Asset Management Plan

Municipality of Powassan

2021

This Asset Management Program was prepared by:

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

Key Statistics

Replacement cost of asset portfolio
$89.9 million

Replacement cost of infrastructure per household
$65,000 (2021)

Percentage of assets in fair or better condition
48%

Percentage of assets with assessed condition data
56%

Annual capital infrastructure deficit
$2.9 million

Recommended timeframe for eliminating annual infrastructure deficit
5-20 Years

Target reinvestment rate
3.4%

Actual reinvestment rate
0.5%

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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 Municipality 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 the Municipality has achieved compliance with O. Reg. 588/17 to the extent of the requirements that must be completed by July 1, 2022. There are additional requirements concerning proposed levels of service and growth that must be met by July 1, 2024 and 2025.

Findings

The overall replacement cost of the asset categories included in this AMP totals $89.9 million. 48% of all assets analysed in this AMP are in fair or better condition and assessed condition data was available for 56% of assets. For the remaining 44% of assets, assessed condition data was unavailable, and 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.

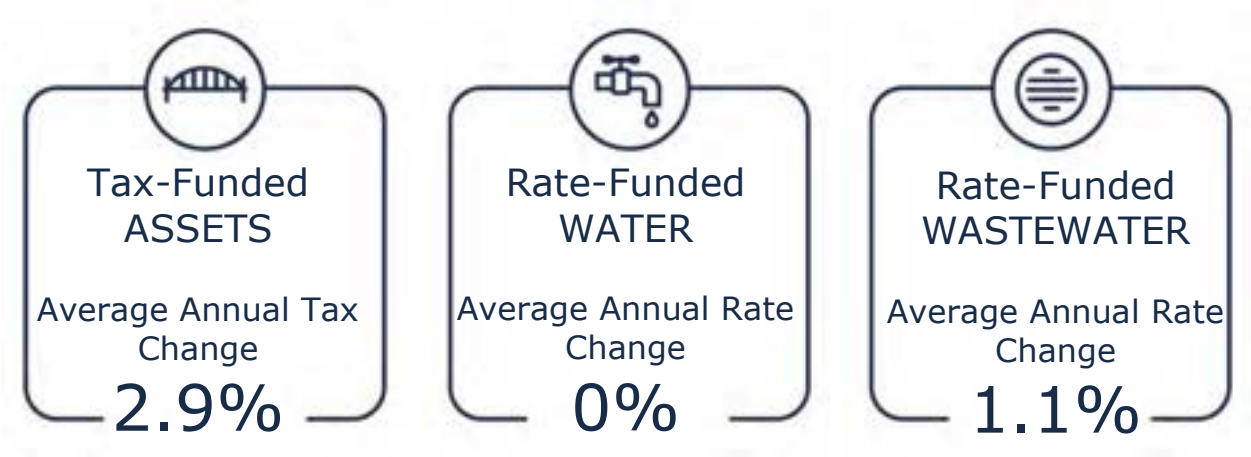
To meet capital replacement and rehabilitation needs for existing infrastructure, prevent infrastructure backlogs, and achieve long-term sustainability, the Municipality's average annual capital requirement totals $3.3 million. Based on a historical analysis of sustainable capital funding sources, the Municipality is committing approximately $404,000 towards capital projects or reserves per year. As a result, there is currently an annual funding gap of $2.9 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 Municipality. Strategic asset management planning is an ongoing and

dynamic process that requires continuous improvement and dedicated resources.

Recommendations

A financial strategy was developed to address the annual capital funding gap. The following graphics shows annual tax/rate change required to eliminate the Municipality's infrastructure deficit based on a 20-year plan for tax-funded assets, 5-year plan for water assets, and 10-year plan for wastewater assets:



Recommendations to guide continuous refinement of the Municipality's asset management program. These include:

- Review data to update and maintain a complete and accurate dataset
- Develop a condition assessment strategy with a regular schedule
- Review and update lifecycle management strategies
- Develop 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

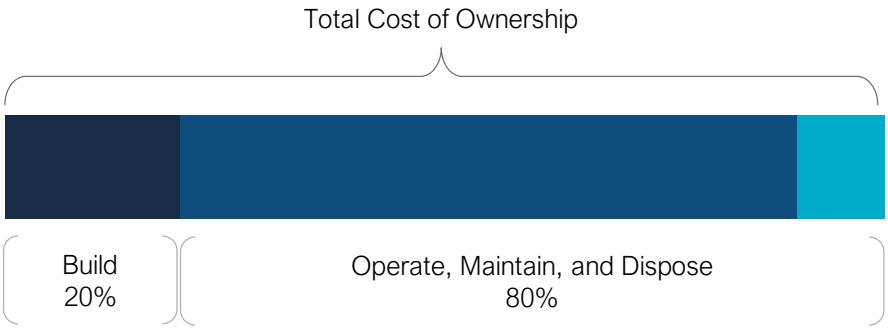
Key Insights

- The 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 Municipality'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 between July 1, 2022, and 2025

1.1 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 a broader asset management program. The industry-standard approach and sequence to developing a practical asset management program begins with a Strategic Plan, followed by an Asset Management Policy and an Asset Management Strategy, concluding with an Asset Management Plan.

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

1.1.1 Asset Management Policy

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

The Municipality adopted a Strategic Asset Management Policy in 2019, in accordance with Ontario Regulation 588/17.

The vision of the policy includes:

- Sustainability, economic development, and community resilience
- Sustainably managing levels of service through lifecycle management
- Achieving municipal infrastructural development goals

1.1.2 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 Municipality plans to achieve asset management objectives through planned activities and decision-making criteria.

The Municipality'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.

1.1.3 Asset Management Plan

The asset management plan (AMP) presents the outcomes of the Municipality'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 Municipality to re-evaluate the state of infrastructure and identify how the organization's asset management and financial strategies are progressing.

1.2 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.

1.2.1 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 Municipality'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.

1.2.2 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.

1.2.3 Levels of Service

A level of service (LOS) is a measure of what the Municipality 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 Municipality as worth measuring and evaluating. The Municipality 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, stormwater) 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 Municipality 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 Municipality's asset management strategies on the physical condition of assets or the quality/capacity of the services they provide.

For core asset categories (roads, bridges and culverts, water, wastewater, stormwater) the Province, through O. Reg. 588/17, has provided technical metrics that are required to be included in this AMP.

Current and Proposed Levels of Service

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

1.3 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

1.3.1 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, 2022. 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 - 12	Complete
Replacement cost of assets in each category	S.5(2), 3(ii)	44.1 - 12.1	Complete
Average age of assets in each category	S.5(2), 3(iii)	4.2 - 12.2	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 - 12.2	Complete
Current levels of service in each category	S.5(2), 1(i-ii)	4.5 - 12.5	Complete for Core Assets Only
Current performance measures in each category	S.5(2), 2	4 - 12	Complete for Core Assets Only
Lifecycle activities needed to maintain current levels of service for 10 years	S.5(2), 4	4.3 - 12.3	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)	6	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 Municipality of Powassan is produced in compliance with Ontario Regulation 588/17. The July 2022 deadline under the regulation—the first of three AMPs—requires analysis of only core assets (roads, bridges and culverts, water, wastewater, and stormwater).

The AMP summarizes the state of the infrastructure for the Municipality'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	
Stormwater Network	
Buildings & Facilities	
Vehicles	
Machinery & Equipment	
Land Improvements	
Water Network	User Rates
Wastewater 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

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 Municipality 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 Municipality 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 Municipality can determine the service life remaining (SLR) for each asset. Using condition data and the asset's SLR, the Municipality 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 Municipality 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 Municipality'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 E includes additional information on the role of asset condition data and provides basic guidelines for the development of a condition assessment program.

