Asset Management Plan

Town of Hawkesbury

2024

This Asset Management Plan was prepared by:

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

Key Statistics

Replacement cost of asset portfolio
$411.1 million

Replacement cost of infrastructure per household
$77,453 (2021)

Percentage of assets in fair or better condition
46%

Percentage of assets with assessed condition data
55%

Annual capital infrastructure deficit
$6.8 million

Recommended timeframe for eliminating annual infrastructure deficit
20 Years

Target reinvestment rate
2.4%

Actual reinvestment rate
0.8%

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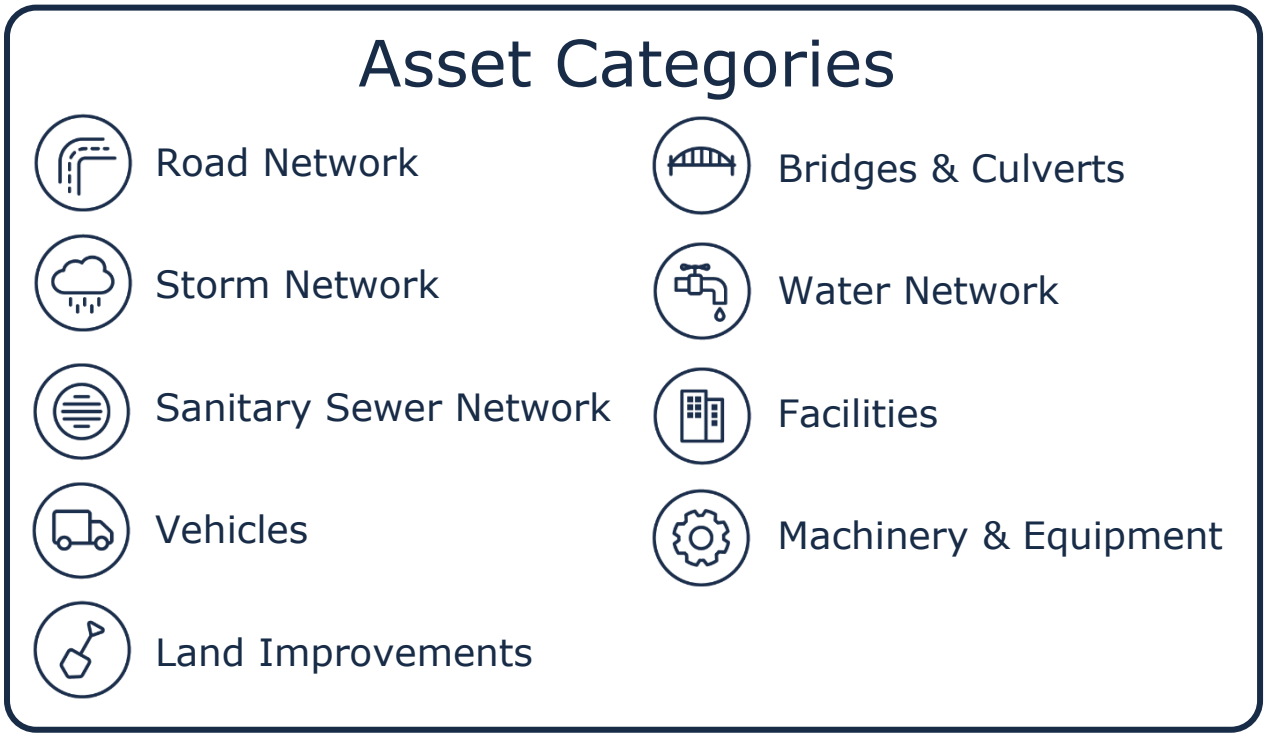
Executive Summary

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

Scope

This AMP identifies the current practices and strategies that are in place to manage public infrastructure and makes recommendations where they can be further refined. Through the implementation of sound asset management strategies, the Town can ensure that public infrastructure is managed to support the sustainable delivery of municipal services.

This AMP include the following asset categories:



With the development of this AMP, Hawkesbury has achieved compliance with O. Reg. 588/17 to the extent of the requirements that must be completed by July 1, 2024. There are additional requirements concerning proposed levels of service and growth that must be met by 2025.

Findings

The overall replacement cost of the asset categories included in this AMP totals $411.1 million. 46% of all assets analysed in this AMP are in fair or better condition and assessed condition data was available for 55% of assets. For the remaining 45% of assets where assessed condition data was unavailable, asset age was used to approximate condition – a data gap that persists in most municipalities. Generally, age misstates the true condition of assets, making assessments essential to accurate asset management planning, and a recurring recommendation in this AMP.

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

To meet capital replacement and rehabilitation needs for existing infrastructure, prevent infrastructure backlogs, and achieve long-term sustainability, the Town's average annual capital requirement totals $9.9 million. Based on a historical analysis of sustainable capital funding sources, the Town is committing approximately $3.1 million towards capital projects or reserves per year. As a result, there is currently an annual funding gap of $6.8 million.

It is important to note that this AMP represents a snapshot in time and is based on the best available processes, data, and information at the Town. Strategic asset management planning is an ongoing and dynamic process that requires continuous improvement and dedicated resources.

Recommendations

Recommendations to guide continuous refinement of the Town’s asset management program. These include:

- Review data on a regular basis to update and maintain a complete and accurate asset register
- Where applicable, develop condition assessment strategies with a regular schedule
- Review and update lifecycle management strategies
- Development and regularly review short- and long-term plans to meet capital requirements
- Measure current levels of service and identify sustainable proposed levels of service

1 Introduction & Context

Key Insights

- The Town of Hawkesbury is a municipality in Eastern Ontario
- The goal of asset management is to minimize the lifecycle costs of delivering infrastructure services, manage the associated risks, while maximizing the value ratepayers receive from the asset portfolio
- The Town's asset management policy provides clear direction to staff on their roles and responsibilities regarding asset management
- An asset management plan is a living document that should be updated regularly to inform long-term planning
- Ontario Regulation 588/17 outlines several key milestone and requirements for asset management plans in Ontario due in July 2022, 2024, and 2025. This plan meets the 2024 requirements

1.1 Hawkesbury Community Profile

Census Characteristic	Town of Hawkesbury	Ontario
Population 2021	10,194	14,223,942
Population Change 2016-2021	-0.7	5.8
Total Private Dwellings	5,308	5,929,250
Population Density	1,009.7/km^2	15.9/km^2
Land Area	10.10 km^2	892,411.76 km^2

The Town of Hawkesbury is located 110 kilometres east of Ottawa, in Southeastern Ontario. The Town is positioned along the southern bank of the Ottawa River, serving as the border between Ontario and Quebec.

The region was settled in the early 1800s by European colonists along with those from Quebec. Hawkesbury has a mix of cultural influences, including English, French, and Indigenous roots; the majority of the community is fluent in both French and English.

The economy of Hawkesbury historically relied on industries like manufacturing, forestry, and agriculture. In recent years, there has been a diversification into other sectors such as healthcare, retail, and services. The proximity to the Ottawa River facilitated transportation and trade, making it beneficial for manufacturing operations.

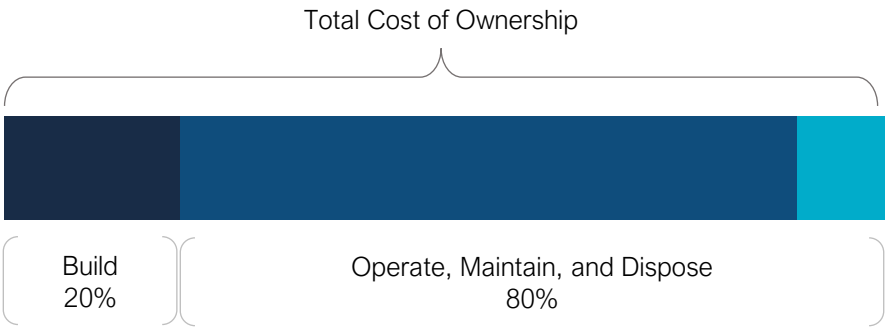
There are a wide range of recreational activities available to the community due to the Town's natural surroundings such as the Ottawa River and provincial parks. Residents are also provided with more affordable housing while having access to amenities within urban centers since the Town is located within close proximity to major cities such as Ottawa and Montreal.

The Town is focused on prioritizing upkeep of its existing infrastructure. Recognizing the importance of preserving its assets, the Town is actively allocating resources to ensure the longevity and functionality of its infrastructure systems.

1.2 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 ratepayers receive from the asset portfolio.

The acquisition of capital assets accounts for only 10-20% of their total cost of ownership. The remaining 80-90% derives from operations and maintenance. This AMP focuses its analysis on the capital costs to maintain, rehabilitate and replace existing municipal infrastructure assets.



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

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

1.2.1 Asset Management Policy

An asset management policy represents a statement of the principles guiding the Town's approach to asset management activities. It aligns with the organizational strategic plan and provides clear direction to municipal staff on their roles and responsibilities as part of the asset management program.

The Town adopted By-law No. R-168-19 "A By-law to Adopt an Asset Management Strategy Policy" on July 1st, 2019, in accordance with Ontario Regulation 588/17.

The objectives of the policy include:

- Budgeting and Planning
- Economic Development and Forward Looking
- Environmental Consciousness
- Community Focused and Transparency
- Innovative Technology and Practices

1.2.2 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 Town plans to achieve asset management objectives through planned activities and decision-making criteria.

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

1.2.3 Asset Management Plan

The asset management plan (AMP) presents the outcomes of the Town's asset management program and identifies the resource requirements needed to achieve a defined level of service. The AMP typically includes the following content:

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

The AMP is a living document that should be updated regularly as additional asset and financial data becomes available. This will allow the Town to re-evaluate the

state of infrastructure and identify how the organization’s asset management and financial strategies are progressing.

1.3 Key Concepts in Asset Management

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

1.3.1 Lifecycle Management Strategies

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

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

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

Lifecycle Activity	Description	Example (Roads)	Cost
Maintenance	Activities that prevent defects or deteriorations from occurring	Crack Seal	$
Rehabilitation/ Renewal	Activities that rectify defects or deficiencies that are already present and may be affecting asset performance	Mill & Re-surface	$$
Replacement/ Reconstruction	Asset end-of-life activities that often involve the complete replacement of assets	Full Reconstruction	$$$

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

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

1.3.2 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 than that of others. 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.

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

1.3.3 Levels of Service

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

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

Community Levels of Service

Community levels of service are a simple, plain language description or measure of the service that the community receives. For core asset categories (roads, bridges and culverts, water, wastewater, storm) the province, through O. Reg. 588/17, has provided qualitative descriptions that are required to be included in this AMP. For

non-core asset categories, the Town has determined the qualitative descriptions that will be used to determine the community level of service provided. These descriptions can be found in the Levels of Service subsection within each asset category.

Technical Levels of Service

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

For core asset categories (roads, bridges and culverts, water, wastewater, storm) the province, through O. Reg. 588/17, has provided technical metrics that are required to be included in this AMP. For non-core asset categories, the Town has determined the technical metrics that will be used to determine the technical level of service provided. These metrics can be found in the Levels of Service subsection within each asset category.

Current and Proposed Levels of Service

This AMP focuses on measuring the current level of service provided to the community. Once current levels of service have been measured, the Town 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 Town. 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 Town must identify a lifecycle management and financial strategy which allows these targets to be achieved.

1.4 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. The impacts on infrastructure are often a result of climate-related extremes such as droughts, floods, higher frequency of freeze-thaw cycles, extended periods of high temperatures, high winds, and wildfires. Physical infrastructure is vulnerable to damage and increased wear when exposed to these extreme events and climate variabilities. Canadian Municipalities are faced with the responsibility to protect their local economy, citizens, environment, and physical assets.

1.4.1 Hawkesbury Climate Profile

The Town of Hawkesbury is situated in Eastern Ontario along south side of Ottawa River. The Town 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 Town of Hawkesbury may experience the following trends:

Higher Average Annual Temperature:

1. Between the years 1971 and 2000 the annual average temperature was 5.5 ºC

2. Under a high emissions scenario, the annual average temperatures are projected to increase by 4.8 ºC by the year 2050 and over 6.7 ºC by the end of the century.

Increase in Total Annual Precipitation:

3. Under a high emissions scenario, Hawkesbury is projected to experience an 13% increase in precipitation by the year 2050 and a 15% increase by the end of the century.

Increase in Frequency of Extreme Weather Events:

4. It is expected that the frequency and severity of extreme weather events will change.

1.4.2 Integrating 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 due to 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. The Town of Hawkesbury is actively involved in climate change initiatives through its participation in the Federation of Canadian Municipalities' (FCM) Partners for Climate Protection (PCP) Program. This program includes a network of over 460 municipal governments committed to reducing greenhouse gas emissions and implementing climate action plans. The Town's involvement allows it to access federal funding and resources to support its climate initiatives. Additionally, Hawkesbury collaborates with the Prescott and Russell Coalition for Climate Action to implement sustainable practices and engage the community in environmental stewardship.

1.5 Ontario Regulation 588/17

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

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

2019

Strategic Asset Management Policy

2022

Asset Management Plan for Core Assets with the following components:

1. Current levels of service
2. Inventory analysis
3. Lifecycle activities to sustain LOS
4. Cost of lifecycle activities
5. Population and employment forecasts
6. Discussion of growth impacts

2024

Asset Management Plan for Core and Non-Core Assets (same components as 2022) and Asset Management Policy Update

2025

Asset Management Plan for All Assets with the following additional components:

1. Proposed levels of service for next 10 years
2. Updated inventory analysis
3. Lifecycle management strategy
4. Financial strategy and addressing shortfalls
5. Discussion of how growth assumptions impacted lifecycle and financial strategies

1.5.1 O. Reg. 588/17 Compliance Review

The following table identifies the requirements outlined in Ontario Regulation 588/17 for municipalities to meet by July 1, 2024. Next to each requirement a page or section reference is included in addition to any necessary commentary.

Requirement	O. Reg. Section	AMP Section Reference	Status
Summary of assets in each category	S.5(2), 3(i)	4.1 – 12.1	Complete
Replacement cost of assets in each category	S.5(2), 3(ii)	4.1 – 12.1	Complete
Average age of assets in each category	S.5(2), 3(iii)	4.3 – 12.3	Complete
Condition of core assets in each category	S.5(2), 3(iv)	4.2 – 12.2	Complete
Description of municipality's approach to assessing the condition of assets in each category	S.5(2), 3(v)	4.2.1 – 12.2.1	Complete
Current levels of service in each category	S.5(2), 1(i-ii)	4.6 – 12.6	Complete
Current performance measures in each category	S.5(2), 2	4.6 – 12.6	Complete
Lifecycle activities needed to maintain current levels of service for 10 years	S.5(2), 4	4.4 – 12.4	Complete
Costs of providing lifecycle activities for 10 years	S.5(2), 4	Appendix B	Complete
Growth assumptions	S.5(2), 5(i-ii) S.5(2), 6(i-vi)	13.1 – 13.2	Complete

2 Scope and Methodology

Key Insights

- This asset management plan includes 9 asset categories and is divided between tax-funded and rate-funded categories
- The source and recency of replacement costs impacts the accuracy and reliability of asset portfolio valuation
- 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

2.1 Asset Categories Included in this AMP

This asset management plan for the Town of Hawkesbury is produced in compliance with Ontario Regulation 588/17. The July 2024 deadline under the regulation—the second of three AMPs—requires analysis of core assets (roads, bridges and culverts, water, sanitary sewer, and storm) and non-core assets (facilities, vehicles, machinery and equipment, and land improvements).

The AMP summarizes the state of the infrastructure for the Town's asset portfolio, establishes current levels of service and the associated technical and customer oriented key performance indicators (KPIs), outlines lifecycle strategies for optimal asset management and performance, and provides financial strategies to reach sustainability for the asset categories listed below.

Asset Category	Source of Funding
Road Network	Tax Levy
Bridges & Culverts	
Storm Network	
Facilities	
Vehicles	
Machinery & Equipment	
Land Improvements	
Water Network	User Rates
Sanitary Sewer Network	

2.2 Deriving Replacement Costs

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

- **User-Defined Cost and Cost/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
- **Cost Inflated User Defined Costs**: Based on costs provided by municipal staff which are inflated or deflated to the data effective date.

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 Town incurred. As assets age, and new products and technologies become available, cost inflation becomes a less reliable method.

2.3 Estimated Useful Life and Service Life Remaining

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

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

$$Service\ Life\ Remaining\ (SLR) = In\ Service\ Date + Estimated\ Useful\ Life (EUL) - Current\ Year$$

2.4 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 Town can determine the extent of any existing funding gap. The reinvestment rate is calculated as follows:

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

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

2.5 Deriving Asset Condition

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

A condition assessment rating system provides a standardized descriptive framework that allows comparative benchmarking across the Town's asset portfolio. The table below outlines the condition rating system used in this AMP to determine asset condition. This rating system is aligned with the Canadian Core Public Infrastructure Survey which is used to develop the Canadian Infrastructure Report Card. When assessed condition data is not available, service life remaining is used to approximate asset condition.

Condition	Description	Criteria	Service Life Remaining (%)
Very Good	Fit for the future	Well maintained, good condition, new or recently rehabilitated	80-100
Good	Adequate for now	Acceptable, generally approaching mid-stage of expected service life	60-80
Fair	Requires attention	Signs of deterioration, some elements exhibit significant deficiencies	40-60
Poor	Increasing potential of affecting service	Approaching end of service life, condition below standard, large portion of system exhibits significant deterioration	20-40
Very Poor	Unfit for sustained service	Near or beyond expected service life, widespread signs of advanced deterioration, some assets may be unusable	0-20

The analysis in this AMP is based on assessed condition data only as available. In the absence of assessed condition data, asset age is used as a proxy to determine asset condition. Appendix D includes additional information on the role of asset condition data and provides basic guidelines for the development of a condition assessment program.

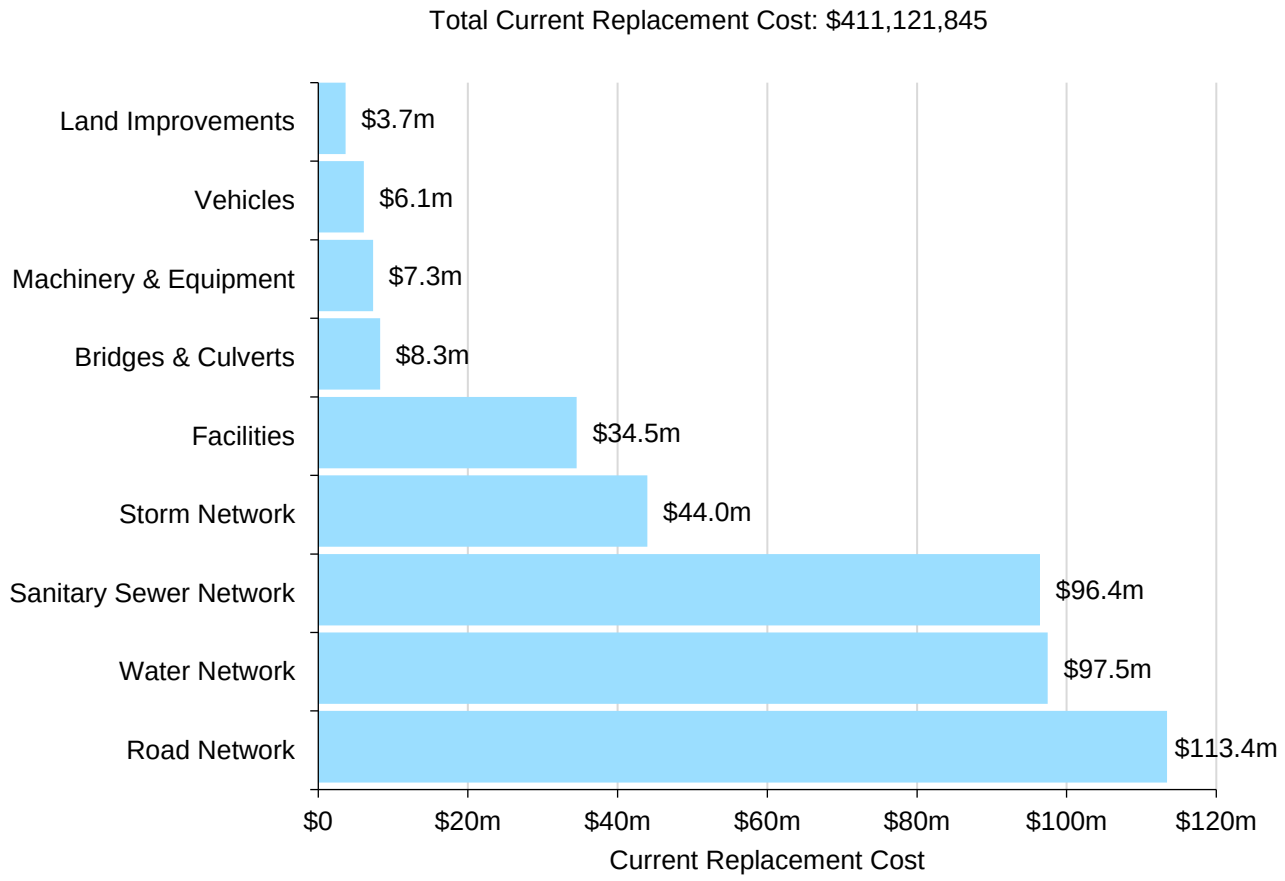
3 Portfolio Overview

Key Insights

- The total replacement cost of the Town's asset portfolio is $411.1 million
- The Town's target re-investment rate is 2.4%, and the actual re-investment rate is 0.8%, contributing to an expanding infrastructure deficit
- 46% of all assets are in fair or better condition
- Average annual capital requirements total $9.9 million per year across all assets

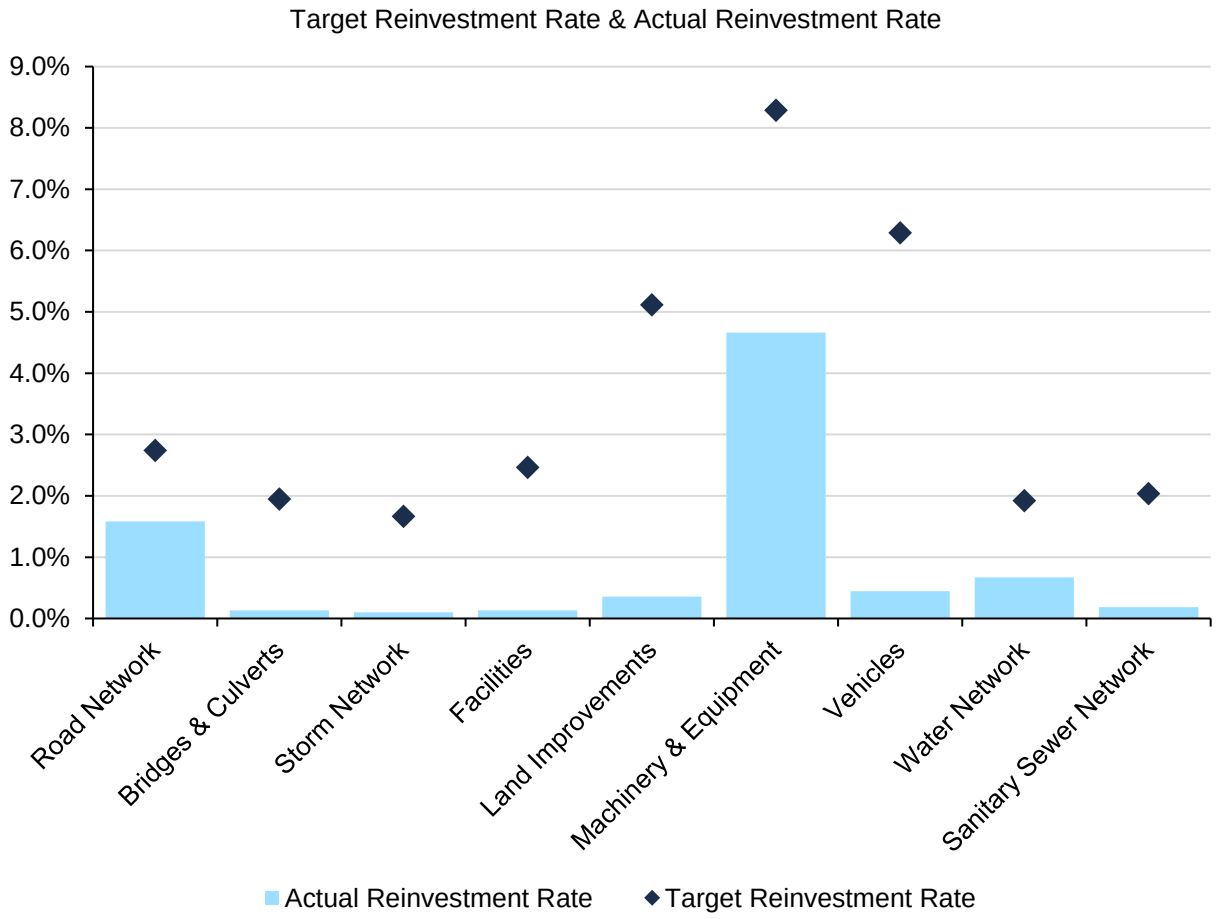
3.1 Total Replacement Cost of Asset Portfolio

The asset categories analyzed in this AMP have a total replacement cost of $411.1 based on inventory data from 2022. 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.



3.2 Target vs Actual Reinvestment Rate

The graph below depicts funding gaps or surpluses by comparing target vs actual reinvestment rates. To meet the long-term replacement needs, the Town should be allocating approximately $9.9 million annually, for a target reinvestment rate of 2.4%. Actual annual spending on infrastructure totals approximately $3.1 million, for an actual reinvestment rate of 0.8%.



3.3 Condition of Asset Portfolio

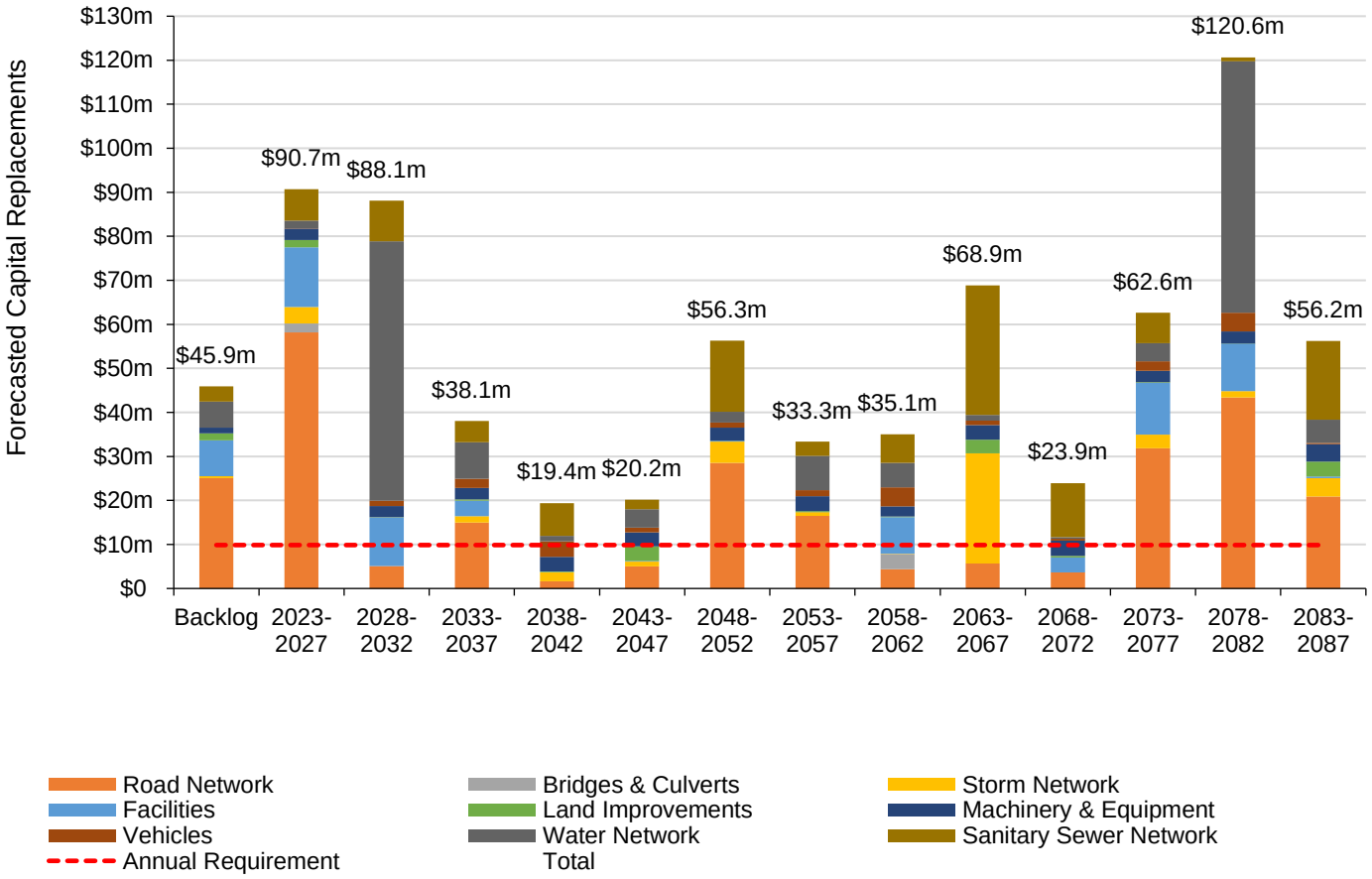
The current condition of the assets is central to all asset management planning. Collectively, 46% of assets in Hawkesbury are in fair or better condition. This estimate relies on both age-based and field condition data.

This AMP relies on assessed condition data for 55% of assets; 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 table below identifies the source of condition data used throughout this AMP.

Asset Category	% of Assets with Assessed Condition	Source of Condition Data
Road Network	81%	RNS, Staff Assessments
Bridges & Culverts	100%	OSIM Report
Storm Network	75%	CCTV Inspections
Facilities	0%	N/A
Machinery & Equipment	25%	Staff Assessments
Vehicles	100%	Staff Assessments
Land Improvements	0%	N/A
Water Network	0%	N/A
Sanitary Sewer network	87%	CCTV Inspections, BCAs

3.4 Forecasted Capital Requirements

The development of a long-term capital forecast should include both asset rehabilitation and replacement requirements. With the development of asset-specific lifecycle strategies that include the timing and cost of future capital events, the Town can produce an accurate long-term capital forecast. The following graph identifies capital requirements over the next 65 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.



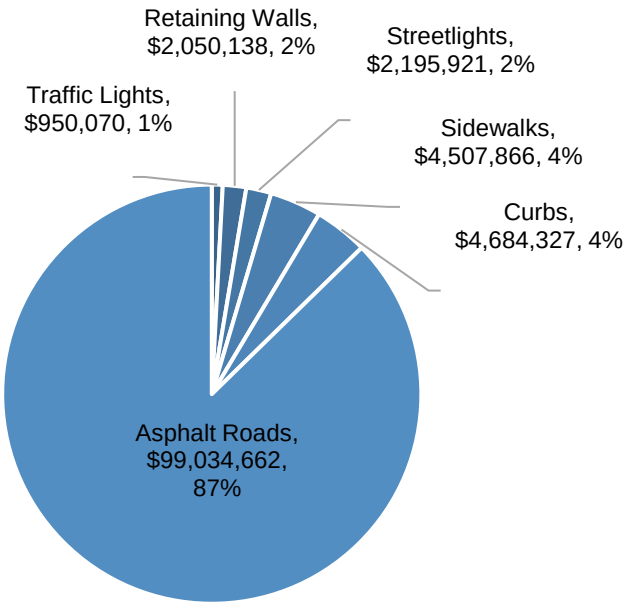
4 Road Network

The road network is a critical component of the provision of safe and efficient transportation services. It includes all municipally owned and maintained roadways in addition to supporting roadside infrastructure including curbs, retaining walls, sidewalks, streetlights, and traffic lights.

