2024

Asset Management Plan

THE TOWNSHIP OF
MONTAGUE
COUNTRY LIVING AT ITS BEST

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 Montague total $91.3 million. 77% of all assets analysed are in fair or better condition. Assessed condition data was available for all roads and most bridge and culvert assets, for the remaining assets, asset age was used to approximate condition. Generally, age can misstate 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 $1.7 million. Based on a historical analysis of sustainable capital funding sources, the Township is committing approximately $950 thousand towards capital projects or reserves per year. As a result, the Township is funding 56% of its annual capital requirements. This creates a total annual funding deficit of $757 thousand.

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 1.2% annual increase in revenues over a 15-year phase-in period. Funding scenarios over longer time frames are also presented which reduce the annual increases.

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 1.0% annual increase respectively in revenues over a 10-year phase-in period. Funding scenarios over longer time frames are also presented which reduce the annual increases.

In addition to annual needs, there is also an infrastructure backlog of $2.3 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.

Risk frameworks and levels of service targets can then be used to prioritize projects and help select the right lifecycle intervention for the right asset at the right time—including replacement or full reconstruction. The Township has developed preliminary risk models which are integrated with its asset register. These models can produce risk matrices that classify assets based on their risk profiles.

Most municipalities in Ontario, and across Canada, continue to struggle with meeting infrastructure demands. This challenge was created over many decades and will take many years to overcome. To this end, several recommendations should be considered, including:

- Continuous and dedicated improvement to the Township's infrastructure datasets, which form the foundation for all analysis, including financial projections and needs.
- Continuous refinements to the risk and lifecycle models as additional data becomes available. This will aid in prioritizing projects and creating more strategic long-term capital budgets.
- Development of key performance indicators for all infrastructure programs to establish benchmark data to calibrate levels of service targets for 2025 regulatory requirements.
- Continue conducting network-wide assessments to ensure condition information remains reliable.

The Township has taken important steps in building its asset management program. Continuous improvement of asset data will be essential in maintaining momentum, supporting long-term financial planning, and delivering affordable service levels to the community.

About this Document

The Township of Montague Asset Management Plan was developed in accordance with Ontario Regulation 588/17 ("O. Reg 588/17"). It contains a comprehensive analysis of Montague'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.

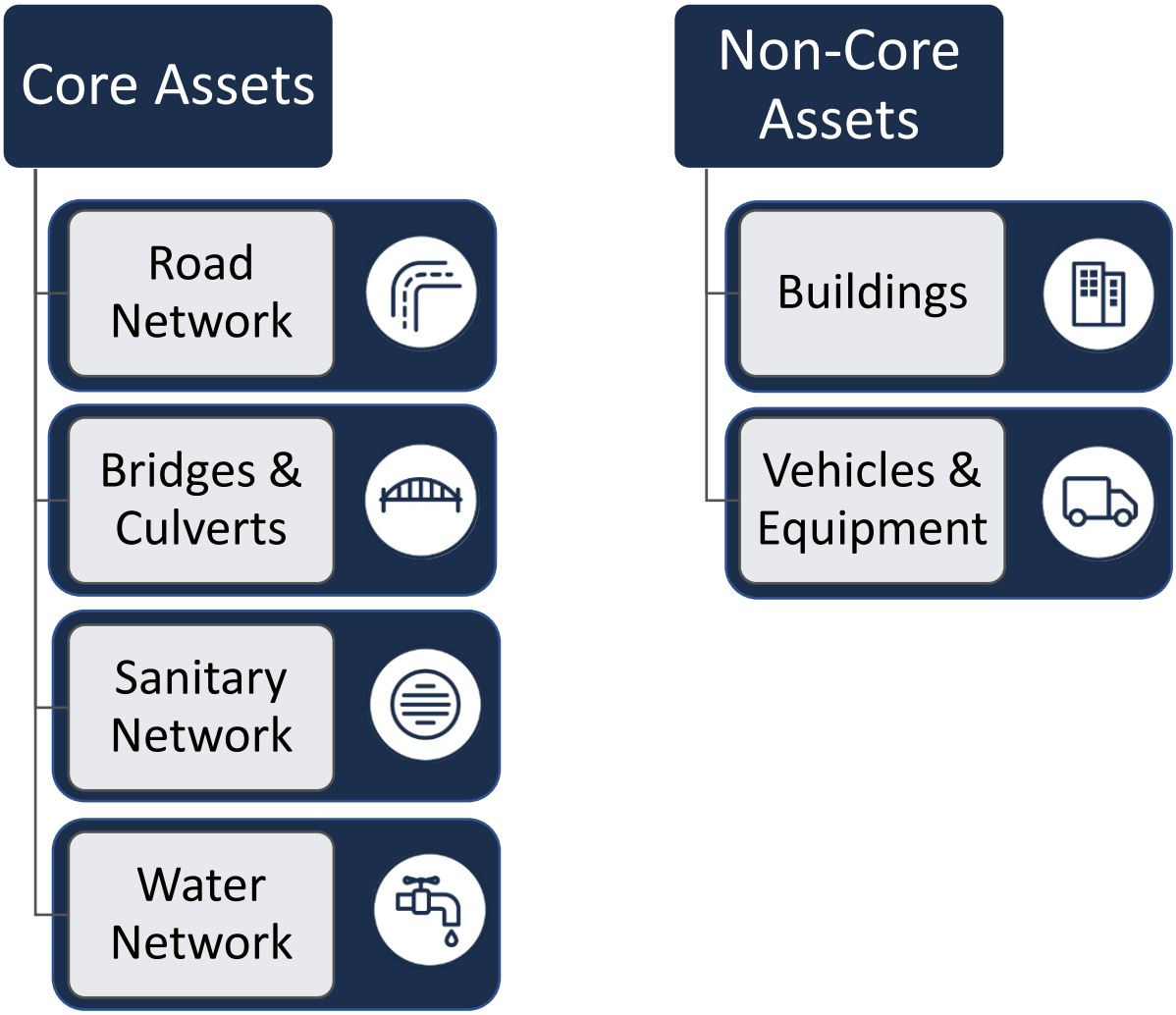
Table 1 Ontario Regulation 588/17 Requirements and Reporting Deadlines

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.

The following asset categories are addressed in further detail in the Appendix.



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 were generated.

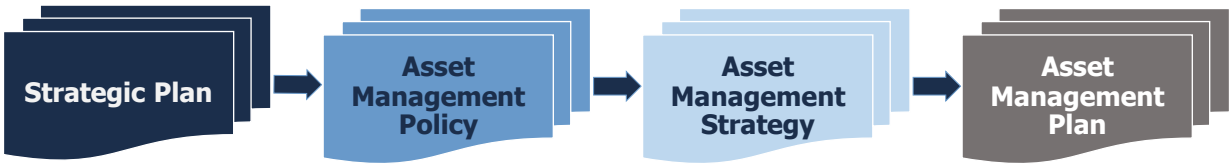
These challenges are quite common and require long-term commitment and sustained effort by staff. As the Township's asset management program evolves and advances, the quality of future AMPs and other core documents that support asset management will continue to increase.

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.

Shown below in the diagram, 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.

Table 2 Asset Hierarchy

CLASS	AM CATEGORY	AM SEGMENT
Infrastructure	Road Network	Gravel Roads Asphalt Roads Surface Treated Roads Streetlights
	Bridges & Culverts	Bridges Culverts
	Sanitary Network	Manholes Sanitary Mains
	Water Network	Water Mains Water Meters Valves Hydrants
General Capital	Buildings	Administration & Fire Roads Recreation & Culture
	Vehicles & Equipment	Administration Fire Roads Recreation & Culture

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

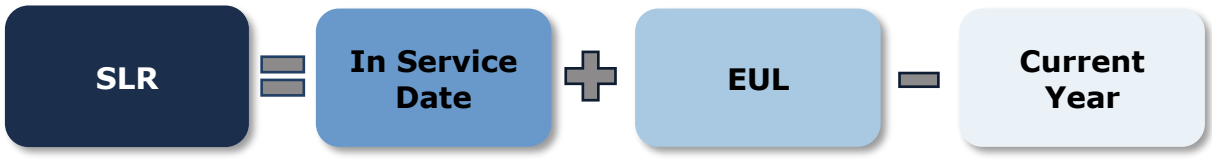
User-defined costs based on reliable sources are a reasonably accurate and reliable way to determine asset replacement costs. Cost inflation is typically used in the absence of reliable replacement cost data. It is a reliable method for recently purchased and/or constructed assets where the total cost 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

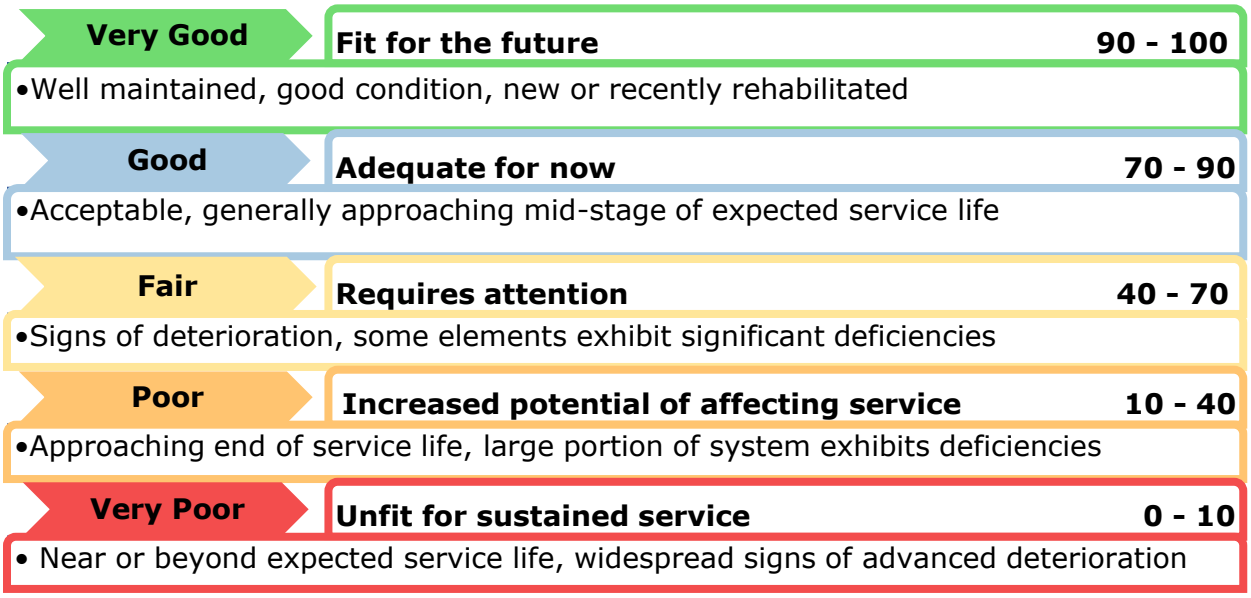


Asset Condition

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 Montague.

Figure 2: Standard Condition Rating Scale



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 G: 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 3 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 3: Lifecyle Management Typical Interventions

Maintenance

- General level of cost is **$**
- All actions necessary for retaining an asset as near as practicable to its original condition,but excluding rehabilitation or renewal. Maintenance does not increase the service potential of the asset

Rehabilitation / Renewal

- General level of cost is **$$$**
- Works to rebuild or replace parts or components of an asset, to restore it to a required functional condition and extend its life, which may incorporate some modification.
- Generally involves repairing the asset to deliver its original level of service (i.e. milling and paving of roads) without resorting to significant upgrading or replacement, using available techniques and standards.

Replacement

- General level of cost is **$$$$$**
- The complete replacement of an asset that has reached the end of its life, so as to provide a similar, or agreed alternative, level of service. Existing asset disposal is generally included

Risk Management Strategies

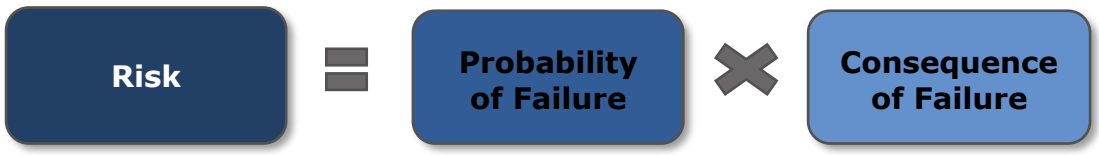
Municipalities generally take a 'worst-first' approach to infrastructure spending. Rather than prioritizing assets based on their importance to service delivery, assets in the worst condition are fixed first, regardless of their criticality. However, not all assets are created equal. Some are more important 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 was performed. 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.

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

Figure 4: Risk Equation



Probability of Failure

Several factors can help decision-makers estimate the probability or likelihood of an asset's failure, including its condition, age, previous performance history, and exposure to extreme weather events, such as flooding and ice jams—both a growing concern for municipalities in Canada.

Consequence of Failure

Estimating criticality also requires identifying the types of consequences that the organization and community may face from an asset's failure, and the magnitude of those consequences. Consequences of asset failure will vary across the infrastructure portfolio; the failure of some assets may result primarily in high direct financial cost but may pose limited risk to the community. Other assets may have a relatively minor financial value, but any downtime may pose significant health and safety hazards to residents. See **Error! Reference source not found.** for definitions and the developed risk models.

Levels of Service

A level of service (LOS) is a measure of the services that Montague 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.

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 must determine 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. There are 3 measures that are used for every asset category, and they are:

- Financial –targeted reinvestment rate compared to the actual current reinvestment rate.
- Performance – this is the average condition for the asset category.
- Risk – this is the average risk for the 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. Once current levels of service have been measured, the Township plans to establish proposed levels of service over a 10-year period, in accordance with O. Reg. 588/17.

Proposed levels of service should be realistic and achievable within the timeframe outlined by the Township. They should also be determined with consideration of a variety of community expectations, fiscal capacity, regulatory requirements, corporate goals, and long-term sustainability. Once proposed levels of service have been established, and prior to July 2025, the Township will identify a lifecycle management and financial strategy which allows these targets to be achieved.

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.

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

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.

Impact of Growth on Lifecycle Activities

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

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

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. This is calculated using each assets replacement cost and estimated useful life.

Reinvestment Rate

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

Portfolio Overview

Community Profile

The Township of Montague is a lower-tier municipality and part of Lanark County which is located in Southeastern Ontario. Montague is just South of the city of Ottawa, with the Rideau River running along the eastern side of the Township.

The Township was incorporated in 1850s and the area has a rich history, with European settlement dating back to the early 19th century. It was initially developed for agriculture and logging due to its fertile land and abundant forests. The Rideau Canal, a significant historical and engineering landmark, passes through part of the Township, and was a crucial factor in the area's early development. The economy traditionally revolved around agriculture, but in recent years, there has been a diversification with some residents commuting to Ottawa or nearby towns for work.

The Township offers various outdoor recreational activities, including fishing, boating, and hiking, particularly along the Rideau River and in the surrounding natural areas. The rural landscape also provides opportunities for cycling and bird watching. The Township values their rural community and local culture, with events and gatherings often centered around agricultural or outdoor activities.

