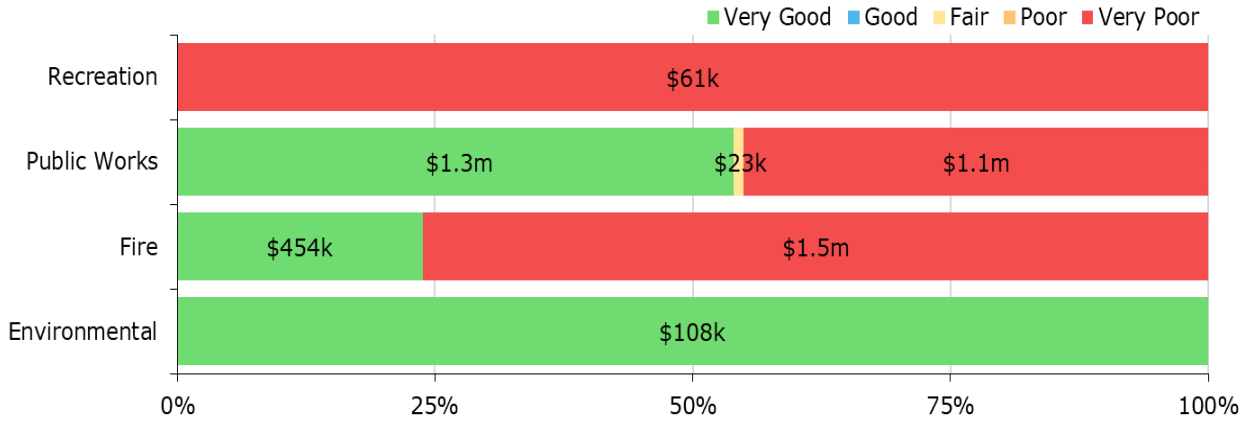
Figure 51: Vehicles Average Age vs Average EUL



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

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

Figure 52: Vehicles Condition Breakdown




To ensure that the Township's vehicles continue to provide an acceptable level of service, the Township should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of maintenance, rehabilitation and replacement activities is required to increase the overall condition of the vehicles.

## Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets. An example of the Township's current approach is staff complete regular visual inspections of vehicles to ensure they are in state of adequate repair prior to operation.

# Lifecycle Management Strategy

The condition or performance of assets will deteriorate over time. To ensure vehicles are performing as expected, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

Figure 53: Vehicles Current Lifecycle Strategy

**Maintenance / Rehabilitation / Replacement**

- operations and maintenance is completed by internal staff
- replacements are completed based on useful life estimates and OEM recommendations

# Risk & Criticality

The risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on available inventory data. See Appendix J: Risk Rating Criteria for the criteria used to determine the risk rating of each asset.

This is a high-level model that has been developed based on information currently available and should be reviewed and adjusted to reflect an evolving understanding of both the probability and consequences of asset failure.

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

Figure 54: Vehicles Risk Matrix


# Levels of Service

The framework created by the Township for levels of service is a valuable tool for assessing and managing the performance of their assets and/or services provided by their assets. Proposed levels of service for the Township have been developed through engagement with Township staff.

## Current Levels of Service

The following tables identify the Township's current level of service for the road network. These metrics include the technical and community level of service metrics that are required as part of O. Reg. 588/17 as well as any additional performance measures that the Township has selected.

### Community Levels of Service

The qualitative descriptions that determine the community levels of service provided by municipal vehicles are based on the service usage outlined below:

- Roads vehicles for road maintenance and winter control activities
- Fire vehicles for emergency services
- Environmental services vehicles for equipment transportation
- Recreation services vehicles for equipment transportation

### Technical Levels of Service

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

Table 19 Vehicles Technical Levels of Service

| Values | Technical Metric | Current LOS |
|---|---|---|
| Cost Efficient | Actual Capital Reinvestment Rate (Annual) – Target Reinvestment Rate (Annual) | 0% - 5.0% |
| Sustainable | Average Condition Rating | Fair (62.26) |
| Safe | Average Risk Rating | Very High (15.58) |

## Proposed Levels of Service

Proposed levels of service are established at the Township-wide level to ensure a strong foundational approach to managing the vehicle assets. This includes a recommended increase in capital funding, improvements in asset data, and the development of condition information through targeted field assessments

# Appendix I: Condition Assessment Guidelines

The foundation of good asset management practice is accurate and reliable data on the current condition of infrastructure. Assessing the condition of an asset at a single point in time allows staff to have a better understanding of the probability of asset failure due to deteriorating condition.