4.1 Asset Inventory

The table below includes the quantity, unit of measure, total replacement cost, and primary replacement cost method of each asset segment in the Town's road network inventory.

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Asphalt Roads	51,961	Meters	$99,035,000	Cost per unit
Curbs	69,989	Meters	$4,684,000	User-defined
Retaining Walls	2	Assets	$2,050,000	CPI
Sidewalks	22,625	Meters	$4,508,000	User-defined
Streetlights	1,592	Assets	$2,196,000	User-defined
Traffic Lights	26	Assets	$950,000	User-defined

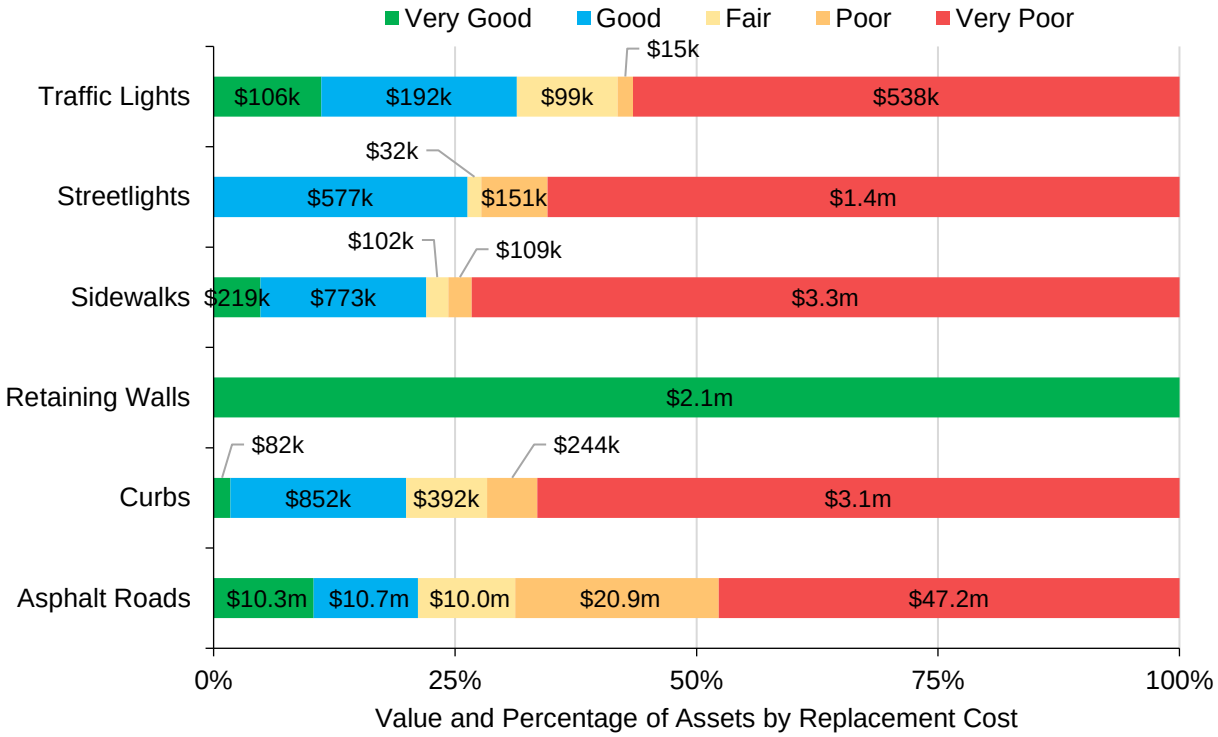


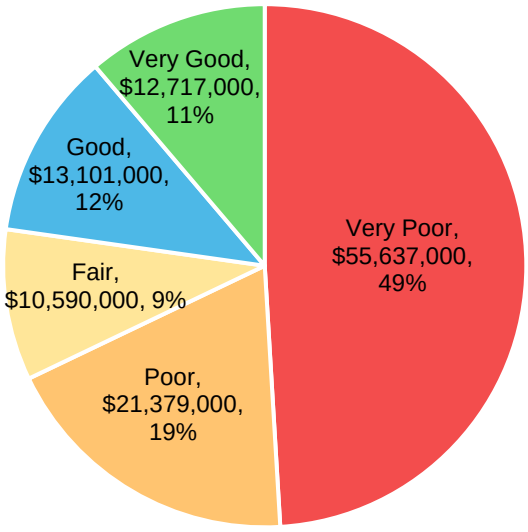
Total Current Replacement Cost: $113,422,984

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

4.2 Asset Condition

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





To ensure that the Town's road network continues to provide an acceptable level of service, it 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 roads.

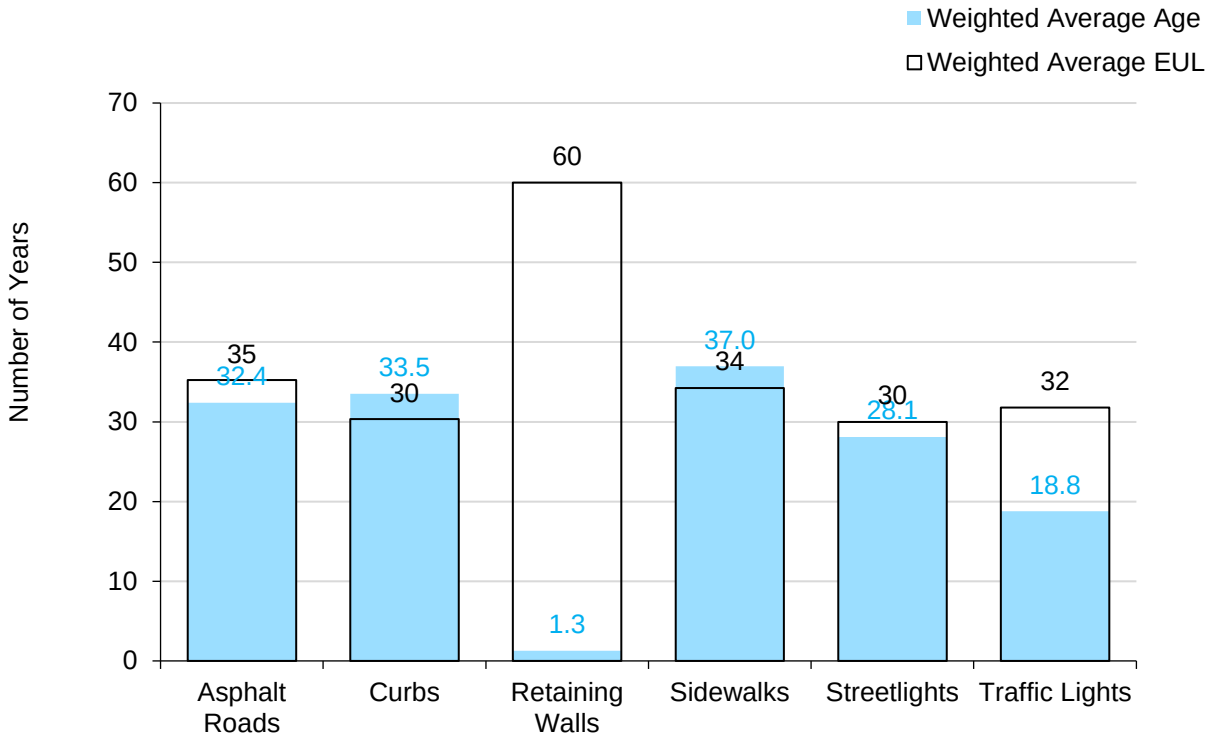
4.2.1 Current Approach to Condition Assessment

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

- Internal staff within the Town conduct routine road patrols to visually inspect and identify deficiencies within the road network
- A Road Needs Study (RNS) was completed in 2017 that included a detailed assessment of the condition of each road segment. The Town is planning to conduct an external assessment in the coming years

4.3 Estimated Useful Life & Average Age

The Estimated Useful Life for road network assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service. Assessed condition may increase or decrease the average service life remaining.



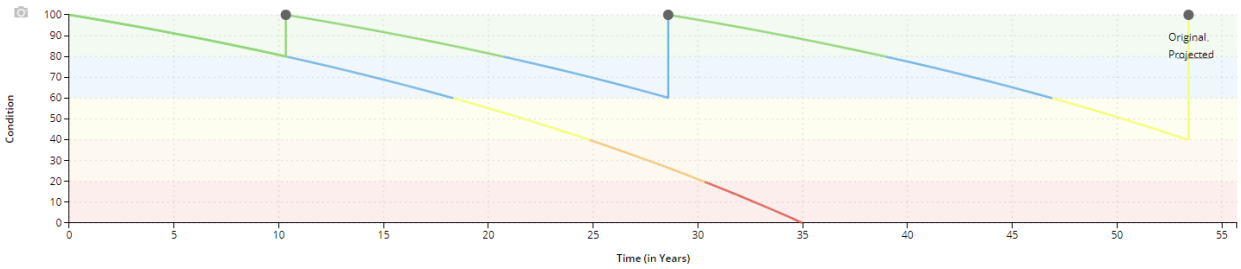
Each asset's Estimated Useful Life should be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

4.4 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 strategy has been developed as a proactive approach to managing the lifecycle of asphalt 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.

Asphalt Roads		
Event Name	**Event Class**	**Event Trigger**
Surface Treatment	Maintenance	PCI: 80
Pulverize and Pave	Rehabilitation	PCI: 60
Full Reconstruction	Replacement	PCI: 40



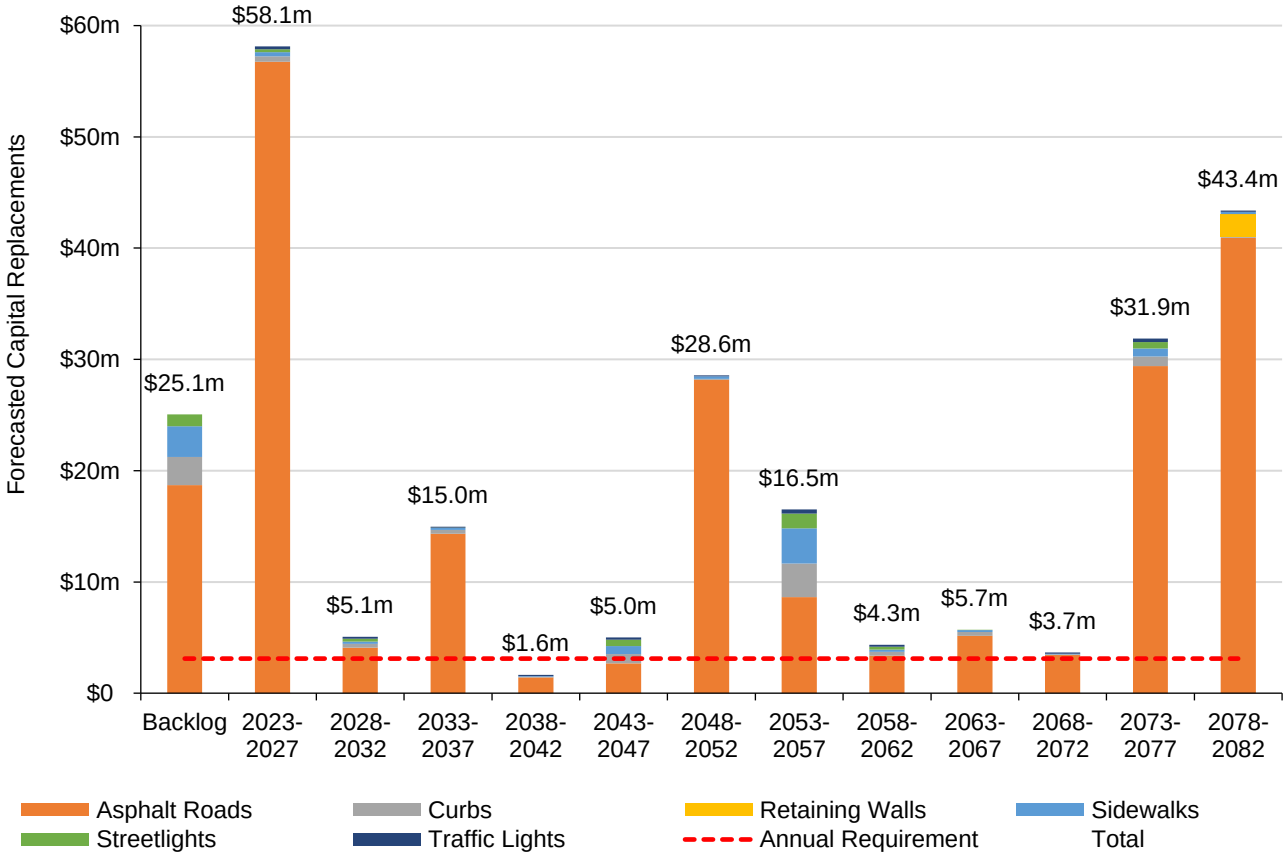
The following table outlines the Town's additional current lifecycle management strategies.

Activity Type	Description of Current Strategy
Maintenance	The Town completes crack sealing, ditch maintenance, curbside maintenance, and asphalt patching on an annual basis
	Summer maintenance activities include sidewalk repair, ditching, mowing, crushing, line painting, and sign maintenance
	Winter maintenance activities include snow plowing, salting, and snow removal
	All maintenance tasks adhere to the Minimum Maintenance Standards (MMS)
	Streetlight maintenance activities include replacing bulbs and other components of the street light as needed

Rehabilitation	Rehabilitation activities are completed on an as-needed, case-by-case basis, primarily in response to a number of failing assets and the pre-existing backlog of tasks
	Pulverization and paving are carried out, with a focus on arterial roads, while local roads typically do not undergo this type of rehabilitation
Replacement	Rehabilitation and replacement activities are prioritized based on asset condition and health and safety risks. Paved road capital activities are done in coordination with underground infrastructure to streamline multiple projects

4.4.1 Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Town should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 60 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.

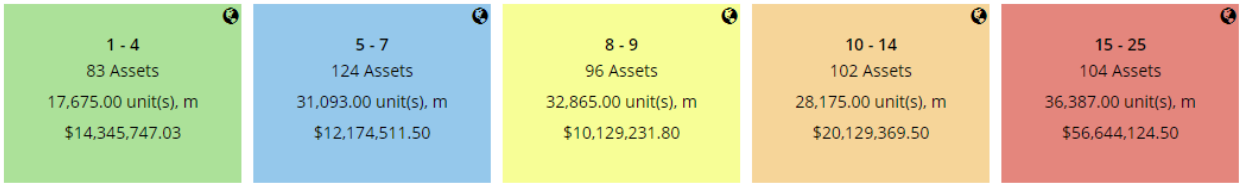


The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix B.

4.5 Risk & Criticality

4.5.1 Risk Matrix

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 2022 inventory data.



This is a high-level model developed for the purposes of this AMP and Town staff should review and adjust the risk model 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)
Condition (Economic)	Replacement Cost (Economic)
	Functional Class (Social)
	Lane (Social)
	AMP Segment (Strategic)

The identification of critical assets allows the Town 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.

4.5.2 Risks to Current Asset Management Strategies

The following section summarizes key trends, challenges, and risks to service delivery that the Town is currently facing:

Climate Change & Extreme Events

Hawkesbury road network faces a significant risk due to increased freeze and thaw cycles. The frequent alternation between freezing temperatures and thawing conditions can take a toll on road surfaces. This process often results in the formation of cracks, potholes, and surface damage, which not only jeopardizes road safety but also escalates maintenance expenses. The Town's geographic location by the river can increase these cycles, making the risk more pronounced. Managing and mitigating this risk is crucial to ensure the road network's is performing at the expected levels of service.

Capital Funding Strategies

Budget constraints pose a significant risk to the Town's road network, exacerbated by the presence of a backlog of overdue projects. Insufficient financial resources can hinder the Town's ability to address pressing maintenance and repair needs effectively. With a backlog of projects, the risk intensifies, as essential road infrastructure may continue to deteriorate due to delayed maintenance. This compromises road safety and quality but also escalates long-term costs as deferred issues worsen over time. To mitigate this risk, careful financial planning and prioritization becomes imperative to tackle the backlog and ensure the Town's road network remains reliable and functional.

Heavy Traffic

The consistent presence of unexpected heavy-weight traffic poses a significant risk to the Town’s road network. Continuous heavy vehicle traffic can lead to accelerated wear and tear on road surfaces, resulting in damage and structural weaknesses. This ongoing impact necessitates frequent and costly repairs. To address this risk effectively, the Town should consider infrastructure improvements to support heavy vehicles, implement maintenance plans, and explore load restrictions where appropriate, ensuring the road network remains resilient without compromising safety and functionality.

4.6 Levels of Service

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

4.6.1 Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2022)
Scope	Description, which may include maps, of the road network in the municipality and its level of connectivity	See Appendix C
Quality	Description or images that illustrate the different levels of road class pavement condition	The Town completed a Road Need Study in 2017, in collaboration with Stantec. Each road section received various condition scores (RCI, PCI, SAI, & PQI) See Appendix C

4.6.2 Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2022)
Scope	Lane-km of arterial roads (MMS classes 1 and 2) per land area (km/km^2)	1.4[1]
	Lane-km of collector roads (MMS classes 3 and 4) per land area (km/km^2)	1.9[2]
	Lane-km of local roads (MMS classes 5 and 6) per land area (km/km^2)	4.7[3]
Quality	Average pavement condition index for paved roads in the municipality	31
	Average surface condition for unpaved roads in the municipality (e.g. excellent, good, fair, poor)	N/A[4]
Performance	Annual capital reinvestment rate	1.6%

[1] Where the number of lanes were not known, assumed two (2).
[2] Where the number of lanes were not known, assumed two (2).
[3] Where the number of lanes were not known, assumed two (2).
[4] The Town does not own/manage any unpaved roads.

4.7 Recommendations

Asset Inventory

- Review the Town's asset register on a scheduled basis to ensure all assets are accounted for (additions, disposals, etc.)
- There are a significant number of assets which have been identified as backlog. These assets are devoid of an assessed condition score and are still operational, beyond their EUL. It is recommended that staff review these assets.

Condition Assessment Strategies

- The last comprehensive assessment of the road network was completed in 2017. Hawkesbury should consider completing an updated assessment (RNS) of all road segments. Furthermore, it is recommended to conduct a formal RNS on a 5-year schedule.

Lifecycle Management Strategies

- Review the identified lifecycle management strategies for the Town's roads, to realize potential cost avoidance and maintain a high quality of road pavement condition.
- Evaluate the efficacy of the Town's lifecycle management strategies at regular intervals to determine the impact cost, condition, and risk.

Risk Management Strategies

- Implement risk-based decision-making as part of asset management planning and budgeting processes. This should include the regular review of high-risk assets to determine appropriate risk mitigation strategies.
- Review risk models on a regular basis and adjust according to an evolving understanding of the probability and consequences of asset failure.

Levels of Service

- Continue to measure current levels of service in accordance with the metrics identified in O. Reg. 588/17 and those metrics that the Town believes to provide meaningful and reliable inputs into asset management planning.
- Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

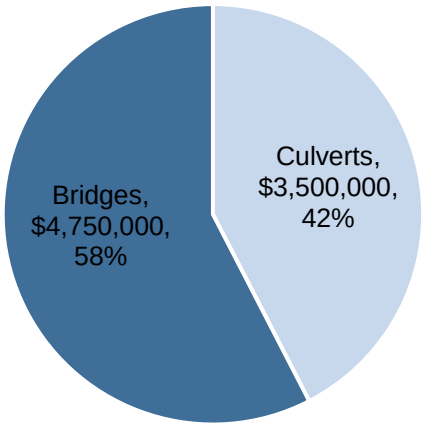
5 Bridges & Culverts

Bridges & culverts represent a critical portion of the transportation services provided to the community. The Town is responsible for the maintenance of all bridges & culverts located across municipal roads with the goal of keeping structures in an adequate state of repair and minimizing service disruptions.

5.1 Asset Inventory

The table below includes the quantity, unit of measure, total replacement cost, and primary replacement cost method of each asset segment in the Town's bridges and culverts inventory.

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Bridges	2	Assets	$4,750,000	User-defined
Culverts	3	Assets	$3,500,000	User-defined

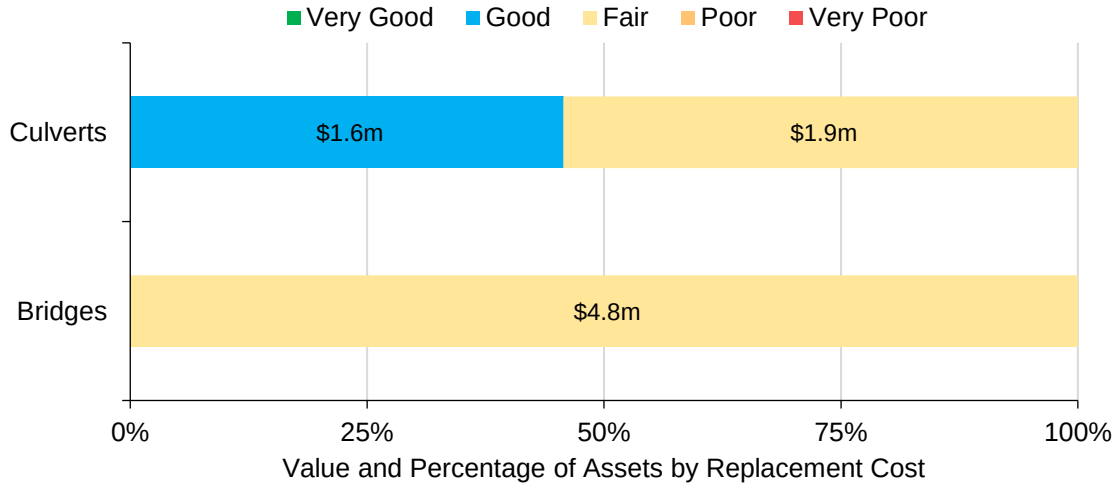


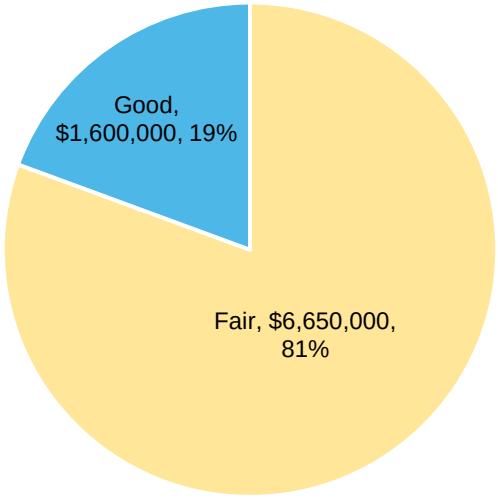
Total Current Replacement Cost: $8,250,000

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

5.2 Asset Condition

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





To ensure that the Town's bridges & culverts continue to provide an acceptable level of service, the Town 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 bridges and culverts.

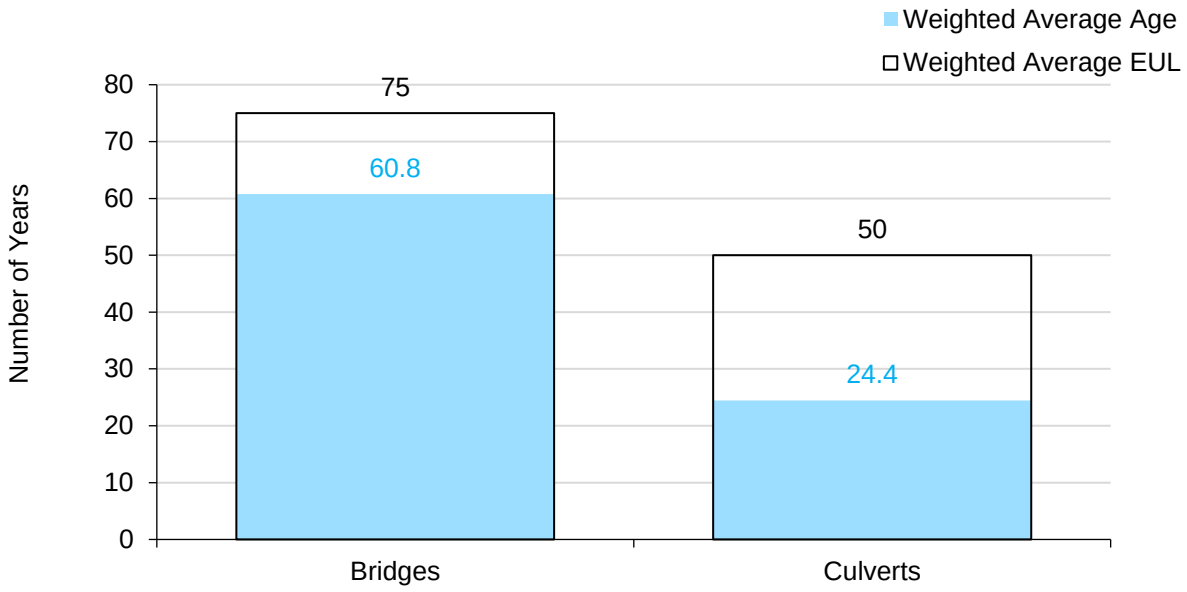
5.2.1 Current Approach to Condition Assessment

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

- Condition assessments of all bridges and culverts with a span greater than or equal to 3 meters are completed every year in accordance with the Ontario Structure Inspection Manual (OSIM)
- The Town possesses one bridge (Cecile) in a critical state of deterioration, necessitating annual inspections and continuous monitoring to assess its condition

5.3 Estimated Useful Life & Average Age

The Estimated Useful Life for bridge and culverts assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service. Assessed condition may increase or decrease the average service life remaining.



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

5.4 Lifecycle Management Strategy

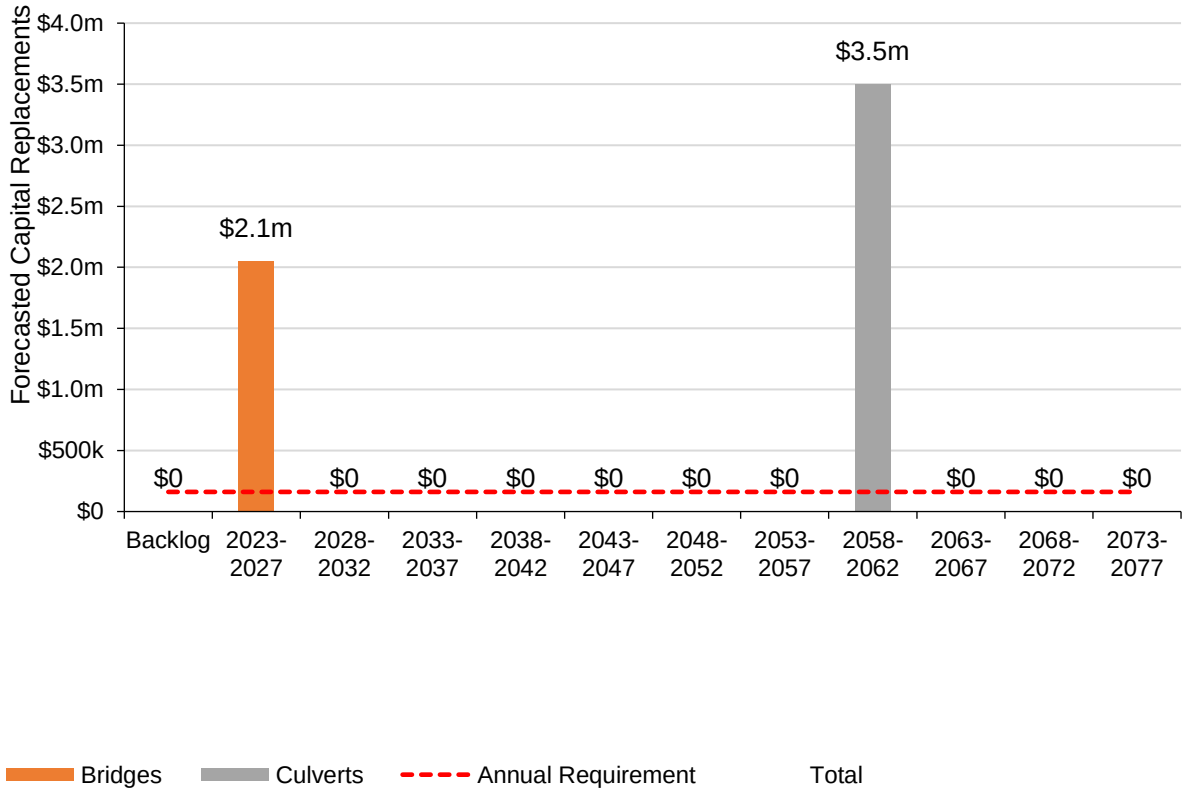
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Maintenance, Rehabilitation and Replacement	Internal staff complete regular maintenance activities for bridges such as sweeping. Winter maintenance activities such as snow removal, salting, and de-icing are performed on an as-needed basis
	All lifecycle activities are driven by the results of mandated structural inspections competed according to the Ontario Structure Inspection Manual (OSIM)
Inspection	The most recent inspection report was completed in 2023

5.4.1 Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Town should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 55 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement.

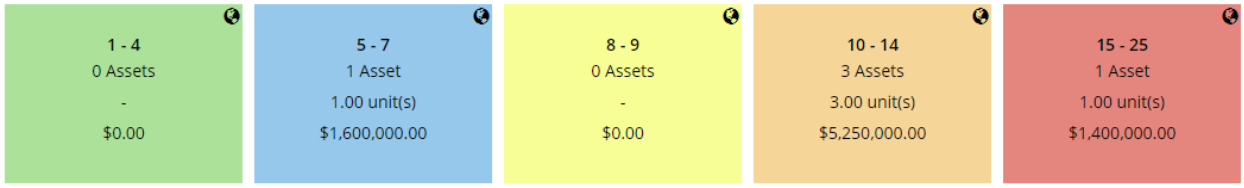


The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix B.

5.5 Risk & Criticality

5.5.1 Risk Matrix

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 2022 inventory data.



This is a high-level model developed for the purposes of this AMP and Town staff should review and adjust the risk model 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 (Economic)	Replacement Cost (Economic)
	Structure Type (Operational)
	AADT (Social)

The identification of critical assets allows the Town 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.

5.5.2 Risks to Current Asset Management Strategies

The following section summarizes key trends, challenges, and risks to service delivery that the Town is currently facing:

Climate Change & Extreme Events

Freeze-thaw cycles and the risk of ice jams causing floods pose significant threats to the Town's bridges and culverts. In regions vulnerable to these conditions, repetitive freezing and thawing can strain structural integrity, leading to cracks and weakened foundations. Additionally, ice jam-related floods can suddenly elevate water levels, putting these critical assets at risk. To mitigate these risks, diligent maintenance, inspections, and strategic design are crucial to ensuring the resilience of bridges and culverts.