Demand within the region is driven by the agricultural industry, which comprises of agricultural products and services, including farm equipment, supplies, and maintenance services. Furthermore, the natural beauty and outdoor recreational opportunities in and around the Township, including activities on the Rideau River and surrounding areas, can drive demand in sectors like tourism, hospitality, and leisure services. Proximity to larger cities, like Ottawa, can also drive demand for residential development in Montague.

Table 3 Montague & Ontario Census Information

Census Characteristic	Montague	Ontario
Population 2021	3,914	14,223,942
Population Change 2016-2021	4.1%	5.8%
Total Private Dwellings	1,551	5,929,250
Population Density	14.1/km^2	15.9/km^2
Land Area	278.47 km^2	892,411.76 km^2

State of the Infrastructure

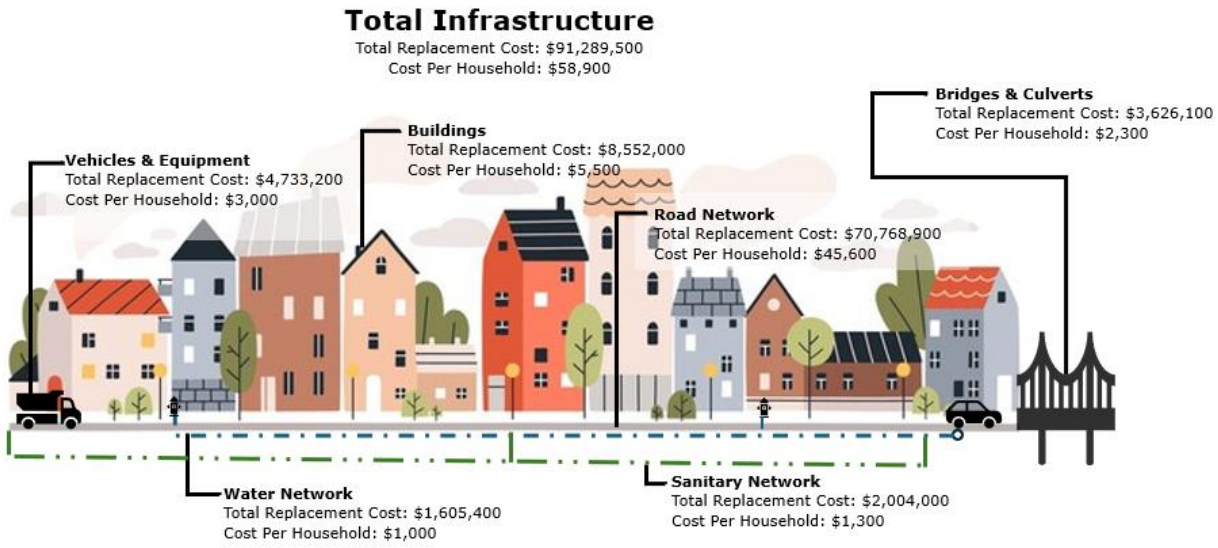
Table 4 Montague State of the Infrastructure

Asset Category	Replacement Cost	Asset Condition	Financial Capacity	
Road Network	$70,768,916	Good (65%)	Annual Requirement:	$1,056,278
			Funding Available:	$663,883
			Annual Deficit:	$392,395
Bridges & Culverts	$3,626,148	Poor (38%)	Annual Requirement:	$70,347
			Funding Available:	$29,895
			Annual Deficit:	$40,452
Buildings	$8,551,971	Fair (59%)	Annual Requirement:	$221,563
			Funding Available:	$94,157
			Annual Deficit:	$127,406
Vehicles & Equipment	$4,733,227	Good (62%)	Annual Requirement:	$294,294
			Funding Available:	$125,065
			Annual Deficit:	$169,229
Water Network	$1,605,179	Good (79%)	Annual Requirement:	$32,272
			Funding Available:	$18,339
			Annual Deficit:	$13,933
Sanitary Network	$2,004,035	Very Good (82%)	Annual Requirement:	$33,401
			Funding Available:	$19,361
			Annual Deficit:	$14,039
Overall	$91,289,476	Good (64%)	Annual Requirement:	$1,708,155
			Funding Available:	$950,700
			Annual Deficit:	$757,455

Replacement Cost

All Montague's asset categories have a total replacement cost of $91.3 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 5: Portfolio Replacement Value and cost per household

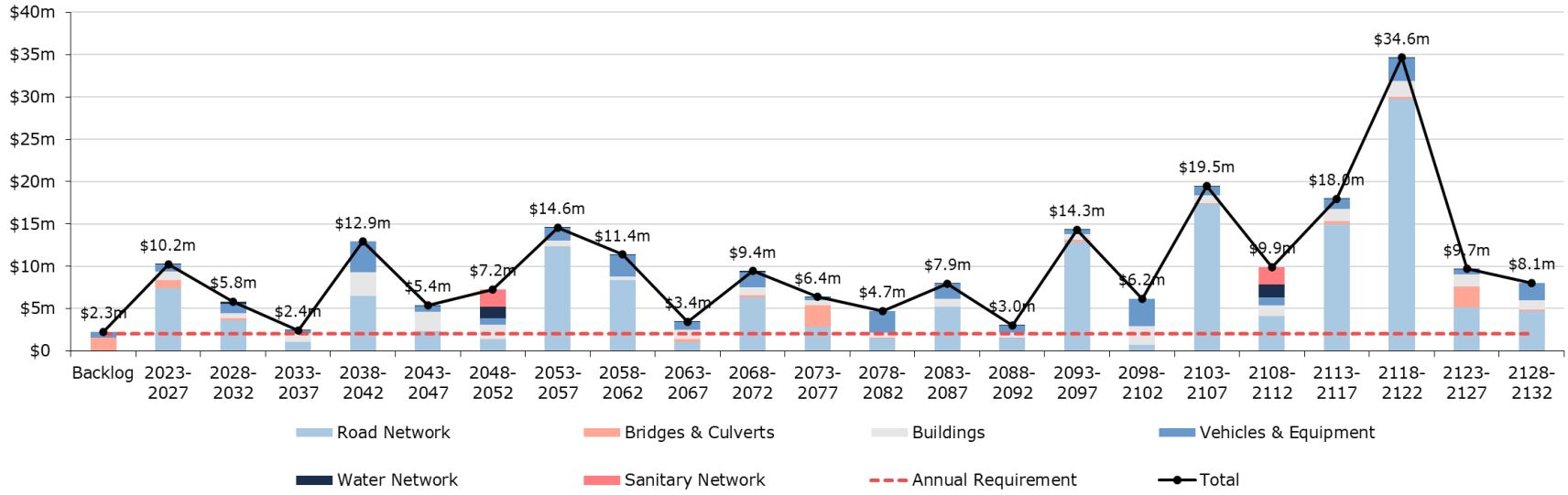


Forecasted Capital Requirements

Aging assets require maintenance, rehabilitation, and replacement. Figure 6 below illustrates the cyclical short-, medium- and long-term infrastructure replacement requirements for all asset categories analyzed. On average, $1.7 million is required each year to remain current with capital replacement needs for Montague's asset portfolio (red dotted line).

Although actual spending may fluctuate substantially from year to year, this figure is a useful benchmark for annual capital expenditure targets (or allocations to reserves) to ensure projects are not deferred and replacement needs are met as they arise. This figure relies on age and available condition data. Based on the current replacement cost of the portfolio, estimated at $91.3 million, this represents an annual target reinvestment rate of 1.87%.

Figure 6: Forecasted Capital Requirements



The chart also illustrates a backlog of $2.3 million, comprising assets that remain in service beyond their estimated useful life. It is unlikely that all such assets are in a state of disrepair, requiring immediate replacements or major renewals. This makes targeted and consistent condition assessments integral.

Risk frameworks, proactive lifecycle strategies, and levels of service targets can then be used to prioritize projects, continuously refine estimates for both backlogs and ongoing capital needs and help select the right treatment for each asset.

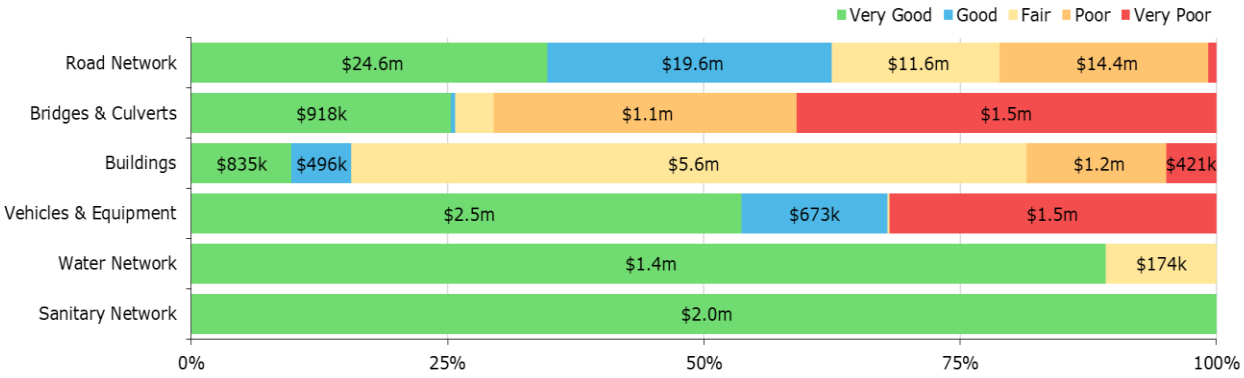
Condition of Asset Portfolio

The current condition of the assets is central to all asset management planning. Collectively, 77% of assets in Montague are in fair or better condition. This estimate relies on both age-based and field condition data.

Assessed condition data is available for roads as well as 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 chart below shows the breakdown of the overall asset portfolio's average condition.

Figure 7: Condition Breakdown



Service Life Remaining

Based on asset age, available assessed condition data and estimated useful life, 18% 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

Montague has noted key trends, challenges, and risks to service delivery that they are currently facing:

Capital Funding Strategies

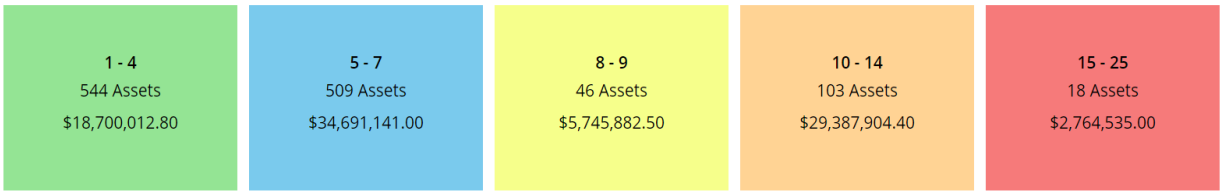
Partially owing to the completeness of the asset data historically, operations tend to be reactive rather than proactive. Problems are generally only known when issues arise, and complaints are made.

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.

The overall asset risk breakdown for Montague's asset inventory is portrayed in the figure below.

Figure 8: 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 Montague's asset management program.

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 the current level of service.

Strategic Plan Line of Site

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

Vision Statement

The Township of Montague is a municipality that embraces growth while maintaining community and financial sustainability. The Township of Montague values and upholds collaborative governance, working with staff, Council, and the community to achieve its shared goals.

Mission Statement

To build and support the community of the Township of Montague by working together to provide relevant and comprehensive municipal services.

Themes of the Strategic Plan

- **Financial and Community Sustainability** - clear emphasis on maintaining affordability for residents through tax rates.
- **Growth** - ensure that growth happens in a way does not unnecessarily burden the Township.
- **Recreation and Lifestyle** - there is a want for some increased services but also clear that there is a limited ability and want to fund new programming.
- **Municipal Facilities and Land** - creating a clear, understandable status of municipal building and land inventory.

Level of Service Statement

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

"The Township of Montague values collaborative governance while ensuring community sustainability with an emphasis on maintaining affordability."

This will be utilized to define levels of service in the Township.

Montague Climate Profile

The Township of Montague is in southeastern Ontario within Lanark County. 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 Montague may experience the following trends:

Higher Average Annual Temperature:

- Between the years 1971 and 2000 the annual average temperature was 6.2 ºC
- Under a high emissions scenario, the annual average temperatures are projected to increase by 5.8 ºC by the year 2050 and over 6.5 ºC by the end of the century.

Increase in Total Annual Precipitation:

- Under a high emissions scenario, Montague is projected to experience an 12% increase in precipitation by the year 2051 and a 17% increase by the end of the century.

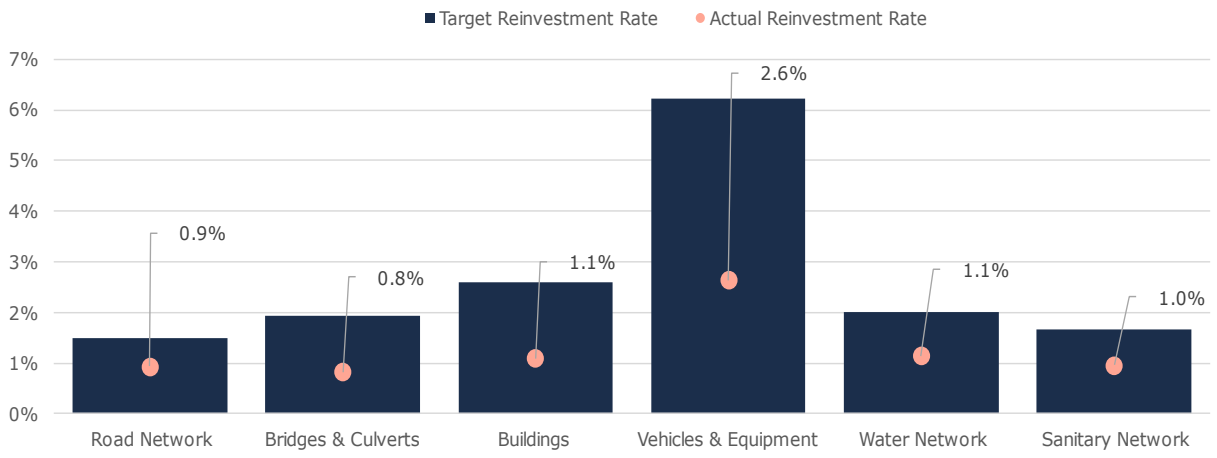
Increase in Frequency of Extreme Weather Events:

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

Reinvestment Rate

The graph below depicts funding gaps or surpluses by comparing target vs actual reinvestment rate. To meet the long-term replacement needs, the Township is recommended to be allocating approximately $1.7 million annually, for a target reinvestment rate of 1.87%. Actual annual spending on infrastructure totals approximately $950 thousand, for an actual reinvestment rate of 1.04%.

Figure 9: Target vs Actual Reinvestment Rates



Growth

Understanding the key drivers of growth and demand will allow the Town 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.