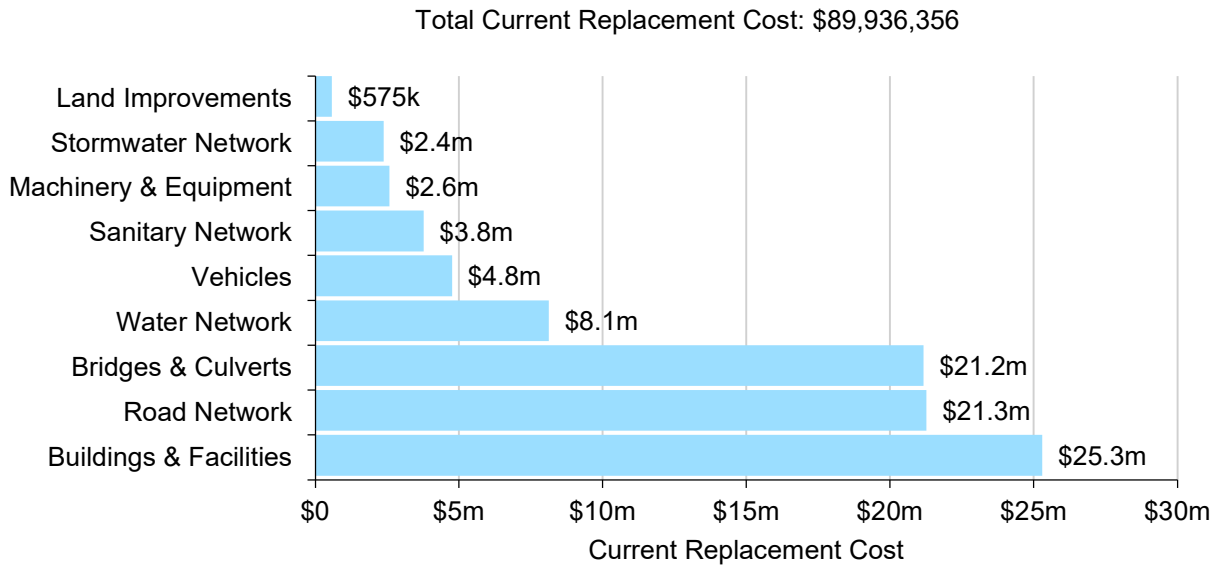
3 Portfolio Overview

Key Insights

- The total replacement cost of the Municipality’s asset portfolio is $89.9 million
- The Municipality’s target re-investment rate is 3.4%, and the actual re-investment rate is 0.5%, contributing to an expanding infrastructure deficit
- 48% of all assets are in fair or better condition
- 41% of assets are projected to require replacement in the next 10 years
- Average annual capital requirements total $3.3 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 $89.9 million based on inventory data from 2021. 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.



The following table identifies the methods employed to determine replacement costs across each asset category:

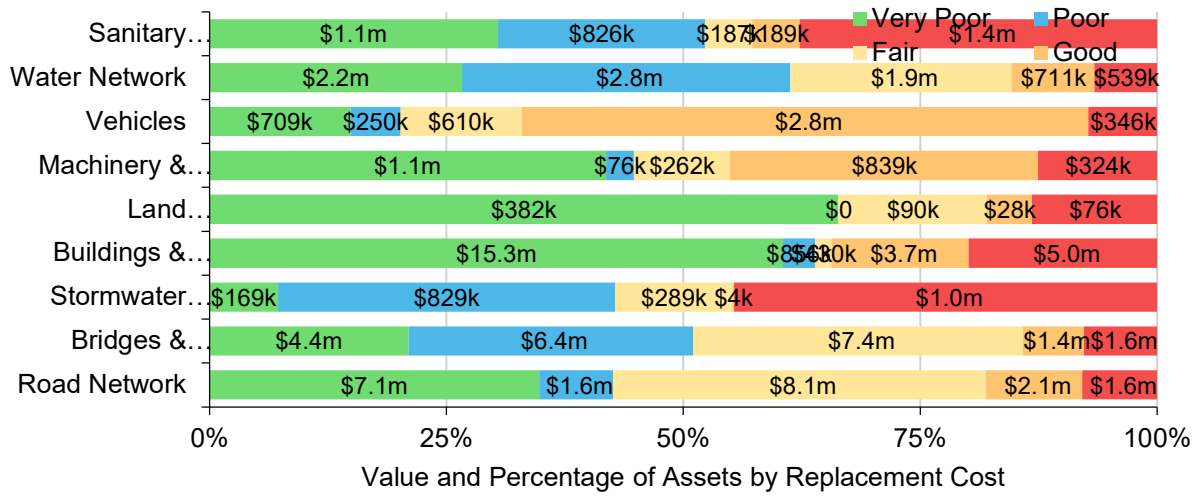
Asset Category	Replacement Cost Method	
	User-Defined	Notes
Road Network	99%	Unit costs are sourced from the public works department
Bridges & Culverts	100%	Replacement costs are sourced from Ontario Structure Inspection Manual (OSIM) report and user-defined costs for culverts
Stormwater Network	100%	Unit costs and user-defined costs are sourced from the public works department
Buildings	99%	Replacement costs are sourced from insurance appraisals
Land Improvements	97%	User-defined costs are sourced from several municipal departments
Machinery & Equipment	100%	User-defined costs are sourced from several municipal departments
Vehicles	100%	User-defined costs are sourced from several municipal departments
Water Network	51%	Unit costs and user-defined costs are sourced from the public works department
Wastewater Network	87%	Unit costs and user-defined costs are sourced from the public works department
Overall	**94%**	

3.2 Target vs. Actual Reinvestment Rate

To meet the long-term replacement needs, the Municipality should be allocating approximately $3 million annually, for a target reinvestment rate of 3.4%. Actual annual spending on infrastructure totals approximately $403,000, for an actual reinvestment rate of 0.5%.

3.3 Condition of Asset Portfolio

The current condition of the assets is central to all asset management planning. Collectively, 48% of assets in Powassan 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 56% 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	99%	2021 Street Scan and Staff Assessments
Bridges & Culverts	62%	Staff Assessed
		Staff Assessed
Stormwater Network	74%	CCTV Inspections (WESSUC Inc.)
Buildings & Facilities	7%	Staff Assessments
Machinery & Equipment	14%	Staff Assessments
Vehicles	51%	Staff Assessments
Land Improvements	99%	Staff Assessments
Water Network	42%	Staff Assessments of Hydrants and Water Well Supply
Wastewater Network	87%	CCTV Inspections (CTSpec Inc.)