Capital Funding Strategies

The constant presence of heavyweight traffic and their vibrations pose a significant risk to a Town's bridges and culverts. These heavy vehicles exert substantial weight and pressure on these critical infrastructure elements, leading to structural wear and potential damage over time. The vibrations generated further accelerate this deterioration, compromising the safety and durability of the bridges and culverts. Proactive maintenance, regular inspections, and structural reinforcements are crucial to ensure the resilience and safety of these assets.

5.6 Levels of Service

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

5.6.1 Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2022)
Scope	Description of the traffic that is supported by municipal bridges (e.g. heavy transport vehicles, motor vehicles, emergency vehicles, pedestrians, cyclists)	Bridges and structural culverts are a key component of the municipal transportation network. None of the Town's structures have loading or dimensional restrictions meaning that most types of vehicles, including heavy transport, emergency vehicles, and cyclists can cross them without restriction.
Quality	Description or images of the condition of bridges and culverts and how this would affect use of the bridges and culverts	As per Ontario Regulation 104/97, every bridge and structural culvert (>3m) owned by the Town is subject to a biennial inspection, following best practices as laid out in the Ontario Structure Inspection Manual (OSIM). All structures are assessed and assigned a Bridge Condition Index (BCI) score, which ranges from 0-100. Condition directly affects the usability of structures, whether it is the paved surface for vehicles, sidewalks for bikes and pedestrians, and so on.

5.6.2 Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2022)
Scope	% of bridges in the Town with loading or dimensional restrictions	0%
Quality	Average bridge condition index value for bridges in the Town	66
	Average bridge condition index value for structural culverts in the Town	71
Performance	Capital re-investment rate	0.1%

5.7 Recommendations

Asset Inventory

- Continue to review and validate inventory data, assessed condition data and replacement costs for all bridges and structural culverts upon the completion of OSIM inspections every 2 years.

Risk Management Strategies

- Implement risk-based decision-making as part of asset management planning and budgeting processes. This should include the regular review of high-risk assets to determine appropriate risk mitigation strategies.
- Review risk models on a regular basis and adjust according to an evolving understanding of the probability and consequences of asset failure.

Lifecycle Management Strategies

- This AMP only includes capital costs associated with the reconstruction of bridges and culverts. The Town should work towards identifying projected capital rehabilitation and renewal costs for bridges and culverts and integrating these costs into long-term planning.

Levels of Service

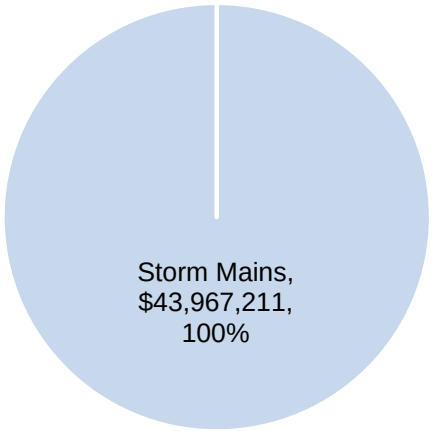
- Continue to measure current levels of service in accordance with the metrics identified in O. Reg. 588/17 and those metrics that the Town believe to provide meaningful and reliable inputs into asset management planning.
- Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

6 Storm Network

6.1 Asset Inventory

The table below includes the quantity, unit of measure, total replacement cost, and primary replacement cost method of each asset segment in the Town's storm network inventory.

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Storm Mains	75,115	Meters	$43,967,000	Cost per unit

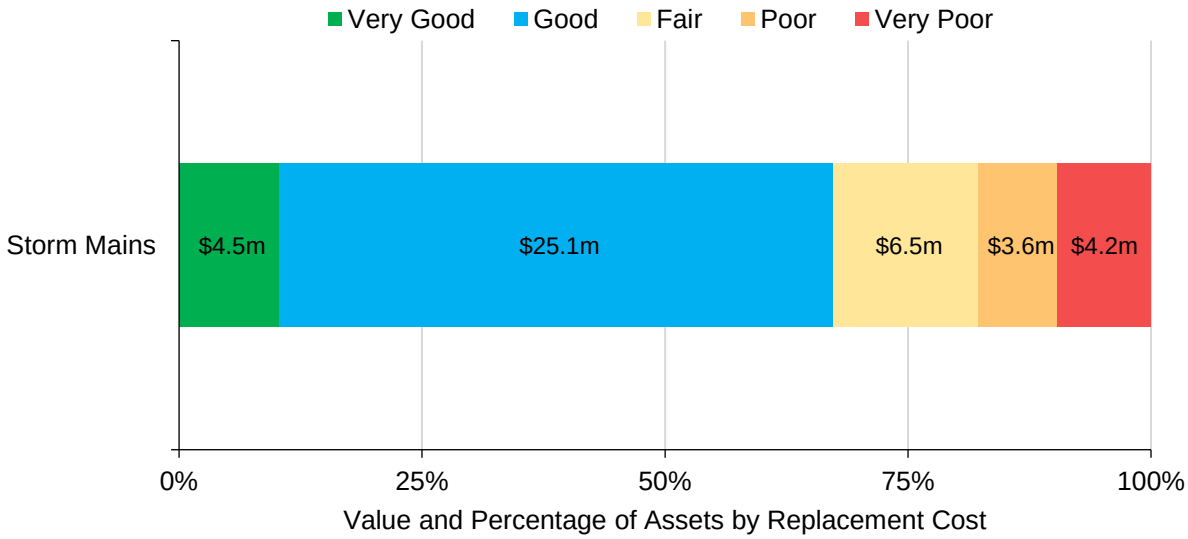


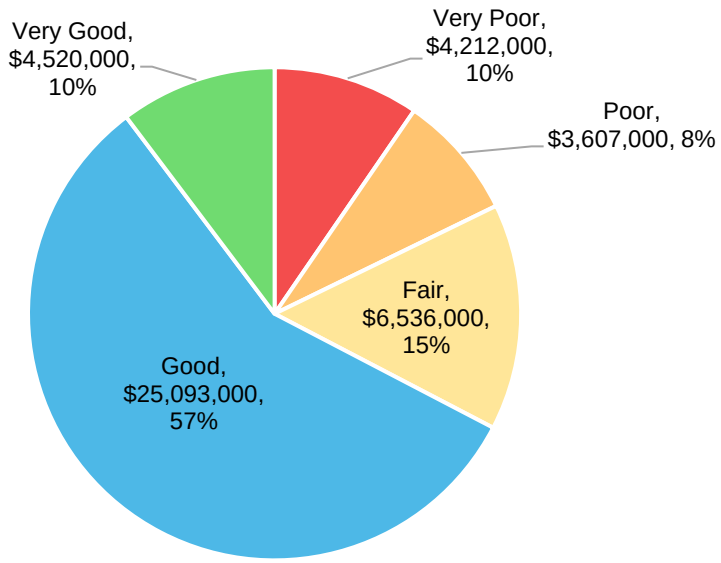
Total Current Replacement Cost: $43,967,211

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

6.2 Asset Condition

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





To ensure that the Town's storm network continue to provide an acceptable level of service, the Town 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 storm network.

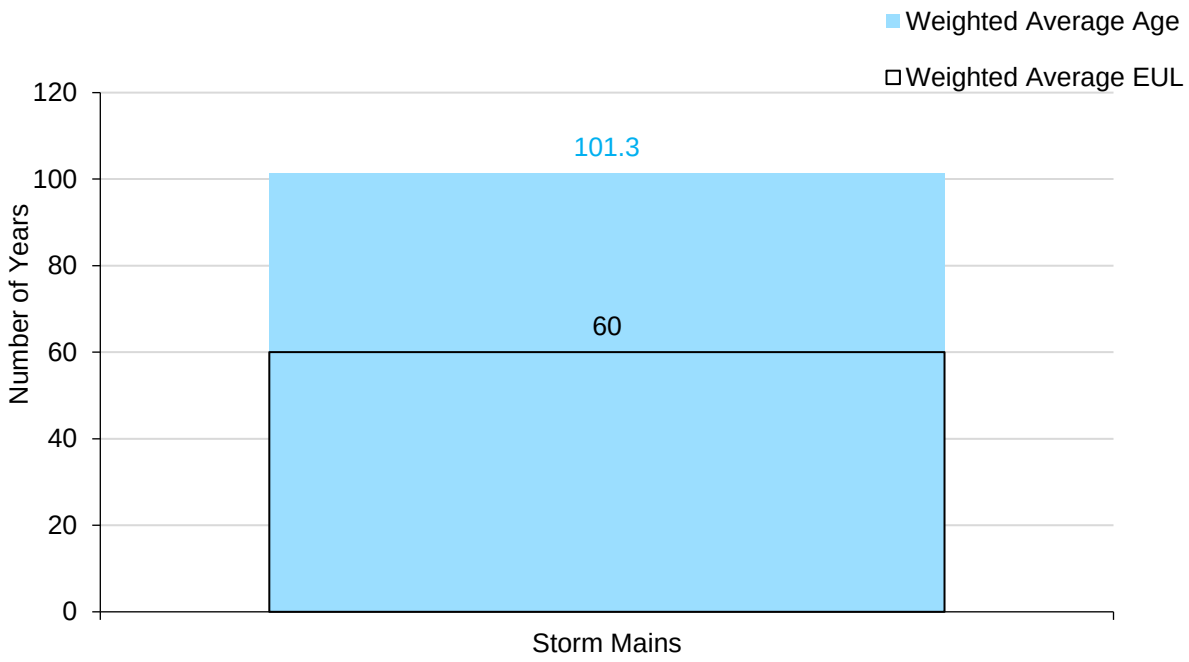
6.2.1 Current Approach to Condition Assessment

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

- There are no formal condition assessment programs in place for the storm appurtenances
- In 2020, a CCTV inspection was conducted for storm mains, and there are plans to establish a recurring CCTV program every 5 years

6.3 Estimated Useful Life & Average Age

The Estimated Useful Life for storm network assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service. Assessed condition may increase or decrease the average service life remaining.



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

6.4 Lifecycle Management Strategy

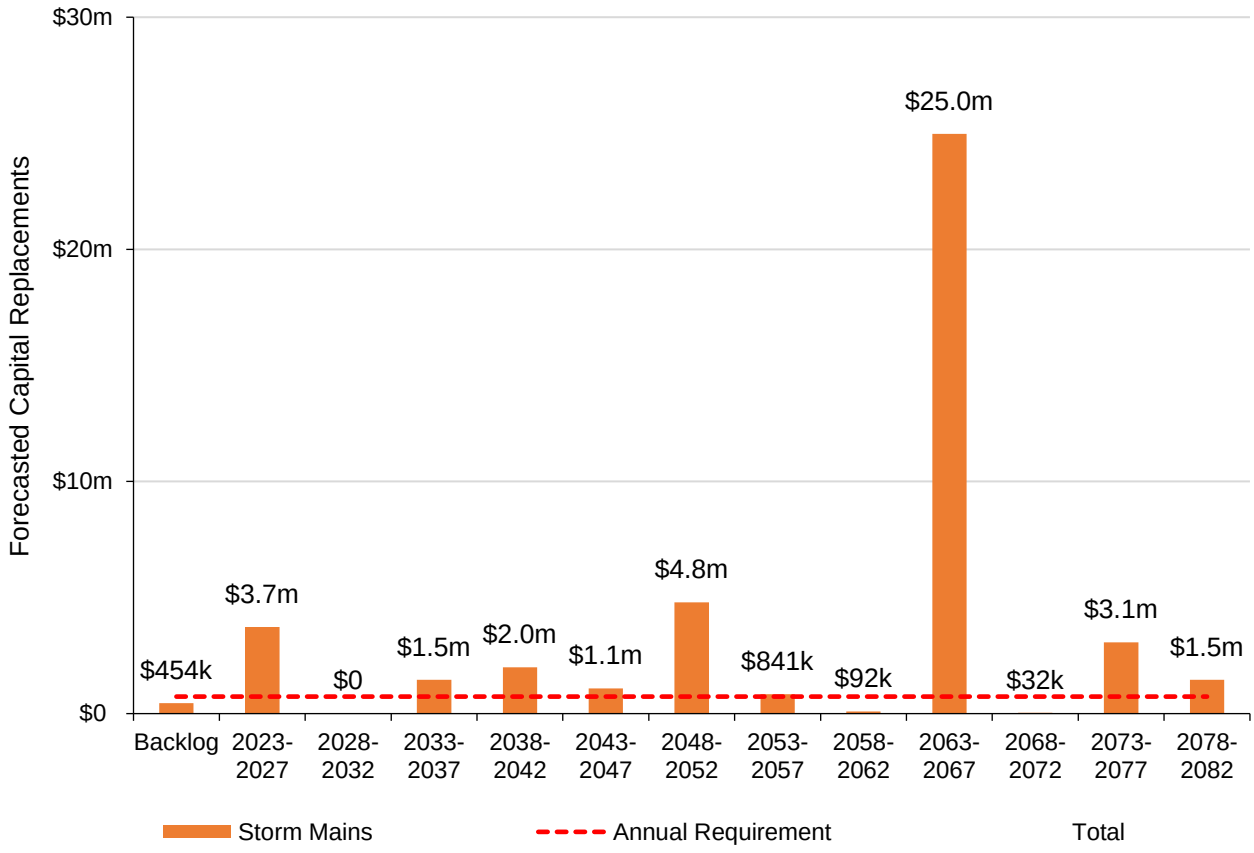
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Maintenance	Catch basin cleaning is conducted every two years, with an annual flushing program set to be introduced in the coming year as part of the maintenance schedule
	Annual maintenance is consistently carried out on manholes to ensure functionality and structural integrity
	Maintenance activities related to storm network assets tend to be more reactive in nature, on an as-needed basis
	In 2020, a CCTV inspection was carried out, with plans in place to establish a recurring CCTV program to be conducted every five years
Rehabilitation	No trenchless re-lining has been completed. Instead, the approach is to address specific areas with spot repairs as the need arises
Replacement	Replacement of storm assets is predominantly reactive, as these components are generally scheduled for replacement toward the end of their expected service life

6.4.1 Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Town should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 60 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.

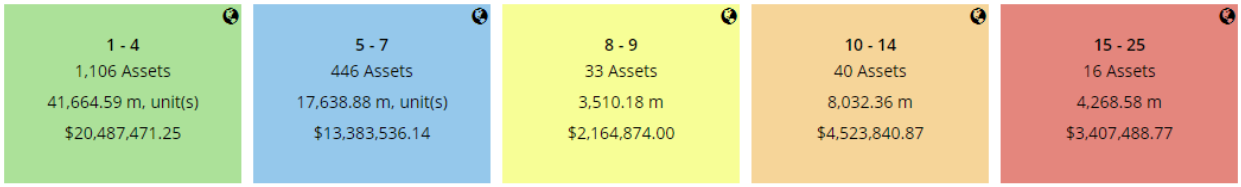


The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix B.

6.5 Risk & Criticality

6.5.1 Risk Matrix

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 2022 inventory data.



This is a high-level model developed for the purposes of this AMP and Town staff should review and adjust the risk model 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 storm network are documented below:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition (Economic)	Replacement Cost (Economic)
	Diameter (Social)

The identification of critical assets allows the Town 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.

6.5.2 Risks to Current Asset Management Strategies

The following section summarizes key trends, challenges, and risks to service delivery that the Town is currently facing:

Climate Change & Extreme Events

Extreme rainfall events, especially when coupled with rain during winter months, pose a significant risk to a Town's storm network. These weather conditions can lead to sudden and substantial increases in water runoff, overwhelming drainage systems and causing flooding in susceptible areas. Furthermore, in the event of winter rainfall, catch basins and drainage pipes may freeze, hindering the natural flow of water and intensifying the potential for localized flooding. To mitigate this risk, the Town needs vigilant monitoring, proactive maintenance, and infrastructure upgrades as needed, to enhance storm network's resilience against extreme weather, safeguarding against flood-related issues.

Capital Funding Strategies

Budget constraints and a lack of long-term reserves, present a significant risk to the Town's storm network. The limited availability of funds can impede necessary infrastructure improvements, leading to deferred maintenance, reduced system efficiency, and an increased likelihood of storm-related issues, such as flooding and erosion. Without adequate financial resources set aside for long-term planning, the Town may struggle to address critical maintenance needs and adapt to changing environmental conditions. Proactive financial planning and alternative funding sources are essential to mitigate this risk, ensuring the network's resilience and protecting the Town from potential service disruptions.

6.6 Levels of Service

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

6.6.1 Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2022)
Scope	Description, which may include map, of the user groups or areas of the municipality that are protected from flooding, including the extent of protection provided by the municipal storm system	See Appendix C

6.6.2 Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2022)
Scope	% of properties in municipality resilient to a 100-year storm	TBD[5]
	% of the municipal storm management system resilient to a 5-year storm	100%
Performance	Annual capital reinvestment rate	0.1%

[5] Currently, the Town does not have sufficient data to provide this metric. However, staff estimates indicate that the % of properties resilient to a 100-year storm, would be very low.

6.7 Recommendations

Asset Inventory

- The Town should continue improving and refining its database by updating pertinent attribute details, including quantities, material, diameter, etc.
- Currently, the storm inventory consists of mains. Going forward, the Town should consider integrating a more granular inventory to include structure such as: maintenance holes, headwalls, catch basins, outlets, etc.

Condition Assessment Strategies

- The development of a comprehensive inventory should be accompanied by a system-wide assessment of the condition of all assets in the storm network through CCTV inspections. Most recently completed in 2020, the Town plans to conduct another inspection in 2025.

Risk Management Strategies

- Implement risk-based decision-making as part of asset management planning and budgeting processes. This should include the regular review of high-risk assets to determine appropriate risk mitigation strategies.
- Review risk models on a regular basis and adjust according to an evolving understanding of the probability and consequences of asset failure.

Lifecycle Management Strategies

- Document and review lifecycle management strategies for the storm network on a regular basis to achieve the lowest total cost of ownership while maintaining adequate service levels.

Levels of Service

- Continue to measure current levels of service in accordance with the metrics that the Town has established in this AMP. Additional metrics can be established as they are determined to provide meaningful and reliable inputs into asset management planning.
- Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

7 Facilities

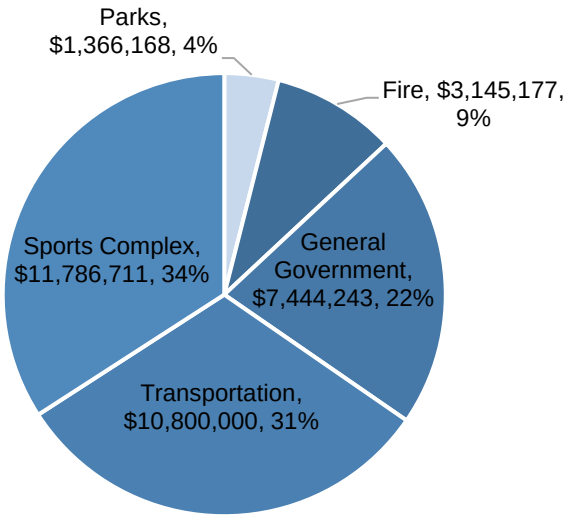
The Town of Hawkesbury owns and maintains several facilities and recreation centres that provide key services to the community. These include:

- Fire hall to provide emergency services
- General government facilities
- Parks facilities and a sports complex to support recreational services
- Transportation facilities to support the public works department

7.1 Asset Inventory

The table below includes the quantity, unit of measure, total replacement cost, and primary replacement cost method of each asset segment in the Town's facilities inventory.

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Fire	1	Assets	$3,145,000	CPI
General Government	41	Assets	$7,444,000	User-defined
Parks	8	Assets	$1,366,000	User-defined
Sports Complex	5	Assets	$11,787,000	User-defined
Transportation	1	Assets	$10,800,000	User-defined

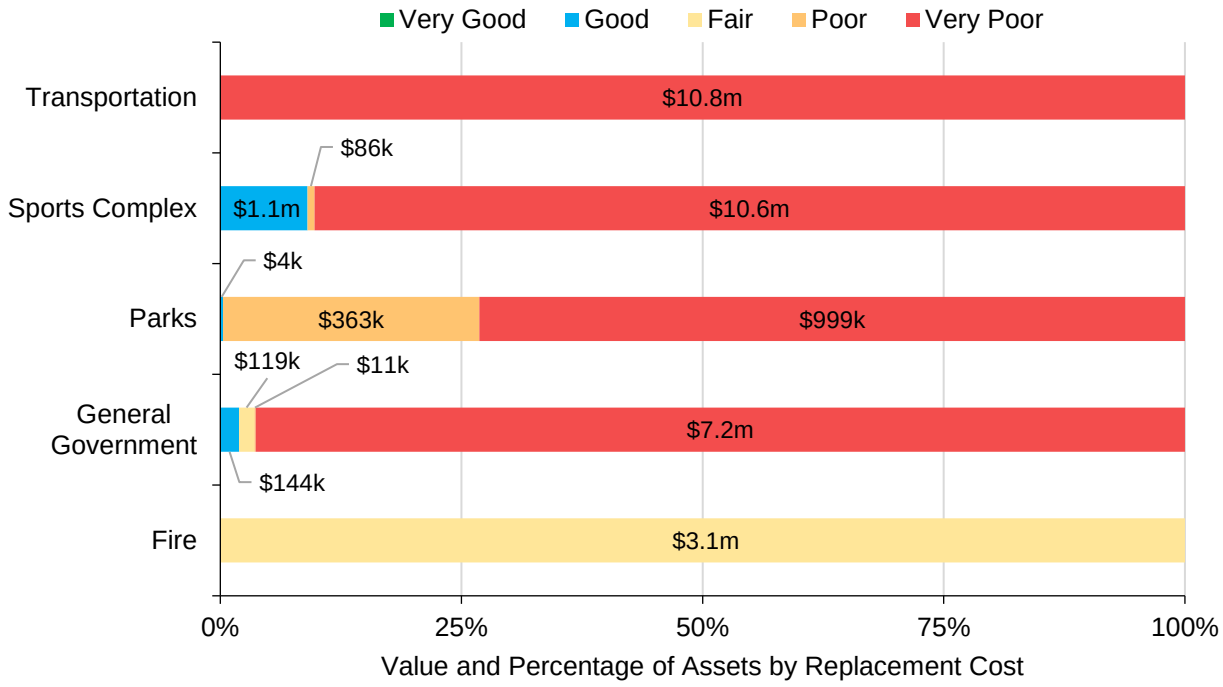


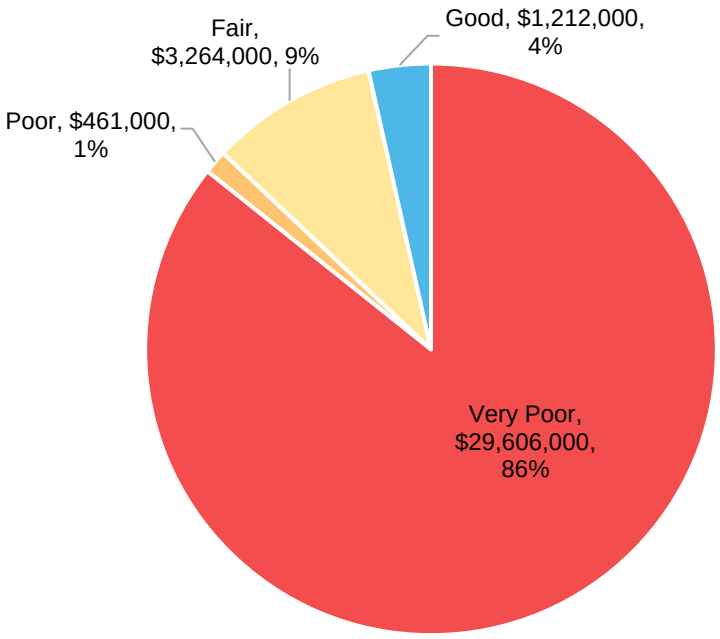
Total Current Replacement Cost: $34,542,299

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

7.2 Asset Condition

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





To ensure that the Town's facilities continue to provide an acceptable level of service, the Town 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 facilities.

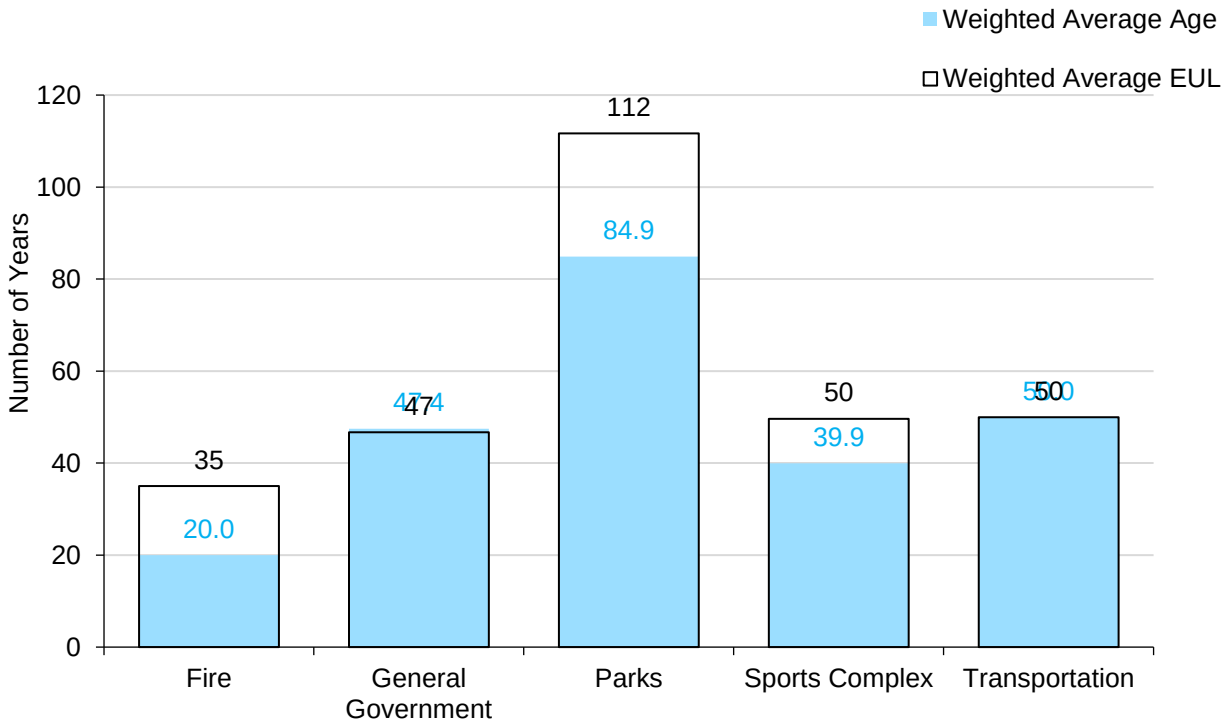
7.2.1 Current Approach to Condition Assessment

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

- Comprehensive Building Condition Assessments (BCAs) have been completed to evaluate the structural, mechanical, electrical, and architectural elements of various facilities
- Internal assessments are conducted on an ad-hoc basis, as needed

7.3 Estimated Useful Life & Average Age

The Estimated Useful Life for facility assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service. Assessed condition may increase or decrease the average service life remaining.



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

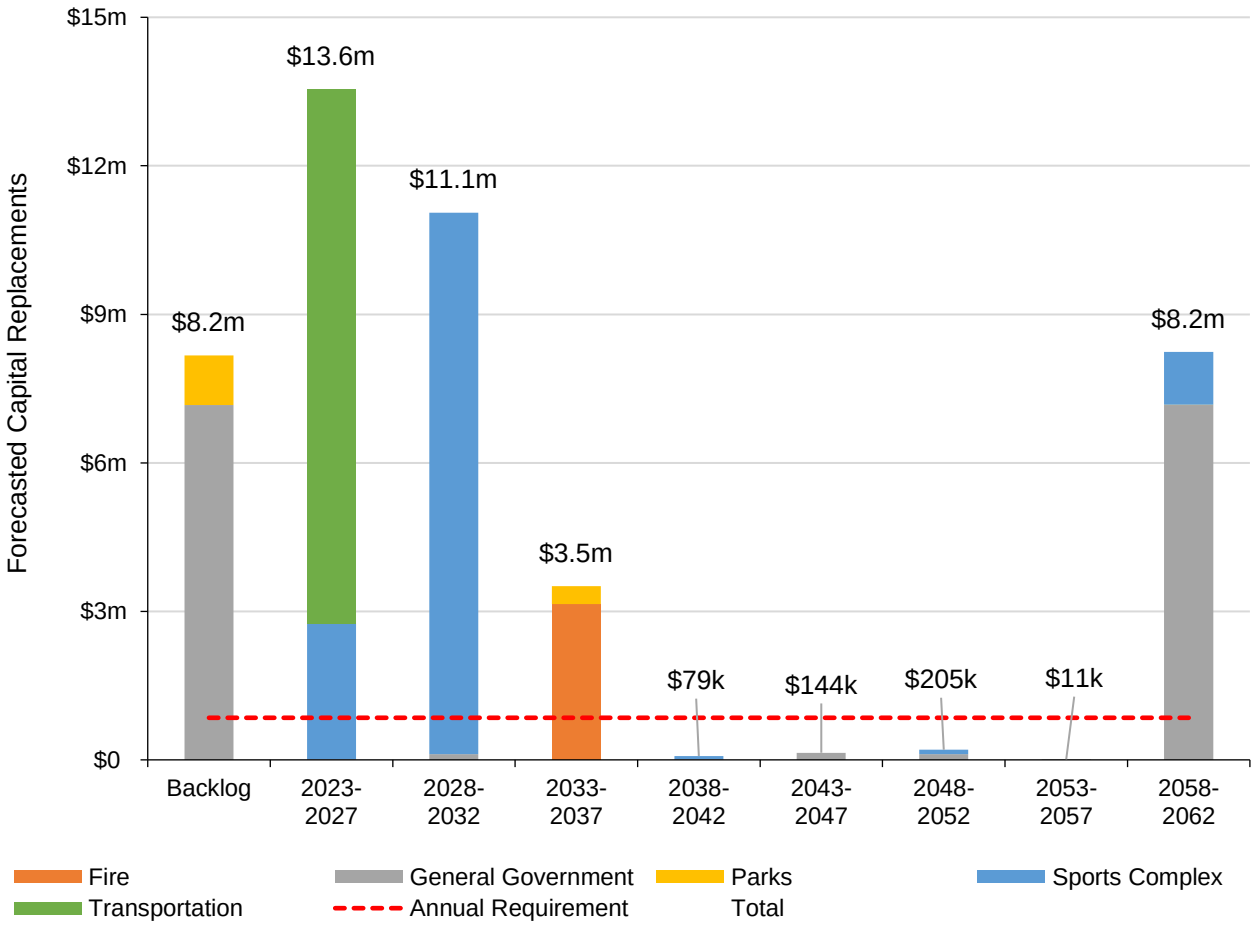
7.4 Lifecycle Management Strategy

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

Activity Type	Description of Current Strategy
Maintenance / Rehabilitation	A Joint Health and Safety Committee is in place, conducting meetings every 3 months to ensure ongoing safety compliance and risk management within the building
	Fire alarm and sprinkler systems undergo comprehensive testing once per year
	Regular duct cleaning and boiler maintenance are conducted
	Boiler maintenance for the pool undergoes thorough inspection and maintenance every 4 months, carried out by a third-party to ensure compliance and functionality
	Elevators undergo monthly inspections conducted by a qualified contractor, ensuring their reliability and safety
	HVAC systems receive start-up procedures from a third-party every winter and summer, ensuring proper functionality
Replacement	Replacement activities are reactive in nature, addressing components or systems on an as-needed basis. Buildings typically approach their end-of-life to where replacement or rehabilitation is determined to be appropriate

7.4.1 Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Town should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 40 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.