Montague Official Plan (2010 – Updated 2023)

The Township of Montague adopted an Official Plan to establish practical and clear objectives and policies in accordance with the Ontario Planning Act. The Official Plan is a planning document for the purpose of guiding the future development of the Township of Montague.

The Official Plan has been approved as of August 3rd, 2010, with updates in April 2023.The designated Settlement Areas of the Township are central to preserving and enhancing its rural character and natural beauty. By regulating new development and directing it towards these areas, the Township aims to support economic growth and diversification, including home-based and tourism-related businesses. The Settlement Areas are being developed to serve as key local centers for residential, social, commercial, and cultural activities, catering to both residents and visitors. Additionally, there's a focus on offering diverse living options in rural and settlement areas in an environmentally responsible way, aligning with the principle of limiting new residential development in rural regions.

The Township plans to direct new residential development towards vacant or underutilized lands in the designated Settlement Area. If there's a lack of growth opportunities through intensification, expanding the Settlement Area's boundaries could be considered, provided this expansion does not affect prime agricultural lands.

Population projections for Montague are expected to reach 4,565 over the planning period to 2028. External factors, including policies in other jurisdictions, can impact Montague Township's population growth and land use. The Lanark County Sustainable Communities Official Plan has a population allocation for the Township of 4,857 to the year 2038

The following tables outlines the recorded population and private dwellings for Montague, based on 2021 Census data.

Historical Figures	1996	2001	2006	2011	2016	2021
Population	3,802	3,671	3,595	3,483	3,761	3,914
Population Change	N/A	-3.4%	-2.1%	-3.2%	8.0%	4.1%
Private Dwellings	N/A	1,215	1,276	1,389	1,489	1,551

Financial Strategy

Financial Strategy Overview

Each year, the Township of Montague 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 averaging 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
- The Canada Community Benefits Fund (CCBF)
- The Ontario Community Infrastructure Fund (OCIF)

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

However, for the road network lifecycle management strategies have been developed to identify costs that are realized through strategic rehabilitation and renewal. The development of these strategies allows for a comparison of potential cost avoidance.

The following table compares two scenarios:

Replacement Only Scenario: Based on the assumption that assets deteriorate and – without regularly scheduled maintenance and rehabilitation – are replaced at the end of their service life.

Lifecycle Strategy Scenario: Based on the assumption that lifecycle activities are performed at strategic intervals to extend the service life of assets until replacement is required.

Table 5 Road Network Annual Capital Requirement Comparison

Asset Segment	Annual Requirements (Replacement Only)	Annual Requirements (Lifecycle Strategy)	Difference
Asphalt Roads	$660,419	$464,278	$196,142
Surface Treated Roads	$1,012,536	$586,274	$426,262
Streetlights	$5,727	$5,727	$0
	$1,678,682	**$1,056,278**	**$622,403**

The implementation of a proactive lifecycle strategy for paved roads (asphalt and surface treatment), leads to a potential annual cost avoidance of approximately $622 thousand. This represents a reduction of the annual capital requirement for paved roads by 37%.

Gravel roads lifecycle costs are not considered capital and gravel roads are not planned for replacement. As the lifecycle strategy scenario represents the lowest cost option available to the Township, this annual capital requirement was used in the development of the financial strategy.

Table 6 outlines the total average annual capital requirements for existing assets in each asset category. Based on a replacement cost of $91.3 million, annual capital requirements total approximately $1.7 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 1.87%.

Table 6 Average Annual Capital Requirements

Asset Category	Replacement Cost	Annual Capital Requirements	Target Reinvestment Rate
Road Network	$70,768,916	$1,056,278	1.5%
Bridges & Culverts	$3,626,148	$70,347	1.9%
Buildings	$8,551,971	$221,563	2.6%
Vehicles & Equipment	$4,733,227	$294,294	6.2%
Water Network	$1,605,179	$32,272	2.0%
Sanitary Network	$2,004,035	$33,401	1.7%
Total	**$91,289,476**	**$1,708,155**	**1.87%**

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 7 summarizes how current capital funding levels compare with funding required for each asset category. At existing levels, the Township is funding 56% of its annual capital requirements for all infrastructure analyzed. This creates a total annual funding deficit of $757 thousand.

Table 7 Current Funding Position vs Required Funding

Asset Category	Annual Capital Requirements	Annual Funding Available	Annual Infrastructure Deficit	Funding Level
Road Network	$1,056,278	$663,883	$392,395	63%
Bridges & Culverts	$70,347	$29,895	$40,452	42%
Buildings	$221,563	$94,157	$127,406	42%
Vehicles & Equipment	$294,294	$125,065	$169,229	42%
Water Network	$32,272	$18,339	$13,933	57%
Sanitary Network	$33,401	$19,361	$14,039	58%
Total	**$1,708,155**	**$950,700**	**$757,455**	**56%**

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 Montague 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 2023, Montague had an annual tax revenue of $3,578,230. As illustrated in the following table, without consideration of any other sources of revenue or cost containment strategies, full funding would require an 20.4% 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 8 Phasing in Annual Tax Increases

Total % Increase Needed in Annual Property Taxation Revenues	Phase-in Period			
	5 Years	10 Years	15 Years	20 Years
98.5%	3.8%	1.9%	1.2%	0.9%

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 $65.7 thousand, against available funding of $37.7 thousand. This creates a funding deficit of $28 thousand. To close this annual gap, the Township's total utility revenues would need to increase by 10.6%.

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 9 Phasing in Rate Increases

Category	Phase-in Period			
	5 Years	10 Years	15 Years	20 Years
Water Network (10.9%)	2.1%	1.0%	0.7%	0.5%
Sanitary Network (10.4%)	2.1%	1.0%	0.7%	0.5%

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 and Key Considerations

Financial Strategies

1. Review feasibility of adopting a full-funding scenario that achieves 100% of average annual requirements for the asset categories analyzed. This involves:
    - implementing a 1.2% annual tax increase over a 15-year phase-in period and allocating the full increase in revenue towards capital funding
    - continued allocation of OCIF and CCBF funding as previously outlined
    - implementing a 1.0% annual water and sanitary increases both over a 10-year phase-in period and allocating the full increase in revenue towards capital funding
    - using risk frameworks and staff judgement to prioritize projects, particularly to aid in elimination of existing infrastructure backlogs

NOTE: Although difficult to capture inflation costs, supply chain issues, and fluctuations in commodity prices will also influence capital expenditures.

Asset Data

1. Continuously review, refine, and calibrate lifecycle and risk profiles to better reflect actual practices and improve capital projections. In particular:
    - the timing of various lifecycle events, the triggers for treatment, anticipated impacts of each treatment, and costs
    - the various attributes used to estimate the likelihood and consequence of asset failures, and their respective weightings
2. Asset management planning is highly sensitive to replacement costs. Periodically update replacement costs based on recent projects, invoices, or estimates, as well as condition assessments, or any other technical reports and studies. Material and labour costs can fluctuate due to local, regional, and broader market trends, and substantially so during major world events. Accurately estimating the replacement cost of like-for-like assets can be challenging. Ideally, several recent projects over multiple years should be used.
3. Continue conducting network-wide assessments to ensure condition information remains reliable. Condition assessments are vital to asset management plans as they provide crucial insights into the health and performance of assets over time. By evaluating the condition of assets regularly, the Township can prioritize maintenance and repair efforts, optimize resource allocation, and extend the lifespan of assets. This proactive approach can ensure the efficient and cost-effective operation of infrastructure and equipment.

Appendix A: Road Network

State of the Infrastructure

Montague's road network comprises the largest share of its infrastructure portfolio, with a current replacement cost of $70 million, distributed primarily between asphalt, surface treated and gravel roads. The Township also owns and manages other supporting infrastructure and capital assets, including streetlights.

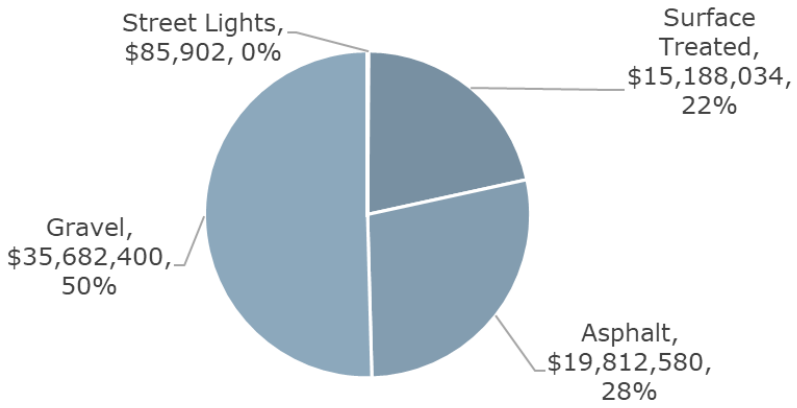
The state of the infrastructure for the road network is summarized below.

Replacement Cost	Condition	Financial Capacity	
$70,768,916	Good (65%)	Annual Requirement:	$1,056,278
		Funding Available:	$663,883
		Annual Deficit:	$392,395

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

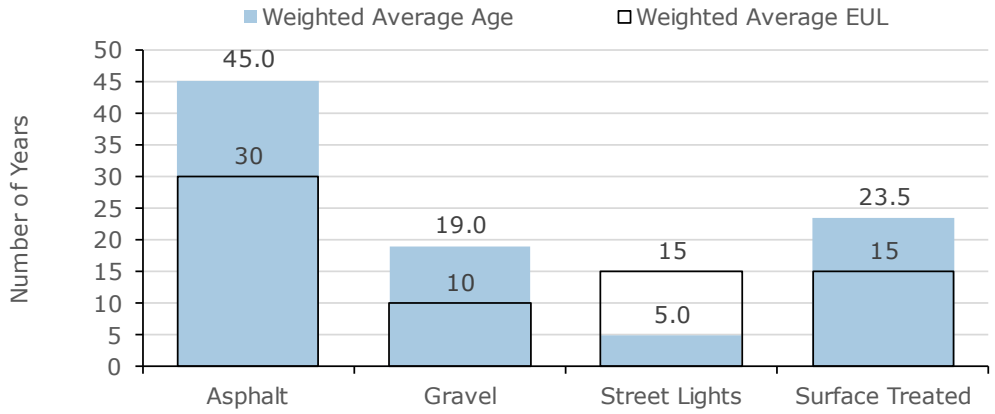


Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

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.

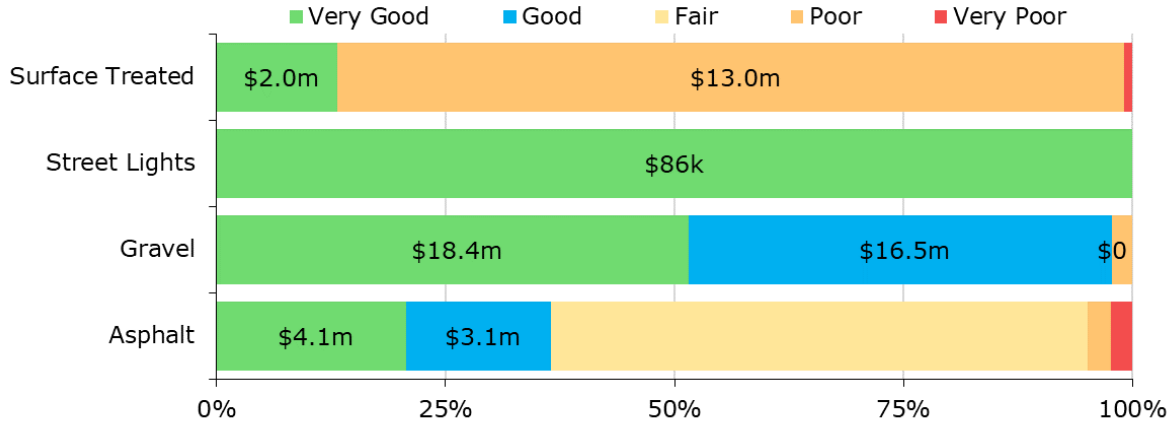
Figure 11: Road Network Average Age vs Average EUL



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

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 following describes the Township's current approach:

- A road needs study, through an external consultant, is conducted and staff intend to reduce the assessment interval by ensuring that internal staff assessments are conducted on a regular basis
- Routine road patrols are undertaken weekly, in compliance with the Minimum Maintenance Standards (MMS)

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

- Operations such as patching, shouldering, and ditching/brushing are routinely conducted on surface treated and asphalt roads.
- For gravel roads, a reactive approach is taken for brushing and ditching, with annual funding allocated for soft spot repair and regravelling on a 4-year cycle. Grading is performed up to 6 times a year as needed, with staff conducting internal annual assessments to gauge road condition and plan maintenance activities accordingly.

Rehabilitation / Renewal / Replacement

- Road replacement decisions align with Asset Management Plan Lifecycles and recommendations from the Roads Needs Study

PCI scores, staff judgment, traffic loads, and opportunity to bundle projects help inform the optimal lifecycle intervention. Lifecycle models used to estimate the savings to annual capital requirement are shown below in Figure 14: Surface Treated (LCB) Road Lifecycle Model and Figure 15: Asphalt (HCB) Road Lifecycle Model.