3.4 Service Life Remaining

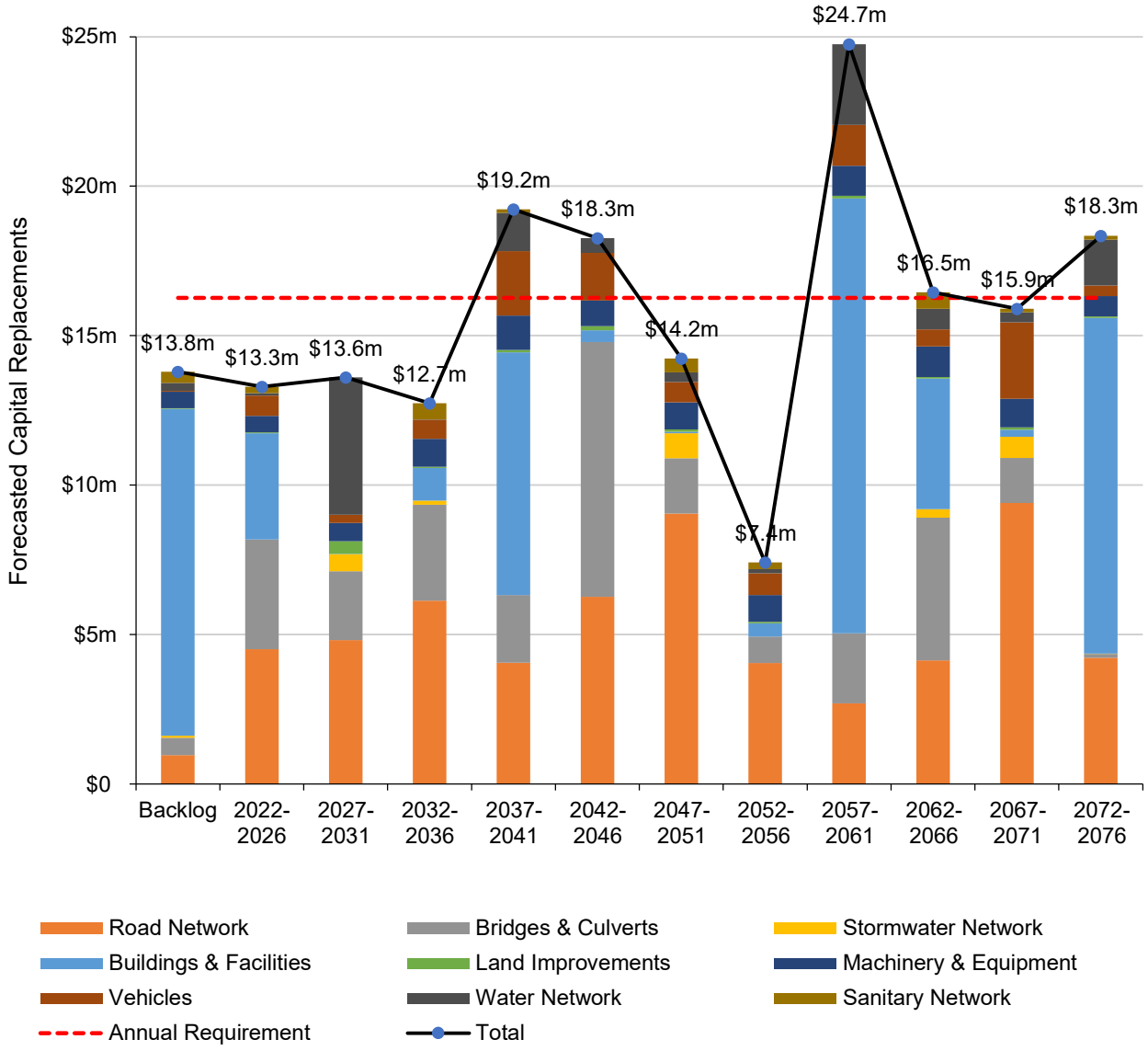
Based on asset age, available assessed condition data and estimated useful life, 41% of the Municipality's assets will require replacement within the next 10 years. Capital requirements over the next 10 years are identified in the table below.

Asset Category	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Bridges & Culverts	$2.1m	$0	$313k	$0	$1.3m	$2.1m	$220k	$0	$0	$0
Buildings	$3.4m	$0	$0	$0	$189k	$0	$0	$0	$0	$10k
Land Improvements	$0	$0	$0	$18k	$10k	$344k	$0	$0	$65k	$21k
Machinery & Equipment	$0	$28k	$77k	$24k	$251k	$265k	$23k	$182k	$121k	$10k
Road Network	$2.3m	$76k	$543k	$767k	$819k	$616k	$1.2m	$1.1m	$1.5m	$447k
Stormwater Network	$0	$0	$0	$0	$0	$0	$86k	$481k	$0	$0
Vehicles	$0	$0	$0	$450k	$0	$0	$219k	$0	$0	$66k
Wastewater Network	$0	$225k	$0	$0	$0	$0	$0	$0	$0	$0
Water Network Total	$0	$75k	$0	$0	$0	$0	$0	$1.7m	$2.8m	$100k
Total	$7.8m	$405k	$933k	$1.3m	$2.5m	$3.3m	$1.7m	$3.5m	$4.4m	$654k

A more detailed summary of the capital requirement within an asset category is available in Appendix B.

3.5 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 Municipality can produce an accurate long-term capital forecast. The following graph identifies capital requirements over the next 50 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average annual capital requirement.



4 Road Network

The road network is a critical component of the provision of safe and efficient transportation services and represents the highest value asset category in the Municipality's asset portfolio. It includes all municipally owned and maintained roadways in addition to supporting roadside infrastructure including sidewalks.

The Municipality's roads and sidewalks are maintained by the Public Works department who is also responsible for winter maintenance.

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

Replacement Cost	Condition	Financial Capacity	
$21.3 million	Fair (58%)	Annual Requirement:	$1,067,920
		Funding Available:	$281,000
		Annual Deficit:	$786,920

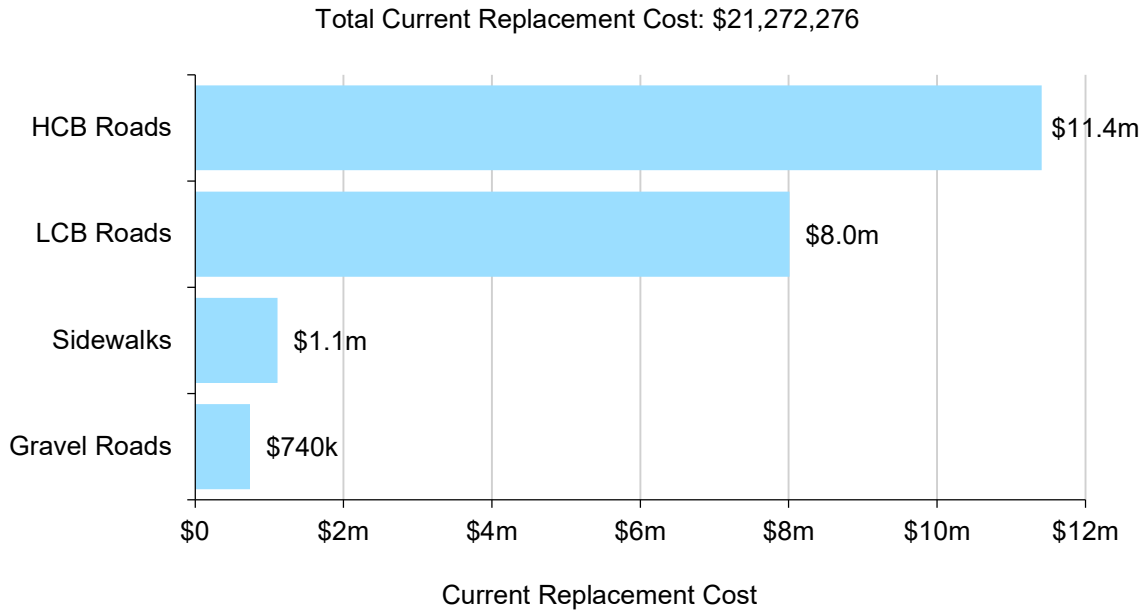
The following core values and level of service statements are a key driving force behind the Municipality's asset management planning:

Service Attribute	Level of Service Statement
Scope	The road network service is conveniently accessible to the whole community in sufficient capacity (meets traffic demands) and is available under most conditions.
Quality	The road network is in fair condition with minimal unplanned service interruptions and road closures.

4.1 Asset Inventory & Costs

The table below includes the quantity, total replacement cost and annual capital requirements of each asset segment in the Municipality's road network inventory.

Asset Segment	Quantity	Replacement Cost	Annual Capital Requirement
Gravel Roads	83,560 m	$740,011	$185,002.00
HCB Roads	20,207 m	$11,407,068	$400,251.05
LCB Roads	18,984 m	$8,163,228	$443,804.56
Sidewalks	7,241 m	$1,112,472	$47,044.15
Total		**$21,272,276**	**$1,067,920.29**



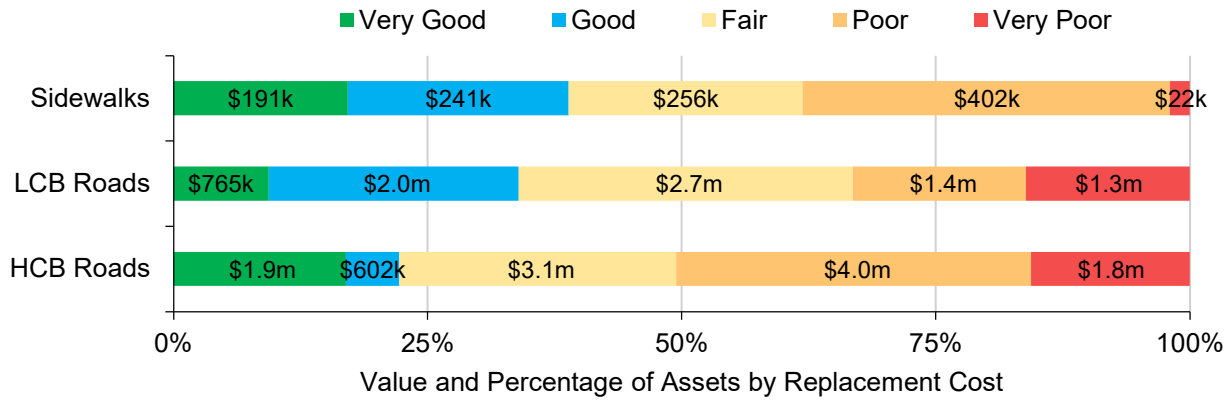
Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

4.2 Asset Condition & Age

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

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)[1]	Average Condition
HCB Roads	25	81.4	53% (Fair)
LCB Roads	15	94.5	59% (Fair)
Gravel Roads	4[2]	1.5	62.5%
Sidewalks	25	65.0	58% (Fair)
Average			**56% (Fair)**

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



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

[1] The average age calculation uses the original construction date of roads. However, roads have been renewed over time with surface treatments and resurfacing, which improves the overall condition. Thus, the average condition reflects the assessed state of the roads, and not necessarily the age.