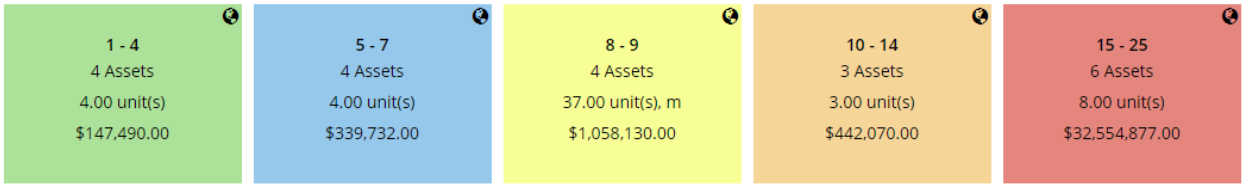


The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix B.

7.5 Risk & Criticality

7.5.1 Risk Matrix

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 2022 inventory data.



This is a high-level model developed for the purposes of this AMP and Town staff should review and adjust the risk model 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 buildings and facilities are documented below:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition (Economic)	Replacement Cost (Economic)
	AMP Segment (Strategic)

The identification of critical assets allows the Town 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.

7.5.2 Risks to Current Asset Management Strategies

The following section summarizes key trends, challenges, and risks to service delivery that the Town is currently facing:

Capital Funding Strategies
The limited budget for capital projects presents a notable risk to the Town's buildings, particularly when faced with a backlog of infrastructure projects. The existing backlog, coupled with budgetary constraints, poses a significant challenge in addressing critical rehabilitation and replacement needs across various facilities. Additionally, the Town's dependence on a grant for a sports complex adds an extra layer of uncertainty. If the grant application proves unsuccessful, it could worsen the financial constraints and hinder the completion of essential projects. The combination of a backlog and reliance on external funding highlights the need for a strategic and varied budgeting approach.

7.6 Levels of Service

The following tables identify the Town's current level of service for facilities.

Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2022)
Scope	Description, which may include maps, of the types of facilities that the Town operates and maintains	Refer to section 7.1
Quality	Describe criteria for rehabilitation and replacement decisions and any related long-term forecasts	Refer to sections 7.2 & 7.4

Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2022)
Quality	Average condition for facilities in the municipality	11%
Performance	Annual capital reinvestment rate	0.1%

7.7 Recommendations

Asset Inventory

- The Town's asset inventory contains a single or a few assets for all facilities. Facilities consist of several separate capital components that have unique estimated useful lives and require asset-specific lifecycle strategies. Staff should work towards a component-based inventory of all facilities to allow for component-based lifecycle planning.
- It is recommended that the Town, when funds permit, conduct a building condition assessment (BCA) of all facilities.
- There are a significant number of assets which have been identified as backlog. These assets are devoid of an assessed condition score and are still operational, beyond their EUL. It is recommended that staff review these assets.

Condition Assessment Strategies

- A comprehensive structural assessment of all facilities is highly recommended to gain a better understanding of the overall heath and condition of each facility to identify accurate short- and long-term capital requirements.

Risk Management Strategies

- Implement risk-based decision-making as part of asset management planning and budgeting processes. This should include the regular review of high-risk assets to determine appropriate risk mitigation strategies.
- Review risk models on a regular basis and adjust according to an evolving understanding of the probability and consequences of asset failure.

Levels of Service

- Begin measuring current levels of service in accordance with the metrics that the Town has established in this AMP. Additional metrics can be established as they are determined to provide meaningful and reliable inputs into asset management planning.
- Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

8 Vehicles

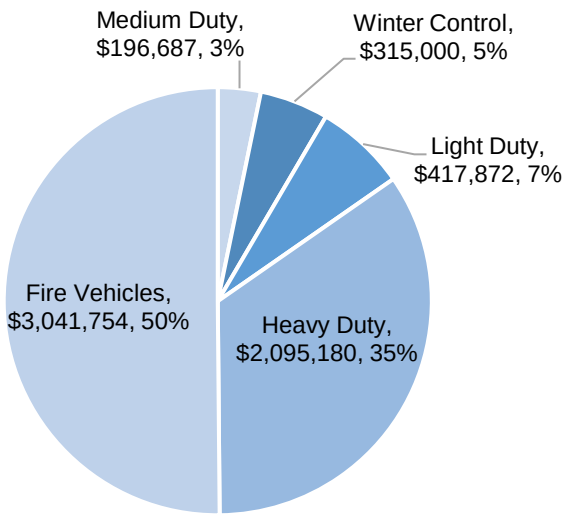
Vehicles allow staff to efficiently deliver municipal services and personnel. Municipal vehicles are used to support several service areas, including:

- Snowplows for winter control activities
- Fire rescue vehicles to provide emergency services
- Various vehicles to support the maintenance of the transportation network and address service requests for environmental services and parks and recreation

8.1 Asset Inventory

The table below includes the quantity, unit of measure, total replacement cost, and primary replacement cost method of each asset segment in the Town's vehicles inventory.

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Fire Vehicles	4	Assets	$3,042,000	User-defined
Heavy Duty	7	Assets	$2,095,000	User-defined
Light Duty	12	Assets	$418,000	CPI
Medium Duty	4	Assets	$197,000	CPI
Winter Control	1	Assets	$315,000	User-defined

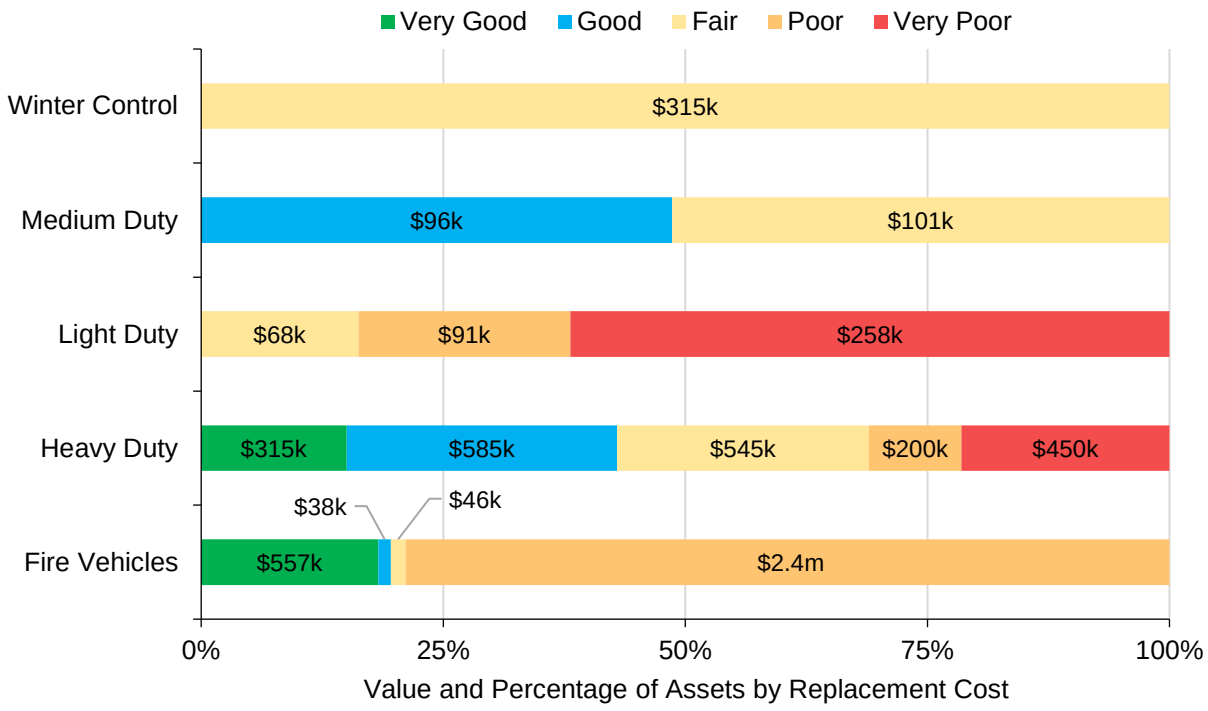


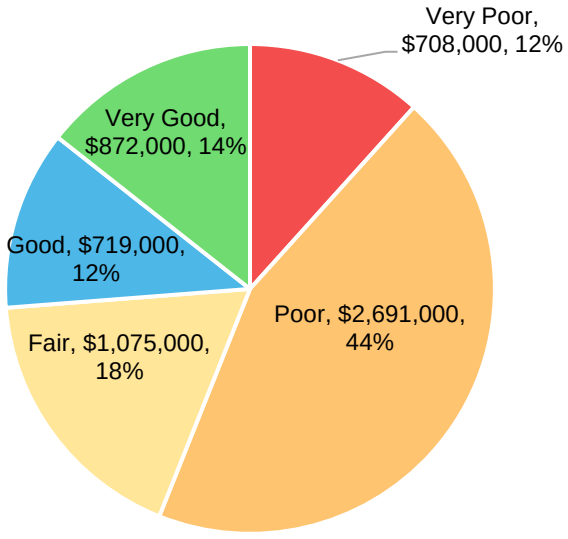
Total Current Replacement Cost: $6,066,493

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

8.2 Asset Condition

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





To ensure that the Town's vehicles continue to provide an acceptable level of service, the Town 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 vehicles.

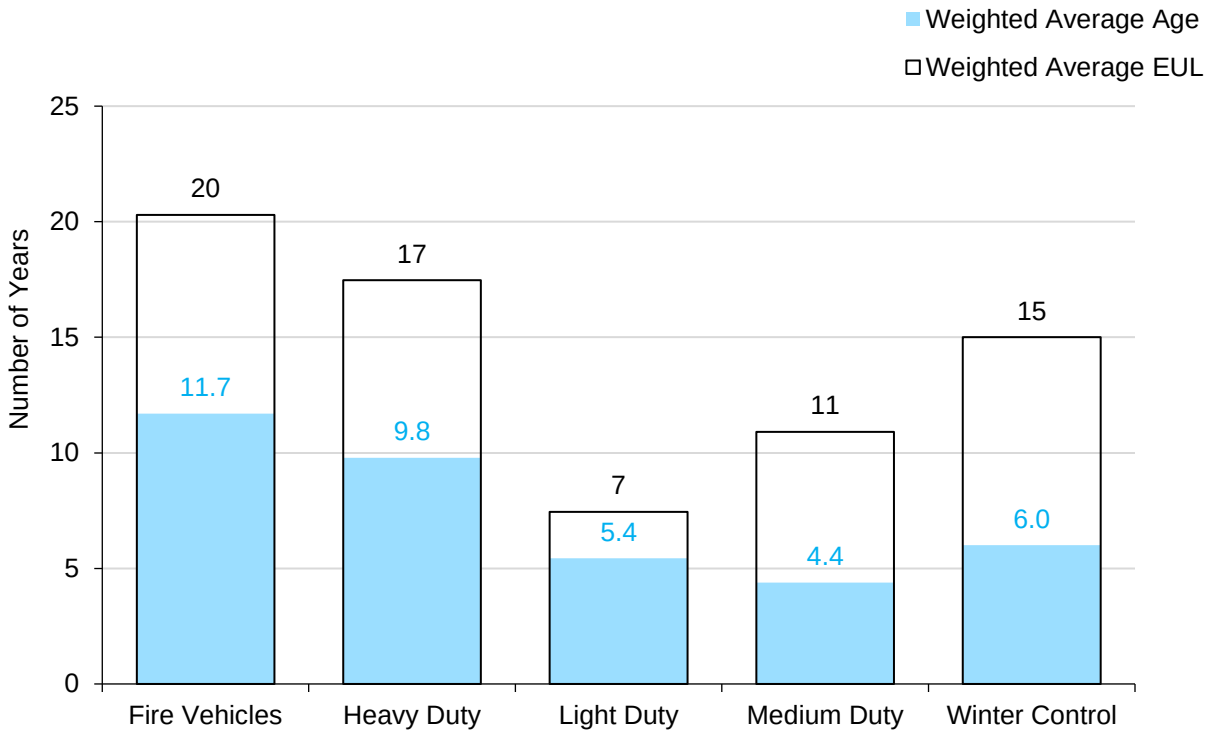
8.2.1 Current Approach to Condition Assessment

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

- Staff complete regular visual inspections of vehicles to ensure they are in state of adequate repair prior to operation
- There are no formal condition assessment programs in place for vehicles

8.3 Estimated Useful Life & Average Age

The Estimated Useful Life for vehicle assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service. Assessed condition may increase or decrease the average service life remaining.



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

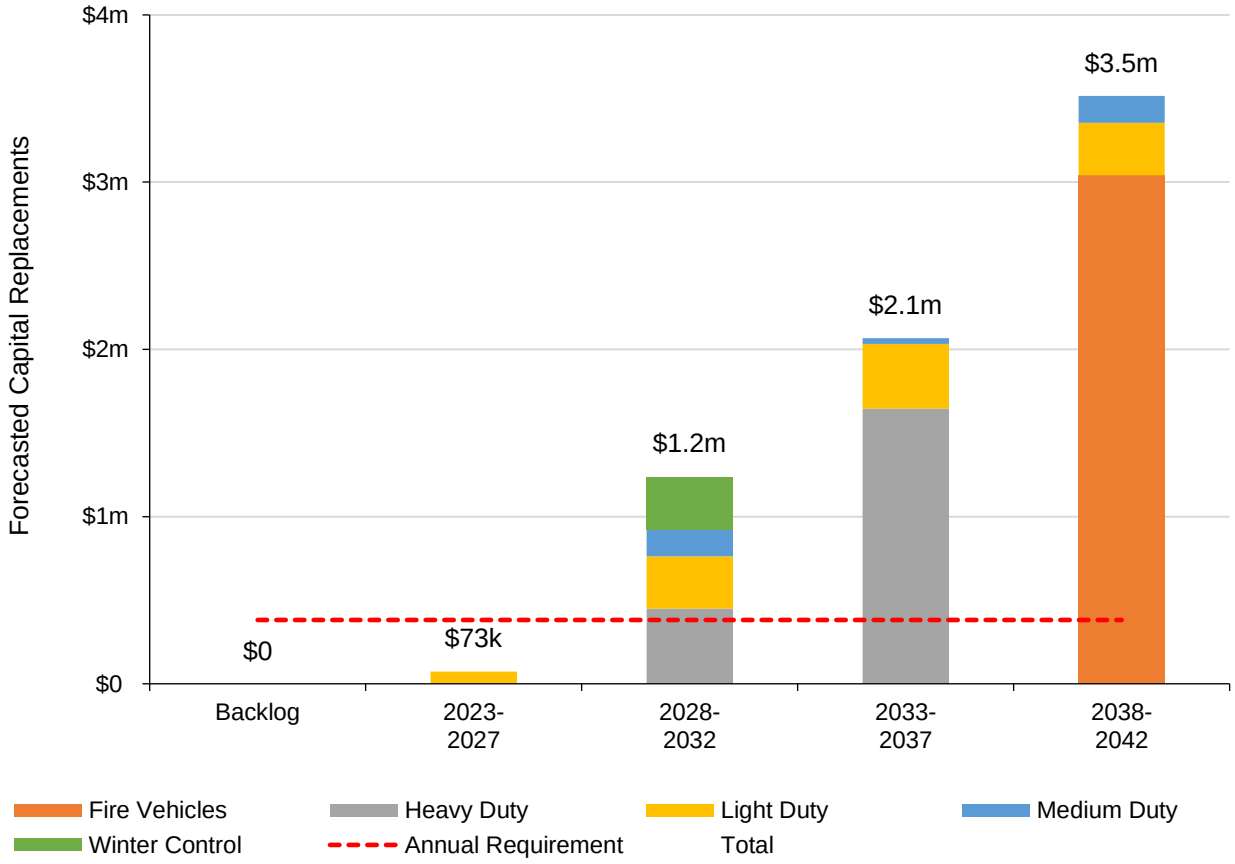
8.4 Lifecycle Management Strategy

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

Activity Type	Description of Current Strategy
Maintenance / Rehabilitation	Visual inspections are conducted on a daily basis to promptly identify and address any visible issues with the vehicle
	Routine maintenance is scheduled based on hours and mileage, occurring every 10,000 km or every 6 months, ensuring timely and preventive care for optimal performance. Larger trucks undergo a comprehensive inspection daily
	Annual safety certifications are carried out by internal mechanics, ensuring compliance with safety standards and identifying any potential concerns that may impact the vehicle's functionality
	Fire vehicles adhere to NFPA standards, with pump tests conducted to ensure the firefighting equipment's operational readiness and effectiveness
Replacement	While a formal plan is not currently in place, vehicles are typically replaced on a 5-7 year cycle. Many vehicles continue to be in-service beyond their Estimated Useful Life (EUL)
	Replacement is prioritized based on asset condition, costs, risks to health and safety, service life remaining, and its usefulness for the Town

8.4.1 Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Town should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 20 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.

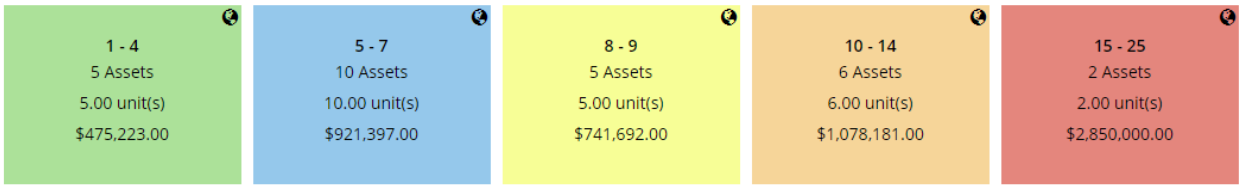


The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix B.

8.5 Risk & Criticality

8.5.1 Risk Matrix

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 2022 inventory data.



This is a high-level model developed for the purposes of this AMP and Town staff should review and adjust the risk model 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 vehicles are documented below:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition (Economic)	Replacement Cost (Economic)
	Department (Strategic)

The identification of critical assets allows the Town 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.

8.5.2 Risks to Current Asset Management Strategies

The following section summarizes key trends, challenges, and risks to service delivery that the Town is currently facing:

Financial Strategies

The Town faces two challenges relating to operations and maintenance costs in its vehicle management which include higher costs associated with aging vehicles and increased expenses related to newer, technologically advanced vehicles. Older vehicles, exceeding their Estimated Useful Life (EUL), incur elevated maintenance costs due to extended wear and tear. This extended service life also strains the budget. Conversely, newer vehicles, equipped with advanced technology, introduce different associated costs. The repairs often require specialized knowledge beyond the capabilities of in-house mechanics, leading to increased outsourcing and higher costs. Maintaining a careful balance in the vehicle replacement strategy is crucial, factoring in the appropriate lifespan of older vehicles and addressing the potential heightened costs related to the upkeep of newer, technologically advanced vehicles.

Vehicle Acquisition

The challenge in acquiring vehicles poses a significant risk to a Town's vehicle management. If a critical vehicle goes out of service, it puts the Town at risk of falling below its established levels of service, affecting its ability to respond promptly to community needs. The extended time required to acquire new vehicles, further compounds this risk. Although the Town’s leasing strategy helps mitigate this challenge for certain vehicles, the issue persists, particularly for larger vehicles. Delays in acquiring essential vehicles can impede the Town's operational efficiency, hampering its ability to provide necessary services and respond to emergencies in a timely manner. Addressing these challenges in the acquisition process becomes crucial for ensuring the reliability and effectiveness of the Town's vehicles.

8.6 Levels of Service

The following tables identify the Town's current level of service for vehicles.

Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2022)
Scope	Description or images of the types of vehicles that the Town operates and the services that they help to provide to the community	Refer to section 8.1
Quality	Describe criteria for rehabilitation and replacement decisions and any related long-term forecasts	Refer to sections 8.2 & 8.4

Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2022)
Quality	Average condition of vehicles in the municipality	43%
Performance	Annual capital reinvestment rate	0.4%

8.7 Recommendations

Asset Inventory

- Numerous asset replacement costs used in this AMP were based on the inflation of historical costs. These costs should be evaluated to determine their accuracy and reliability. Staff should allocate appropriate resources to gather accurate replacement costs and update them on a regular basis to ensure the accuracy of capital projections.

Condition Assessment Strategies

- Identify condition assessment strategies for high value and high-risk equipment.
- Review assets that have surpassed their estimated useful life to determine if immediate replacement is required or whether these assets are expected to remain in-service. Adjust the service life and/or condition ratings for these assets accordingly.

Risk Management Strategies

- Implement risk-based decision-making as part of asset management planning and budgeting processes. This should include the regular review of high-risk assets to determine appropriate risk mitigation strategies.
- Review risk models on a regular basis and adjust according to an evolving understanding of the probability and consequences of asset failure.

Levels of Service

- Begin measuring current levels of service in accordance with the metrics that the Town has established in this AMP. Additional metrics can be established as they are determined to provide meaningful and reliable inputs into asset management planning.
- Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

9 Machinery & Equipment

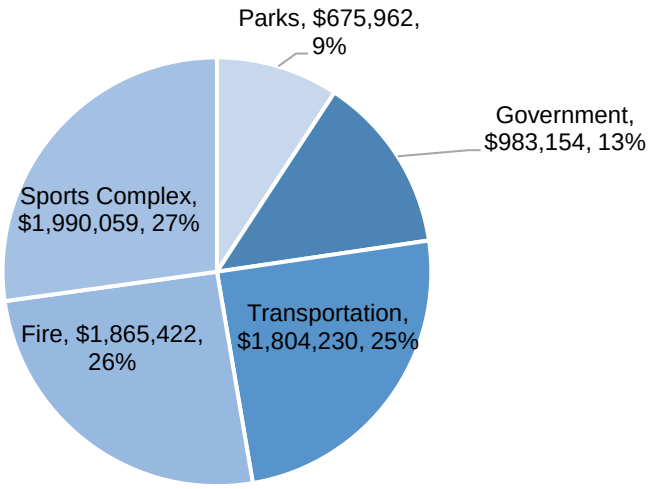
To maintain the high quality of public infrastructure and support the delivery of core services, Town staff own and employ various types of machinery and equipment. This includes:

- Fire equipment to support the delivery of emergency services
- Government equipment to support administrative services
- Parks and recreation equipment for recreational areas and facilities
- Transportation equipment to assist transportation services

9.1 Asset Inventory

The table below includes the quantity, unit of measure, total replacement cost, and primary replacement cost method of each asset segment in the Town's machinery and equipment inventory.

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Fire	615	Assets	$1,865,000	User-defined
Government	23	Assets	$983,000	User-defined
Parks	17	Assets	$676,000	User-defined
Sports Complex	30	Assets	$1,990,000	User-defined
Transportation	27	Assets	$1,804,000	User-defined

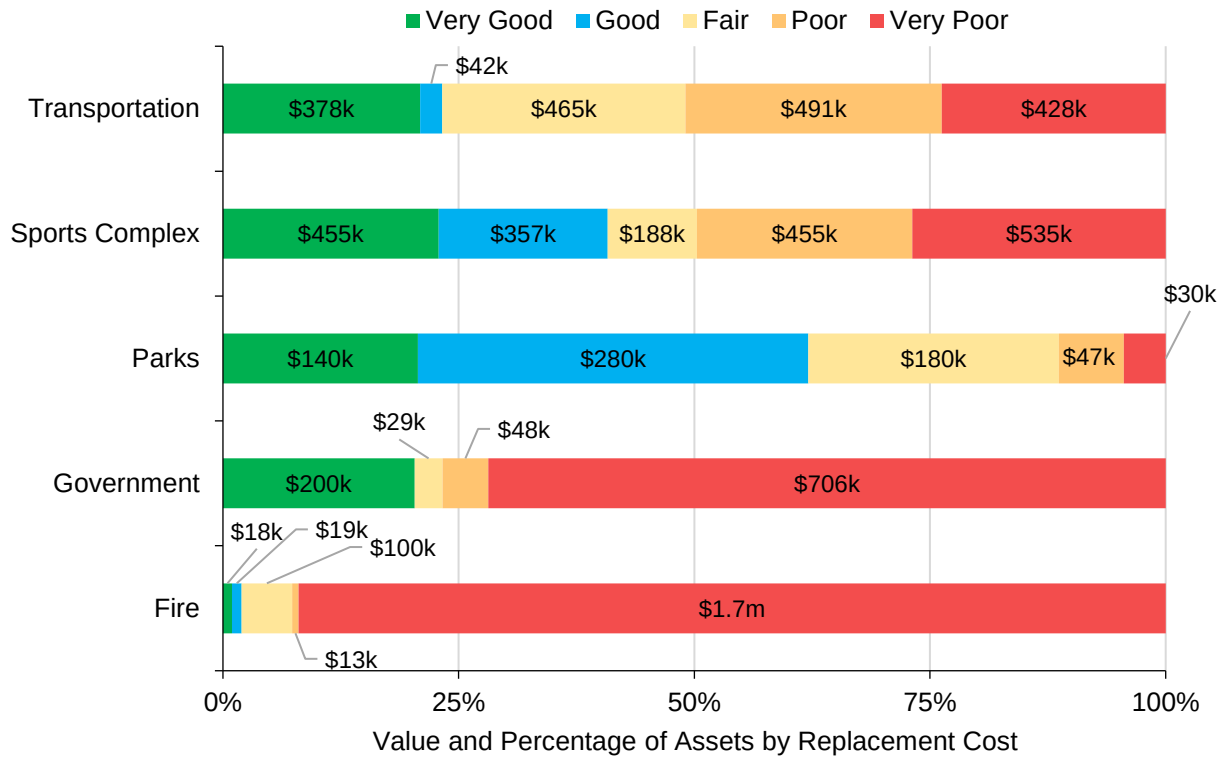


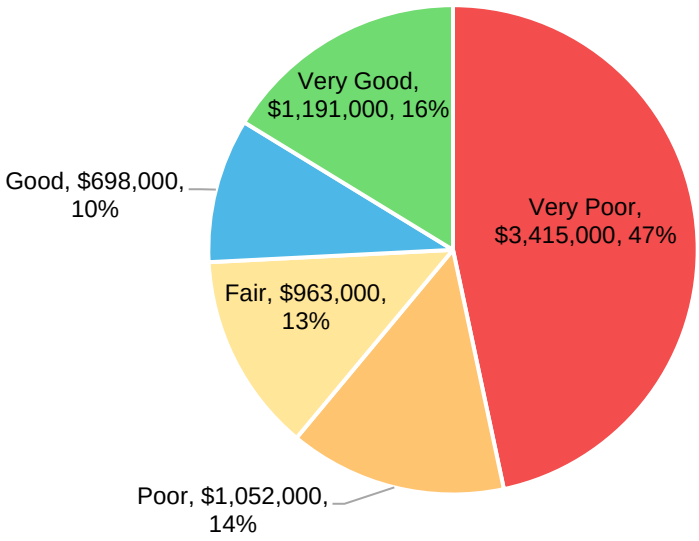
Total Current Replacement Cost: $7,318,827

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

9.2 Asset Condition

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





To ensure that the Town's machinery and equipment continue to provide an acceptable level of service, the Town 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 machinery and equipment.

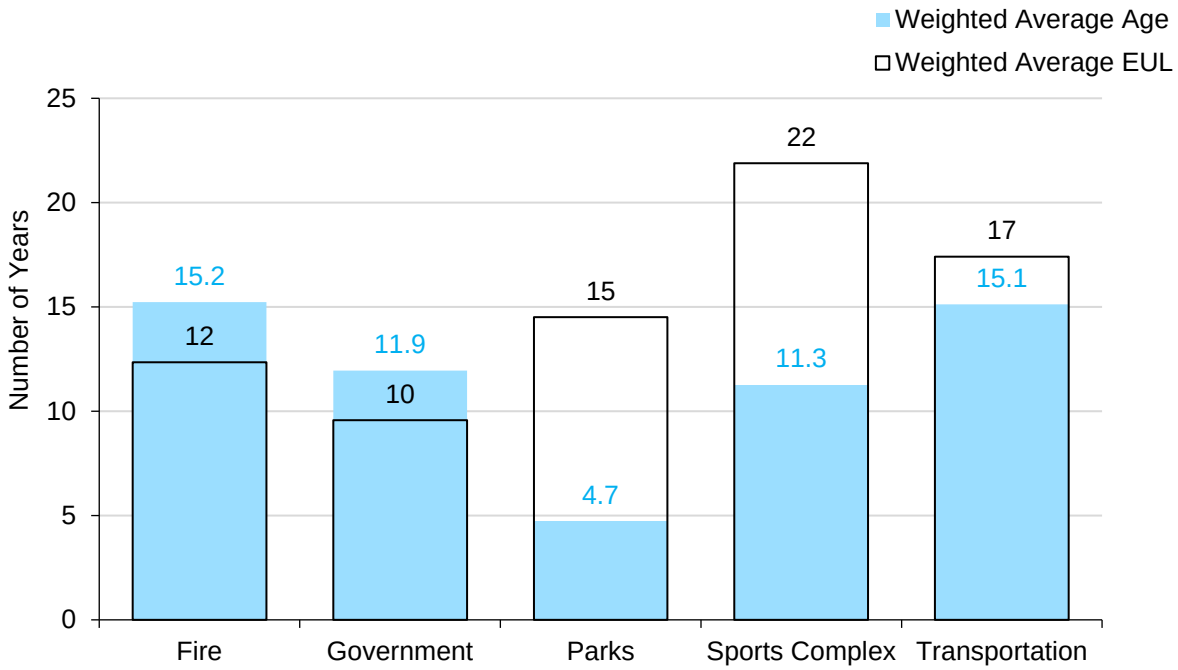
9.2.1 Current Approach to Condition Assessment

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

- Staff complete regular visual inspections, document mileage, and hours of use of machinery and equipment to ensure they are in state of adequate repair
- Small equipment and lifting devices, including hoists for trucks, undergo inspections once per year by external contractors
- There are no formal condition assessment programs in place, although some machinery and equipment were assigned cursory condition ratings for this AMP

9.3 Estimated Useful Life & Average Age

The Estimated Useful Life for machinery and equipment assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service. Assessed condition may increase or decrease the average service life remaining.