Figure 14: Surface Treated (LCB) Road Lifecycle Model

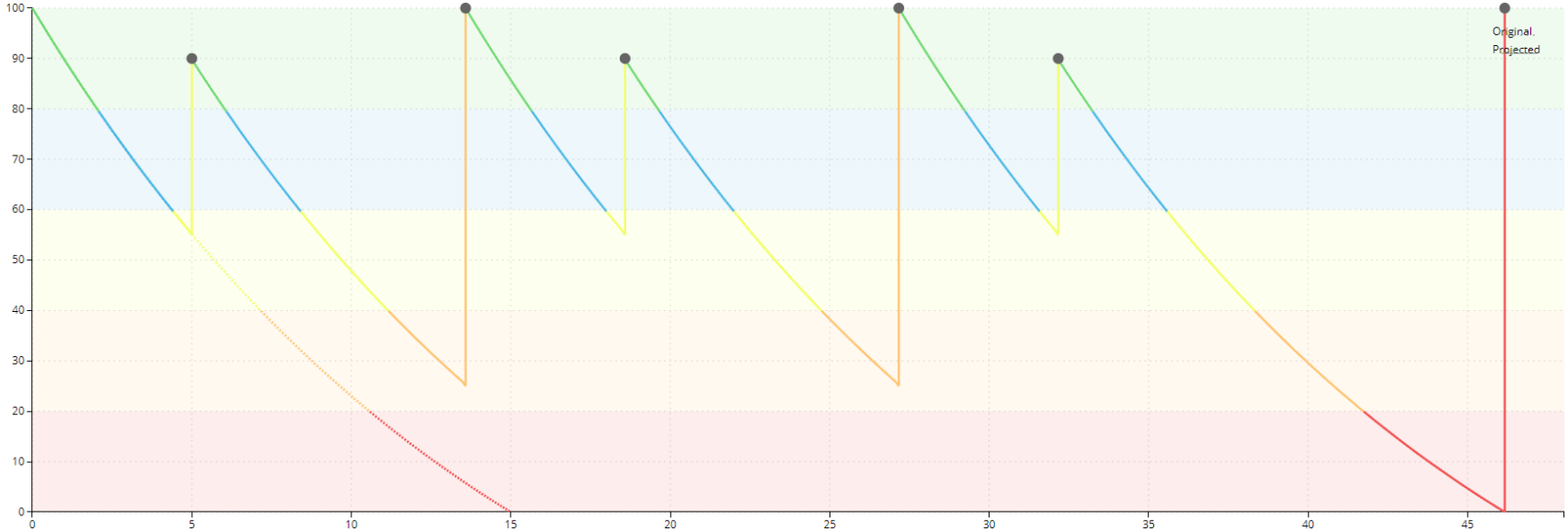
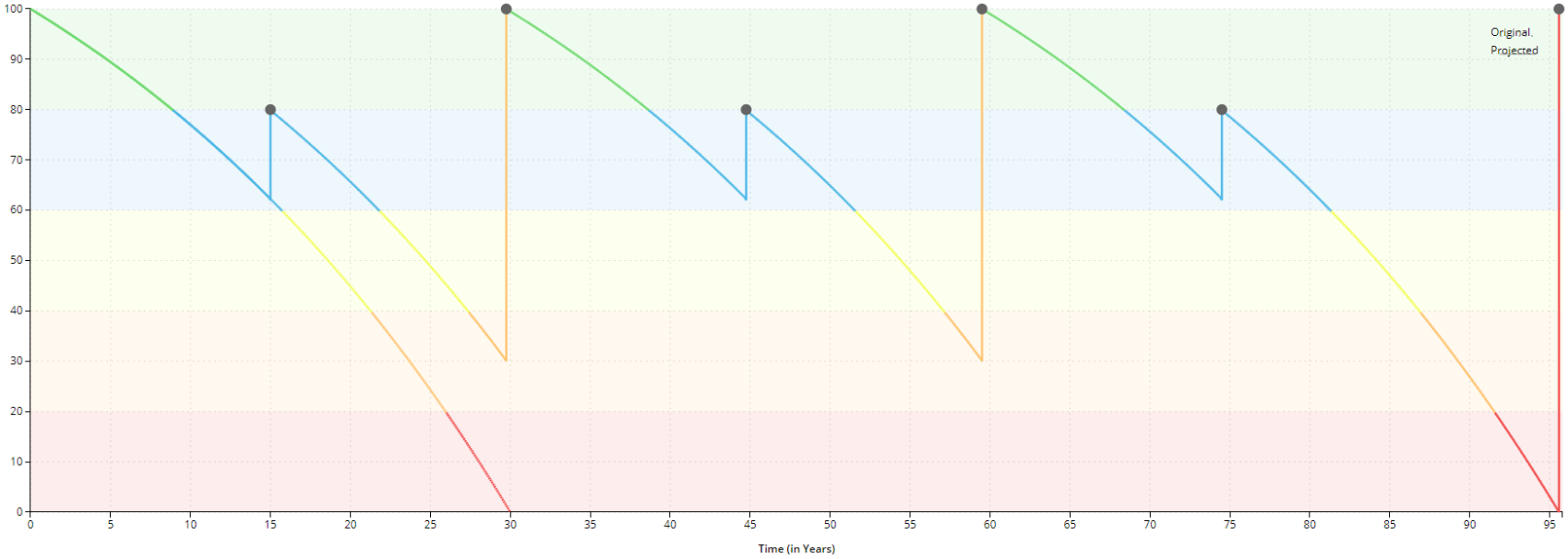


Figure 15: Asphalt (HCB) Road Lifecycle Model



Forecasted Capital Requirements

Figure 16 illustrates the cyclical short-, medium- and long-term infrastructure rehabilitation and replacement requirements for the Township's road network. Based on the lifecycle strategies identified previously for HCB and LCB roads, and assuming the end-of-life replacement of all other assets in this category, the following graph forecasts capital requirements for the road network. This analysis was run until 2128 to capture at least one iteration of replacement for the longest-lived asset in the asset register.

Montague's average annual requirements (red dotted line) total $1.06 million for all assets in the road network. Although actual spending may fluctuate substantially from year to year, this figure is a useful benchmark value for annual capital expenditure targets (or allocations to reserves) to ensure projects are not deferred and replacement needs are met as they arise. The chart illustrates capital needs through the forecast period in 5-year intervals.

The projections are designed to provide a long-term, portfolio-level overview of capital needs and should be used to support improved financial planning over several decades. They are based on asset replacement costs, age analysis, and condition data when available, as well as lifecycle modeling (roads only identified above).

Figure 16: Road Network Forecasted Capital Replacement Requirements

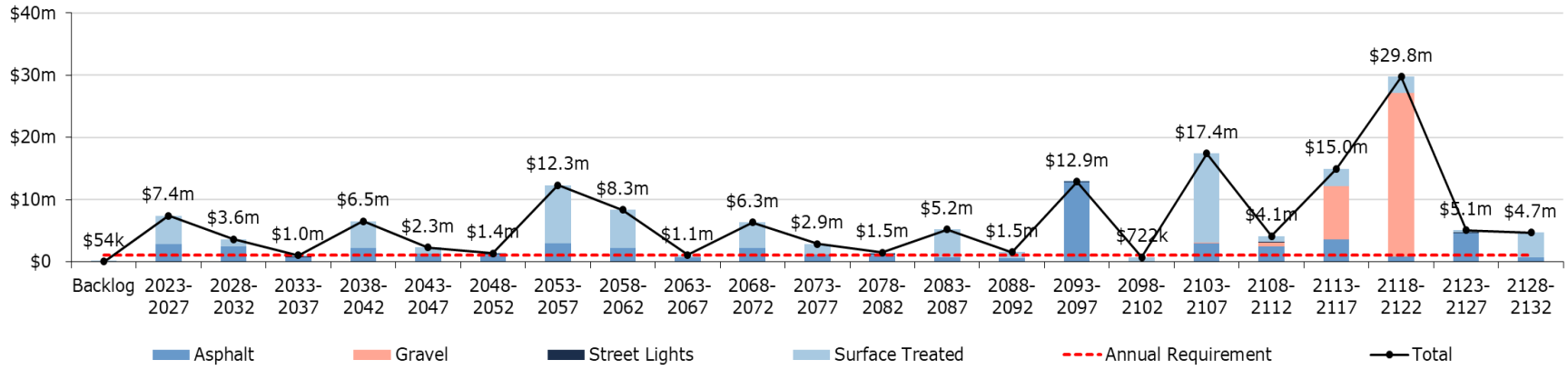


Table 10 below summarizes the projected cost of lifecycle activities (rehabilitation and replacement) that may need to be undertaken over the next 10 years to support current levels of service. These projections are generated in Citywide and rely on the data available in the asset register.

These projections can be different from actual capital forecasts. Consistent data updates, especially condition, will improve the alignment between the system-generated expenditure requirements, and the Township's capital expenditure forecasts.

Table 10 Road Network System-generated 10-Year Capital Costs

Segment	Total	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Asphalt	$5.3m	$0	$184k	$618k	$0	$2.0m	$398k	$48k	$2.0m	$0	$0
Streetlights	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Surface Treated	$5.8m	$553k	$2.7m	$1.2m	$0	$81k	$134k	$567k	$389k	$0	$96k
Total	**$11.0m**	**$553k**	**$2.9m**	**$1.9m**	**$0**	**$2.1m**	**$532k**	**$615k**	**$2.4m**	**$0**	**$96k**

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.

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 asset-specific attributes that municipal staff utilize to define and prioritize the criticality of the road network are documented below:

Probability of Failure (POF)	Consequence of Failure (COF)
Service Life Remaining (Operational 20%)	Segment (Financial 50%)
Condition (Performance 80%)	Traffic Volume (Operational 50%)

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 following tables identify the Township's metrics to identify their current level of service for the roads. By comparing the cost, performance (average condition) and risk year-over-year, Montague will be able to evaluate how their services/assets are trending. The Township will use this data to set a target level of service and determine proposed levels for the regulation by 2025. The tables that follow summarize Montague's current levels of service.

Community Levels of Service

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

Table 11 Road Network Community Levels of Service

Service Attribute	Qualitative Description	Current LOS
Scope	Description, which may include maps, of the road network in the Township and its level of connectivity	The Township's road network spans a total of 158 km primarily within a rural setting, with areas of urban development. See Figure 18
Quality	Description or images that illustrate the different levels of road class pavement condition	See Figure 2 for the description of road condition

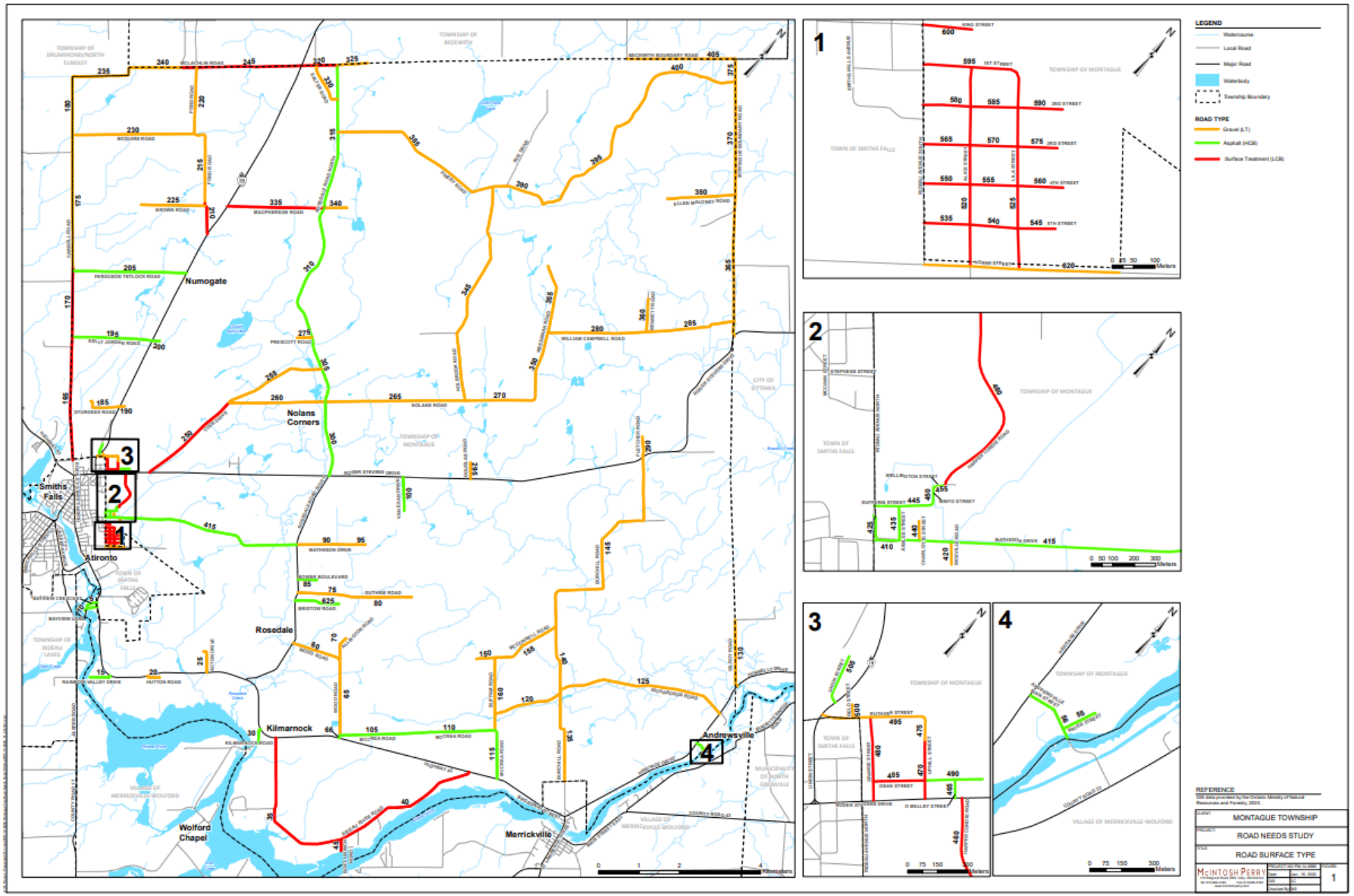
Technical Levels of Service

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

Table 12 Road Network Technical Levels of Service

Service Attribute	Technical Metric	Current LOS
Scope	Lane-km of arterial roads (MMS classes 1 and 2) per land area (km/km^2)	0 km/km^2
	Lane-km of collector roads (MMS classes 3 and 4) per land area (km/km^2)	0 km/km^2
	Lane-km of local roads (MMS classes 5 and 6) per land area (km/km^2)	0.567 km/km^2
Quality	Average pavement condition index for paved roads in the municipality	51% - Fair
	Average surface condition for unpaved roads in the municipality (e.g., excellent, good, fair, poor)	Good
	Average Condition Rating	65%
Performance	Average Asset Risk	8.16 (Moderate)
	Target reinvestment rate	1.5%

Figure 18: Map of Roads



Appendix B: Bridges & Culverts

State of the Infrastructure

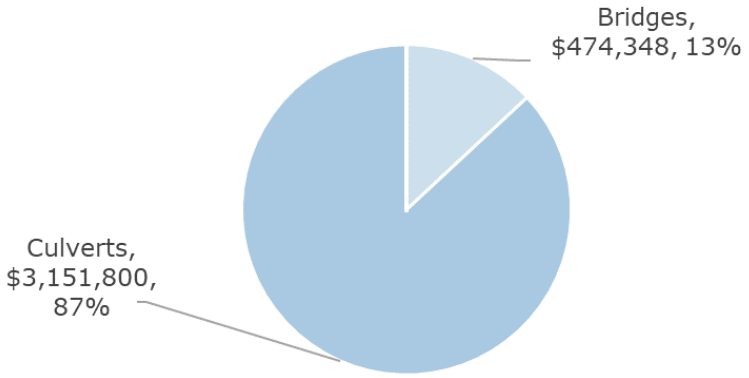
Bridges and culverts (B&C) represent a critical portion of the transportation services provided to the community. The state of the infrastructure for bridges and culverts is summarized in the following table.