[2] On average, Powassan re-stones gravel roads every four years.

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

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 Municipality's current approach:

- A Pavement Condition Index (PCI) evaluation was completed in 2021 by ScreetScan. The evaluation includes a detailed assessment of the condition of each road and sidewalk segment. The Municipality has hired Golder Associates to conduct a road needs study in 2022. The Municipality plans to complete road needs studies on a 5-year cycle.

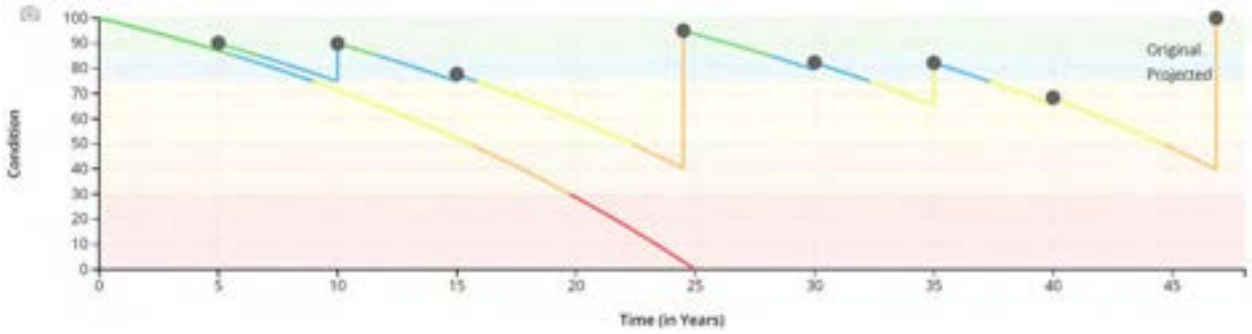
In this AMP the following rating criteria is used to determine the current condition of road segments and forecast future capital requirements:

Condition	Rating
Very Good	85-100
Good	75-84
Fair	50-74
Poor	30-49
Very Poor	0-29

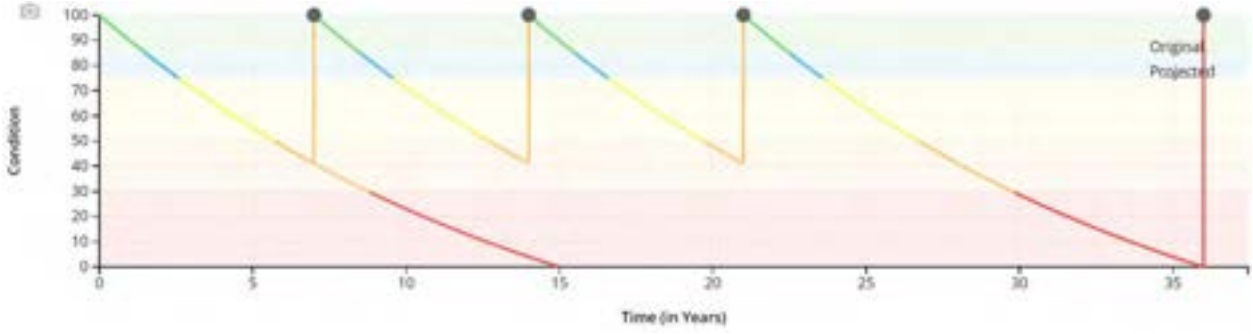
4.3 Lifecycle Management Strategy

The condition or performance of most assets will deteriorate over time. This process is affected by a range of factors including an asset's characteristics, location, utilization, maintenance history and environment. The following lifecycle strategies have been developed as a proactive approach to managing the lifecycle of LCB, HCB, and gravel 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.

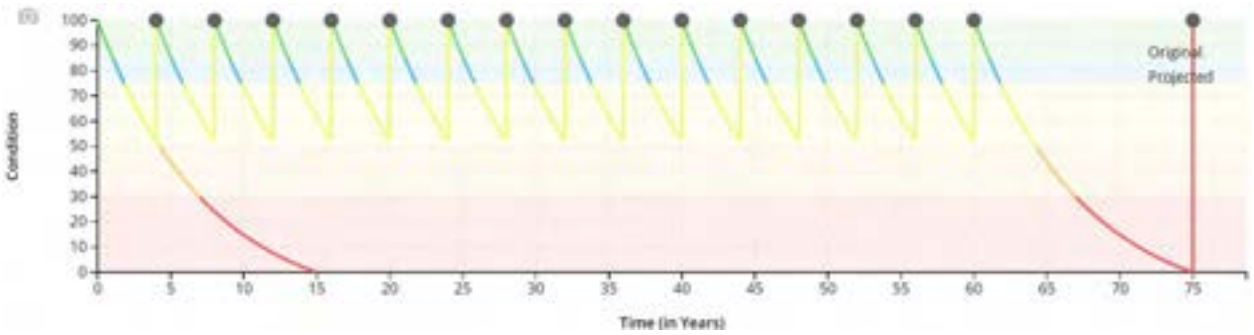
Paved Roads (HCB)		
Event Name	**Event Class**	**Event Trigger**
Crack Sealing	Preventative Maintenance	5, 15, 30, 40 Years
Micro-Surfacing	Preventative Maintenance	10, 35 Years
Mill & Pave	Rehabilitation	40% Condition
Full Reconstruction	Replacement	40% Condition



Paved Roads (LCB)		
Event Name	**Event Class**	**Event Trigger**
Single Surface Treatment	Rehabilitation	7 Years (Repeated)
Full Reconstruction	Replacement	End of Life



Gravel Roads		
Event Name	**Event Class**	**Event Trigger**
New Surface & Single Lift	Rehabilitation	4 Years (Repeated)
Full Reconstruction	Replacement	0% Condition