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

9.4 Lifecycle Management Strategy

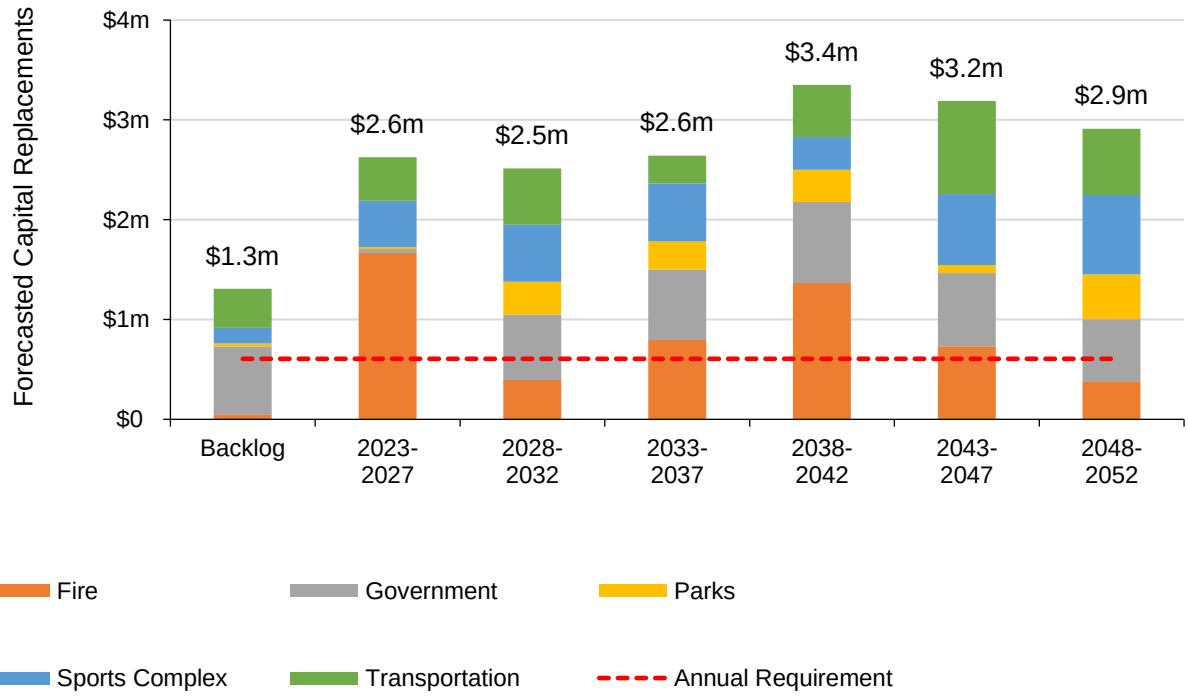
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Maintenance/ Rehabilitation	Bunker gear undergoes annual warranty inspections, ensuring that the safety and functionality of equipment is maintained
	Regular inspection and maintenance is conducted on various machinery based on specific mileage or hours of use
	Elevators undergo an annual inspection conducted by contracted professionals, ensuring compliance with safety standards and identifying any potential issues
	Small equipment and lifting devices, including hoists for trucks, undergo repairs once per year, completed by external contractors
	Generators, dehumidifiers, and other components not directly part of the building infrastructure are maintained by external contractors
Replacement	The replacement of machinery and equipment depends on deficiencies identified by operators that may impact their ability to complete required tasks
	IT equipment replacement is conducted reactively, promptly addressing failures to minimize disruptions and proactively guided by consultant recommendations

9.4.1 Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Town 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.

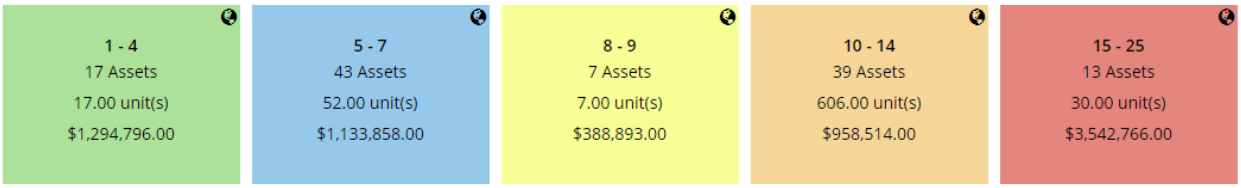


The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix B.

9.5 Risk & Criticality

9.5.1 Risk Matrix

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 2022 inventory data.



This is a high-level model developed for the purposes of this AMP and Town staff should review and adjust the risk model 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 machinery and equipment are documented below:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition (Economic)	Replacement Cost (Economic)
	AMP Segment (Strategic)

The identification of critical assets allows the Town 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.

9.5.2 Risks to Current Asset Management Strategies

The following section summarizes key trends, challenges, and risks to service delivery that the Town is currently facing:

Asset Data Confidence

Data quality poses a notable risk to a Town's machinery and equipment assets, encompassing challenges related to inadequate descriptions and inaccurate replacement costs. Inaccurate descriptions or missing details can lead to confusion, hindering the ability to make informed decisions about maintenance, repairs, and replacements. Additionally, inaccurate replacement cost data can jeopardize financial planning and budgeting, increasing the likelihood of unforeseen expenditures or budgetary shortfalls. Ensuring comprehensive and accurate data quality is essential for informed decision-making, enabling the Town to effectively manage the lifecycle of its machinery and equipment assets while maintaining fiscal responsibility.

Capital Funding Strategies

Increased maintenance and replacement costs of aging equipment pose a risk to a Town's machinery and equipment. These factors create a financial challenge for the Town, demanding a proactive and strategic approach to navigate rising costs.

9.6 Levels of Service

The following tables identify the Town's current level of service for machinery and equipment assets.

Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2022)
Scope	Description or images of the types of machinery and equipment that the Town operates and the services that they help to provide to the community	Refer to section 9.1
Quality	Describe criteria for rehabilitation and replacement decisions and any related long-term forecasts	Refer to sections 9.2 & 9.4

Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2022)
Quality	Average condition of machinery and equipment in the municipality	34%
Performance	Annual capital reinvestment rate	4.7%

9.7 Recommendations

Asset Inventory

- Town staff should continue refining its asset register by updating replacement costs. Replacement costs should be updated according to the best available information on the cost to replace the asset, using today's value.

Condition Assessment Strategies

- Identify condition assessment strategies for high value and high-risk equipment.
- Review assets that have surpassed their estimated useful life to determine if immediate replacement is required or whether these assets are expected to remain in-service. Adjust the service life and/or condition ratings for these assets accordingly.

Risk Management Strategies

- Implement risk-based decision-making as part of asset management planning and budgeting processes. This should include the regular review of high-risk assets to determine appropriate risk mitigation strategies.
- Review risk models on a regular basis and adjust according to an evolving understanding of the probability and consequences of asset failure.

Levels of Service

- Begin measuring current levels of service in accordance with the metrics that the Town has established in this AMP. Additional metrics can be established as they are determined to provide meaningful and reliable inputs into asset management planning.
- Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

10 Land Improvements

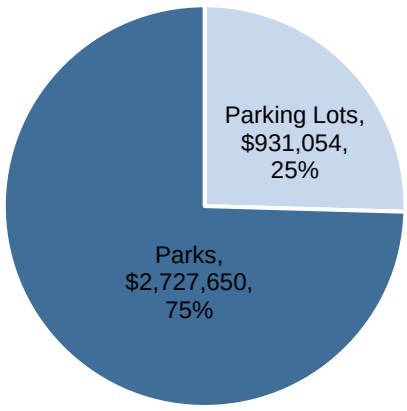
The Town of Hawkesbury owns a small number of assets that are considered land improvements. This category includes:

- Parking lots for municipal facilities
- Park assets for outdoor recreational areas

10.1 Asset Inventory

The table below includes the quantity, unit of measure, total replacement cost, and primary replacement cost method of each asset segment in the Town's land improvements inventory.

Segment	Components	Unit of Measure	Replacement Cost	Primary RC Method
Parking Lots	6	Assets	$931,000	User-defined
Parks	94	Assets	$2,728,000	CPI

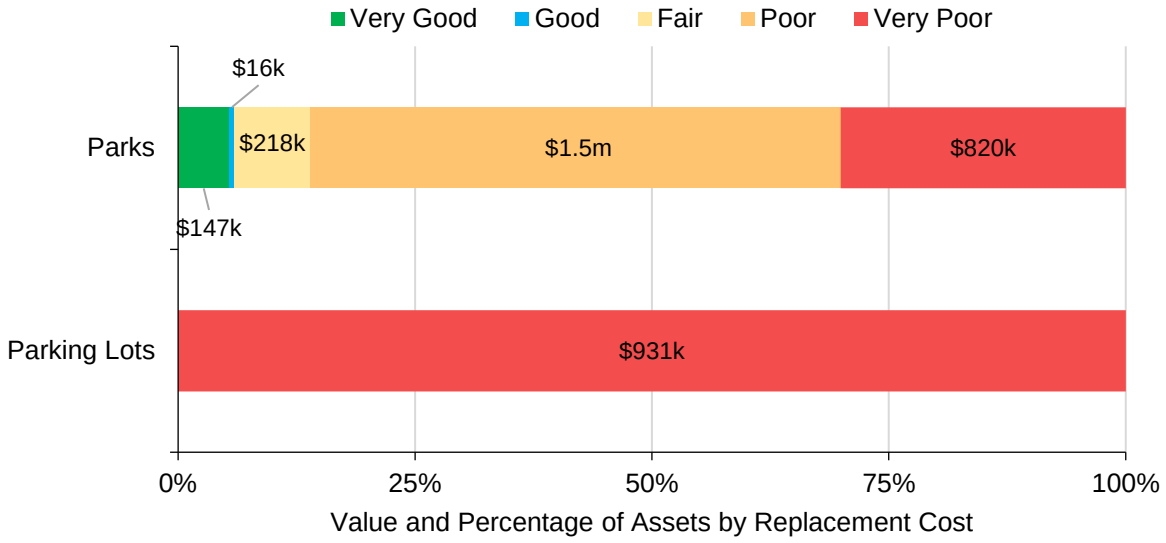


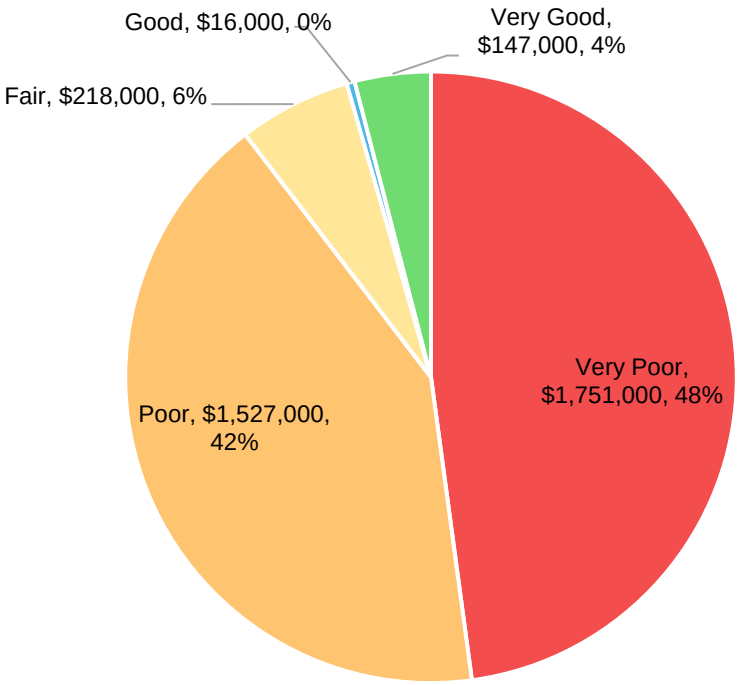
Total Current Replacement Cost: $3,658,704

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

10.2 Asset Condition

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





To ensure that the Town's land improvements continue to provide an acceptable level of service, the Town 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 land improvements.

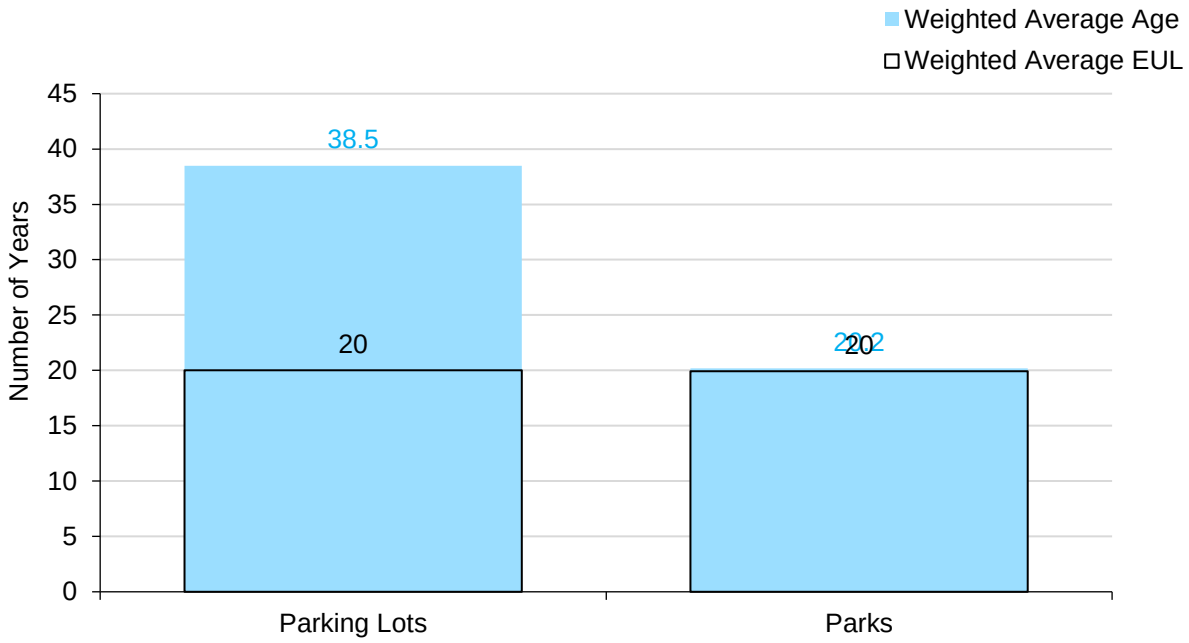
10.2.1 Current Approach to Condition Assessment

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

- Play structures undergo a comprehensive CSA inspection annually to ensure compliance with safety standards
- Visual inspections for play structures are carried out daily
- The splash pad also receives regular visual inspections to ensure optimal functionality and safety
- Park shelters undergo weekly inspections to address any visible concerns related to safety and maintenance

10.3 Estimated Useful Life & Average Age

The Estimated Useful Life for land improvement assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service. Assessed condition may increase or decrease the average service life remaining.



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

10.4 Lifecycle Management Strategy

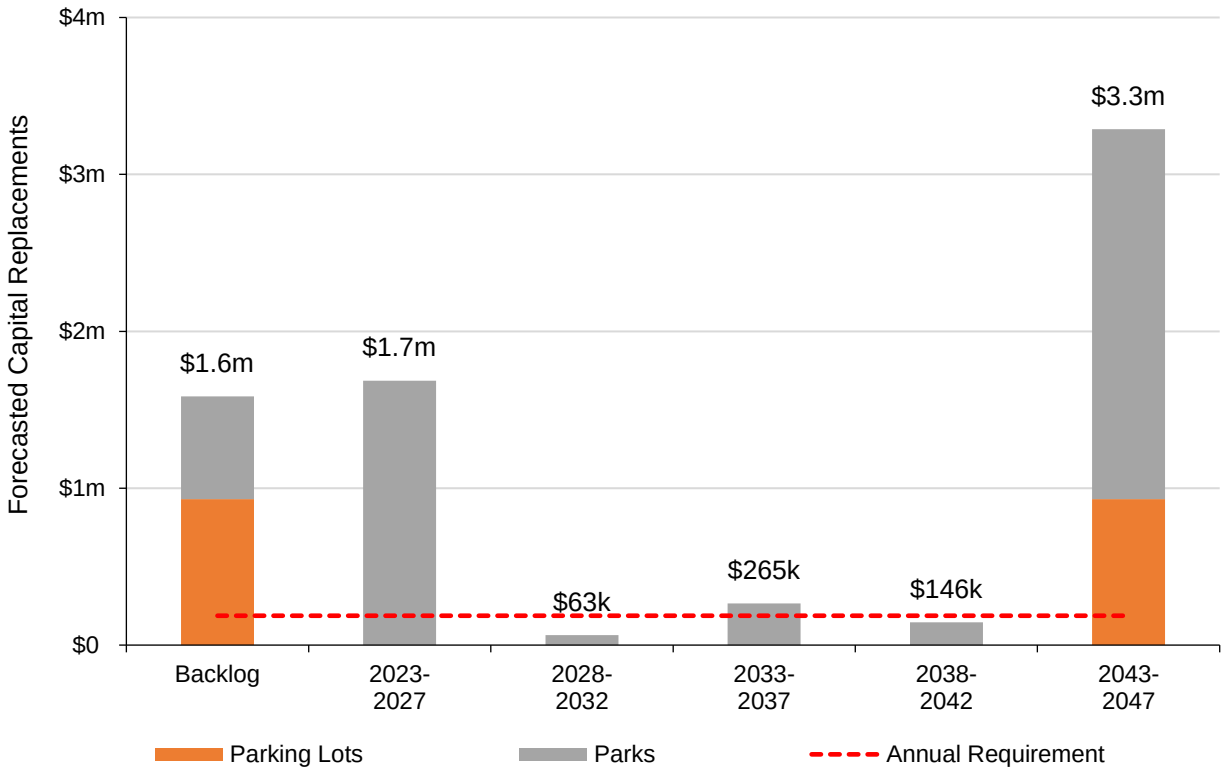
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Maintenanace & Rehabilitation	Sports fields, tennis courts, and splash pads receive an annual pressure wash and undergo a weekly routine involving the use of a blower
	Sports fields receive regular checks and leveling of the field, along with grass cutting before every summer game to uphold playing conditions and aesthetic standards
	Repairs to land improvement assets are conducted reactively, addressing specific issues as they arise
Replacement	The land improvements asset category includes several unique asset types and replacements are dealt with on a case-by-case basis

10.4.1 Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Town 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.

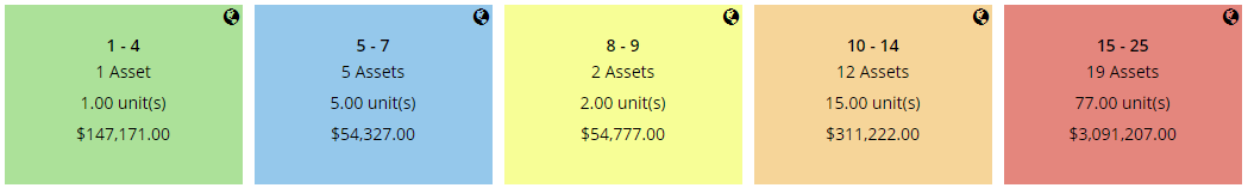


The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix B.

10.5 Risk & Criticality

10.5.1 Risk Matrix

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 2022 inventory data.



This is a high-level model developed for the purposes of this AMP and Town staff should review and adjust the risk model 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 land improvements are documented below:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition (Economic)	Replacement Cost (Economic)
	AMP Segment (Strategic)

The identification of critical assets allows the Town 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.

10.5.2 Risks to Current Asset Management Strategies

The following section summarizes key trends, challenges, and risks to service delivery that the Town is currently facing:

Capital Funding Strategies
Historical limitations in budget and underfunding pose a risk to a Town's land improvement assets. Inadequate financial resources may result in deferred maintenance, compromising the safety and functionality of parks and recreational facilities. Insufficient funding can lead to accelerated deterioration, necessitating more extensive and costly rehabilitation efforts in the future. Ensuring sufficient resources are allocated to maintenance and capital projects for land improvement assets is essential for ensuring their continued effectiveness and longevity, all while maintaining fiscal responsibility.

10.6 Levels of Service

The following tables identify the Town's current level of service for land improvement assets.

Community Levels of Service

The following table outlines the qualitative descriptions that determine the community levels of service provided by land improvement assets.

Service Attribute	Qualitative Description	Current LOS (2022)
Scope	Description or images of the types of land improvement assets that the Town operates and the services that they help to provide to the community	Refer to section 10.1
Quality	Describe criteria for rehabilitation and replacement decisions and any related long-term forecasts	Refer to sections 10.2 & 10.4

Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2022)
Quality	Average condition of land improvements in the municipality	17%
Performance	Annual capital reinvestment rate	0.4%

10.7 Recommendations

Asset Inventory

- Town staff should continue refining its asset register by updating replacement costs. Replacement costs should be updated according to the best available information on the cost to replace the asset, using today's value.

Condition Assessment Strategies

- Identify condition assessment strategies for high value and high-risk assets.
- Review assets that have surpassed their estimated useful life to determine if immediate replacement is required or whether these assets are expected to remain in-service. Adjust the service life and/or condition ratings for these assets accordingly.

Risk Management Strategies

- Implement risk-based decision-making as part of asset management planning and budgeting processes. This should include the regular review of high-risk assets to determine appropriate risk mitigation strategies.
- Review risk models on a regular basis and adjust according to an evolving understanding of the probability and consequences of asset failure.

Levels of Service

- Begin measuring current levels of service in accordance with the metrics that the Town has established in this AMP. Additional metrics can be established as they are determined to provide meaningful and reliable inputs into asset management planning.
- Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

11 Water Network

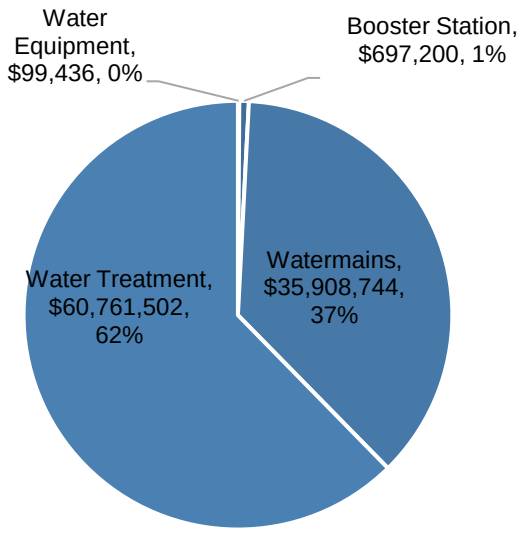
The Town manages an extensive water network consisting of various assets including:

- Booster station
- Underground infrastructure
- Water equipment
- Watermains

11.1 Asset Inventory

The table below includes the quantity, unit of measure, total replacement cost, and primary replacement cost method of each asset segment in the Town's water network inventory.

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Booster Station	1	Assets	$697,000	User-defined
Water Equipment	4	Assets	$99,000	CPI
Water Treatment	12	Assets	$60,762,000	User-defined
Watermains	35,908,744	Meters	$35,909,000	Cost per unit

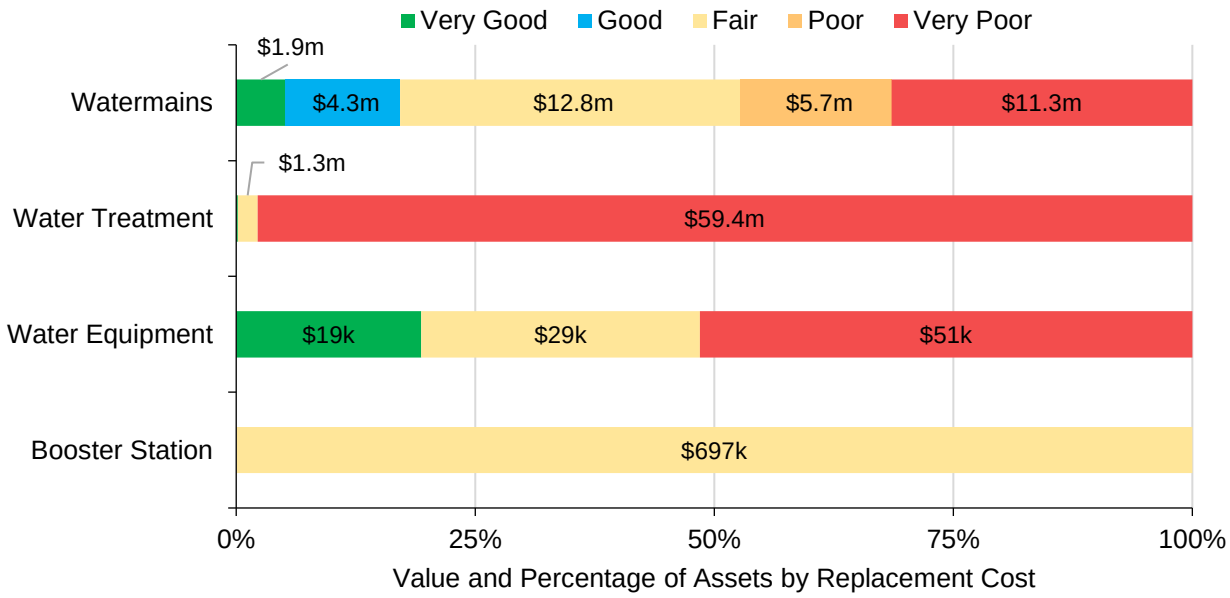


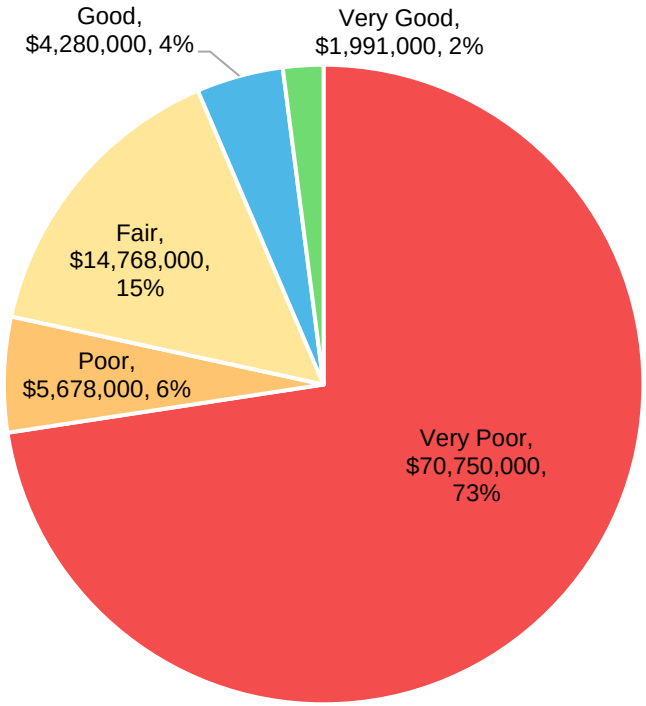
Total Current Replacement Cost: $97,466,882

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

11.2 Asset Condition

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





To ensure that the Town's water network continue to provide an acceptable level of service, the Town 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 water network.

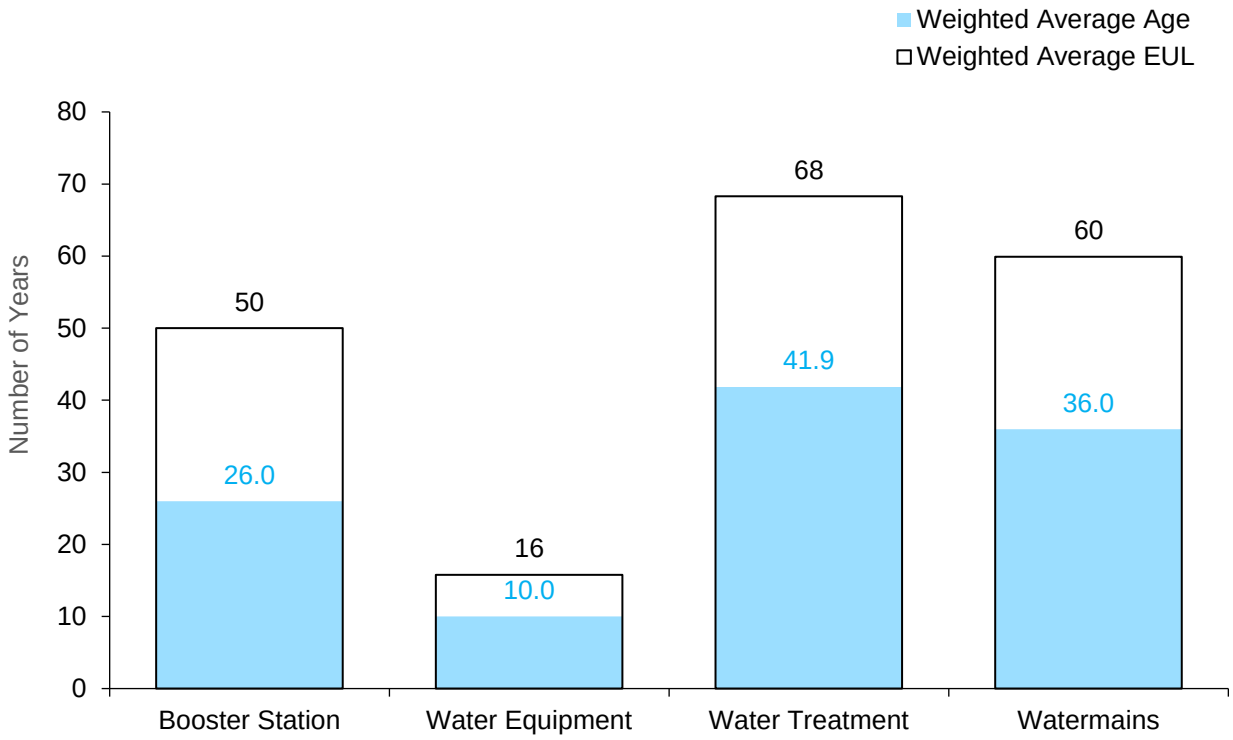
11.2.1 Current Approach to Condition Assessment

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

- Staff rely on the age of the asset and number of breaks of water mains to determine the projected condition of assets
- There are no formal condition assessment programs in place for the water network

11.3 Estimated Useful Life & Average Age

The Estimated Useful Life for water network assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service. Assessed condition may increase or decrease the average service life remaining.