Replacement Cost	Condition	Financial Capacity	
$3,626,148	Poor (38%)	Annual Requirement:	$70,347
		Funding Available:	$29,895
		Annual Deficit:	$40,452

Inventory & Valuation

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

Figure 19 Bridges & Culverts Replacement Cost

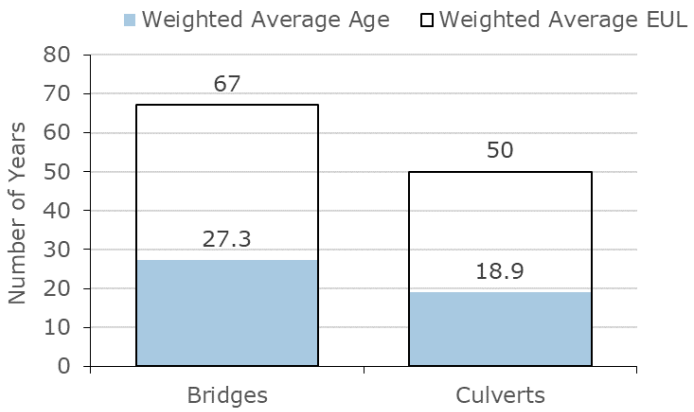


Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed. This can be included in the Ontario Structures Inspection Manual (OSIM) inspections as the replacement cost is part of the calculation for the bridge condition index (BCI).

Asset Condition & Age

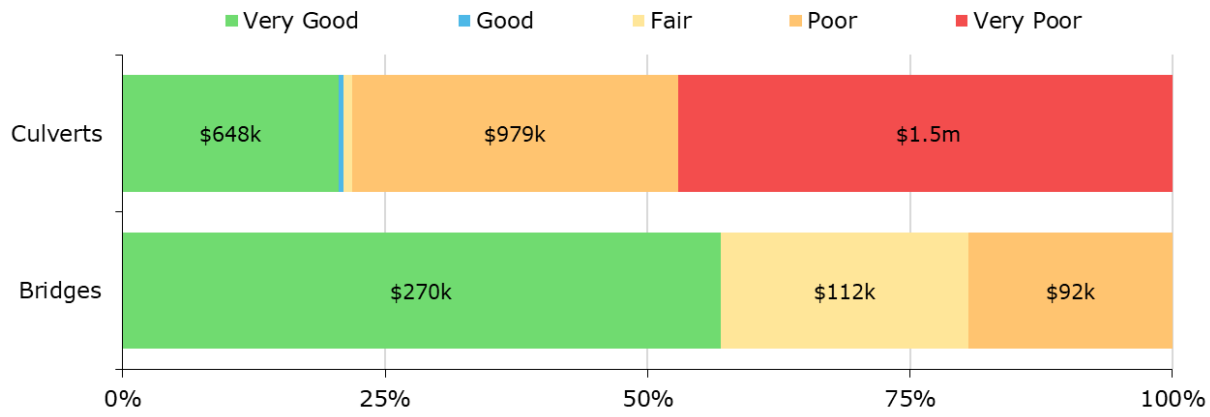
The graph below identifies the average age and the estimated useful life for each asset segment. The values are weighted based on replacement cost.

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. Montague's current approach is to assess the bridges and culverts every 2 years in accordance with the Ontario Structure Inspection Manual (OSIM). The most recent assessment was completed in 2023 by Greer Galloway 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 in Fair condition, as well as a structural culvert in Very Good condition.

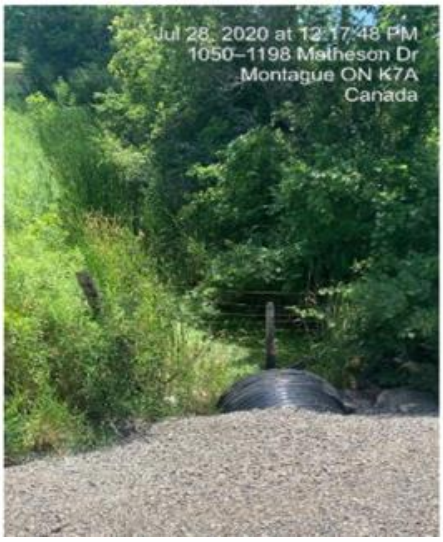
Figure 22: B&C Condition Images

Richardson Culvert (BCI=100)

Richardson Bridge (BCI=71.6 Good)

Figure 1: South Elevation

Matheson Drive Culvert (BCI=87.1 Very Good)



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 Montague'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
- The Township aims to enhance its infrastructure by prioritizing the replacement of aging bridges and culverts. As part of this initiative, the municipality plans to replace 10-15 bridges & culverts annually, ensuring the continued safety and functionality of vital transportation routes

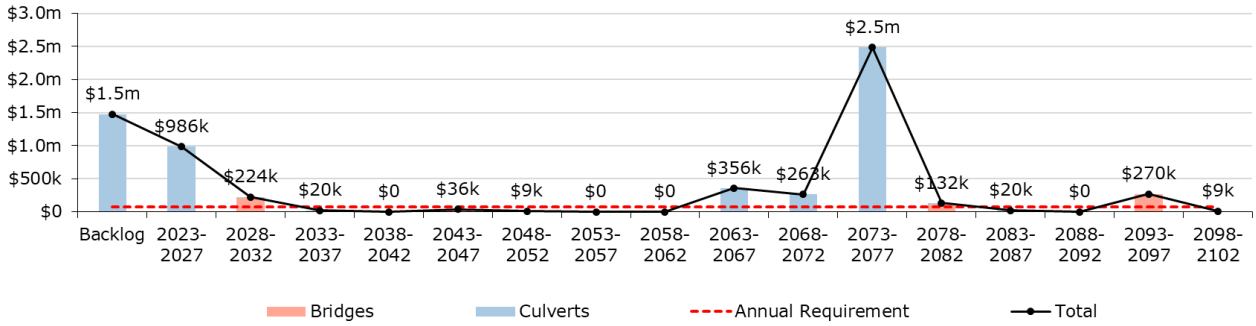
Forecasted Capital Requirements

Figure 24 illustrates the cyclical short-, medium- and long-term infrastructure rehabilitation and replacement requirements for the Township's bridges and culverts. These projections are based on asset replacement costs, age analysis, and condition data. They are designed to provide a long-term, portfolio-level overview of capital needs and should be used to support improved financial planning over several decades.

The analysis was run until 2102 to capture at least one iteration of replacement for the longest-lived asset in the asset register. Montague's average annual requirements (red dotted line) for bridges and culverts total $70 thousand. Although actual spending may fluctuate substantially from year to year, this figure is a useful benchmark value for annual capital expenditure targets (or allocations to reserves) to ensure projects are not deferred and replacement needs are met as they arise.

OSIM condition assessments and a robust risk framework will ensure that high-criticality assets receive proper and timely lifecycle intervention, including rehabilitation and replacement activities.

Figure 24: B&C Forecasted Capital Replacement Requirements



These are represented at the major asset level.

Table 13 below summarizes the projected cost of lifecycle activities (as previously described) that may need to be undertaken over the next 10 years to support current levels of service. These are represented at the major asset level.

Table 13 B&C System-generated 10-Year Capital Costs

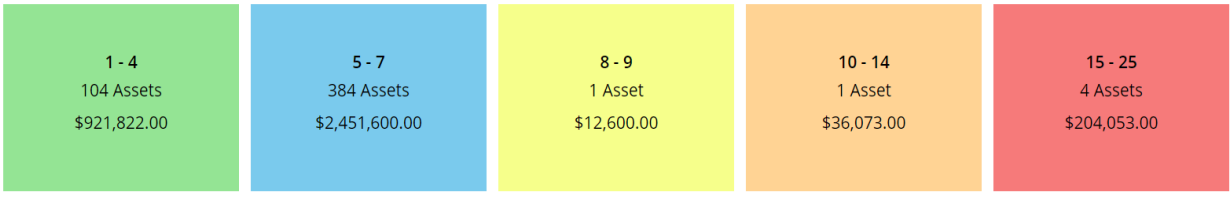
Segment	Total	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Bridges	$204k	$0	$0	$0	$0	$0	$0	$92k	$73k	$39k	$0
Culverts	$1.0m	$0	$7k	$0	$0	$979k	$5k	$14k	$0	$0	$0
Total	**$1.2m**	**$0**	**$7k**	**$0**	**$0**	**$979k**	**$5k**	**$107k**	**$73k**	**$39k**	**$0**

These projections are generated in Citywide and rely on the data available in the asset register. Assessed condition data and replacement costs were used to assist in forecasting replacement needs for bridges and structural culverts.

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.

Figure 25: 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 asset-specific attributes that municipal staff utilize to define and prioritize the criticality of bridges and culverts are documented below:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition (Performance 60%)	Replacement Cost (Financial 50%)
Service Life Remaining (Operational 40%)	Traffic Volume 50% (Operational 50%)
	Segment 50% (Operational 50%)

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 following tables identify the Township's metrics to identify their current level of service for bridges and culverts. By comparing the cost, performance (average condition) and risk year-over-year, Montague will be able to evaluate how their services/assets are trending. The Township will use this data to set a target level of service and determine proposed levels for the regulation by 2025. The tables that follow summarize Montague's current levels of service.

Community Levels of Service

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

Table 14 B&C Network Community Levels of Service

Service Attribute	Qualitative Description	Current LOS
Scope	Description of the traffic that is supported by municipal bridges (e.g. heavy transport vehicles, motor vehicles, emergency vehicles, pedestrians, cyclists)	The Township's bridges support a range of traffic types, including heavy and light vehicles, pedestrians and cyclists. They are used as part of major transportation routes that accommodate all types of travel including emergency response, transportation of goods/services, and personal travel.
Quality	Description or images of the condition of bridges and how this would affect use of the bridges	See Figure 22: B&C Condition Images
	Description or images of the condition of culverts and how this would affect use of the culverts	See Figure 22: B&C Condition Images

Technical Levels of Service

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

Table 15 B&C Network Technical Levels of Service

Service Attribute	Technical Metric	Current LOS
Scope	% of bridges in the municipality with loading or dimensional restrictions	0
Quality	Average bridge condition index value for bridges	75% - Good
	Average bridge condition index value for structural culverts	33% - Poor
	Average Condition Rating	38.5%
Performance	Average Asset Risk	5.95 (Low)
	Target reinvestment rate	1.9%

Appendix C: Water Network

State of the Infrastructure

The Township's water distribution services are confined to its boundaries, with all treated water sourced from the Town of Smiths Falls via the Smiths Falls Water Treatment Plant.

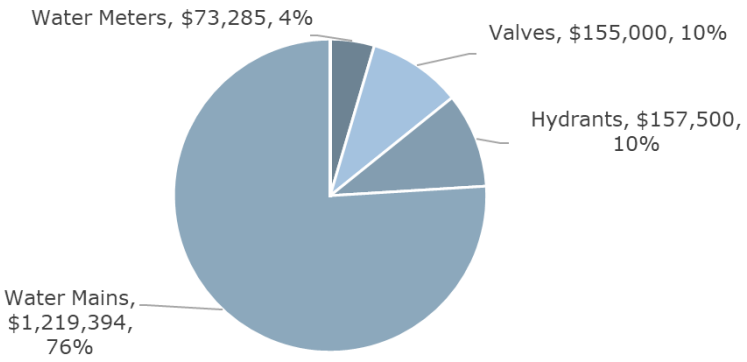
The state of the infrastructure for the water network is summarized in the following table:

Replacement Cost	Condition	Financial Capacity	
$1,605,179	Good (79%)	Annual Requirement:	$32,272
		Funding Available:	$18,339
		Annual Deficit:	$13,933

Inventory & Valuation

The graph below displays the total replacement cost of each asset segment in Montague's water network inventory.

Figure 26: Water Network Replacement Cost

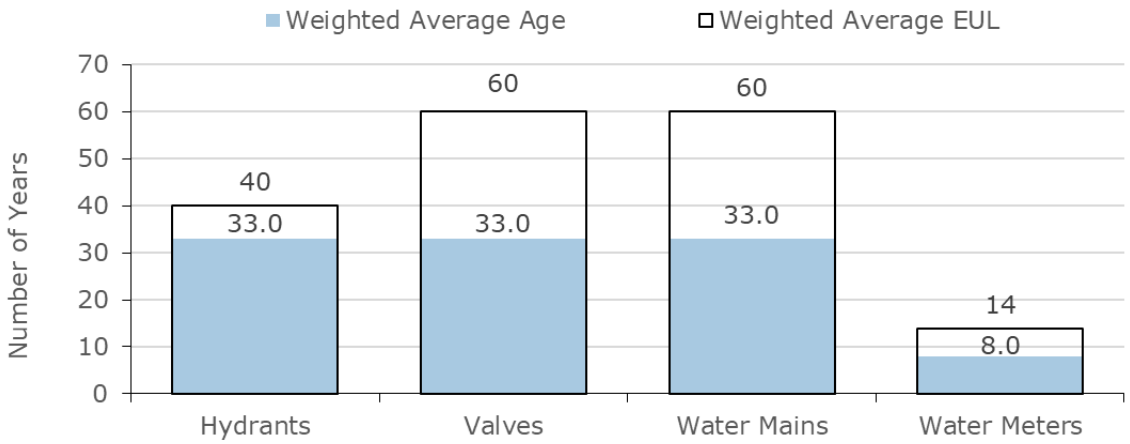


Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

Asset Condition & Age

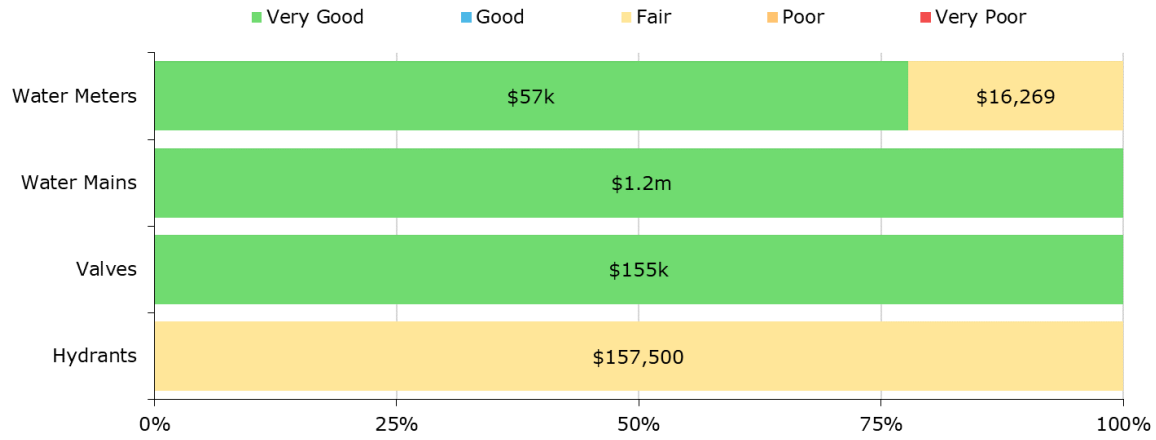
The graph below identifies the current average condition, the average age, and the estimated useful life for each asset segment. The average condition (%) is a weighted value based on replacement cost.

Figure 27: 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 28: 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

Above ground distribution assets such as hydrants and valves are assessed regularly to ensure operability.