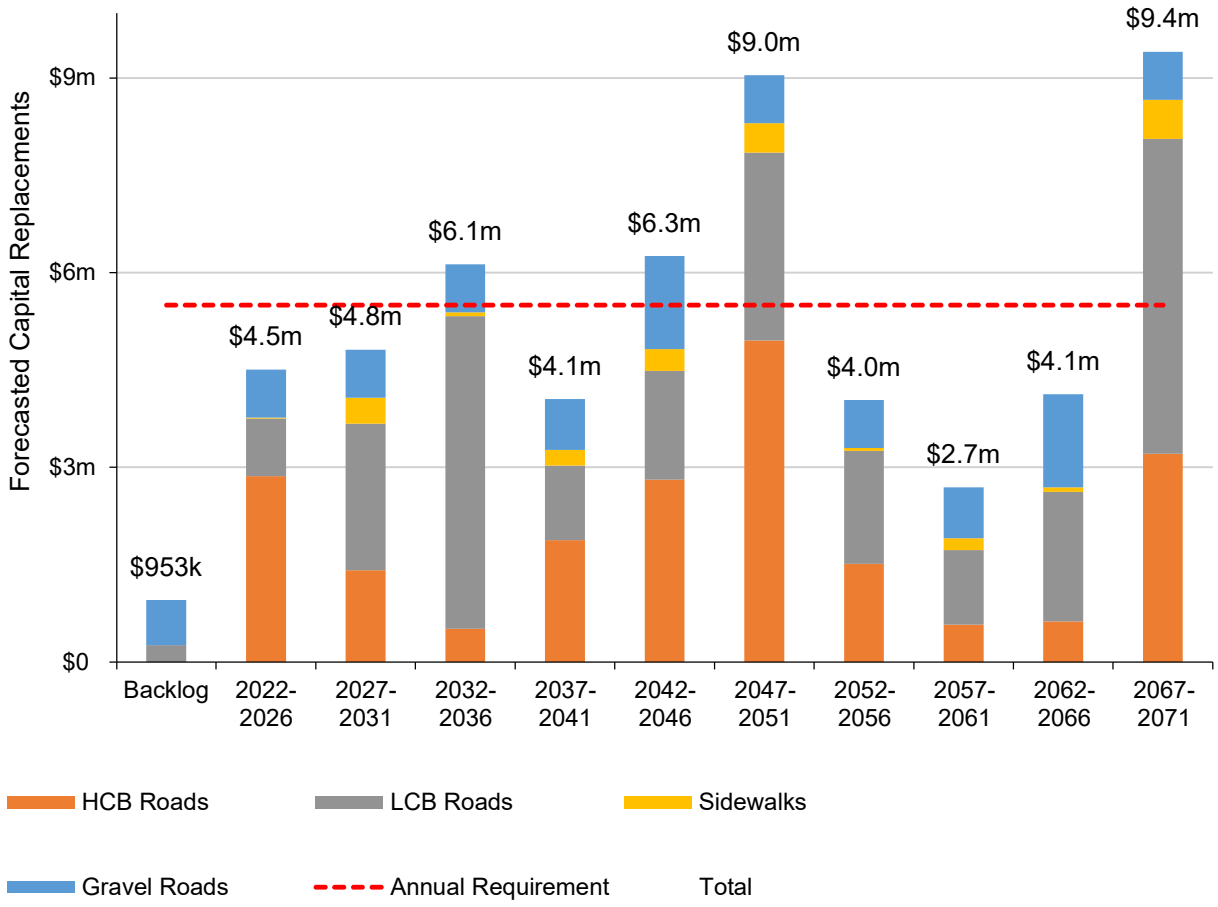
The following table outlines the Municipality's current lifecycle management strategies that are not defined by the above strategies.

Activity Type	Description of Current Strategy
Maintenance	Maintenance activities for roads and sidewalks include winter maintenance such as snow removal and salt/sand for ice removal as needed. One quarter of the gravel road network is replaced annually. Most gravel roads are treated with calcium chloride as needed.
Renewal/ Replacement	Replacement activities are prioritized based on asset condition and health and safety risks.

4.3.1 Forecasted Capital Requirements

Based on the lifecycle strategies identified previously for HCB and LCB roads, and assuming the end-of-life replacement of all other assets in this category, the following graph forecasts capital requirements for the road network.

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Municipality should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 50 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average annual capital requirements.



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.

4.4 Risk & Criticality

4.4.1 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 2021 inventory data.

This is a high-level model developed for the purposes of this AMP and Municipality 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	Surface Type
Traffic Range (2014 AECOM Study)	Traffic Range (2014 AECOM Study)

The identification of critical assets allows the Municipality 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.

4.4.2 Risks to Current Asset Management Strategies

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

Aging Infrastructure and Capital Funding

The Municipality's road network is aging with much of the network exceeding the expected useful life. Staff capacity is sometimes insufficient to deploy optimal maintenance and assessment strategies. Major capital projects may also be deferred depending on the availability of grant funding opportunities. A long-term capital funding strategy that is developed in accordance with underground infrastructure capital projects can reduce dependency on grant funding and help prevent deferral of necessary capital works.

Climate Change and Extreme Weather

An increase in the frequency and intensity of precipitation events can result in flooding of sections of the road network. In some cases, the drainage capacity of the road network is not sufficient to withstand heavy water flow, particularly on rural roads. Further issues can arise as a result of flooding and poor drainage including accelerated deterioration caused by freeze/thaw cycles. To improve asset resiliency, staff should identify problem areas and improve drainage through enhanced lifecycle strategies.

4.5 Levels of Service

The following tables identify the Municipality'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 Municipality has selected for this AMP.

4.5.1 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 (2020)
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	Very Poor: Widespread signs of deterioration. Requires remedial work to bring road up to standard. Service is affected Poor: Large portions of road exhibiting deterioration with rutting, potholes, distortions, longitude and lateral cracking. Road is mostly below standard. Fair: Some sections of road starting to deteriorate. Requires some remedial work and surface upgrade in near future. Good: Road is in overall good condition. Few sections are starting to show signs of minimal deterioration. Very Good: Road is well maintained and in excellent condition. Surface was newly or recently upgraded. No signs of deterioration or remedial work required.

4.5.2 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 (2020)
Scope	Lane-km of arterial roads (MMS classes 1 and 2) per land area (km/km^2)	0
	Lane-km of collector roads (MMS classes 3 and 4) per land area (km/km^2)	0.43
	Lane-km of local roads (MMS classes 5 and 6) per land area (km/km^2)	0.61
Quality	Average pavement condition index for paved roads in the municipality	56%
	Average surface condition for unpaved roads in the municipality (e.g. excellent, good, fair, poor)	Fair
Performance	Capital reinvestment rate	1.4%

4.6 Recommendations

Condition Assessment Strategies

- The last comprehensive assessment of the road network was completed in 2021. Consider adopting a 5- to 7-year assessment program to ensure that condition data is regularly up to date to best inform lifecycle management strategies.

Lifecycle Management Strategies

- Implement the identified lifecycle management strategies for HCB, LCB, and Gravel roads to realize potential cost avoidance and maintain a high quality of road pavement condition.
- Evaluate the efficacy of the Municipality'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 Municipality 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 and culverts represent a critical portion of the transportation services provided to the community. The Department of Public Works is responsible for the maintenance of all bridges and culverts located across municipal roads with the goal of keeping structures in an adequate state of repair and minimizing service disruptions.

The state of the infrastructure for bridges and culverts is summarized in the following table.

Replacement Cost	Condition	Financial Capacity	
$21.2 million	Poor (37%)	Annual Requirement:	$587,000
		Funding Available:	$21,000
		Annual Deficit:	$566,000

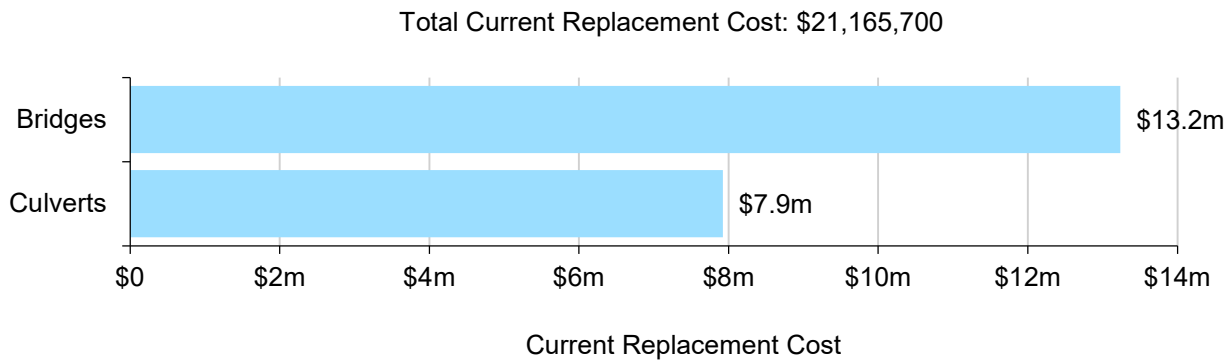
The following core values and level of service statements are a key driving force behind the Municipality's asset management planning:

Service Attribute	Level of Service Statement
Scope	Bridges and culverts are conveniently accessible to the whole community in sufficient capacity (meets traffic demands) and are available under most weather conditions. Two of the bridges have dimensional or loading restrictions.
Quality	The bridges and culverts are in poor condition but have minimal unplanned service interruptions and closures.