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

11.4 Lifecycle Management Strategy

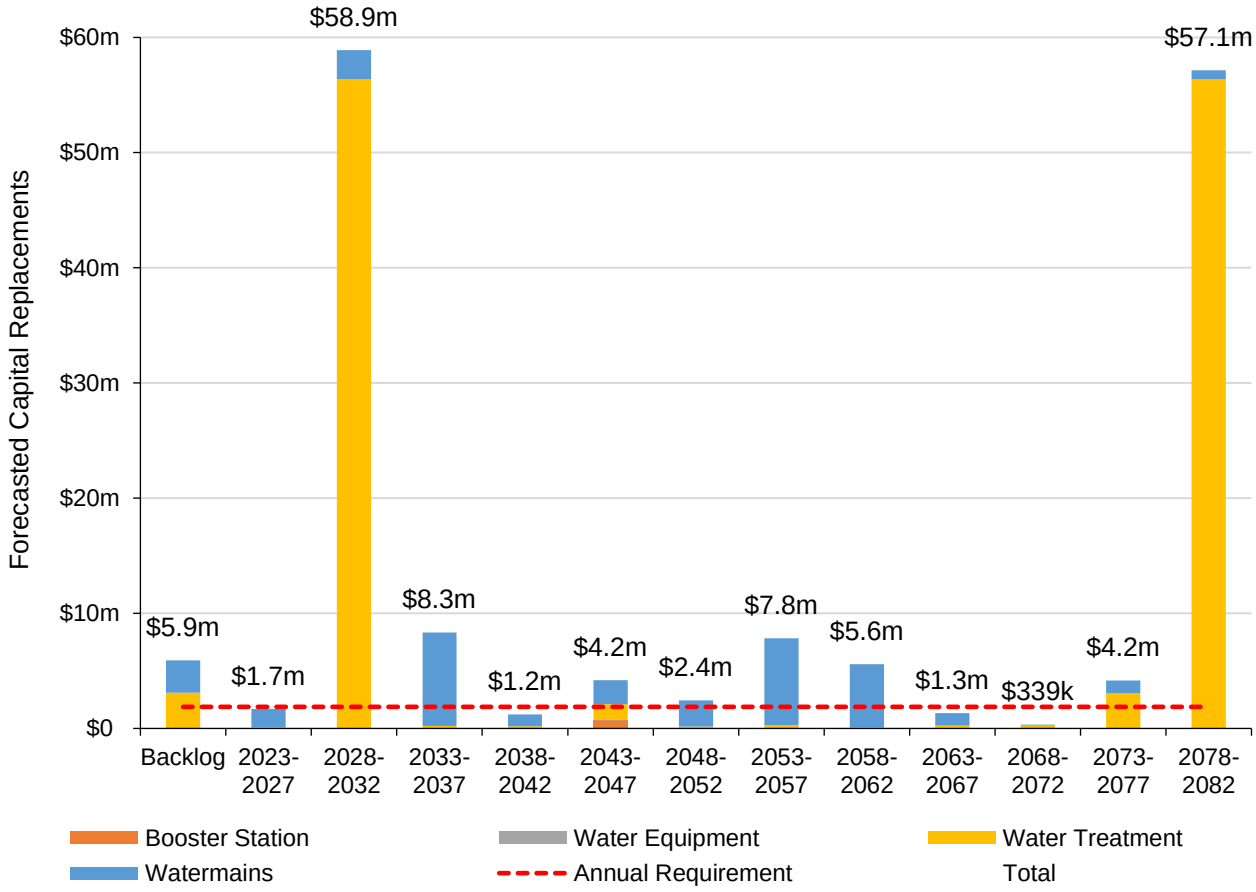
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Maintenance	Unidirectional flushing operations are routinely performed to enhance water quality and system efficiency
	Detailed readings for flow capacity are systematically recorded
	Fire flow testing is completed through external contractors, providing comprehensive reports for each hydrant, on a biennial basis
	Cathodic protection is implemented whenever there is access to the main pipe during repair and maintenance
	Corrosion inhibitor, specifically zinc polyphosphate is applied to mitigate corrosion-related issues
Rehabilitation	Rehabilitation strategies for water mains involve relining, with a relining program to be implemented in the future
Replacement	Asset replacement decisions are multifaceted and can be triggered by factors such as watermain breaks and leaks, fire flow and pressure requirements, unidirectional flushing results, resident complaints, and the recommendations of engineering services in conjunction with reconstruction projects
	Replacement activities for water mains are conducted and prioritized with the replacement of other underground infrastructure, to best streamline projects.

11.4.1 Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Town should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 60 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.

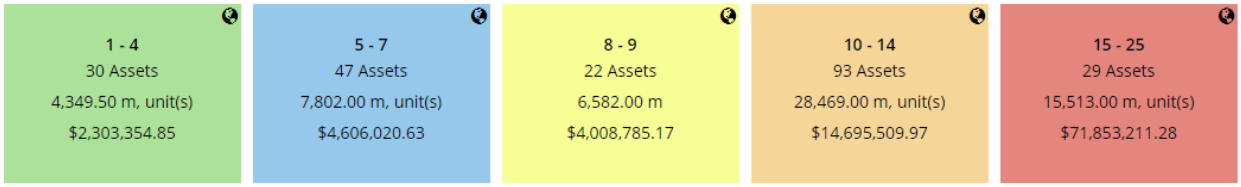


The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix B.

11.5 Risk & Criticality

11.5.1 Risk Matrix

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 2022 inventory data.



This is a high-level model developed for the purposes of this AMP and Town staff should review and adjust the risk model 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 water network are documented below:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition (Economic)	Replacement Cost (Economic)
Material (Economic)	Diameter (Social)
Service Life Remaining (Operational)	AMP Segment (Strategic)

The identification of critical assets allows the Town 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.

11.5.2 Risks to Current Asset Management Strategies

The following section summarizes key trends, challenges, and risks to service delivery that the Town is currently facing:

Climate Change & Extreme Events

Freezing pipes within a Town's water network, while not occurring frequently, pose a notable risk to the water network. When pipes freeze, they can potentially burst, leading to disruptions in water supply, leaks, and even costly infrastructure damage. The expansion of ice within the pipes can exert considerable pressure, potentially compromising the structural integrity of the network. To mitigate this risk, taking proactive measures such as insulation and regular inspections during cold spells are essential to ensure the continued reliability and functionality of the Town's water network.

11.6 Levels of Service

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

11.6.1 Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2022)
Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal water system	See Appendix C
	Description, which may include maps, of the user groups or areas of the municipality that have fire flow	See Appendix C
Reliability	Description of boil water advisories and service interruptions	Hawkesbury experienced no boil water advisories in 2022. However, water service interruptions may occur due to main breaks, maintenance activities or reconstruction projects. Staff tend to these interruptions and inform residents in a timely manner.

11.6.2 Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2022)
Scope	% of properties connected to the municipal water system	100%
	% of properties where fire flow is available	100%
Reliability	# of connection-days per year where a boil water advisory notice is in place compared to the total number of properties connected to the municipal water system	0
	# of connection-days per year where water is not available due to water main breaks compared to the total number of properties connected to the municipal water system	0
Performance	Capital re-investment rate	0.7%

11.7 Recommendations

Asset Inventory

- There are a significant number of assets which have been identified as backlog. These assets are devoid of an assessed condition score and are still operational, beyond their EUL. It is recommended that staff review these assets.
- Gather accurate replacement costs and update on a regular basis to ensure the accuracy of capital projections.

Condition Assessment Strategies

- Identify condition assessment strategies for high value and high-risk water network assets.

Lifecycle Management Strategies

- Specifically, regarding the water treatment plant, Town staff should allocate appropriate resources to update pertinent details (operations, maintenance, and scheduled rehabilitation events) within its asset register.

Risk Management Strategies

- Implement risk-based decision-making as part of asset management planning and budgeting processes. This should include the regular review of high-risk assets to determine appropriate risk mitigation strategies.
- Review risk models on a regular basis and adjust according to an evolving understanding of the probability and consequences of asset failure.

Levels of Service

- Continue to measure current levels of service in accordance with the metrics that the Town has established in this AMP. Additional metrics can be established as they are determined to provide meaningful and reliable inputs into asset management planning.
- Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

12 Sanitary Sewer Network

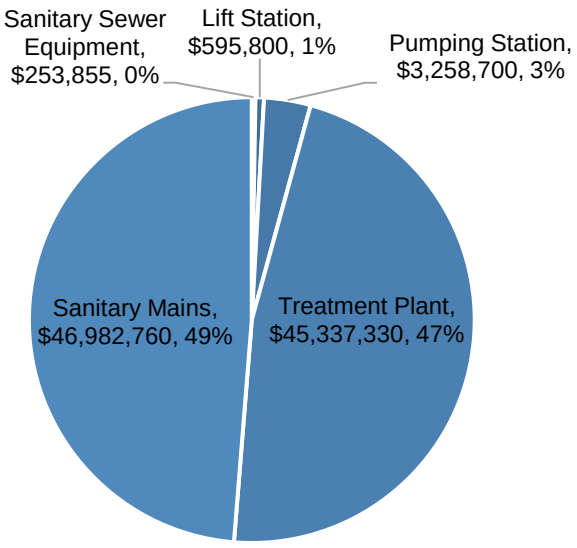
The Town manages an extensive sanitary sewer network consisting of various assets including:

- Lift and pumping stations
- Underground infrastructure
- Sanitary sewer equipment
- Treatment plant

12.1 Asset Inventory

The table below includes the quantity, unit of measure, total replacement cost, and primary replacement cost method of each asset segment in the Town's sanitary sewer network inventory.

Segment	Quantity	Unit of Measure	Replacement Cost	Primary RC Method
Lift Station	5	Assets	$596,000	User-defined
Pumping Station	1	Assets	$3,259,000	User-defined
Sanitary Mains	94,433	Meters	$46,983,000	Cost per unit
Sanitary Sewer Equipment	5	Assets	$254,000	CPI
Treatment Plant	303,636	Area (sq ft)	$45,337,000	User-defined

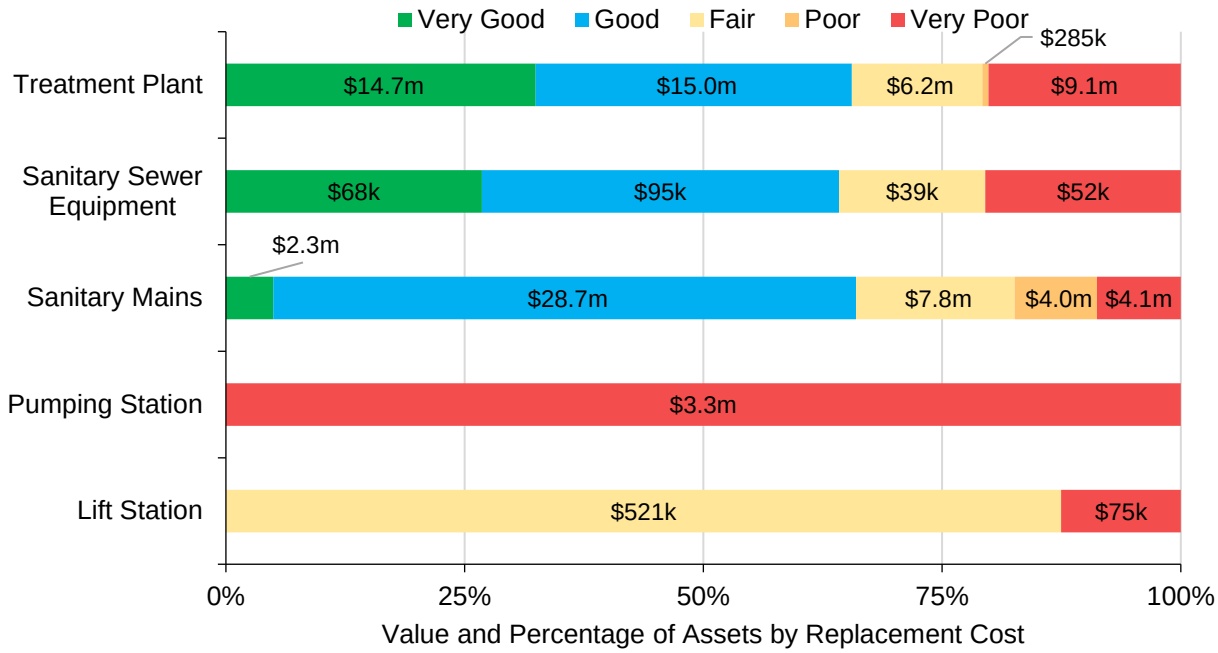


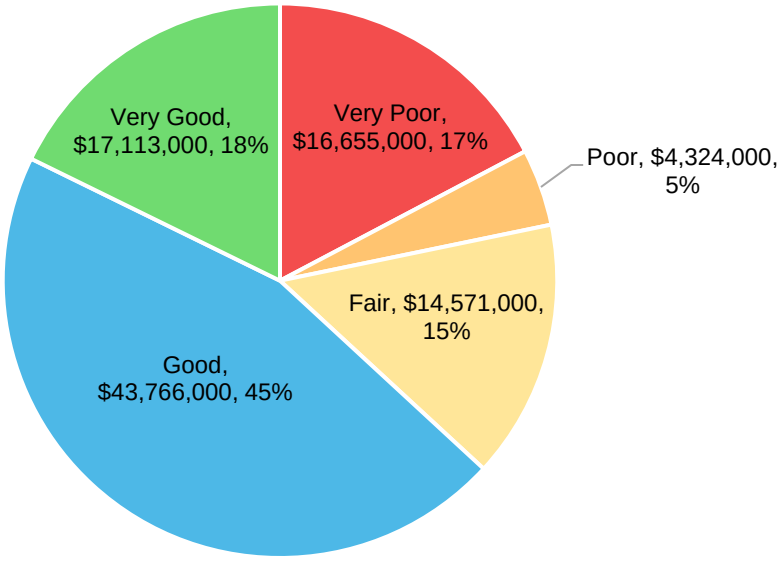
Total Current Replacement Cost: $96,428,445

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

12.2 Asset Condition

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





To ensure that the Town's sanitary sewer network continue to provide an acceptable level of service, the Town 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 sanitary sewer network.

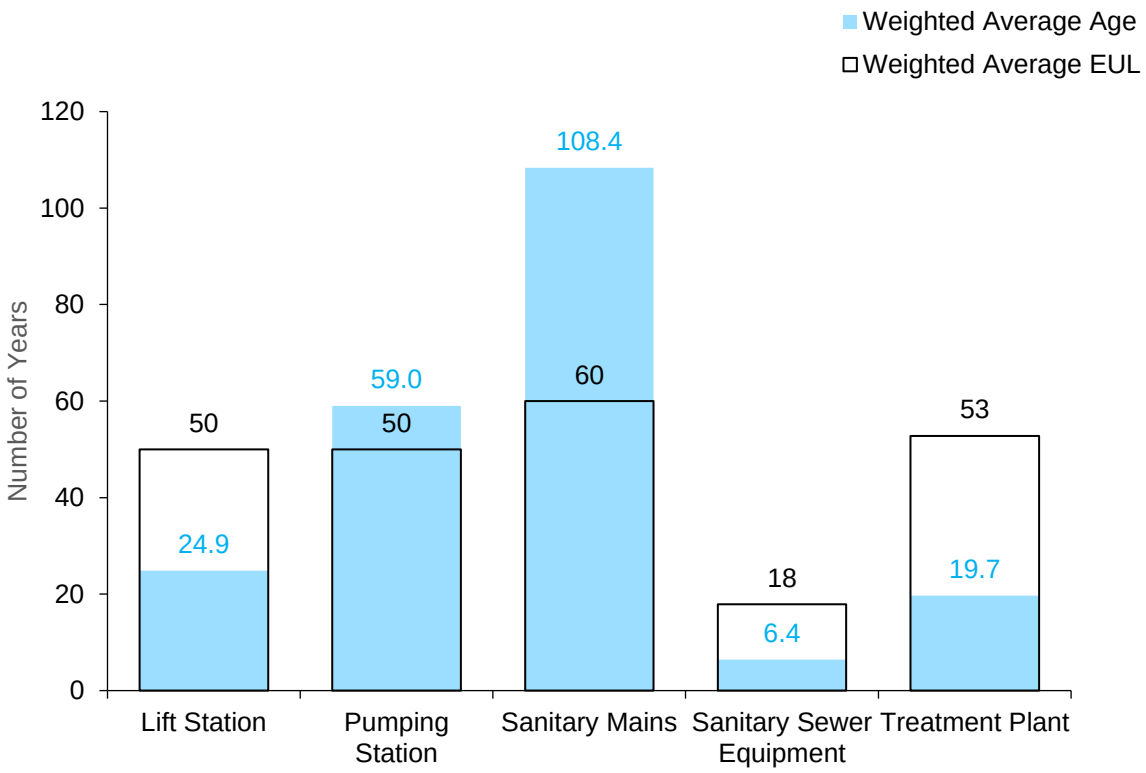
12.2.1 Current Approach to Condition Assessment

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

- The most recent CCTV inspection was completed in 2021-2022, and there are intentions to implement further CCTV inspections in areas where issues have been identified
- The Town has recently (2023) gone through a formal building condition assessment of its sewage plant

12.3 Estimated Useful Life & Average Age

The Estimated Useful Life for sanitary sewer network assets has been assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service. Assessed condition may increase or decrease the average service life remaining.



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

12.4 Lifecycle Management Strategy

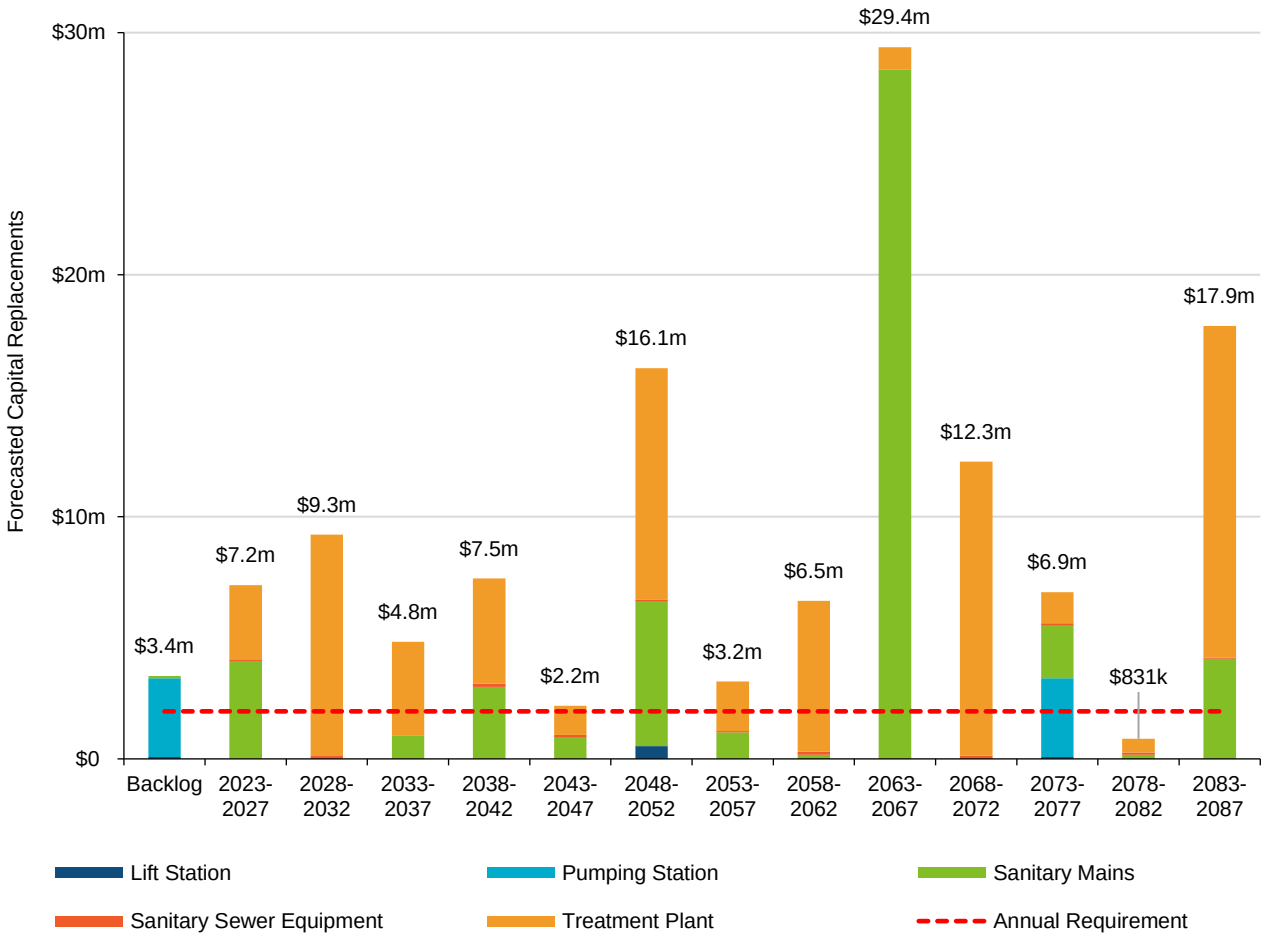
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Maintenance	Main flushing is currently carried out selectively on specific network sections, with a focus on addressing problematic areas. The Town plans to transition towards implementing annual flushing across the entire network in the future
	Immediate repairs for mains take precedence, with ongoing maintenance efforts receiving priority once these repairs are completed
	CCTV inspections were conducted in 2007, and there are plans to implement them in areas where issues have been identified
	Manhole maintenance is performed on an annual basis
Rehabilitation	The lift station and water treatment plant are currently owned and maintained by the Town, and there are no immediate plans for upgrades or renewal as these assets are relatively new
	Rehabilitation strategies for mains involve relining, with a relining program to be implemented in the future
Replacement	Replacement activities for mains are conducted and prioritized with the replacement of other underground infrastructure

12.4.1 Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Town should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 65 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.

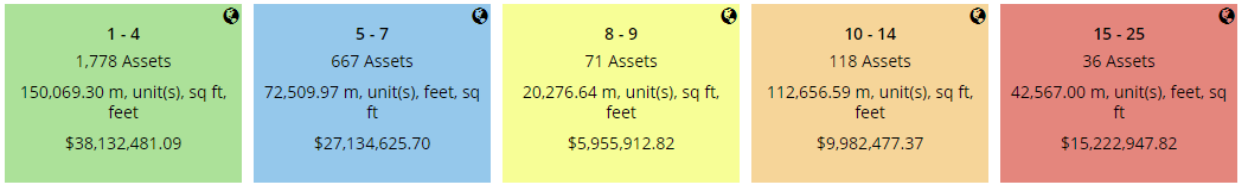


The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix B.

12.5 Risk & Criticality

12.5.1 Risk Matrix

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 2022 inventory data.



This is a high-level model developed for the purposes of this AMP and Town staff should review and adjust the risk model 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 sanitary sewer network are documented below:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition (Economic)	Replacement Cost (Economic)
Material (Economic)	Diameter (Social)
Service Life Remaining (Operational)	AMP Segment (Strategic)

The identification of critical assets allows the Town 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.

12.5.2 Risks to Current Asset Management Strategies

The following section summarizes key trends, challenges, and risks to service delivery that the Town is currently facing:

Climate Change & Extreme Events

Extreme weather events such as rainfall poses a significant risk to a Town's sanitary sewer network, particularly in areas with combined sewers. During intense rain events, the combined sewer system may face challenges such as sewer backups, excessive water inflow, infiltration, and increased risk of blockages. This influx of water overwhelms the capacity of the network and can contribute to infiltration, where rainwater enters the sanitary sewers through cracks or joints. Additionally, the heightened flow may exacerbate blockages caused by debris and foreign objects. The combined effect of these factors elevates the potential for system overflows, localized flooding, and strain on infrastructure. Proactive measures, including robust sanitary sewer management strategies such as the implementation of a relining program and regular maintenance are essential to mitigate these risks and enhance the resilience of the sanitary sewer network in the face of extreme rainfall events.

12.6 Levels of Service

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

12.6.1 Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2022)
Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal wastewater system	See Appendix C
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	The system has a single combined sewer overflow (CSO) located at the intersection of Cameron Street and Main Street. The overflow manhole contains a benched weir equipped with a flow meter and ultrasonic level/flow sensor and a sample trap which diverts raw sewage to a 525 mm pipe discharging to the Ottawa River.
	Description of the frequency and volume of overflows in combined sewers in the municipal wastewater system that occur in habitable areas or beaches	See Appendix C
	Description of how storm water can get into sanitary sewers in the municipal wastewater system, causing sewage to	Storm water can enter sanitary sewers due to cracks in sanitary mains or through indirect connections (e.g. weeping tiles). In the case of heavy rainfall events, sanitary sewers may experience a volume of water and

Service Attribute	Qualitative Description	Current LOS (2022)
	overflow into streets or backup into homes	sewage that exceeds its designed capacity. In some cases, this can cause water and/or sewage to overflow backup into homes. the disconnection of weeping tiles from sanitary mains and the use of sump pumps and pits directing storm water to the storm drain system can help to reduce the chance of this occurring.
	Description of how sanitary sewers in the municipal wastewater system are designed to be resilient to storm infiltration	The Town follows a series of design standards that integrate servicing requirements and land use considerations when constructing or replacing sanitary sewers. These standards have been determined with consideration of the minimization of sewage overflows and backups.
	Description of the effluent that is discharged from sewage treatment plants in the municipal wastewater system	Effluent refers to water pollution that is discharged from a wastewater treatment plant, and may include suspended solids, total phosphorous and biological oxygen demand. The Environmental Compliance Approval (ECA) identifies the effluent criteria for municipal wastewater treatment plants.

12.6.2 Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2022)
Scope	% of properties connected to the municipal wastewater system	99.9%
Reliability	# of events per year where combined sewer flow in the municipal wastewater system exceeds system capacity compared to the total number of properties connected to the municipal wastewater system	4[6]
	# of connection-days per year having wastewater backups compared to the total number of properties connected to the municipal wastewater system	1[7]
	# of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system	1[8]
Performance	Capital re-investment rate	0.2%

[6] CSO events
[7] 1 residential sewer backup
[8] 1 bypass

12.7 Recommendations

Asset Inventory

- There are a significant number of assets which have been identified as backlog. These assets are devoid of an assessed condition score and are still operational, beyond their EUL. It is recommended that staff review these assets.
- Gather accurate replacement costs and update on a regular basis to ensure the accuracy of capital projections.

Condition Assessment Strategies

- Identify condition assessment strategies for high value and high-risk water network assets.

Risk Management Strategies

- Implement risk-based decision-making as part of asset management planning and budgeting processes. This should include the regular review of high-risk assets to determine appropriate risk mitigation strategies.
- Review risk models on a regular basis and adjust according to an evolving understanding of the probability and consequences of asset failure.

Lifecycle Management Strategies

- A trenchless re-lining strategy is expected to extend the service life of sanitary mains at a lower total cost of ownership and should be implemented to extend the life of infrastructure at the lowest total cost of ownership.
- Evaluate the efficacy of the Town’s lifecycle management strategies at regular intervals to determine the impact cost, condition and risk.

Levels of Service

- Continue to measure current levels of service in accordance with the metrics that the Town has established in this AMP. Additional metrics can be established as they are determined to provide meaningful and reliable inputs into asset management planning.
- Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

13 Impacts of Growth

Key Insights

- Understanding the key drivers of growth and demand will allow the Town to more effectively plan for new infrastructure, and the upgrade or disposal of existing infrastructure
- Moderate fluctuation of population and employment growth is expected
- The costs of growth should be considered in long-term funding strategies that are designed to maintain the current level of service

13.1 Description of Growth Assumptions

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 Town to more effectively plan for new infrastructure, and the upgrade or disposal of existing infrastructure. Increases or decreases in demand can affect what assets are needed and what level of service meets the needs of the community.

13.1.1 United Counties of Prescott and Russell Official Plan (September 2022)

The United Counties of Prescott and Russell is comprised of eight local municipalities which includes the Town of Hawkesbury. The Official Plan is a planning document for the purpose of guiding the future development of the Town of Hawkesbury. The Official Plan has been approved by the Ministry of Municipal Affairs and Housing as of September 2022.

The objective of the Official Plan is to offer guidance for growth, development, redevelopment, and conservation efforts in the United Counties. The plan establishes a policy framework for regulatory tools like zoning by-laws, community planning permits systems, plans of subdivision and consents, capital works programs, municipal budgets, and various municipal by-laws, ultimately aiming to enhance the livability and quality of the United Counties of Prescott and Russell.

The Settlement Area will be the focus of future urban habitat expansion within the Town, shaping urban density, growth, and functional diversity within the municipality. There will be a focus on developing and intensifying the Town's existing land without necessitating the expansion of its Settlement Area, which will limit urban sprawl.

To illustrate historical growth rates, the following table shows population and housing figures from 1996 to 2021. The following table outlines the population and employment forecasts allocated to Hawkesbury.

Historical Figures	1996	2001	2006	2011	2016	2021
Population	10,162	10,319	10,869	10,551	10,263	10,194
Population Change	N/A	1.5%	5.3%	-2.9%	-2.7%	-0.7%
Private Dwellings	N/A	4,691	4,974	4,948	4,956	5,308

The population of Hawkesbury ranges from 10,162 in 1996 to 10,869 in 2006, and back down to 10,194 in 2021. Between the years of 2001 and 2006 there were

significant increases in population. Since 2006, there has been a slight decrease of population until 2021. The district Official Plan has predicted slight increases of population, and recent census data for Hawkesbury indicates that the Town may not reach the future projected population.

13.2 Impact of Growth on Lifecycle Activities

By July 1, 2025, the Town'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 Town'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 Town will need to review the lifecycle costs of growth-related infrastructure. These costs should be considered in long-term funding strategies that are designed to, at a minimum, maintain the current level of service.

14 Financial Strategy

Key Insights

- The Town is committing approximately $3,103,000 towards capital projects per year from sustainable revenue sources
- Given the annual capital requirement of $9,862,000, there is currently a funding gap of $6,759,000 annually
- Tax-funded assets recommendation: increasing tax revenues by 1.5% each year for the next 20 years to achieve a sustainable level of funding
- Sanitary sewer network rate funded assets recommendation: increasing rate revenues by 4.1% annually for the next 15 years to achieve a sustainable level of funding
    - Alternatively, increasing rates by 1.9% over 20 years will achieve sustainable level of funding
- Water network rate funded assets recommendation: increasing rate revenues by 3.4% annually for the next 15 years to achieve a sustainable level of funding
    - Alternatively, increasing rates by 2.6% over 20 years will achieve sustainable level of funding

14.1 Financial Strategy Overview

For an asset management plan to be effective and meaningful, it must be integrated with financial planning and long-term budgeting. The development of a comprehensive financial plan will allow the Town of Hawkesbury to identify the financial resources required for sustainable asset management based on existing asset inventories, desired levels of service, and projected growth requirements.

This report develops such a financial plan by presenting several scenarios for consideration and culminating with final recommendations. As outlined below, the scenarios presented model different combinations of the following components:

1. The financial requirements for:
    a. Existing assets
    b. Existing service levels
    c. Requirements of contemplated changes in service levels (none identified for this plan)
    d. Requirements of anticipated growth (none identified for this plan)
2. Use of traditional sources of municipal funds:
    a. Tax levies
    b. User fees
    c. Reserves
    d. Debt
    e. Development charges
3. Use of non-traditional sources of municipal funds:
    a. Reallocated budgets
    b. Partnerships
    c. Procurement methods
4. Use of Senior Government Funds:
    a. CCBF
    b. Annual grants

Note: Periodic grants are normally not included due to Provincial requirements for firm commitments. However, if moving a specific project forward is wholly dependent on receiving a one-time grant, the replacement cost included in the financial strategy is the net of such grant being received.