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 29: Water Network Current Lifecycle Strategy

Maintenance / Rehabilitation / Replacement

- Regular chlorine testing through sampling to maintain water quality standards
- Repairs are promptly addressed on a reactive basis in response to complaints to uphold service reliability and address community concerns
- Water hydrant flow-testing every 5 years to assess functionality and identify any potential issues for proactive maintenance

Forecasted Capital Requirements

The annual capital requirement represents the average amount per year that Montague should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 30 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average capital requirements at $32 thousand.

Figure 30: Water Network Forecasted Capital Replacement Requirements

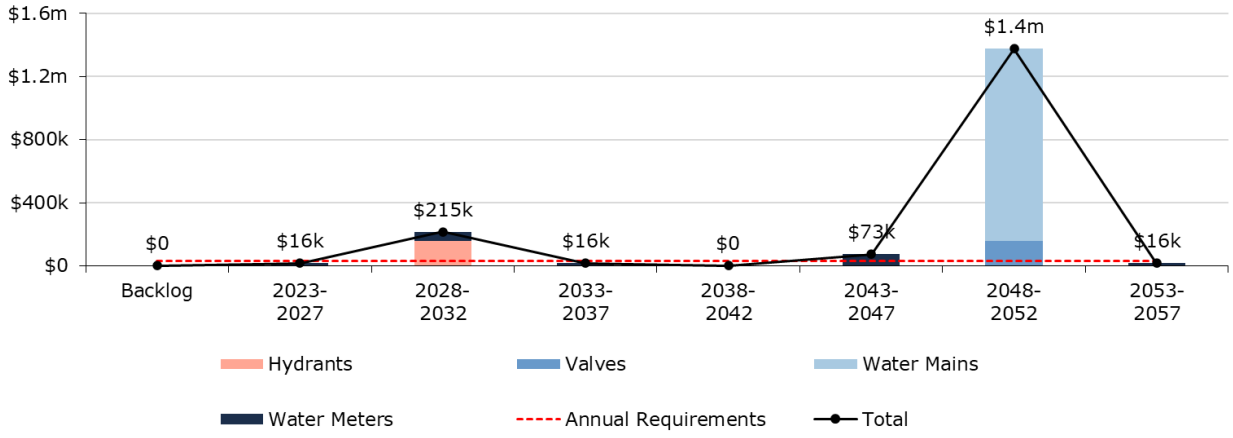


Table 16 Water Network System-Generated 10-Year Capital Costs below summarizes the projected cost of lifecycle activities (capital activities only) that may need to be undertaken over the next 10 years to support current levels of service.

Table 16 Water Network System-Generated 10-Year Capital Costs

Segment	Total	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Hydrants	$158k	$0	$0	$0	$0	$0	$0	$158k	$0	$0	$0
Valves	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Mains	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Meters	$73k	$0	$16k	$0	$0	$0	$0	$57k	$0	$0	$0
Total	**$231k**	$0	**$16k**	$0	$0	$0	$0	**$215k**	$0	$0	$0

These projections are generated in Citywide and rely on the data available in the asset register, which was limited to asset age, replacement cost, and useful life.

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.

Figure 31: 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. This is the criteria set up for mains, all other assets are only replacement cost for consequence of failure.

The asset-specific attributes that municipal staff utilize to define and prioritize the criticality of water mains are documented below:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition (Performance 60%)	Road Surface Type (Financial 50%)
Service Life Remaining % (Operational 40%)	Pipe Diameter (50% Operational)

The asset-specific attributes that municipal staff utilize to define and prioritize the criticality of the rest of the water network are documented below:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition (Performance 60%)	Replacement Cost (100% Financial)
Service Life Remaining % (Operational 40%)	

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 following tables identify the Township's metrics to identify their current level of service for the water network. By comparing the cost, performance (average condition) and risk year-over-year, Montague will be able to evaluate how their services/assets are trending. The Township will use this data to set a target level of service and determine proposed levels for the regulation by 2025. The tables that follow summarize Montague's current levels of service.

Community Levels of Service

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

Table 17 Water Network Community Levels of Service

Service Attribute	Qualitative Description	Current LOS
Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal water system	See Figure 32: Water Network Map
	Description, which may include maps, of the user groups or areas of the municipality that have fire flow	140 properties out of 1663 in the Township are connected to the water system and the water system has fire flow available.
Reliability	Description of boil water advisories and service interruptions	There have been no boil water advisories or main breaks

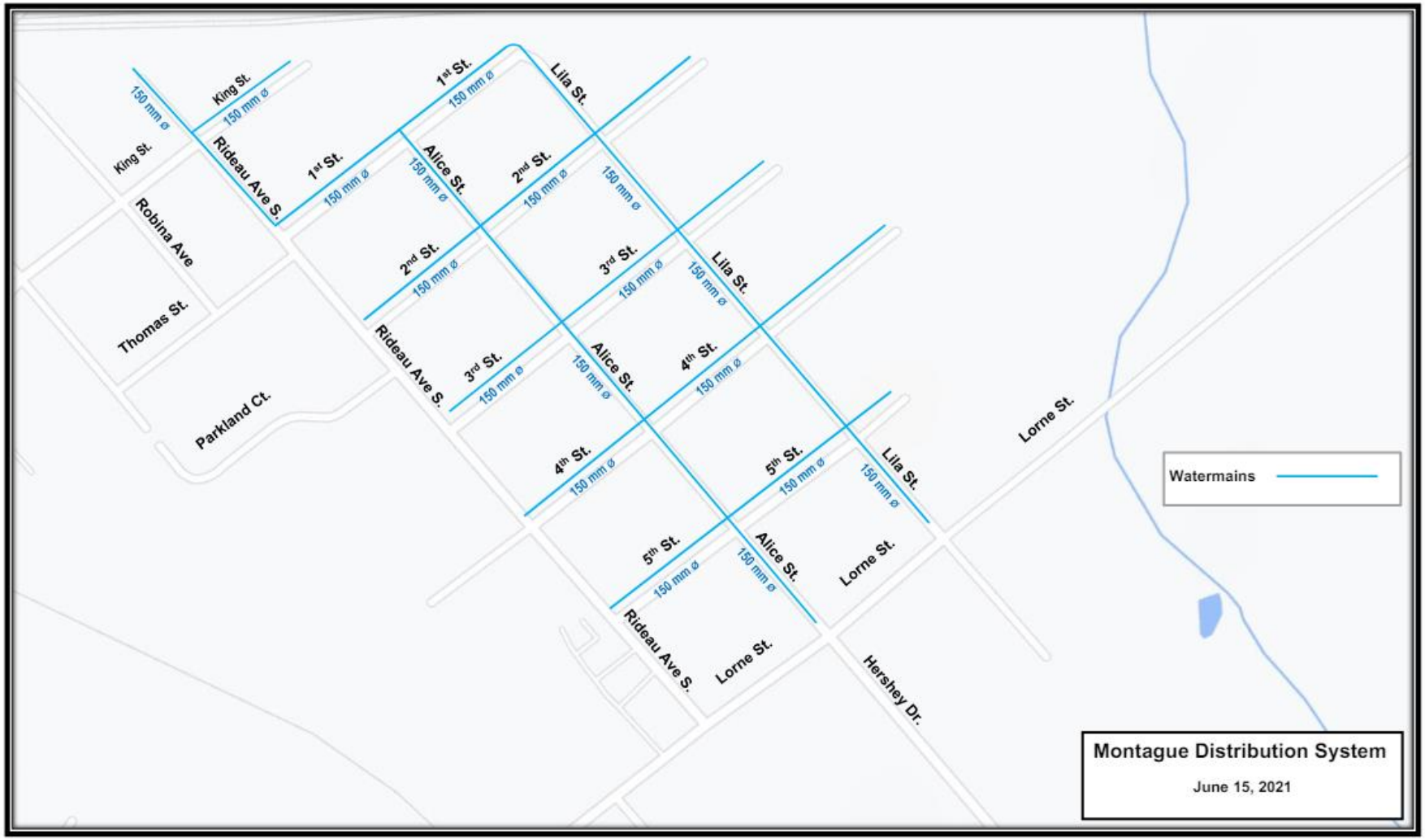
Technical Levels of Service

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

Table 18 Water Network Technical Levels of Service

Service Attribute	Technical Metric	Current LOS
Scope	% of properties connected to the municipal water system	8.4%
	% of properties where fire flow is available	8.4%
Reliability	# of connection-days per year where a boil water advisory notice is in place compared to the total number of properties connected to the municipal water system	0
	# of connection-days per year where water is not available to water main breaks compared to the total number of properties connected to the municipal water system	0
	Average Condition	79%
Performance	Average Asset Risk	4.52 (Very Low)
	Target reinvestment rate	2.0%

Figure 32: Water Network Map



Appendix D: Sanitary Network

State of the Infrastructure

The Township owns Sanitary Network infrastructure for collection, conveyance, and disposal of wastewater. The Town of Smiths Falls owns and operates the treatment system. The Sanitary Network contributes to the environmental services provided to the community.

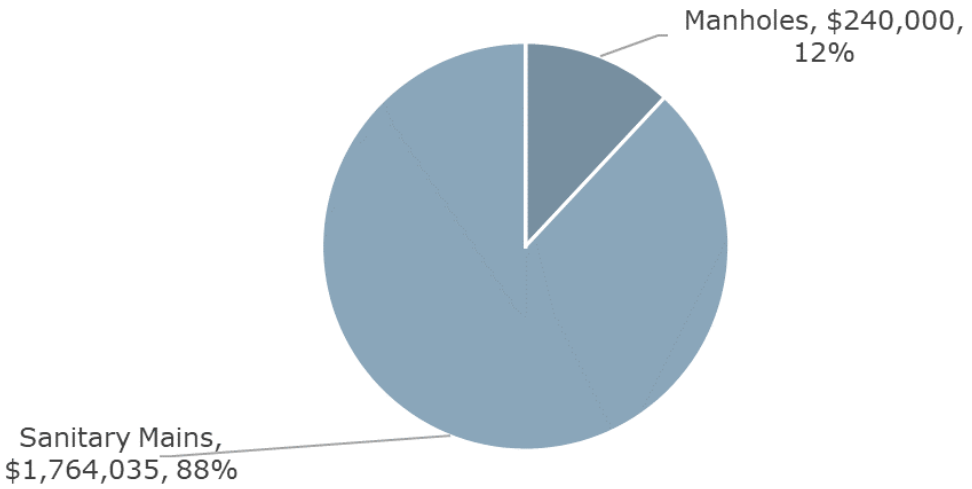
The state of the infrastructure for the sanitary network is summarized in the following table:

Replacement Cost	Condition	Financial Capacity	
$2,004,035	Very Good (82%)	Annual Requirement:	$33,401
		Funding Available:	$19,361
		Annual Deficit:	$14,039

Inventory & Valuation

The graph below displays the total replacement cost of each asset segment in Montague's sanitary network inventory.

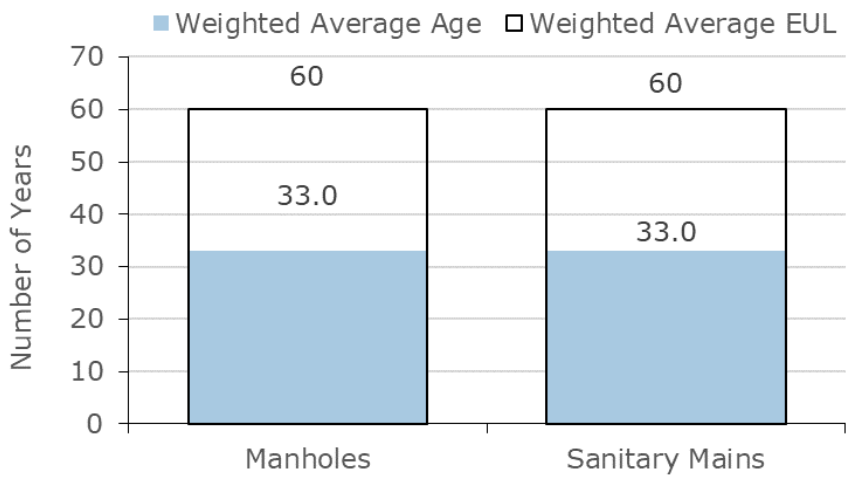
Figure 33: Sanitary Network Replacement Cost



Asset Condition & Age

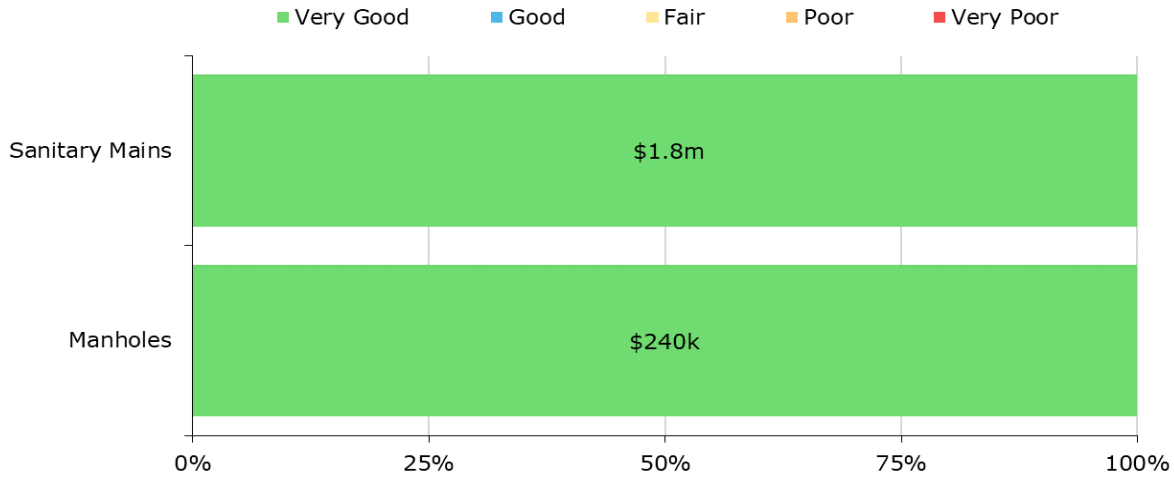
The table below identifies the current average condition, the average age, and the estimated useful life for each asset segment. The average condition (%) is a weighted value based on replacement cost.

Figure 34: 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 35: 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. The Township implements a comprehensive condition assessment strategy, which includes conducting CCTV inspections on a scheduled basis. These inspections are performed every five years to ensure the continued integrity and functionality of the infrastructure.

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 36: Sanitary Network Current Lifecycle Strategy

Maintenance / Rehabilitation / Replacement
•Maintenance program involves cleaning and flushing of sanitary mains every 5 years

Forecasted Capital Requirements

The annual capital requirement represents the average amount per year that Montague should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 35 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average capital requirements at $33 thousand.