5.1 Asset Inventory & Costs

The table below includes the quantity, total replacement cost and annual capital requirements of each asset segment in the Municipality's bridges and culverts inventory.

Asset Segment	Quantity (Component)	Replacement Cost	Annual Capital Requirement
Bridges	12 (179)	$13,239,254	$259,739
Culverts	29 (353)	$7,926,446	$327,434
Total		**$21,165,700**	**$587,172**



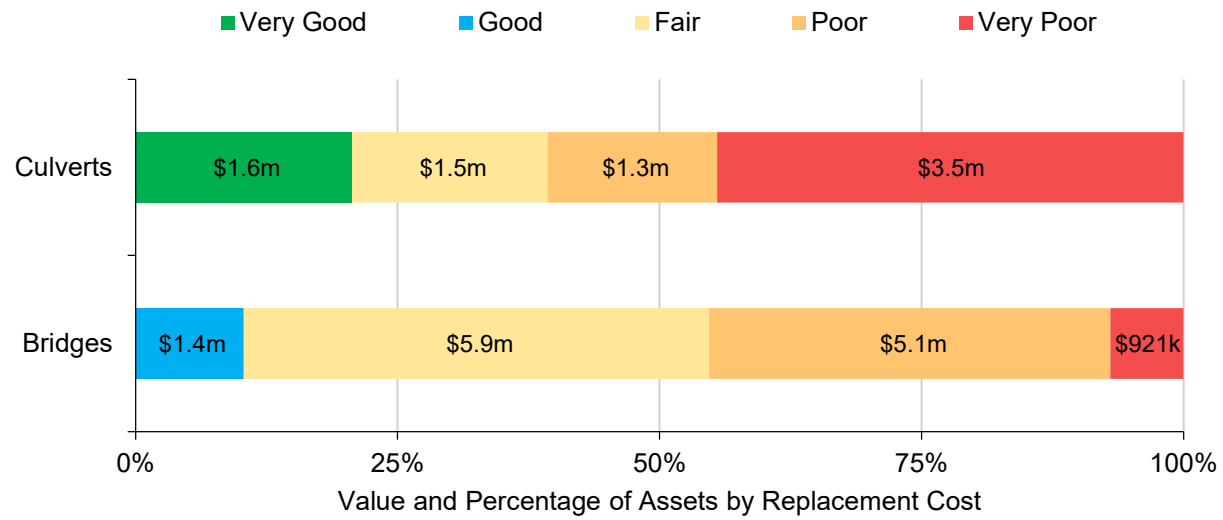
Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

5.2 Asset Condition & Age

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

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Condition
Bridges	40	50.2	37% (Poor)
Culverts	40	41.5	35% (Poor)
Average		**49.9**	**37% (Poor)**

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



To ensure that the Municipality's Bridges & Culverts continue to provide an acceptable level of service, the Municipality 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.

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

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 Municipality's current approach:

- Condition assessments of all bridges and culverts with a span greater than or equal to 3 meters are completed every 2 years in accordance with the Ontario Structure Inspection Manual (OSIM).
- Small culverts are visually assessed on an annual basis and deficiencies are noted to inform short- and long-term planning.

In this AMP, the following rating criteria is used to determine the current condition of bridges and culverts and forecast future capital requirements:

Condition	Rating
Very Good	80-100
Good	60-80
Fair	40-60
Poor	20-40
Very Poor	0-20

5.3 Lifecycle Management Strategy

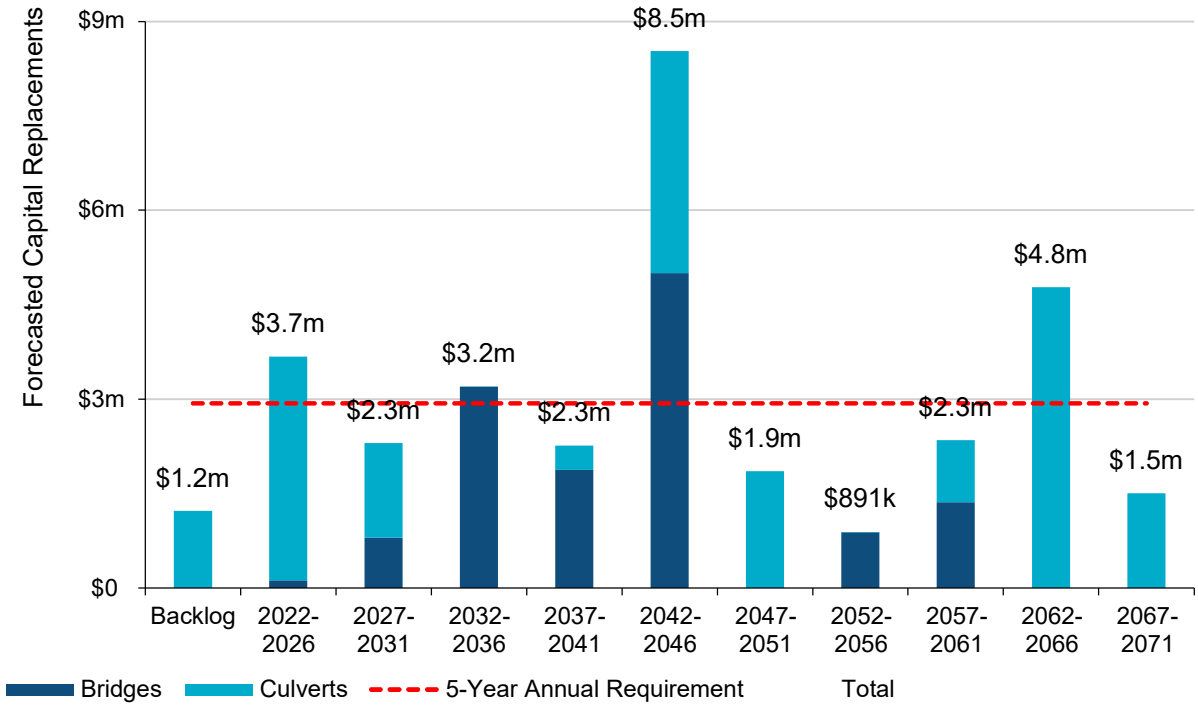
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Maintenance, Rehabilitation and Replacement	All lifecycle activities for structural bridges and culverts are driven by the results of mandated structural inspections competed according to the Ontario Structure Inspection Manual (OSIM).
	Lifecycle activities for non-structural culverts (with a span of less than 3 meters) are conducted as needed based on visual inspections by internal staff. Maintenance activities may include cleaning and clearing of large obstacles. Replacement of culverts is based on asset condition, asset criticality, and funding available.

5.3.1 Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Municipality should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 50 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average annual capital requirements.



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.

5.4 Risk & Criticality

5.4.1 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 2021 inventory data.

This is a high-level model developed for the purposes of this AMP and Municipality 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	Replacement Cost

The identification of critical assets allows the Municipality 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.

5.4.2 Risks to Current Asset Management Strategies

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

Aging Infrastructure & Capital Funding Strategies

The Municipality has a large inventory of bridges which require regular maintenance and assessment. Many of the bridges and culverts are beyond the expected useful life and are in poor condition. Staff capacity and expertise are sometimes insufficient to deploy optimal maintenance and assessment strategies. Major capital rehabilitation projects for bridges and culverts may also be deferred depending on the availability of grant funding opportunities. A long-term capital funding strategy can reduce dependency on grant funding and help prevent deferral of necessary capital works.

5.5 Levels of Service

The following tables identify the Municipality'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 Municipality has selected for this AMP.

5.5.1 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 (2020)
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. Two of the Municipality'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	See Appendix C

5.5.2 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 (2020)
Scope	% of bridges in the Municipality with loading or dimensional restrictions	4.9%
Quality	Average bridge condition index value for bridges in the Municipality	37%
	Average bridge condition index value for structural culverts in the Municipality	35%
Performance	Capital re-investment rate	0.1%

5.6 Recommendations

Data Review/Validation

- 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 Municipality 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 Municipality 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 Stormwater Network

The Municipality is responsible for owning and maintaining a stormwater network of storm mains, catch basins, cross culverts and other supporting infrastructure.