Condition data is vital to the development of data-driven asset management strategies. Without accurate and reliable asset data, there may be little confidence in asset management decision-making which can lead to premature asset failure, service disruption and suboptimal investment strategies. To prevent these outcomes, the Township's condition assessment strategy should outline several key considerations, including:

- The role of asset condition data in decision-making
- Guidelines for the collection of asset condition data
- A schedule for how regularly asset condition data should be collected

## Role of Asset Condition Data

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

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

## Guidelines for Condition Assessment

Whether completed by external consultants or internal staff, condition assessments should be completed in a structured and repeatable fashion, according to consistent and objective assessment criteria. Without proper guidelines for the completion of condition assessments there can be little confidence in the validity of condition data and asset management strategies based on this data.

Condition assessments must include a quantitative or qualitative assessment of the current condition of the asset, collected according to specified condition rating criteria, in a format that can be used for asset management decision-making. As a result, it is important that staff adequately define the condition rating criteria that

should be used and the assets that require a discrete condition rating. When engaging with external consultants to complete condition assessments, it is critical that these details are communicated as part of the contractual terms of the project.

There are many options available to the Township to complete condition assessments. In some cases, external consultants may need to be engaged to complete detailed technical assessments of infrastructure. In other cases, internal staff may have sufficient expertise or training to complete condition assessments.

## Developing a Condition Assessment Schedule

Condition assessments and general data collection can be both time-consuming and resource intensive. It is not necessarily an effective strategy to collect assessed condition data across the entire asset inventory. Instead, the Township should prioritize the collection of assessed condition data based on the anticipated value of this data in decision-making. The International Infrastructure Management Manual (IIMM) identifies four key criteria to consider when making this determination:

- Relevance: every data item must have a direct influence on the output that is required
- Appropriateness: the volume of data and the frequency of updating should align with the stage in the assets life and the service being provided
- Reliability: the data should be sufficiently accurate, have sufficient spatial coverage and be appropriately complete and current
- Affordability: the data should be affordable to collect and maintain

# Appendix J: Risk Rating Criteria

## Risk Definitions

| | |
|---|---|
| **Risk** | Integrating a risk management framework into your asset management program requires the translation of risk potential into a quantifiable format. This will allow you to compare and analyze individual assets across your entire asset portfolio. Asset risk is typically defined using the following formula: **Risk = Probability of Failure (POF) x Consequence of Failure (COF)** |
| | |
| **Probability of Failure (POF)** | The probability of failure relates to the likelihood that an asset will fail at a given time. The current physical condition and service life remaining are two commonly used risk parameters in determining this likelihood. |
| POF - Structural | The likelihood of asset failure due to aspects of an asset such as load carrying capacity, condition or breaks |
| POF - Functional | The likelihood of asset failure due to its performance |
| **POF - Range** | **1 - Rare 2 - Unlikely 3 - Possible 4 - Likely 5 - Almost Certain** |
| | |
| **Consequences of Failure (COF)** | The consequence of failure describes the overall effect that an asset's failure will have on an organization's asset management goals. Consequences of failure can range from non-eventful to impactful: a small diameter water main break in a subdivision may cause several rate payers to be without water service for a short time. However, a larger trunk water main may break outside a hospital, leading to significantly higher consequences. |
| COF - Financial | The monetary consequences of asset failure for the organization and its customers |
| COF - Social | The consequences of asset failure on the social dimensions of the community |
| COF - Environmental | The consequence of asset failure on an asset's surrounding environment |
| COF - Operational | The consequence of asset failure on the Township's day-to-day operations |
| COF - Health & safety | The consequence of asset failure on the health and well-being of the community |
| COF - Economic | The consequence of asset failure on strategic planning |
| **COF - Range** | **1 - Insignificant 2 - Minor 3 - Moderate 4 - Major 5 - Severe** |

# Risk Frameworks

| Probability of Failure | | | |
|---|---|---|---|
| **Criteria** | **Sub-Criteria** | **Value/ Range** | **Score** |
| Performance (60%) | Condition | 0-39 | 5 - Almost Certain |
| | | 40-49 | 4 - Likely |
| | | 50-69 | 3 - Possible |
| | | 70-89 | 2 - Unlikely |
| | | 90-100 | 1 - Rare |
| Operational (40%) | Service Life Remaining | <10% | 5 - Almost Certain |
| | | 10 - <20% | 4 - Likely |
| | | 20 - <30% | 3 - Possible |
| | | 30 - <40% | 2 - Unlikely |
| | | =>40% | 1 - Rare |

| Consequence of Failure | | | |
|---|---|---|---|
| **Criteria** | **Sub-Criteria** | **Value/Range** | **Score** |
| Financial 100% | Replacement Cost ($) | >$500,000 | 5 - Severe |
| | | $250,000 - $500,000 | 4 - Major |
| | | $75,000 - $250,000 | 3 - Moderate |
| | | $25,000 - $75,000 | 2 - Minor |
| | | < $25,000 | 1 - Insignificant |