Figure 37: Sanitary Network Forecasted Capital Replacement Requirements

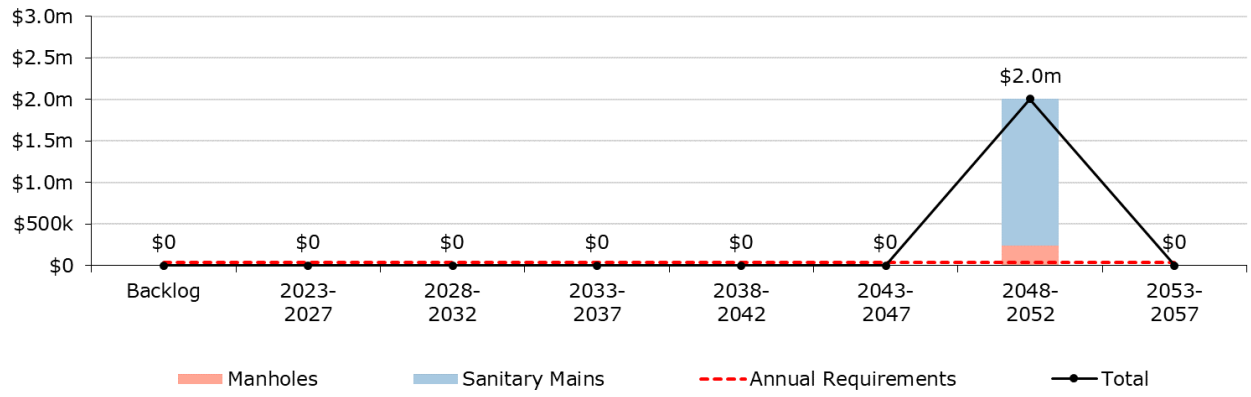


Table 19 Sanitary Network System-Generated 10-Year Capital Costs below summarizes the projected cost of lifecycle activities (capital activities only) that may need to be undertaken over the next 10 years to support current levels of service.

Table 19 Sanitary Network System-Generated 10-Year Capital Costs

Segment	Total	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Manholes	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sanitary Mains	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

These projections are generated in Citywide and rely on the data available in the asset register, which was limited to asset age, replacement cost, and useful life.

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.

Figure 38: 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 asset-specific attributes that municipal staff utilize to define and prioritize the criticality of sanitary mains are documented below:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition (Performance 60%)	Pipe Material (Financial 50%)
Service Life Remaining % (Operational 40%)	Pipe Diameter (50% Operational)

The asset-specific attributes that municipal staff utilize to define and prioritize the criticality of the rest of the sanitary sewer network are documented below:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition (Performance 60%)	Replacement Cost (100% Financial)
Service Life Remaining % (Operational 40%)	

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 following tables identify the Township's metrics to identify their current level of service for the sanitary network. By comparing the cost, performance (average condition) and risk year-over-year, Montague will be able to evaluate how their services/assets are trending. The Township will use this data to set a target level of service and determine proposed levels for the regulation by 2025. The tables that follow summarize Montague's current levels of service.

Community Levels of Service

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

Table 20 Sanitary Network Community Levels of Service

Service Attribute	Qualitative Description	Current LOS
Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal wastewater system	See Figure 39: Sanitary Network Map
Reliability	Description of how combined sewers in the municipal wastewater system are designed with overflow structures in place which allow overflow during storm events to prevent backups into homes	N/A
	Description of the frequency and volume of overflows in combined sewers in the municipal wastewater system that occur in habitable areas or beaches	N/A
	Description of how stormwater can get into wastewater mains in the municipal wastewater system, causing sewage to overflow into streets or backup into homes	No known cross-connections by design. Infiltration of groundwater to pipes occurs through pipe defects.
	Description of how wastewater mains in the municipal wastewater system are designed to be resilient to stormwater infiltration	The wastewater system is built at a standard to seal it from infiltration. I&I is not present in new areas, and mostly an issue with older areas.
	Description of the effluent that is discharged from sewage treatment plants in the municipal wastewater system	Sewage Treatment is managed by Smith Falls

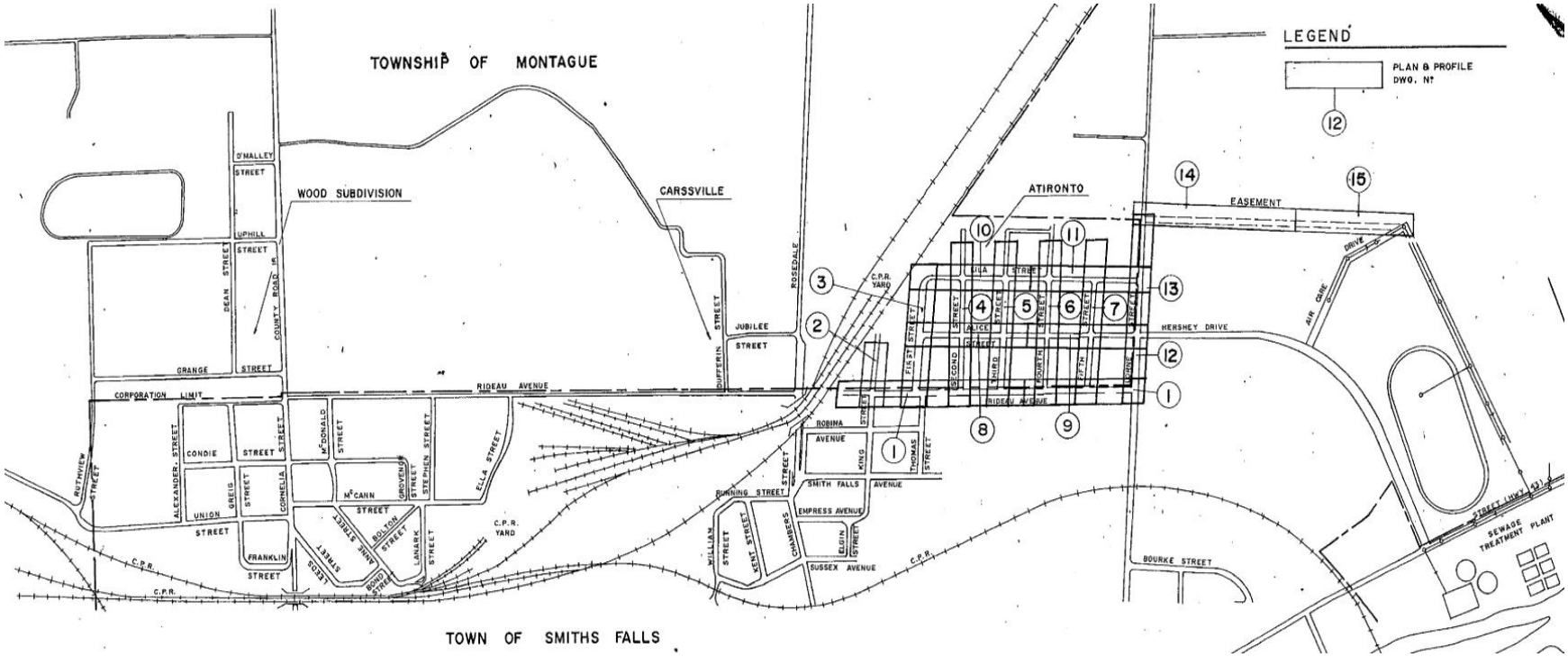
Technical Levels of Service

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

Table 21 Sanitary Network Technical Levels of Service

Service Attribute	Technical Metric	Current LOS
Scope	% of properties connected to the municipal wastewater system	8.4%
Quality	# of events per year where combined sewer flow in the municipal wastewater system exceeds system capacity compared to the total number of properties connected to the municipal wastewater system	N/A
	# of connection-days per year having wastewater backups compared to the total number of properties connected to the municipal wastewater system	0
	# of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system	N/A
Performance	Average Asset Risk	3.32 (Very Low)
	Target reinvestment rate	1.7%

Figure 39: Sanitary Network Map



Appendix E: Buildings

State of the Infrastructure

Montague owns and maintains several facilities that provide key services to the community. These include:

- administrative offices & fire halls
- public works garages and storage sheds
- recreation facilities

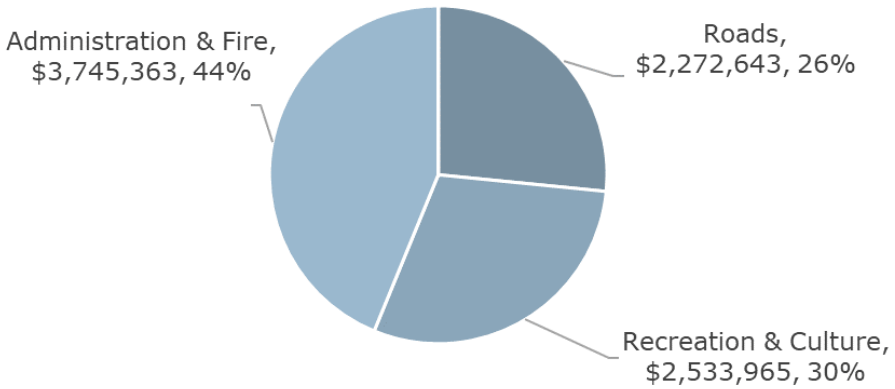
The state of the infrastructure for the buildings and facilities is summarized in the following table.

Replacement Cost	Condition	Financial Capacity	
$8,551,971	Fair (59%)	Annual Requirement:	$221,563
		Funding Available:	$94,157
		Annual Deficit:	$127,406

Inventory & Valuation

The graph below displays the total replacement cost of each asset segment in Montague's buildings inventory. The Township has a complete componentization of their buildings their inventory tracks buildings activities as a detailed componentization.

Figure 40: Buildings Replacement Cost

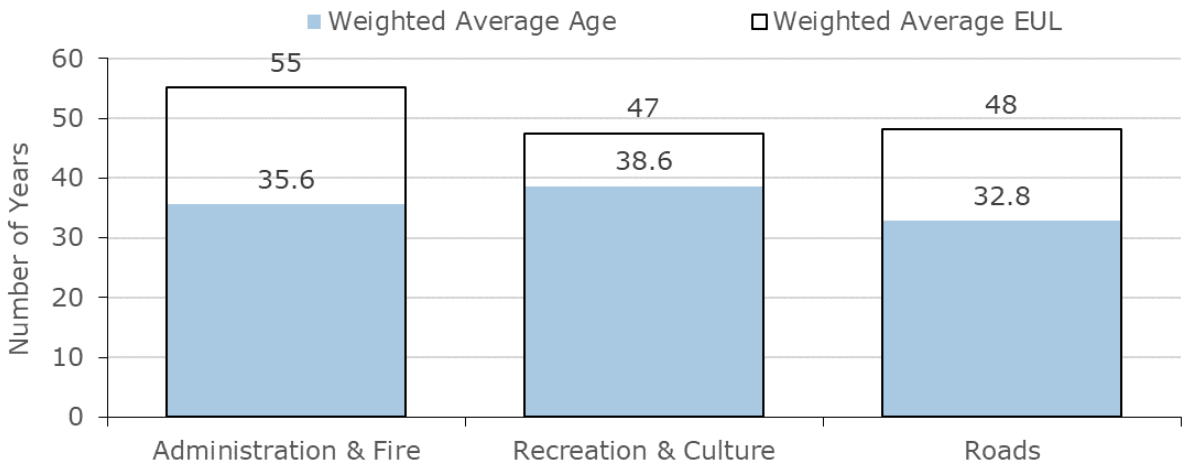


Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to represent capital requirements more accurately.

Asset Condition & Age

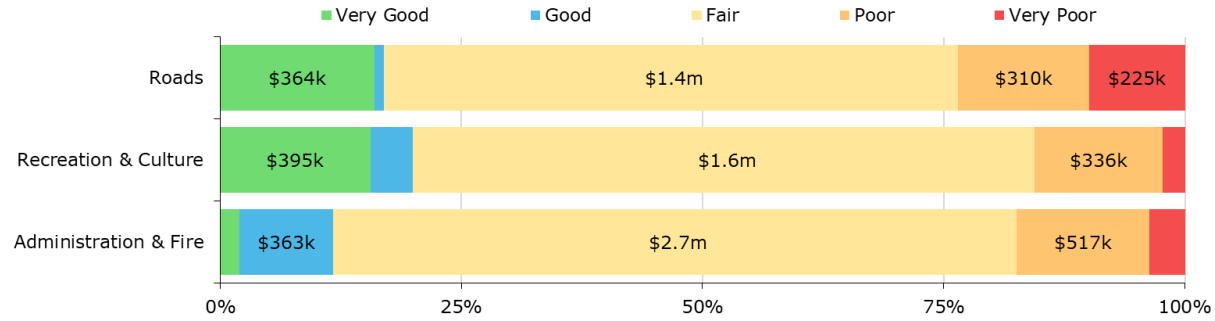
The graph below identifies the average age, and the estimated useful life for each asset segment. The values are weighted based on replacement cost.

Figure 41: 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 42: 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. Building condition assessments are conducted on a 5-year cycle to evaluate structural integrity and identify necessary improvements. A comprehensive inventory and assessment were completed in 2023 by ABSI

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 43: Buildings Current Lifecycle Strategy

Maintenance / Rehabilitation / Replacement

- Upgrades to buildings are facilitated through grant funding, enabling the municipality to enhance infrastructure while optimizing resource allocation
- Heating systems undergo annual inspections to maintain efficiency and safety standards
- Repairs and replacements of component systems are addressed promptly on an as-needed basis, ensuring the continued reliability and comfort of municipal facilities

Forecasted Capital Requirements

The annual capital requirement represents the average amount per year that Montague should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 45 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average capital requirements at just under $222 thousand.

Figure 44: Buildings Forecasted Capital Replacement Requirements

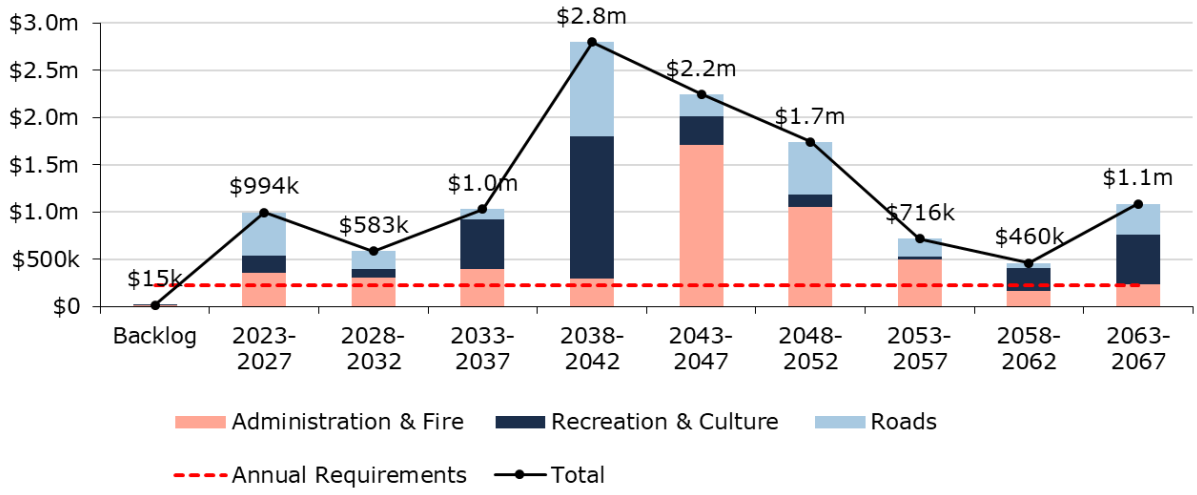


Table 22 below summarizes the projected cost of lifecycle activities (capital activities only) that may need to be undertaken over the next 10 years to support current levels of service.