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

Replacement Cost	Condition	Financial Capacity	
$2.4 million	Fair (65%)	Annual Requirement:	$54,000
		Funding Available:	$2,000
		Annual Deficit:	$52,000

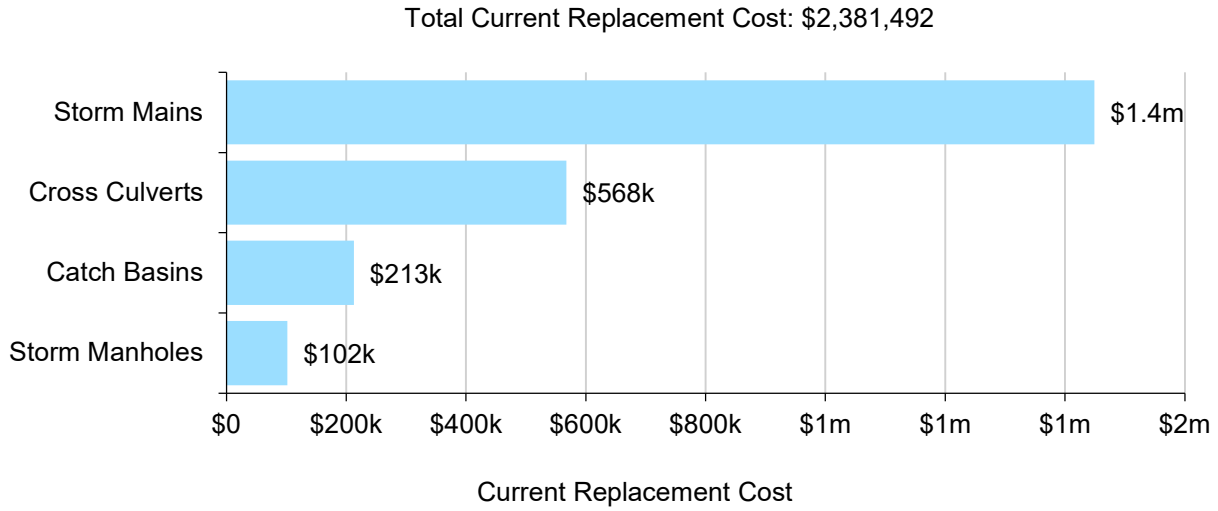
The following core values and level of service statements are a key driving force behind the Municipality's asset management planning:

Service Attribute	Level of Service Statement
Scope	The stormwater network service is available to the whole community in sufficient capacity during the summer and winter seasons. During the spring and fall the stormwater network does not always have sufficient capacity to meet flow demands.
Quality	The stormwater network is in fair condition with minimal unplanned service interruptions and road closures.

6.1 Asset Inventory & Costs

The table below includes the quantity, total replacement cost and annual capital requirements of each asset segment in the Municipality's stormwater network inventory.

Asset Segment	Quantity	Replacement Cost	Annual Capital Requirement
Catch Basins	71	$213,000.00	$2,840.00
Cross Culverts	731 m	$567,829.90	$28,392
Storm Mains[3]	3,099 m	$1,492,662.50	$20,982
Storm Manholes[4]	18	$108,000.00	$1,440
Total		**$2,381,492**	**$53,654**



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

[3] The Municipality owns 109 meters of storms mains with an unknown in-service date; without assessed condition an approximation of age cannot be made.

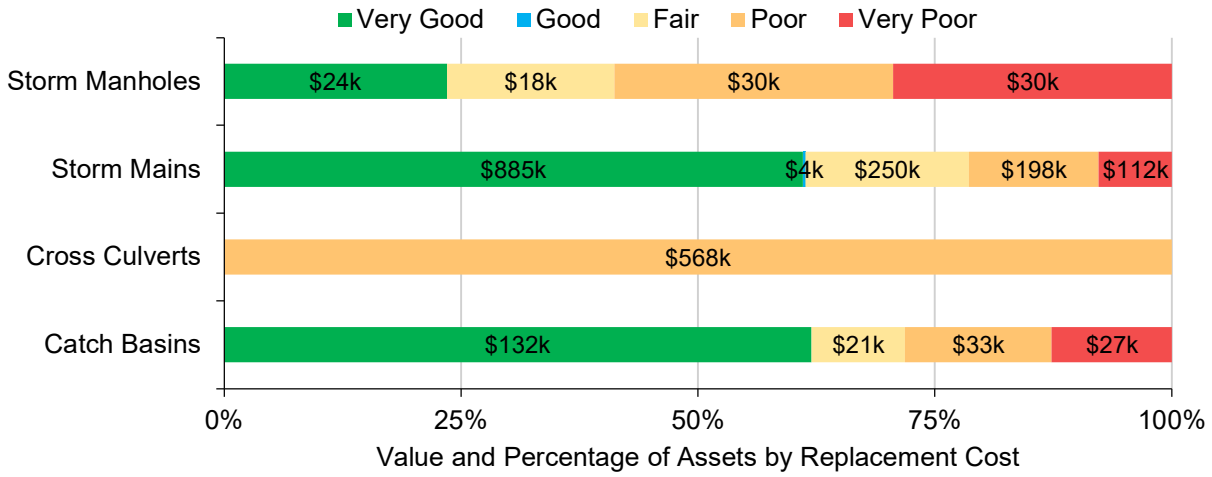
[4] The Municipality owns 1 storm manhole with an unknown in-service date; without assessed condition an approximation of age cannot be made.

6.2 Asset Condition & Age

The table below identifies the current average condition, the average age, and the estimated useful life for each asset segment. The average condition (%) is a weighted value based on replacement cost. Storm mains and manholes rely on assessed condition from a closed-circuit television (CCTV) inspection.

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Condition
Catch Basins	75	N/A	75% (Good)[5]
Cross Culverts	20	13	35% (Poor)
Storm Mains	73	N/A	77% (Good)
Storm Manholes	75	N/A	49% (Fair)
Average			**65% (Fair)**

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



To ensure that the Municipality's stormwater network continues to provide an acceptable level of service, the Municipality 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 stormwater network.

[5] Although in-service dates are unknown for catch basins, staff were able to estimate the condition based on the neighboring pipe condition.

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

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 Municipality's current approach:

- CCTV inspections are conducted every 5-years. Condition ratings are provided following CCTV inspections for all storm mains.
- Catch basins, manholes, and cross culverts are visually assessed on an annual basis and deficiencies are noted to inform short- and long-term financial planning.

In this AMP the following rating criteria is used to determine the current condition of road segments and forecast future capital requirements:

Condition	Rating
Very Good	80-100
Good	60-80
Fair	40-60
Poor	20-40
Very Poor	0-20