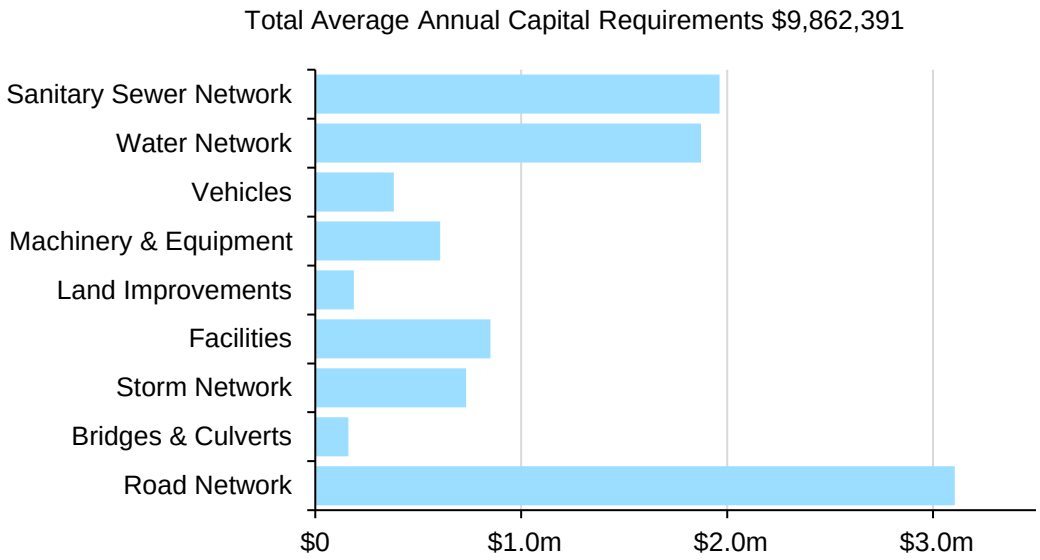
If the financial plan component results in a funding shortfall, the province requires the inclusion of a specific plan as to how the impact of the shortfall will be managed. In determining the legitimacy of a funding shortfall, the province may evaluate a Town's approach to the following:

a) To reduce financial requirements, consideration has been given to revising service levels downward.
b) All asset management and financial strategies have been considered. For example:
    - If a zero-debt policy is in place, is it warranted? If not the use of debt should be considered.
    - Do user fees reflect the cost of the applicable service? If not, increased user fees should be considered.

14.1.1 Annual Requirements & Capital Funding

Annual Requirements

The annual requirements represent the amount the Town should allocate annually to each asset category to meet replacement needs as they arise, prevent infrastructure backlogs, and achieve long-term sustainability. In total, the Town must allocate approximately $9.9 million annually to address capital requirements for the assets included in this AMP.



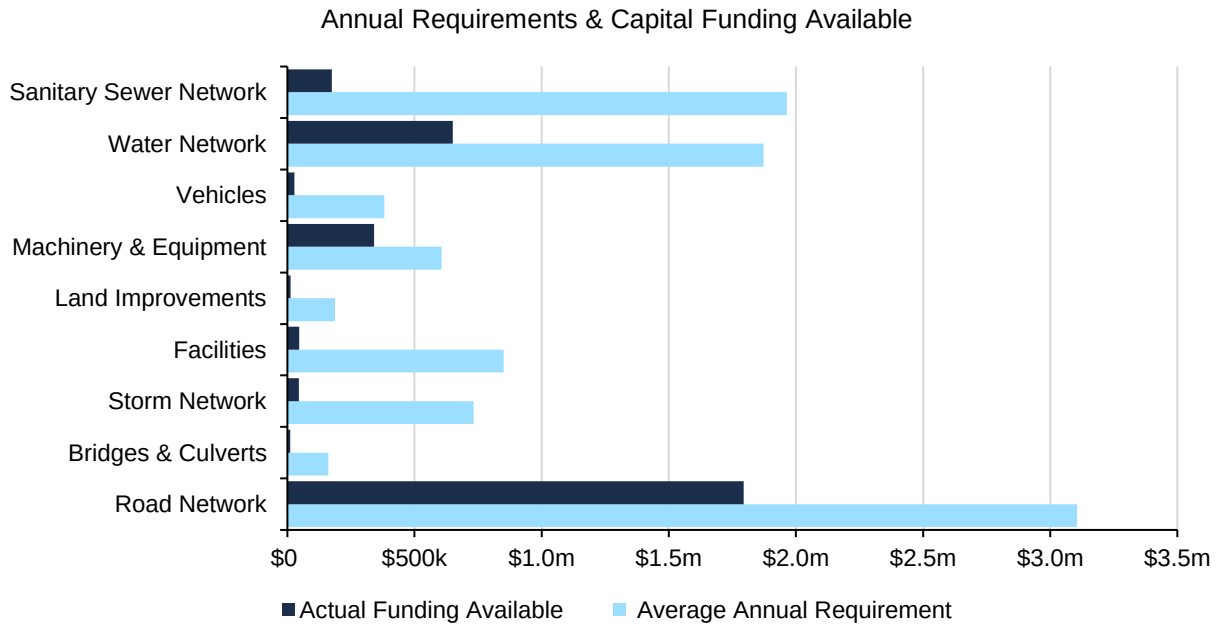
For most asset categories the annual requirement has been calculated based on a "replacement only" scenario, in which capital costs are only incurred at the construction and replacement of each asset.

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

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

Annual Funding Available

Based on a historical analysis of sustainable capital funding sources, the Town is committing approximately $3,103,000 towards capital projects per year. Given the annual capital requirement of $9,862,000, there is currently a funding gap of $6,759,000 annually.



14.2 Funding Objective

We have developed a scenario that would enable Hawkesbury to achieve full funding within 1 to 20 years for the following assets:

a) **Tax Funded Assets:** Road Network, Bridges & Culverts, Storm Network, Facilities, Vehicles, Machinery & Equipment, and Land Improvements
b) **Rate Funded Assets:** Water Network and Sanitary Sewer Network

For each scenario developed we have included strategies, where applicable, regarding the use of cost containment and funding opportunities.

14.3 Financial Profile: Tax Funded Assets

14.3.1 Current Funding Position

The following tables show, by asset category, Hawkesbury's average annual asset investment requirements, current funding positions, and funding increases required to achieve full funding on assets funded by taxes.

Asset Category	Avg. Annual Requirement	Annual Funding Available					
		Taxes	CCBF	OCIF	Taxes to Reserves	Total Available	Annual Deficit
Bridges & Culverts	$161,000	$11,000				$11,000	$150,000
Facilities	$850,000	$46,000				$46,000	$804,000
Land Improvements	$187,000	$13,000				$13,000	$174,000
Machinery & Equipment	$606,000	$43,000			$298,000	$341,000	$265,000
Road Network	$3,106,000	$177,000	$325,000	$1,184,000	$109,000	$1,795,000	$1,311,000
Stormwater Network	$733,000	$45,000				$45,000	$688,000
Vehicles	$382,000	$27,000				$27,000	$355,000
	$6,025,000	**$362,000**	**$325,000**	**$1,184,000**	**$407,000**	**$2,278,000**	**$3,747,000**

The average annual investment requirement for the above categories is $6.0 million. Annual revenue currently allocated to these assets for capital purposes is $2.3 million leaving an annual deficit of $3.7 million. Put differently, these infrastructure categories are currently funded at 38% of their long-term requirements.

14.3.2 Full Funding Requirements

In 2022, the Town of Hawkesbury has annual tax revenues of $11,533,000. As illustrated in the following table, without consideration of any other sources of revenue or cost containment strategies, full funding would require the following tax change over time:

Asset Category	Tax Change Required for Full Funding
Bridges & Culverts	1.3%
Facilities	7.0%
Land Improvements	1.5%
Machinery & Equipment	2.3%
Road Network	11.4%
Stormwater Network	6.0%
Vehicles	3.1%
	32.6%

Our recommendations include capturing the above changes and allocating them to the infrastructure deficit outlined above. The table below outlines this concept and presents several options:

	No reallocation of decrease in debt payment				Reallocation of decrease in debt payments			
	5 Years	10 Years	15 Years	20 Years	5 Years	10 Years	15 Years	20 Years
Infrastructure Deficit	$3,747,000	$3,747,000	$3,747,000	$3,747,000	$3,747,000	$3,747,000	$3,747,000	$3,747,000
Change in Debt Costs	N/A	N/A	N/A	N/A	($126,000)	($335,000)	($335,000)	($335,000)
Resulting Infrastructure Deficit:	$3,747,000	$3,747,000	$3,747,000	$3,747,000	$3,621,000	$3,412,000	$3,412,000	$3,412,000
Tax Increase Required	32.5%	32.5%	32.5%	32.5%	31.4%	29.6%	29.6%	29.6%
Annually:	**6.5%**	**3.3%**	**2.2%**	**1.6%**	**6.3%**	**3.0%**	**2.0%**	**1.5%**

14.3.3 Financial Strategy Recommendations

Considering all the above information, we recommend the 20-year option. This involves full funding being achieved over 20 years by:

a) when realized, reallocating the debt cost reductions of $335,000 to the infrastructure deficit as outlined above.
b) increasing tax revenues by 1.5% each year for the next 20 years solely for the purpose of phasing in full funding to the asset categories covered in this section of the AMP.

c) allocating the current CCBF and OCIF revenue as outlined previously.
d) increasing existing and future infrastructure budgets by the applicable inflation index on an annual basis in addition to the deficit phase-in.

Notes:

1. As in the past, periodic senior government infrastructure funding will most likely be available during the phase-in period. By Provincial AMP rules, this periodic funding cannot be incorporated into an AMP unless there are firm commitments in place. We have included OCIF formula-based funding, if applicable since this funding is a multi-year commitment[9].
2. We realize that raising tax revenues by the amounts recommended above for infrastructure purposes will be difficult to do. However, considering a longer phase-in window may have even greater consequences in terms of infrastructure failure.

Although this option achieves full funding on an annual basis in 20 years and provides financial sustainability over the period modeled, the recommendations do require prioritizing capital projects to fit the resulting annual funding available. Current data shows the pent-up investment demand of $22,751,458 in backlog.

Category	Backlog
Road Network	$11,528,328.17
Facilities	$8,169,000.00
Land Improvements	$1,440,877.00
Machinery & Equipment	$1,273,966.00
Storm Network	$339,286.80
Total	**$22,751,457.97**

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

[9] The Town should take advantage of all available grant funding programs and transfers from other levels of government. While OCIF has historically been considered a sustainable source of funding, the program is currently undergoing review by the provincial government. Depending on the outcome of this review, there may be changes that impact its availability.

14.4 Financial Profile: Rate Funded Assets

14.4.1 Current Funding Position

The following tables show, by asset category, Hawkesbury's average annual asset investment requirements, current funding positions, and funding increases required to achieve full funding on assets funded by rates.

Asset Category	Avg. Annual Requirement	Rates	To Operations	Total Available	Annual Deficit
Water Network	$1,873,000	$2,275,000	($1,625,000)	$650,000	$1,223,000
Sanitary Sewer Network	$1,964,000	$2,501,000	($2,326,000)	$175,000	$1,789,000
	$3,837,000	**$4,776,000**	**($3,951,000)**	**$825,000**	**$3,012,000**

The average annual investment requirement for the above categories is $3.8 million. Annual revenue currently allocated to these assets for capital purposes is $825 thousand, leaving an annual deficit of $3.0 million. Put differently, these infrastructure categories are currently funded at 22% of their long-term requirements.

14.4.2 Full Funding Requirements

In 2022, the Town of Hawkesbury has annual water and sanitary revenues of $2,275,000 and $2,501,000, respectively. As illustrated in the table below, without consideration of any other sources of revenue, full funding would require the following changes over time:

Asset Category	Tax Change Required for Full Funding
Water Network	53.8%
Sanitary Sewer Network	71.5%
	63.1%

Our recommendations include capturing the above changes and allocating them to the infrastructure deficit outlined above. The table below outlines this concept and presents several options:

Water Network								
	No reallocation of decrease in debt payment				Reallocation of decrease in debt payments			
	5 Years	10 Years	15 Years	20 Years	5 Years	10 Years	15 Years	20 Years
Infrastructure Deficit	$1,223,000	$1,223,000	$1,223,000	$1,223,000	$1,167,000	$1,167,000	$1,167,000	$1,167,000
Decrease in debt payments	n/a	n/a	n/a	n/a	$0	($59,000)	($59,000)	$59,000)
Resulting Infrastructure Deficit:	$1,223,000	$1,223,000	$1,223,000	$1,223,000	$1,223,000	$1,164,000	$1,164,000	$1,164,000
Rate Increase Required	53.8%	53.8%	53.8%	53.8%	53.8%	51.2%	51.2%	51.2%
Annually:	**10.8%**	**5.4%**	**3.6%**	**2.7%**	**10.8%**	**5.1%**	**3.4%**	**2.6%**

Sanitary Sewer Network								
	No reallocation of decrease in debt payment				Reallocation of decrease in debt payments			
	5 Years	10 Years	15 Years	20 Years	5 Years	10 Years	15 Years	20 Years
Infrastructure Deficit	$1,789,000	$1,789,000	$1,789,000	$1,789,000	$1,789,000	$1,789,000	$1,789,000	$1,789,000
Decrease in debt payments	n/a	n/a	n/a	n/a	($163,000)	($262,000)	($262,000)	($858,000)
Resulting Infrastructure Deficit:	$1,789,000	$1,789,000	$1,789,000	$1,789,000	$1,626,000	$1,527,000	$1,527,000	$931,000
Rate Increase Required	71.5%	71.5%	71.5%	71.5%	65.0%	61.1%	61.1%	37.2%
Annually:	**14.3%**	**7.2%**	**4.8%**	**3.6%**	**13.0%**	**6.1%**	**4.1%**	**1.9%**

14.4.3 Financial Strategy Recommendations

Considering all the above information, we recommend the 15-year option for the water network and the 15-year option for the sanitary sewer network. This involves full funding being achieved over the respective periods by:

a) increasing rate revenues by 3.4% for water services each year for the next 15 years and increasing rate revenues by 4.1% for sanitary services each year for the next 15 years solely for the purpose of phasing in full funding to the asset categories covered in this section of the AMP.
b) when realized, reallocating debt cost reductions of $59,000 to the water network and $262,000 to the sanitary network as outlined above.
c) increasing existing and future infrastructure budgets by the applicable inflation index on an annual basis in addition to the deficit phase-in.

Notes:

1. We realize that raising rate revenues for infrastructure purposes will be difficult to do. However, considering a longer phase-in window may have even greater consequences in terms of infrastructure failure.
2. If in the case that a 3.4% rate revenue increase for water services is considered unrealistic to achieve, an acceptable alternative would be the 20-year option with a 2.6% rate increase and reallocating debt cost reductions of $59,000 to the water network as presented above
3. If in the case that a 4.1% rate revenue increase for sanitary services is considered unrealistic to achieve, an acceptable alternative would be the 20-year option with a 1.9% rate increase and reallocating debt cost reductions of $858,000 to the sanitary network as presented above.
4. As in the past, periodic senior government infrastructure funding will most likely be available during the phase-in period. This periodic funding should not be incorporated into an AMP unless there are firm commitments in place.
5. Any increase in rates required for operations would be in addition to the above recommendations.

Although this option achieves full funding on an annual basis in 15 years and provides financial sustainability over the period modeled, the recommendations do require prioritizing capital projects to fit the resulting annual funding available. Current data shows the pent-up investment demand of $5,879,135 in backlog.

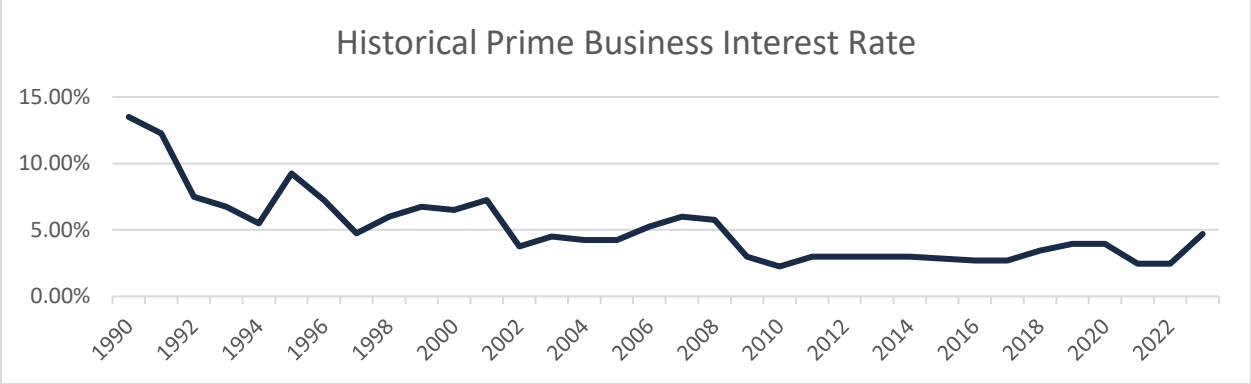
Category	**Backlog**
Sanitary Sewer Network	$ 3,402,124.48
Water Network	$ 2,477,010.36
Total	**$ 5,879,134.84**

14.5 Use of Debt

Debt can be strategically utilized as a funding source with in the long-term financial plan. The benefits of leveraging debt for infrastructure planning include:

a) the ability to stabilize tax & user rates when dealing with variable and sometimes uncontrollable factors
b) equitable distribution of the cost/benefits of infrastructure over its useful life
c) a secure source of funding
d) flexibility in cash flow management

Debt management policies and procedures with limitations and monitoring practices should be considered when reviewing debt as a funding option. In efforts to mitigate increasing commodity prices and inflation, interest rates have been rising. Sustainable funding models that include debt need to incorporate the now current realized risk of rising interest rates. The following graph shows the historical changes to the lending rates:



A change in 15-year rates from 5% to 7% would change the premium from 45% to 65%. Such a change would have a significant impact on a financial plan.

For reference purposes, the following table outlines the premium paid on a project if financed by debt. For example, a $1 million project financed at 3.0%[10] over 15 years would result in a 26% premium or $260 thousand of increased costs due to interest payments. For simplicity, the table does not consider the time value of money or the effect of inflation on delayed projects.

The Town of Hawkesbury employs a strategic policy of using debt as one component of its comprehensive asset management funding approach. Effectively and sustainably leveraging debt can significantly contribute to reducing the infrastructure deficit, potentially accelerating the timeline compared to relying

[10] Current municipal Infrastructure Ontario rates for 15-year money is 4.03%.

solely on tax or rate levies alone. Therefore, the Town should continue to incorporate debt in its asset management funding strategy.

Table 1: Premiums Paid

Interest Rate	Number of Years Financed					
	5	10	15	20	25	30
7.0%	22%	42%	65%	89%	115%	142%
6.5%	20%	39%	60%	82%	105%	130%
6.0%	19%	36%	54%	74%	96%	118%
5.5%	17%	33%	49%	67%	86%	106%
5.0%	15%	30%	45%	60%	77%	95%
4.5%	14%	26%	40%	54%	69%	84%
4.0%	12%	23%	35%	47%	60%	73%
3.5%	11%	20%	30%	41%	52%	63%
3.0%	9%	17%	26%	34%	44%	53%
2.5%	8%	14%	21%	28%	36%	43%
2.0%	6%	11%	17%	22%	28%	34%
1.5%	5%	8%	12%	16%	21%	25%
1.0%	3%	6%	8%	11%	14%	16%
0.5%	2%	3%	4%	5%	7%	8%
0.0%	0%	0%	0%	0%	0%	0%

The following tables outline how Hawkesbury has historically used debt for investing in the asset categories as listed. There is currently $13,553,000 of debt outstanding for the assets covered by this AMP with corresponding principal and interest payments of $1,427,000 (2024), well within its provincially prescribed maximum of $3,139,229.

Asset Category	Current Debt Outstanding (2023)	Use of Debt in the Last Five Years				
		2018	2019	2020	2021	2022
Bridges & Culverts	$109,000					
Facilities	$2,678,000		$228,000			
Land Improvements	$109,000					
Machinery & Equipment	$118,000					
Road Network	$993,000		$228,000			
Storm Network	$109,000					
Vehicles	$109,000					
Total Tax Funded:	**$4,225,000**		**$456,000**			
Water Network	$445,000					
Sanitary Sewer Network	$8,883,000					
Total Rate Funded:	**$9,328,000**					

Asset Category	Principal & Interest Payments in the Next Ten Years						
	2024	2025	2026	2027	2028	2029	2034
Bridges & Culverts	$14,000	$14,000	$14,000	$14,000	$14,000	$14,000	$0
Facilities	$236,000	$212,000	$189,000	$189,000	$189,000	$189,000	$175,000
Land Improvements	$14,000	$14,000	$14,000	$14,000	$14,000	$14,000	$0
Machinery & Equipment	$17,000	$17,000	$17,000	$14,000	$14,000	$14,000	$0
Road Network	$201,000	$177,000	$153,000	$125,000	$125,000	$125,000	$0
Storm Network	$14,000	$14,000	$14,000	$14,000	$14,000	$14,000	$0
Vehicles	$14,000	$14,000	$14,000	$14,000	$14,000	$14,000	$0
Total Tax Funded:	**$510,000**	**$462,000**	**$415,000**	**$384,000**	**$384,000**	**$384,000**	**$175,000**
Water Network	$59,000	$59,000	$59,000	$59,000	$59,000	$59,000	$0
Sanitary Sewer Network	$858,000	$858,000	$858,000	$695,000	$695,000	$695,000	$596,000
Total Rate Funded:	**$917,000**	**$917,000**	**$917,000**	**$754,000**	**$754,000**	**$754,000**	**$596,000**

The revenue options outlined in this plan allow Hawkesbury to fully fund its long-term infrastructure requirements without further use of debt.

14.6 Use of Reserves

14.6.1 Available Reserves

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

a) the ability to stabilize tax rates when dealing with variable and sometimes uncontrollable factors
b) financing one-time or short-term investments
c) accumulating the funding for significant future infrastructure investments
d) managing the use of debt
e) normalizing infrastructure funding requirement

By asset category, the table below outlines the details of the reserves currently available to Hawkesbury.

Asset Category	Balance at December 31, 2022
Bridges & Culverts	$0
Facilities	$296,000
Land Improvements	$48,000
Machinery & Equipment	$593,000
Road Network	$430,000
Storm Network	$0
Vehicles	$539,000
Total Tax Funded:	**$1,906,000**
Water Network	$2,463,000
Sanitary Sewer Network	$531,000
Total Rate Funded:	**$2,994,000**

There is considerable debate in the municipal sector as to the appropriate level of reserves that a Town should have on hand. There is no clear guideline that has gained wide acceptance. Factors that municipalities should consider when determining their capital reserve requirements include:

a) breadth of services provided
b) age and condition of infrastructure
c) use and level of debt
d) economic conditions and outlook
e) internal reserve and debt policies.

These reserves are available for use by applicable asset categories during the phase-in period to full funding. This coupled with Hawkesbury's judicious use of debt in the past, allows the scenarios to assume that, if required, available reserves and debt capacity can be used for high priority and emergency infrastructure investments in the short- to medium-term.

14.6.2 Recommendation

In 2025, Ontario Regulation 588/17 will require Hawkesbury to integrate proposed levels of service for all asset categories in its asset management plan update. We recommend that future planning should reflect adjustments to service levels and their impacts on reserve balances.

15 Appendices

Key Insights

- Appendix A includes a one-page report card with an overview of key data from each asset category
- Appendix B identifies projected 10-year capital requirements for each asset category
- Appendix C includes several maps that have been used to visualize the current level of service
- Appendix D provides additional guidance on the development of a condition assessment program

Appendix A: Infrastructure Report Card

Asset Category	Replacement Cost (millions)	Asset Condition	Financial Capacity	
Road Network	$113.4	31 (Poor)	Annual Requirement:	$3,106,000
			Funding Available:	$1,795,000
			Annual Deficit:	**$1,311,000**
Bridges & Culverts	$8.2	68 (Good)	Annual Requirement:	$161,000
			Funding Available:	$11,000
			Annual Deficit:	**$150,000**
Storm Network	$44.0	57 (Fair)	Annual Requirement:	$733,000
			Funding Available:	$45,000
			Annual Deficit:	**$688,000**
Facilities	$34.5	11 (Very Poor)	Annual Requirement:	$850,000
			Funding Available:	$46,000
			Annual Deficit:	**$804,000**
Land Improvements	$3.7	17 (Very Poor)	Annual Requirement:	$187,000
			Funding Available:	$13,000
			Annual Deficit:	**$174,000**
Machinery & Equipment	$7.3	34 (Poor)	Annual Requirement:	$606,000
			Funding Available:	$341,000
			Annual Deficit:	**$265,000**
Vehicles	$6.1	43 (Fair)	Annual Requirement:	$382,000
			Funding Available:	$27,000
			Annual Deficit:	**$355,000**
Water Network	$97.5	24 (Poor)	Annual Requirement:	$1,873,000
			Funding Available:	$650,000
			Annual Deficit:	**$1,223,000**
Sanitary Sewer Network	$96.4	55 (Fair)	Annual Requirement:	$1,964,000
			Funding Available:	$175,000
			Annual Deficit:	**$1,789,000**
Overall	**$411.1**	**37 (Poor)**	Annual Requirement:	$9,862,000
			Funding Available:	$3,103,000
			Annual Deficit:	**$6,759,000**

Appendix B: 10-Year Capital Requirements

The following tables identify the capital cost requirements for each of the next 10 years to meet projected capital requirements and maintain the current level of service.

Road Network

Asset Segment	Backlog	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Asphalt Roads	$18.7m	$42.1m	$5.9m	$1.5m	$2.4m	$4.8m	$547k	$1.4m	$1.1m	$933k	$105k
Curbs	$2.5m	$85k	$35k	$10k	$224k	$122k	$110k	$0	$0	$129k	$106k
Retaining Walls	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sidewalks	$2.8m	$0	$45k	$32k	$60k	$254k	$136k	$0	$0	$23k	$25k
Streetlights	$1.1m	$49k	$18k	$25k	$116k	$49k	$116k	$0	$0	$81k	$70k
Traffic Lights	$0	$269k	$0	$0	$0	$0	$0	$0	$0	$179k	$0
	$25.1m	**$42.5m**	**$6.0m**	**$1.6m**	**$2.8m**	**$5.3m**	**$908k**	**$1.4m**	**$1.1m**	**$1.3m**	**$306k**

Bridges & Culverts

Asset Segment	Backlog	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Bridges	$0	$0	$0	$608k	$1.4m	$0	$0	$0	$0	$0	$0
Culverts	$0	$0	$0	$608k	$1.4m	$0	$0	$0	$0	$0	$0
	$0	**$0**	**$0**	**$1.2m**	**$2.8m**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

Storm Network

Asset Segment	Backlog	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Storm Mains	$454k	$3.0m	$0	$320k	$0	$373k	$0	$0	$0	$0	$0
	$454k	**$3.0m**	**$0**	**$320k**	**$0**	**$373k**	**$0**	**$0**	**$0**	**$0**	**$0**

Facilities											
Asset Segment	Backlog	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Fire	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
General Government	$7.2m	$0	$0	$0	$0	$11k	$0	$0	$0	$0	$119k
Parks	$999k	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sports Complex	$0	$2.4m	$77k	$15k	$0	$200k	$215k	$10.6m	$86k	$0	$0
Transportation	$51k	$2k	$10.8m	$0	$0	$0	$0	$0	$0	$0	$0
	$8.2m	**$2.5m**	**$10.9m**	**$15k**	**$0**	**$211k**	**$215k**	**$10.6m**	**$86k**	**$0**	**$119k**

Machinery & Equipment											
Asset Segment	Backlog	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Fire	$44k	$0	$127k	$1.0m	$506k	$23k	$67k	$60k	$42k	$202k	$23k
Government	$686k	$0	$20k	$0	$0	$16k	$595k	$29k	$32k	$0	$0
Parks	$30k	$0	$0	$21k	$0	$0	$150k	$21k	$4k	$30k	$125k
Sports Complex	$156k	$65k	$326k	$0	$0	$72k	$68k	$362k	$93k	$46k	$0
Transportation	$391k	$0	$5k	$0	$32k	$400k	$429k	$8k	$13k	$116k	$0
	$1.3m	**$65k**	**$478k**	**$1.0m**	**$538k**	**$511k**	**$1.3m**	**$480k**	**$184k**	**$393k**	**$148k**

Vehicles											
Asset Segment	Backlog	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Fire Vehicles	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Heavy Duty	$0	$0	$0	$0	$0	$0	$450k	$0	$0	$0	$0
Light Duty	$0	$0	$0	$35k	$37k	$0	$246k	$0	$67k	$0	$0
Medium Duty	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$161k
Winter Control	$0	$0	$0	$0	$0	$0	$0	$0	$0	$315k	$0
	$0	**$0**	**$0**	**$35k**	**$37k**	**$0**	**$696k**	**$0**	**$67k**	**$315k**	**$161k**

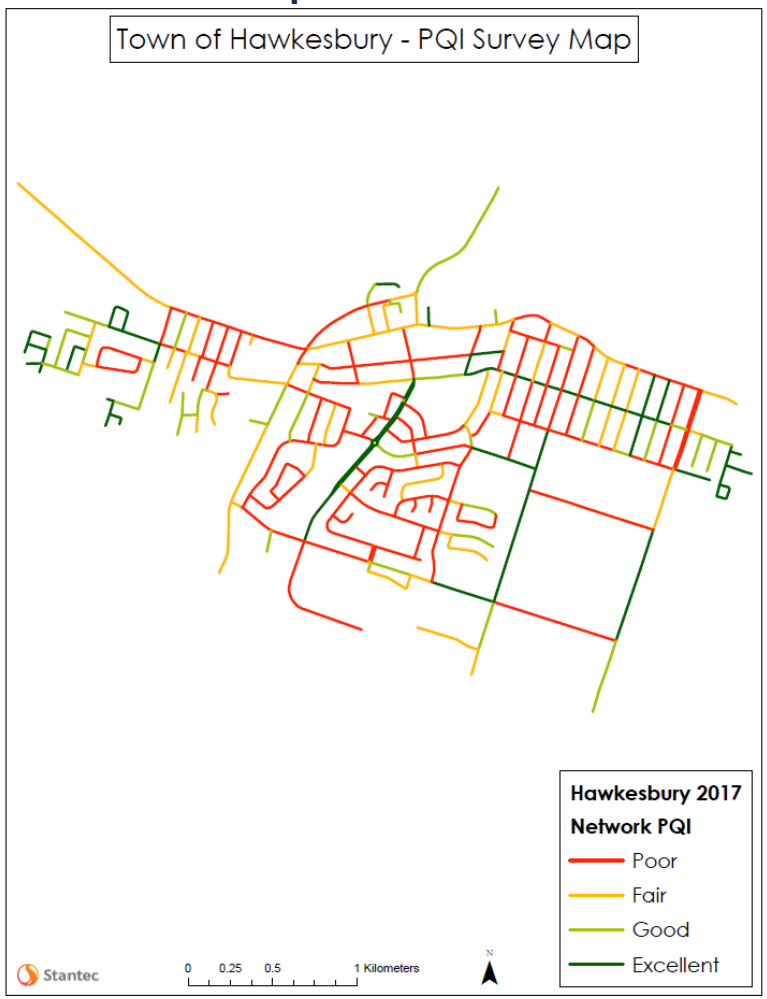
Land Improvements											
Asset Segment	Backlog	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Parking Lots	$931k	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Parks	$654k	$0	$166k	$0	$0	$1.5m	$0	$16k	$24k	$23k	$0
	$1.6m	**$0**	**$166k**	**$0**	**$0**	**$1.5m**	**$0**	**$16k**	**$24k**	**$23k**	**$0**

Water Network											
Asset Segment	Backlog	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Booster Station	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Equipment	$32k	$0	$0	$0	$19k	$0	$0	$0	$0	$29k	$0
Water Treatment	$3.1m	$40k	$40k	$0	$0	$0	$0	$0	$56.3m	$80k	$0
Watermains	$2.8m	$257k	$85k	$1.1m	$90k	$0	$91k	$854k	$1.4m	$0	$168k
	$5.9m	**$298k**	**$125k**	**$1.1m**	**$109k**	**$0**	**$91k**	**$854k**	**$57.7m**	**$109k**	**$168k**

Sanitary Sewer network											
Asset Segment	Backlog	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Lift Station	$75k	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Pumping Station	$3.3m	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sanitary Mains	$93k	$3.6m	$0	$87k	$0	$391k	$0	$0	$0	$0	$0
Sanitary Sewer Equipment	$0	$52k	$0	$0	$0	$0	$0	$17k	$0	$107k	$0
Treatment Plant	$0	$0	$1.3m	$1.7m	$59k	$128k	$7k	$123k	$173k	$2.3m	$6.6m
	$3.4m	**$3.6m**	**$1.3m**	**$1.7m**	**$59k**	**$520k**	**$7k**	**$140k**	**$173k**	**$2.4m**	**$6.6m**

Appendix C: Level of Service Maps

Road Network Map[11]



[11] The map above is from the Town's road needs study (RNS), which was conducted in 2017. It displays all roads which are managed and owned by the Town.