Table 22 Buildings System-Generated 10-Year Capital Costs

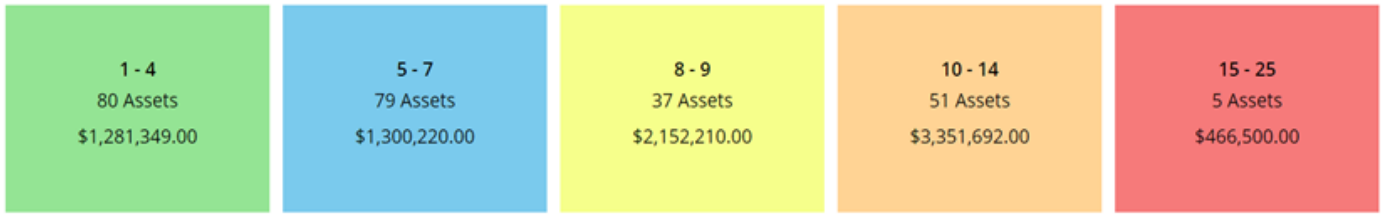
Segment	Total	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Administration & Fire	$660k	$0	$209k	$114k	$16k	$17k	$185k	$48k	$64k	$8k	$0
Recreation & Culture	$274k	$0	$88k	$62k	$17k	$17k	$33k	$17k	$38k	$2k	$0
Roads	$643k	$0	$275k	$158k	$21k	$0	$55k	$7k	$101k	$13k	$14k
Total	**$1.6m**	**$0**	**$572k**	**$334k**	**$53k**	**$34k**	**$273k**	**$72k**	**$203k**	**$22k**	**$14k**

These projections are generated in Citywide and rely on the data available in the asset register, which was limited to asset age, replacement cost, and useful life.

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.

Figure 45: 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 asset-specific attributes that municipal staff utilize to define and prioritize the criticality of the facilities are documented below:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition (Performance 60%)	Replacement Cost (80% Financial)
Service Life Remaining % (Operational 40%)	AMP Segment (20% Operational)

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

By comparing the cost, performance (average condition) and risk year-over-year, the Township will be able to evaluate how their services/assets are trending. The Township will use this data to set a target level of service and determine proposed levels for the regulation by 2025.

Community Levels of Service

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

- administrative offices
- museum and community hall
- fire hall and associated offices and facilities
- public works garages and storage sheds

Technical Levels of Service

The quantitative metrics that determine the technical level of service provided by the buildings in Montague are going to be the analysis of target reinvestment rate, asset performance (average condition) and average asset risk.

Table 23 Buildings Technical Levels of Service

Service Attribute	Technical Metric	Current LOS
Scope	Average Asset Risk	9.56 (Moderate)
Quality	Average Condition Rating	59%
Performance	Target Reinvestment Rate	2.6%

Appendix F: Vehicles & Equipment

State of the Infrastructure

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

- Roads vehicles for road maintenance
- Fire vehicles & equipment for emergency services
- Administrative equipment for municipal offices
- Recreation services equipment

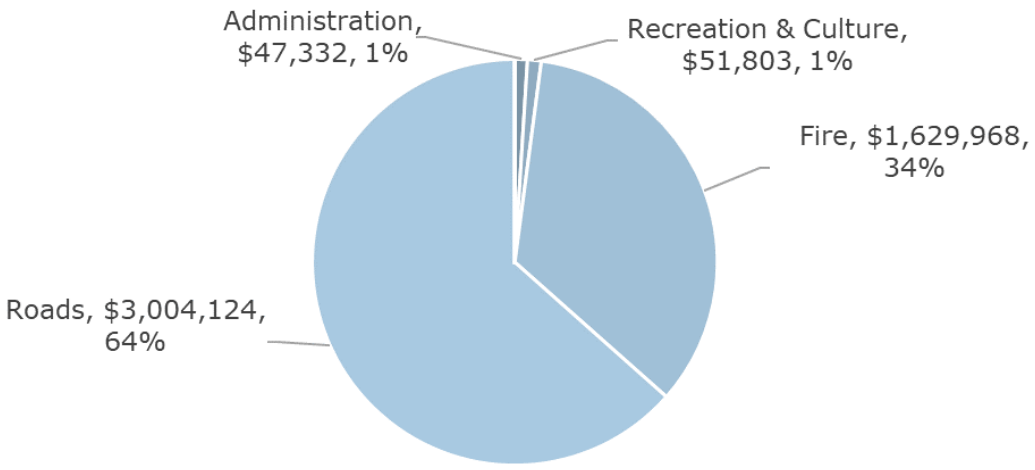
The state of the infrastructure for the vehicles is summarized in the following table.

Replacement Cost	Condition	Financial Capacity	
$4,733,227	Good (62%)	Annual Requirement:	$294,294
		Funding Available:	$125,065
		Annual Deficit:	$169,229

Inventory & Valuation

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

Figure 46: Vehicles & Equipment Replacement Costs

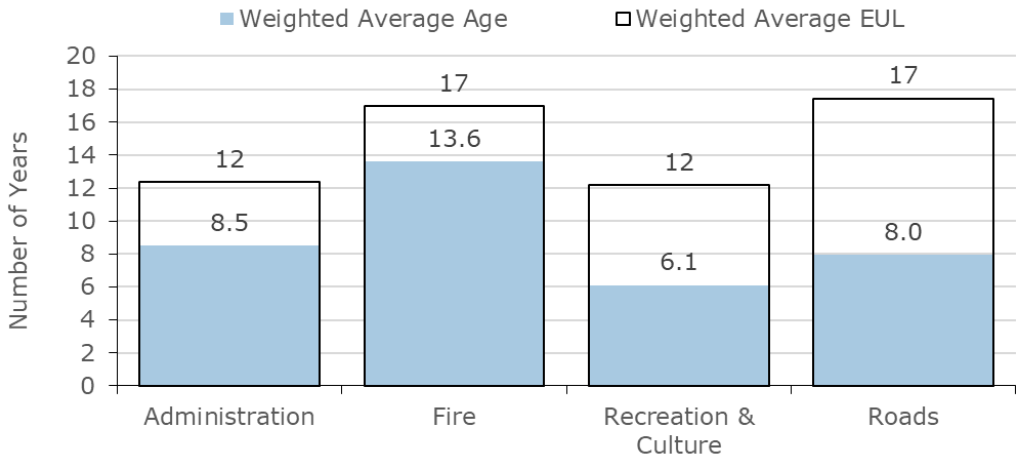


Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to represent capital requirements more accurately.

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.

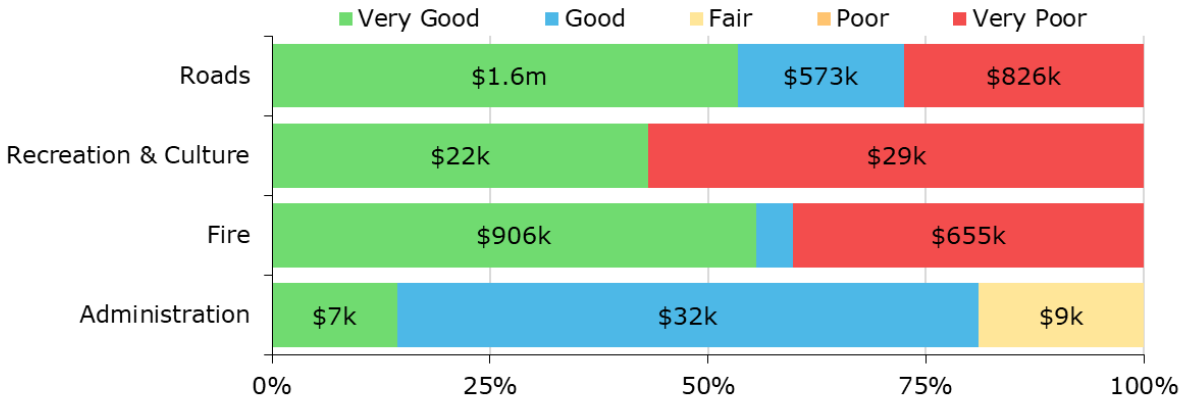
Figure 47: Vehicles & Equipment Average Age vs Average EUL



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 48: Vehicles & Equipment Condition Breakdown



To ensure that the Township's vehicles and equipment 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 and equipment.

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 for municipal roads vehicles and equipment includes annual safety inspections for vehicles, where mechanics review their condition and assess maintenance expenses.

Lifecycle Management Strategy

The condition or performance of assets will deteriorate over time. To ensure vehicles and equipment are performing as expected, it is important to establish a lifecycle management strategy to proactively manage asset deterioration. The assets in this category are very varied and below are listed some examples but it covers major equipment and vehicles.

Figure 49: Vehicles & Equipment Current Lifecycle Strategy

Maintenance / Rehabilitation / Replacement

- Adherence to regulatory requirements and best practices in maintaining essential vehicles such as Fire Station pumpers and tankers. These vehicles undergo replacement every 20 years, complemented by annual servicing to uphold performance standards.
- For other municipal vehicles, replacement timelines are determined based on mileage, typically falling within a 20-25 year lifecycle.
- Regular maintenance of Fire Station equipment follows manufacturer recommendations, while Self-Contained Breathing Apparatus (SCBA) equipment undergoes monthly testing and replacement based on staff recommendations
- Based on staff recommendations and Asset Management Plan lifecycles, vehicles are replaced when deemed necessary to maintain reliability and safety standards
- Maintenance of road network equipment adheres to manufacturer recommendations

Forecasted Capital Requirements

The annual capital requirement represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 25 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average annual capital requirements at $294 thousand.

Figure 50: Vehicles & Equipment Forecasted Capital Replacement Requirements

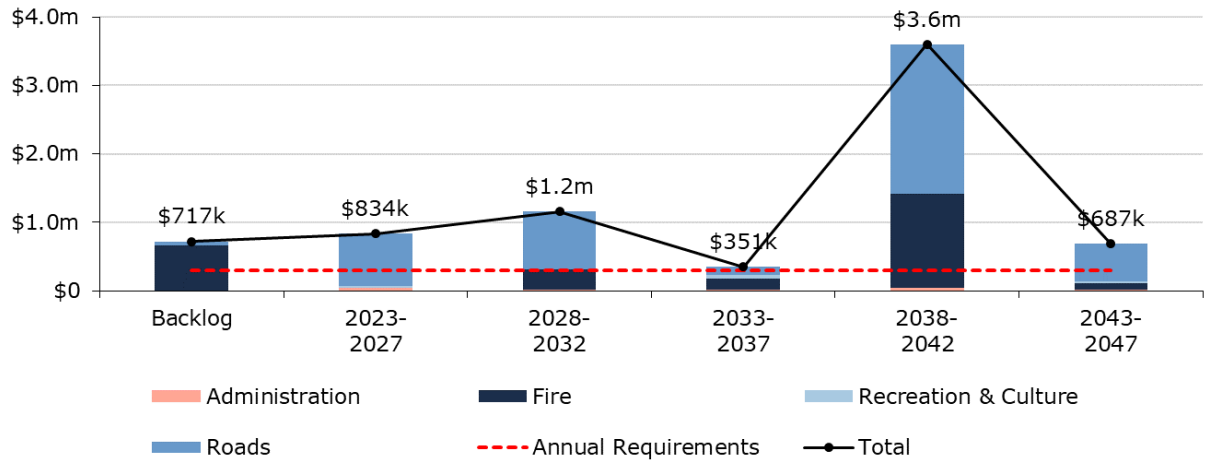


Table 24 below summarizes the projected cost of lifecycle activities (capital replacement only) that may need to be undertaken over the next 10 years to support current levels of service. These projections are generated in Citywide and rely on the data available in the asset register.

Table 24 Vehicles & Equipment System-Generated 10-Year Capital Costs

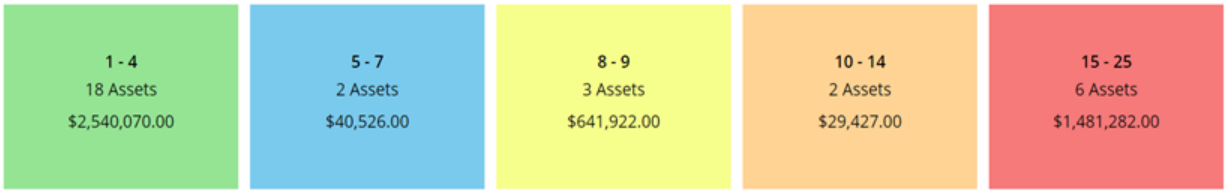
Segment	Total	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Administration	$56k	$0	$9k	$0	$0	$32k	$0	$9k	$7k	$0	$0
Fire	$297k	$0	$0	$0	$0	$0	$150k	$69k	$27k	$51k	$0
Recreation & Culture	$29k	$29k	$0	$0	$0	$0	$0	$0	$0	$0	$0
Roads	$1.6m	$410k	$355k	$0	$0	$0	$357k	$0	$399k	$0	$83k
Total	**$2.0m**	**$439k**	**$364k**	**$0**	**$0**	**$32k**	**$507k**	**$76k**	**$433k**	**$51k**	**$83k**

As no assessed condition data was available for the vehicles, only age was used to determine forthcoming replacement needs. These projections can be different from actual capital forecasts. Consistent data updates, especially condition, will improve the alignment between the system-generated expenditure requirements, and the Township's capital expenditure forecasts.

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.

Figure 51: Vehicles & Equipment 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 asset-specific attributes that municipal staff utilize to define and prioritize the criticality of the vehicles and equipment are documented below:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition (Performance 60%)	Replacement Cost (80% Financial)
Service Life Remaining (Operational 40%)	AMP Segment (20% Operational)

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

By comparing the cost, performance (average condition) and risk year-over-year, the Township will be able to evaluate how their services/assets are trending. The Township will use this data to set a target level of service and determine proposed levels for the regulation by 2025.

Community Levels of Service

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

- Roads vehicles and equipment for road maintenance
- Fire vehicles and equipment for emergency services
- Administrative equipment for municipal offices
- Recreation services equipment and vehicles

Technical Levels of Service

The quantitative metrics that determine the technical level of service provided by the buildings in Montague are going to be the analysis of target reinvestment rate, asset performance (average condition) and average asset risk.

Table 25 Buildings Technical Levels of Service

Service Attribute	Technical Metric	Current LOS
Scope	Average Asset Risk	10.01 (High)
Quality	Average Condition Rating	62%
Performance	Target Reinvestment Rate	6.2%

Appendix G: 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