Road Network Classification

The following table summarizes the roads which are owned and managed by the Town of Hawkesbury.

Asset ID	Profile	Name	In-Service Date	Unit of Measure	Quantity
427	Local Roads	Abbott Street	1/1/1962	Length (m)	246
424	Local Roads	Abbott Street	1/1/1968	Length (m)	259
445	Local Roads	Aberdeen Street	1/1/1997	Length (m)	89
433	Local Roads	Aberdeen Street	1/1/1965	Length (m)	175
442	Local Roads	Aberdeen Street	1/1/1997	Length (m)	180
430	Local Roads	Aberdeen Street	1/1/1965	Length (m)	186
436	Local Roads	Aberdeen Street	1/1/1997	Length (m)	209
439	Local Roads	Aberdeen Street	1/1/1997	Length (m)	298
452	Local Roads	Albert Street	1/1/1985	Length (m)	299
455	Local Roads	Albert Street	1/1/1977	Length (m)	386
458	Local Roads	Alexander Siversky Street	1/1/2001	Length (m)	387
461	Local Roads	Allan Street	1/1/1968	Length (m)	183
464	Local Roads	Andr? Street	1/1/2002	Length (m)	118
467	Local Roads	Atlantic Street	1/1/1992	Length (m)	153
471	Local Roads	Belle Rive Street	1/1/2001	Length (m)	385
474	Local Roads	Bertha Street	1/1/1965	Length (m)	226
477	Local Roads	Bertha Street	1/1/1965	Length (m)	247
480	Local Roads	Berthiaume Street	1/1/1988	Length (m)	389
487	Collector Roads	Bon Pasteur Street	12/31/2007	Length (m)	256
504	Collector Roads	Cameron Street	1/1/1976	Length (m)	153
494	Collector Roads	Cameron Street	1/1/1963	Length (m)	249
502	Collector Roads	Cameron Street	1/1/1970	Length (m)	297

1993	Collector Roads	Cameron Street	12/31/2021	Length (m)	364
1850	Collector Roads	Cameron Street	12/31/2016	Length (m)	373
1617	Collector Roads	CAMERON STREET	11/2/2012	Length (m)	689
1812	Collector Roads	Cameron Street	1/1/2015	Length (m)	695
1774	Collector Roads	Cartier Blvd	1/1/2015	Length (m)	87
1775	Collector Roads	Cartier Blvd	1/1/2015	Length (m)	93
1776	Collector Roads	Cartier Blvd	1/1/2015	Length (m)	110
1778	Collector Roads	Cartier Blvd	1/1/2015	Length (m)	135
1777	Collector Roads	Cartier Blvd	1/1/2015	Length (m)	177
1779	Collector Roads	Cartier Blvd	1/1/2015	Length (m)	408
537	Local Roads	Catherine Street	1/1/1963	Length (m)	244
540	Local Roads	Catherine Street	1/1/1965	Length (m)	246
543	Collector Roads	Cecile Blvd	1/1/1968	Length (m)	210
1780	Local Roads	Cecile Blvd	1/1/2015	Length (m)	262
1865	Local Roads	Cecile Blvd	12/31/2016	Length (m)	398
556	Local Roads	Chamberlain Street	1/1/2006	Length (m)	247
553	Local Roads	Chamberlain Street	1/1/2006	Length (m)	251
563	Local Roads	Champlain Street	1/1/1968	Length (m)	246
559	Local Roads	Champlain Street	1/1/1968	Length (m)	304
566	Local Roads	Charlebois Street	1/1/1996	Length (m)	226

569	Local Roads	Charles Emile Street	1/1/1980	Length (m)	95
572	Local Roads	Chartrand Street	1/1/1993	Length (m)	88
575	Local Roads	Chartrand Street	1/1/1996	Length (m)	232
578	Arterial Roads	Chenail Blvd	1/1/1998	Length (m)	758
582	Local Roads	Christine Street	1/1/1996	Length (m)	199
585	Local Roads	Church Street	1/1/1951	Length (m)	58
588	Local Roads	Clement Street	1/1/2001	Length (m)	130
592	Local Roads	Desjardins Street	1/1/1994	Length (m)	197
595	Local Roads	Dollard Stret	1/1/1960	Length (m)	78
601	Local Roads	Dufferin Street	1/1/1996	Length (m)	244
598	Local Roads	Dufferin Street	1/1/1996	Length (m)	257
604	Local Roads	Duplate Street	1/1/1977	Length (m)	196
610	Local Roads	Edmond Street	1/1/1995	Length (m)	72
607	Local Roads	Edmond Street	1/1/2005	Length (m)	75
622	Local Roads	Edmond Street	1/1/1992	Length (m)	115
613	Local Roads	Edmond Street	1/1/1977	Length (m)	130
619	Local Roads	Edmond Street	1/1/1977	Length (m)	190
625	Local Roads	Edmond Street	1/1/1996	Length (m)	195
616	Local Roads	Edmond Street	1/1/1977	Length (m)	214
628	Local Roads	Emerald Street	1/1/1974	Length (m)	275
637	Local Roads	Garneau Street	1/1/2001	Length (m)	80
634	Local Roads	Garneau Street	1/1/1983	Length (m)	83
631	Local Roads	Garneau Street	1/1/1967	Length (m)	180
640	Local Roads	Gascon Street	1/1/1979	Length (m)	257
643	Local Roads	Genevieve Street	1/1/1981	Length (m)	218
646	Local Roads	Gerard Street	1/1/1980	Length (m)	197
658	Local Roads	Ghislain Street	1/1/1977	Length (m)	277
655	Local Roads	Ghislain Street	1/1/1977	Length (m)	383
649	Local Roads	Ghislain Street	1/1/1977	Length (m)	406

652	Local Roads	Ghislain Street	1/1/1977	Length (m)	489
664	Local Roads	Gladstone Street	1/1/1969	Length (m)	246
661	Local Roads	Gladstone Street	1/1/1969	Length (m)	250
667	Local Roads	Gordon Street	1/1/1994	Length (m)	256
673	Local Roads	Hamilton Street	1/1/1997	Length (m)	115
670	Local Roads	Hamilton Street	1/1/1997	Length (m)	200
677	Local Roads	Hampden Street	1/1/1961	Length (m)	178
684	Collector Roads	Higginson Street	1/1/1968	Length (m)	167
691	Collector Roads	Higginson Street	1/1/1989	Length (m)	267
687	Collector Roads	Higginson Street	1/1/1996	Length (m)	332
695	Local Roads	Industrial Blvd	1/1/1970	Length (m)	818
700	Local Roads	Jacynthe Street	1/1/2002	Length (m)	52
697	Local Roads	Jacynthe Street	1/1/2002	Length (m)	198
703	Local Roads	James Street	1/1/1981	Length (m)	261
707	Local Roads	James Street	1/1/1970	Length (m)	302
710	Local Roads	James Street	1/1/1974	Length (m)	700
713	Local Roads	Jerome Street	1/1/1980	Length (m)	151
716	Arterial Roads	John Street	1/1/2005	Length (m)	200
720	Arterial Roads	John Street	1/1/1998	Length (m)	618
727	Local Roads	Kipling Street	1/1/1973	Length (m)	148
723	Local Roads	Kipling Street	1/1/1968	Length (m)	221
730	Local Roads	Kitchener Street	1/1/1965	Length (m)	221
733	Local Roads	Kitchener Street	1/1/2002	Length (m)	314
740	Local Roads	Lafleche Street	1/1/1983	Length (m)	238
743	Local Roads	Lafleche Street	1/1/1983	Length (m)	262

737	Local Roads	Lafleche Street	1/1/1994	Length (m)	370
746	Local Roads	Lafrance Street	1/1/2007	Length (m)	93
1853	Collector Roads	Lansdowne Street	12/31/2016	Length (m)	94
764	Local Roads	Lansdowne Street	1/1/1994	Length (m)	250
1847	Collector Roads	Lansdowne Street	12/31/2016	Length (m)	297
1843	Collector Roads	Lansdowne Street	12/31/2016	Length (m)	303
1857	Collector Roads	Lansdowne Street	12/31/2016	Length (m)	477
775	Local Roads	Laurier Street	1/1/1968	Length (m)	238
772	Local Roads	Laurier Street	1/1/1968	Length (m)	247
768	Local Roads	Laurier Street	1/1/1968	Length (m)	361
778	Local Roads	Laurin Street	1/1/1985	Length (m)	85
781	Arterial Roads	Main Street East	1/1/1968	Length (m)	228
790	Arterial Roads	Main Street East	1/1/1997	Length (m)	437
793	Arterial Roads	Main Street East	1/1/1968	Length (m)	465
783	Arterial Roads	Main Street East	1/1/1987	Length (m)	466
787	Arterial Roads	Main Street East	1/1/1987	Length (m)	505
796	Arterial Roads	Main Street East	1/1/2005	Length (m)	585
799	Arterial Roads	Main Street West	1/1/1997	Length (m)	414
802	Arterial Roads	Main Street West	1/1/1997	Length (m)	438

806	Arterial Roads	Main Street West	1/1/1968	Length (m)	833
808	Local Roads	Mario Street	1/1/2002	Length (m)	219
815	Local Roads	Mary Street	1/1/1962	Length (m)	246
811	Local Roads	Mary Street	1/1/1961	Length (m)	268
1709	Arterial Roads	McGill CONNECTING LINK	7/2/2014	Length (m)	900
818	Arterial Roads	McGill Street	1/1/2005	Length (m)	241
826	Arterial Roads	McGill Street	1/1/2005	Length (m)	604
822	Arterial Roads	McGill Street	1/1/2005	Length (m)	772
829	Local Roads	Mill Entrance	1/1/1968	Length (m)	108
832	Local Roads	Montcalme Street	1/1/1963	Length (m)	151
842	Collector Roads	Nelson Street East	1/1/1977	Length (m)	134
835	Local Roads	Nelson Street East	1/1/1967	Length (m)	136
838	Local Roads	Nelson Street East	1/1/1977	Length (m)	314
852	Collector Roads	Nelson Street West	1/1/2002	Length (m)	255
849	Collector Roads	Nelson Street West	1/1/2007	Length (m)	404
845	Collector Roads	Nelson Street West	1/1/1982	Length (m)	411
855	Local Roads	Omer Street	1/1/1980	Length (m)	396
858	Local Roads	Paquette Street	12/31/2007	Length (m)	109
861	Local Roads	Parisien Street	1/1/1980	Length (m)	403
864	Local Roads	Paul Crescent	1/1/2001	Length (m)	351
867	Local Roads	Pilon Street	1/1/1996	Length (m)	379
870	Local Roads	Poplar Street	1/1/1957	Length (m)	92

874	Local Roads	Portelance Street	1/1/1976	Length (m)	640
881	Local Roads	Prospect Street	1/1/1997	Length (m)	177
877	Local Roads	Prospect Street	1/1/1997	Length (m)	221
885	Local Roads	Race Street	1/1/1990	Length (m)	150
889	Collector Roads	Regent Street	1/1/1968	Length (m)	277
895	Collector Roads	Regent Street	1/1/1978	Length (m)	339
898	Local Roads	Rejane Street	1/1/1980	Length (m)	434
1531	Local Roads	Richer Street	9/1/2009	Length (m)	153
904	Local Roads	Riordon Street	1/1/1956	Length (m)	137
907	Local Roads	Roch Street	1/1/1996	Length (m)	147
910	Local Roads	Roch Street	1/1/2001	Length (m)	175
913	Local Roads	Roxanne Street	1/1/2007	Length (m)	81
919	Local Roads	Royal Avenue	1/1/2007	Length (m)	125
916	Local Roads	Royal Avenue	1/1/1993	Length (m)	281
922	Local Roads	Rupert Street	1/1/2006	Length (m)	154
929	Local Roads	Salisbury Street	1/1/2002	Length (m)	107
925	Local Roads	Salisbury Street	1/1/2002	Length (m)	221
932	Local Roads	Seguin Street	1/1/1980	Length (m)	166
935	Local Roads	Sidney Street	1/1/1992	Length (m)	328
938	Local Roads	Sinclair Street	1/1/1965	Length (m)	179
941	Local Roads	Sinclair Street	1/1/1965	Length (m)	214
949	Local Roads	Smerdon Street	1/1/1968	Length (m)	102
945	Local Roads	Smerdon Street	1/1/1995	Length (m)	178
958	Collector Roads	Spence Avenue	1/1/1968	Length (m)	378
955	Collector Roads	Spence Avenue	1/1/1968	Length (m)	400

952	Collector Roads	Spence Avenue	1/1/1968	Length (m)	498
964	Collector Roads	Spence Avenue	1/1/1977	Length (m)	759
966	Collector Roads	Stanley Street	1/1/2002	Length (m)	184
970	Local Roads	Stanley Street	12/31/2007	Length (m)	308
976	Local Roads	Stevens Street	1/1/1985	Length (m)	80
979	Local Roads	Stevens Street	1/1/1992	Length (m)	261
982	Local Roads	Tach? Blvd	1/1/1976	Length (m)	393
987	Local Roads	Tessier Street	1/1/1986	Length (m)	350
985	Local Roads	Tessier Street	1/1/1978	Length (m)	420
989	Local Roads	Theriault Street	1/1/1980	Length (m)	120
995	Local Roads	Theriault Street	1/1/1969	Length (m)	194
992	Local Roads	Theriault Street	1/1/1969	Length (m)	247
1002	Local Roads	Thorne Street	1/1/2003	Length (m)	96
998	Local Roads	Thorne Street	1/1/2002	Length (m)	120
1809	Collector Roads	Tupper Street	1/1/2015	Length (m)	260
1018	Collector Roads	Tupper Street	1/1/2007	Length (m)	443
1010	Collector Roads	Tupper Street	1/1/1988	Length (m)	494
1006	Collector Roads	Tupper Street	1/1/1988	Length (m)	496
1808	Collector Roads	Tupper Street	1/1/2015	Length (m)	656
1023	Local Roads	Wellesly Street	1/1/2005	Length (m)	246
1020	Local Roads	Wellesly Street	1/1/2005	Length (m)	253
1035	Local Roads	West Street	1/1/2006	Length (m)	104
1532	Local Roads	West Street	9/1/2009	Length (m)	116

1533	Local Roads	West Street	9/1/2009	Length (m)	284
1040	Collector Roads	William Street	1/1/1981	Length (m)	111
1037	Collector Roads	William Street	1/1/1968	Length (m)	253
1043	Local Roads	Wolfe Street	1/1/1960	Length (m)	144

Description or images that illustrate the different levels of road class pavement condition

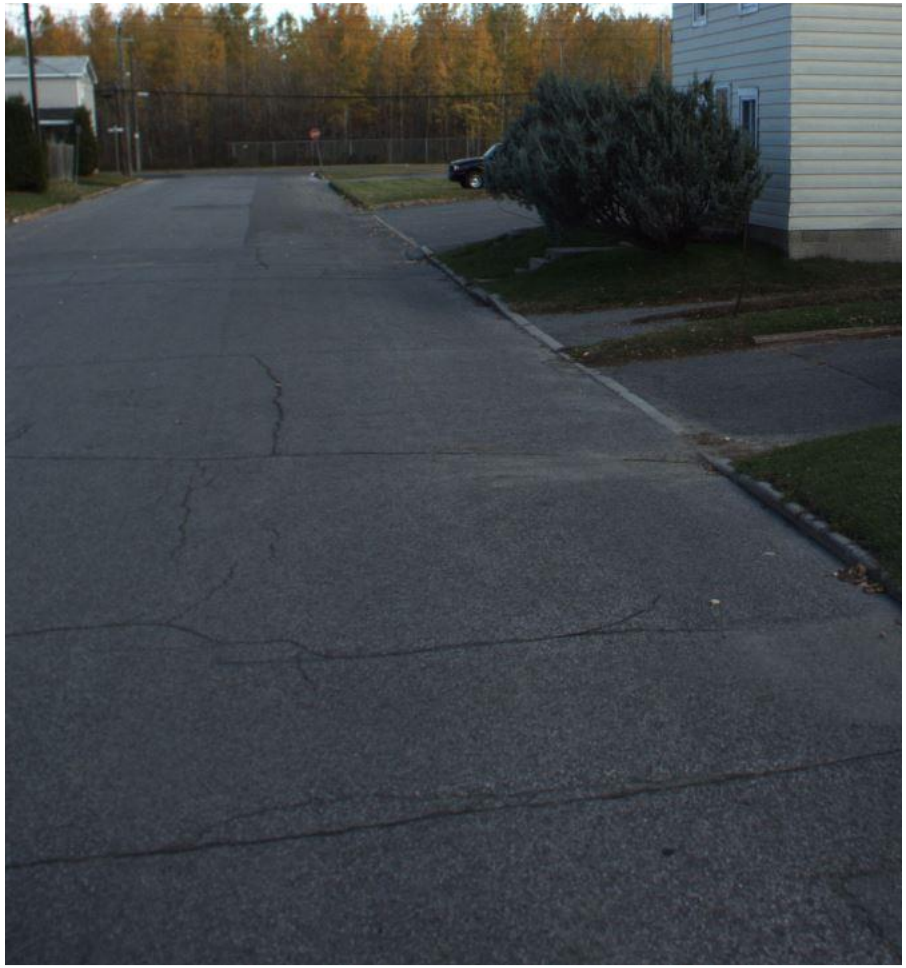
PQI= 80-100 (Excellent)

No distresses

Good ride quality

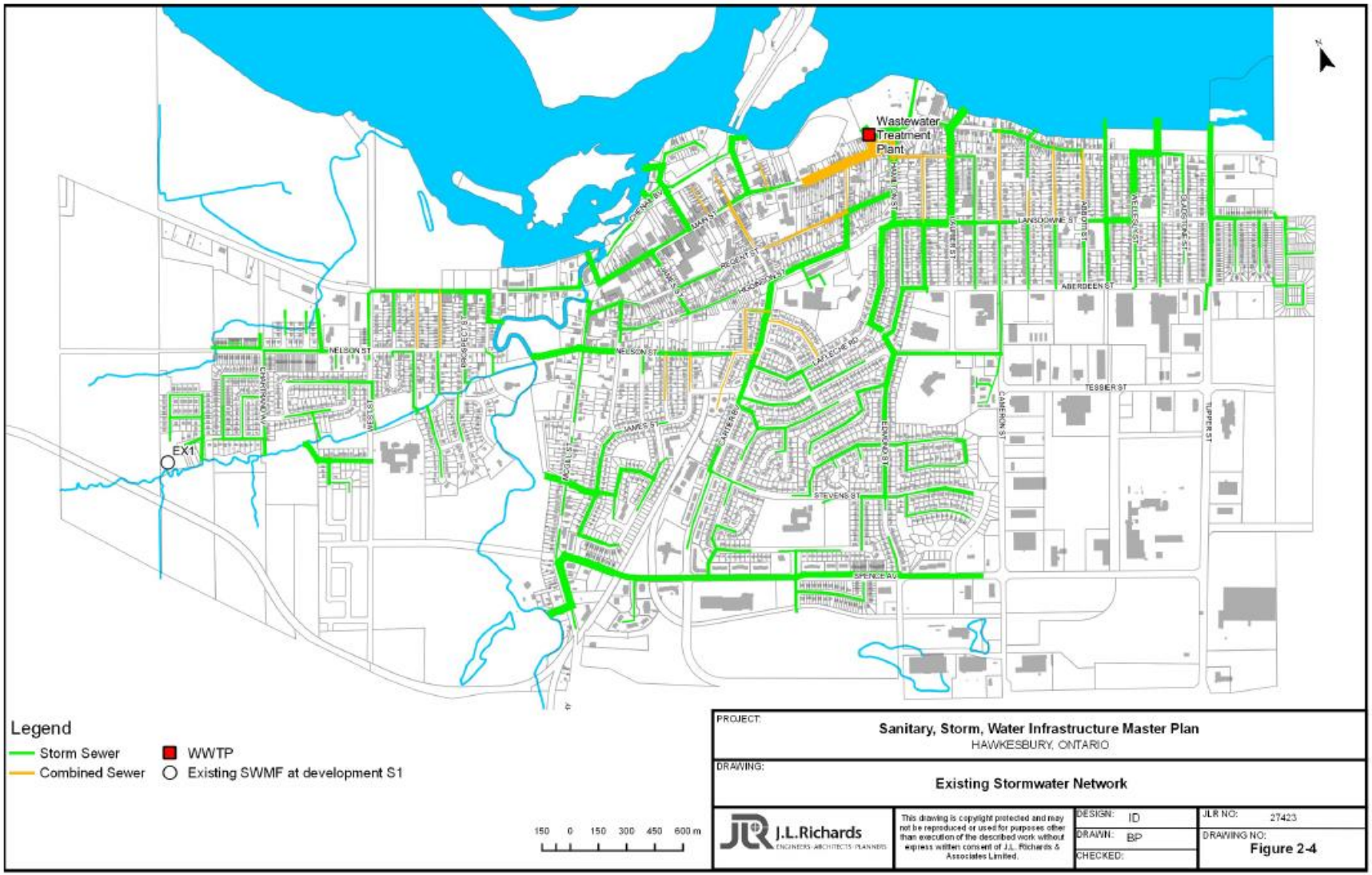
PQI = 60-80 (GOOD)
Localized slight/moderate linear cracks
Little to no alligator cracking present
No rutting or distortions
Fair to good ride quality

PQI=40-60 (FAIR)
Extensive slight/moderate linear cracks
Localized alligator/edge cracking
Fair ride quality

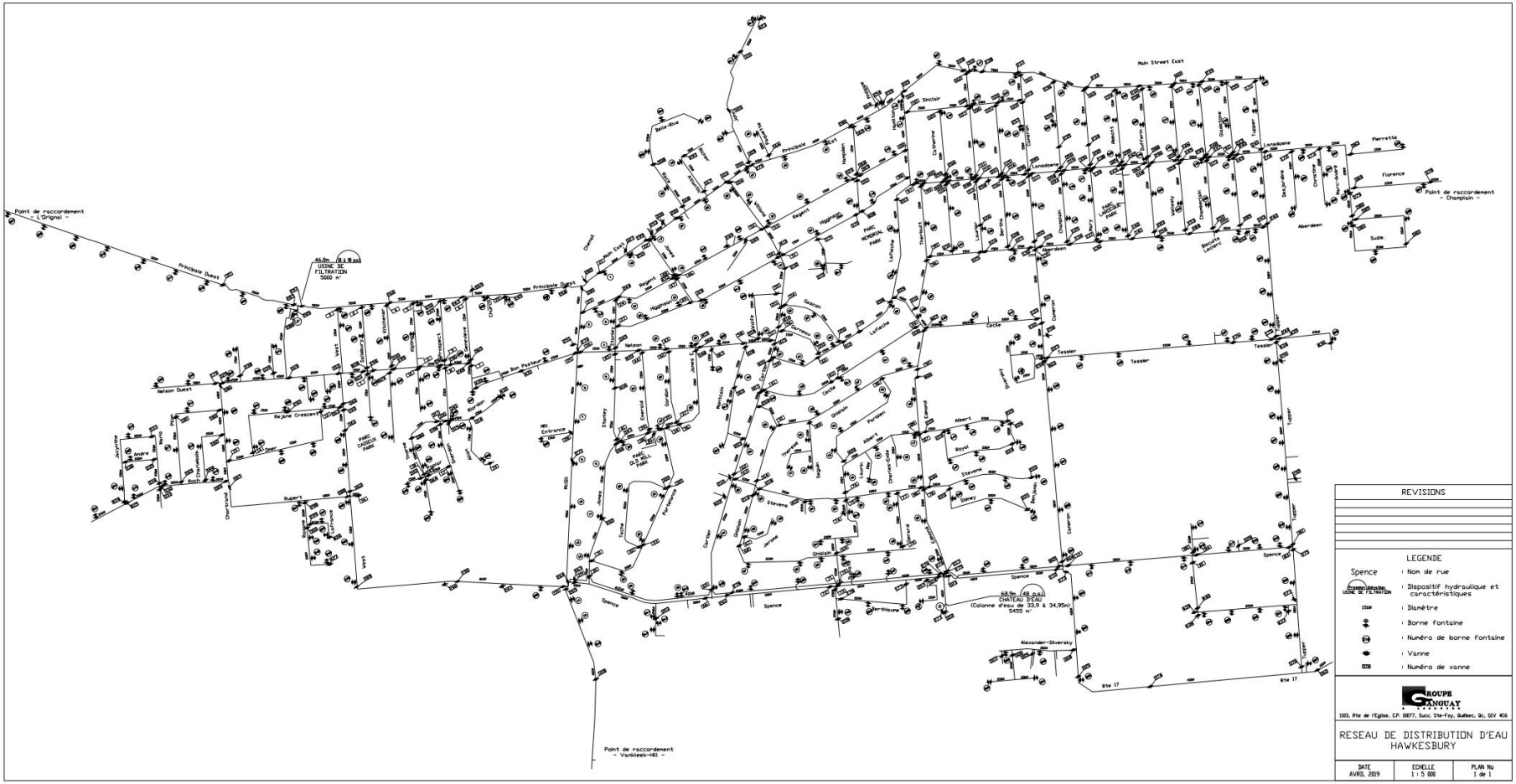


PQI=0 - 40 (POOR)
Extensive moderate to severe cracking
Extensive Alligator or Edge Cracking
Potholes or poor patches
Poor ride quality

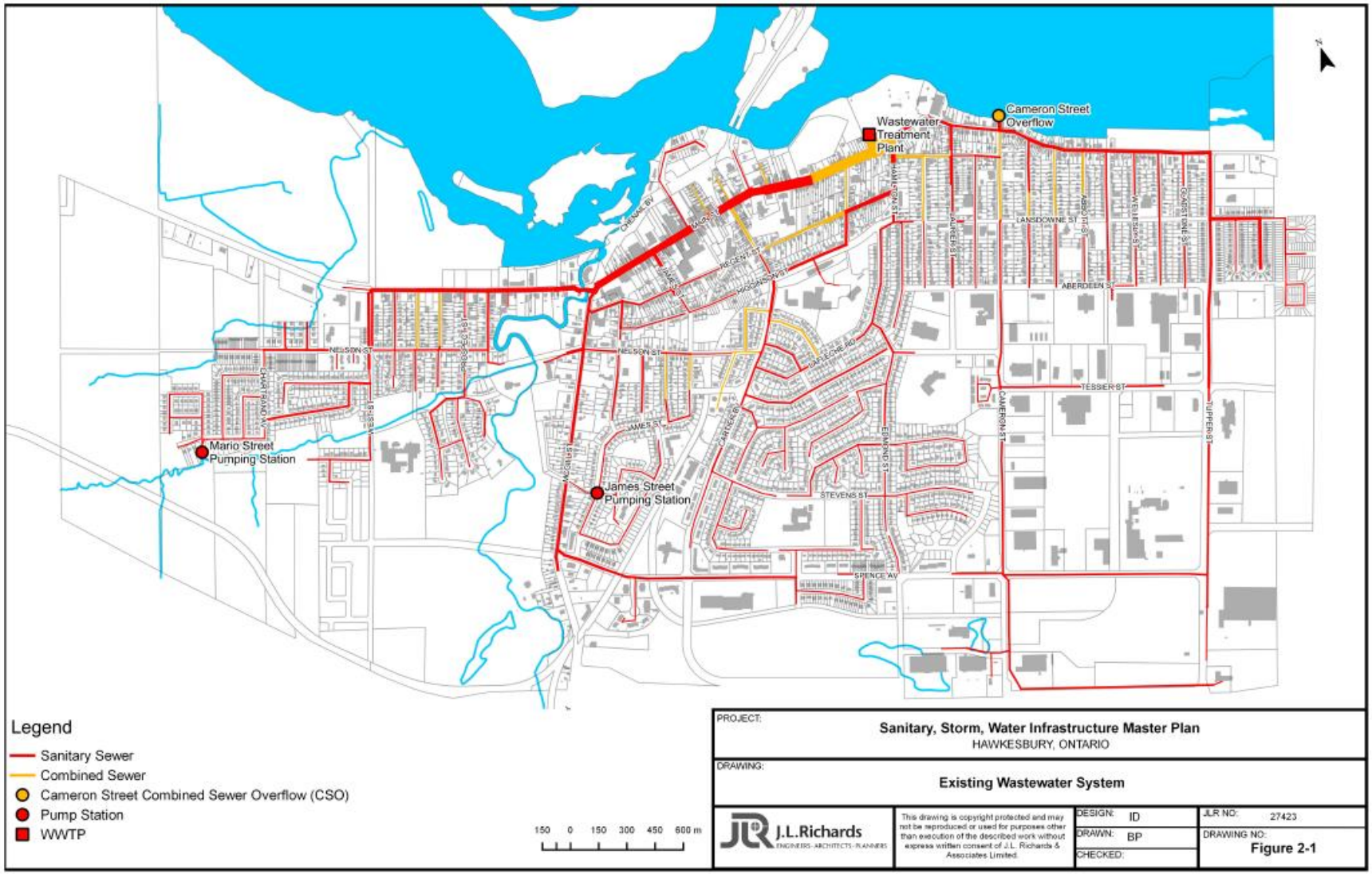
Storm Network Map



Water Network Map



Sanitary Sewer Network Map



Sanitary Sewer CSO Data

Reason Codes	
1 *(Heavy Precipitation)*	5 *(Sewer Problems)*
2 *(Snow Melt)*	6 *(Power Failure)*
3 *(Equipment Failure)*	7 *(Exceed Design Capacity)*
4 *(Maintenance/upgraded)*	O *(Others)*

Date of Event	Location	Type	Duration	Estimate volume *(m3)*	Reason (Code)
Sunday, May 15, 2022	Cameron/Main East	CSO	12 minutes	42.09	1
Tuesday, June 7, 2022	Cameron/Main East	CSO	15 minutes	19.52	1
Thursday, June 16, 2022	Cameron/Main East	CSO	13 minutes	41.5	1
Tuesday, August 9, 2022	Cameron/Main East	CSO	16 minutes	28.31	1
			Total bypass volume *(m3)*	131.42	

2022 CSO Summary Report

	January	February	March	April	May	June	July	August	September	October	November	December	Total
Number *(days)*	0	0	0	0	1	2	0	1	0	0	0	0	4
Duration *(minute)*	0	0	0	0	12	28	0	16	0	0	0	0	56
Estimated Volume *(m3)*	0	0	0	0	42	61	0	28	0	0	0	0	131

Volume of Overflow as % of Average Daily			0.005%
Flow *(ADF)**	ADF =	7,455	m^3/day

Appendix D: 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 Town'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 Town'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 Town 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 Town 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 Town 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 Town 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:

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