6.3 Lifecycle Management Strategy

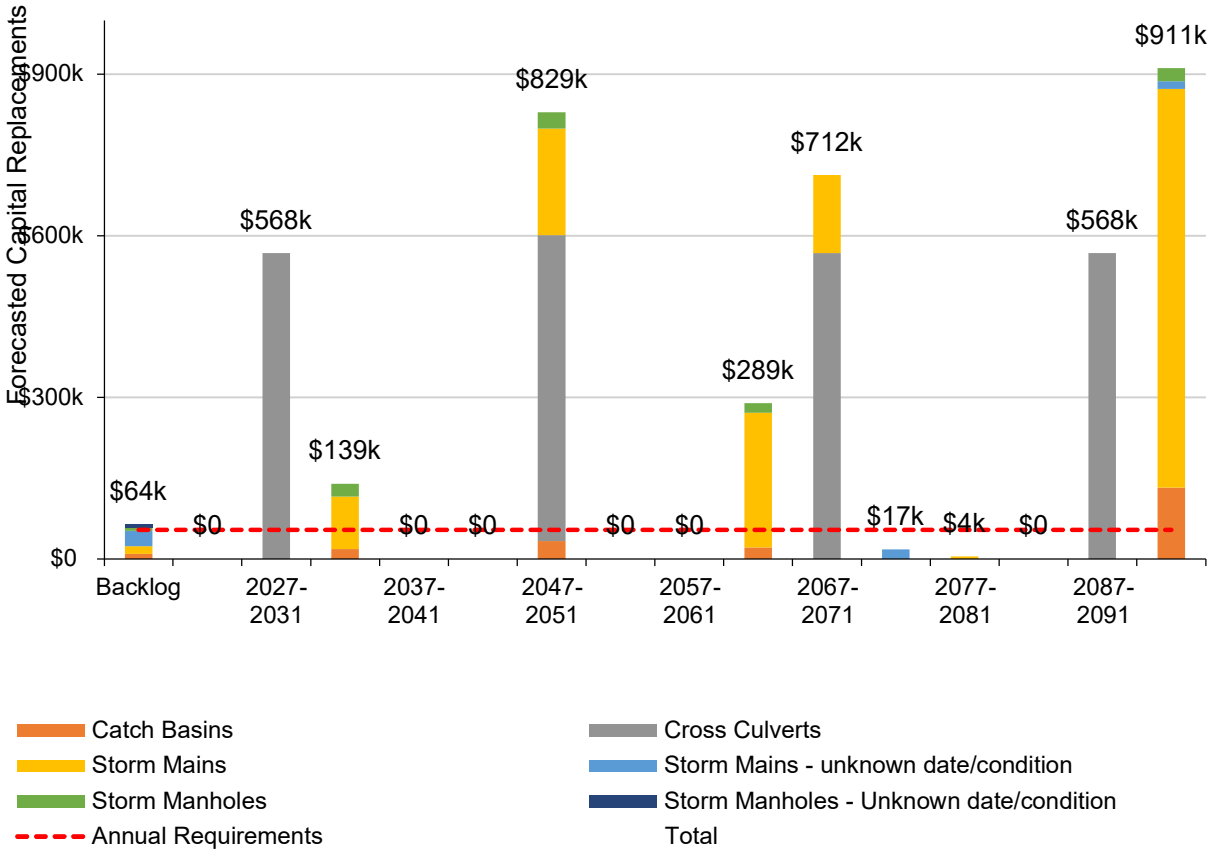
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Maintenance	Flushing of the storm mains takes place every 5 years in coordination with the CCTV inspections.
	Catch basins and manholes are cleaned every 5 years or more frequently when possible.
Rehabilitation	Trenchless re-lining has the potential to reduce total lifecycle costs but would require a formal condition assessment program to determine viability.
Replacement	Replacement activities are based on a multitude of factors, including asset condition, asset criticality, and funding available.

6.3.1 Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Municipality should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 75 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average annual capital requirements.



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.

6.4 Risk & Criticality

6.4.1 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 2021 inventory data.

This is a high-level model developed for the purposes of this AMP and Municipality 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 stormwater network are documented below:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition	Replacement Cost (Financial)

The identification of critical assets allows the Municipality 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.

6.4.2 Risks to Current Asset Management Strategies

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

Climate Change & Extreme Events

The stormwater network does not have capacity to withstand major precipitation events, particularly during the spring. There is higher runoff in some areas, believed to be caused by urbanization and a clogged system. Additional information will help address concerns with system capacity and the ability of the stormwater network to handle any potential increase in the intensity, frequency, and duration of rainfall events. Incorporating a monitoring and maintenance program for all stormwater infrastructure into the asset management plan can further support infrastructure resiliency and reduce risk.

Capital Funding Strategies

Many of the assets in the stormwater network are beyond the expected useful life. Staff capacity is sometimes insufficient to deploy optimal maintenance and assessment strategies. Major capital rehabilitation projects may also be deferred depending on the availability of grant funding opportunities. A long-term capital funding strategy can reduce dependency on grant funding and help prevent deferral of necessary capital works.

6.5 Levels of Service

The following tables identify the Municipality's current level of service for the stormwater 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 Municipality has selected for this AMP.

6.5.1 Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2020)
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 stormwater system	See Appendix C

6.5.2 Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2020)
Scope	% of properties in municipality resilient to a 100-year storm	25%[6]
	% of the municipal stormwater management system resilient to a 5-year storm	50%[7]
Performance	Capital reinvestment rate	0.1%

[6] This is based on the observations of municipal staff.
[7] This is based on the observations of municipal staff.

6.6 Recommendations

Inventory

- The stormwater inventory has been developed by relying on third-party assessment records, verified by staff. However, there may be some underground assets that are unknown. Future efforts should identify the full scope of the stormwater network.

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 stormwater network through CCTV and visual inspections. Catch basins have not been assessed in this AMP, although estimates have been made by considering neighboring infrastructure. Going forward, the condition assessment program should evaluate the performance and structural adequacy of catch basins.
- Continue to gather condition data through CCTV inspections and upload the information into Citywide to improve lifecycle management strategies.

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 stormwater 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 Municipality 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 Buildings

The Municipality of Powassan owns and maintains several buildings and recreation centres that provide key services to the community. These include:

- administrative offices
- public library
- fire stations and associated offices and facilities
- public works garages and storage sheds
- senior building and community centre

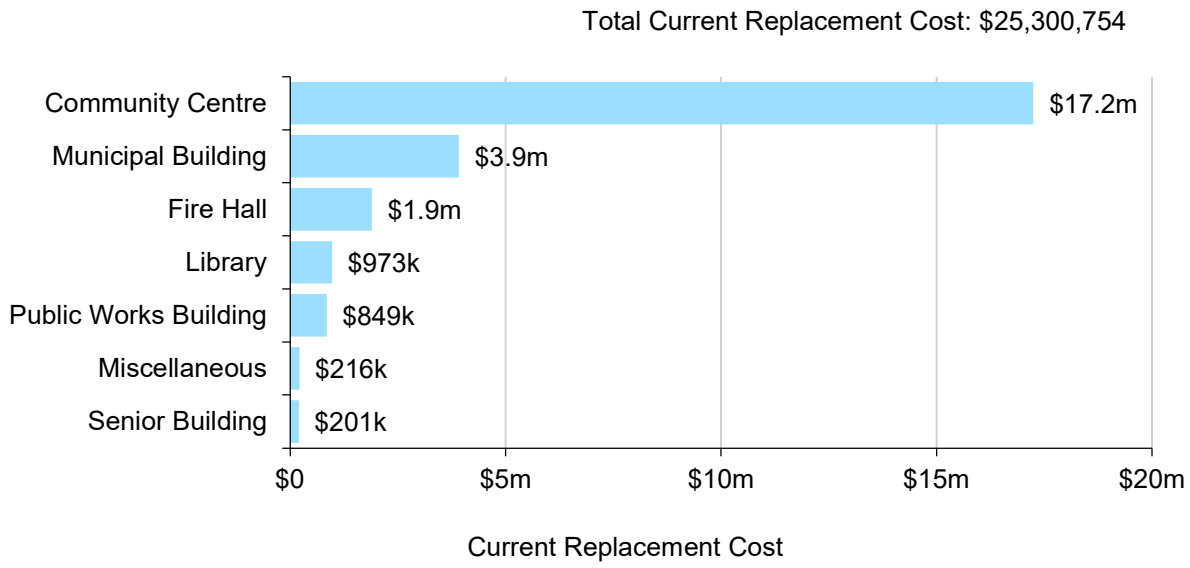
The state of the infrastructure for the buildings is summarized in the following table.

Replacement Cost	Condition	Financial Capacity	
$25.2 million	Poor (32%)	Annual Requirement:	$812,000
		Funding Available:	$12,000
		Annual Deficit:	$800,000

7.1 Asset Inventory & Costs

The table below includes the quantity, total replacement cost and annual capital requirements of each asset segment in the Municipality's buildings inventory.

Asset Segment	Quantity (Component)	Replacement Cost	Annual Capital Requirement
Community Centre	5 (13)	$17,247,218	$616,423.02
Fire Hall	2	$1,897,911	$45,761.22
Library	1	$972,958	$23,410.07
Miscellaneous	3	$216,386	$7,803.05
Municipal Building	2 (5)	$3,915,995	$97,899.88
Public Works Building	3	$849,353	$16,912.33
Senior Building	1	$200,933	$4,018.66
Total		**$25,300,754**	**$812,228.23**



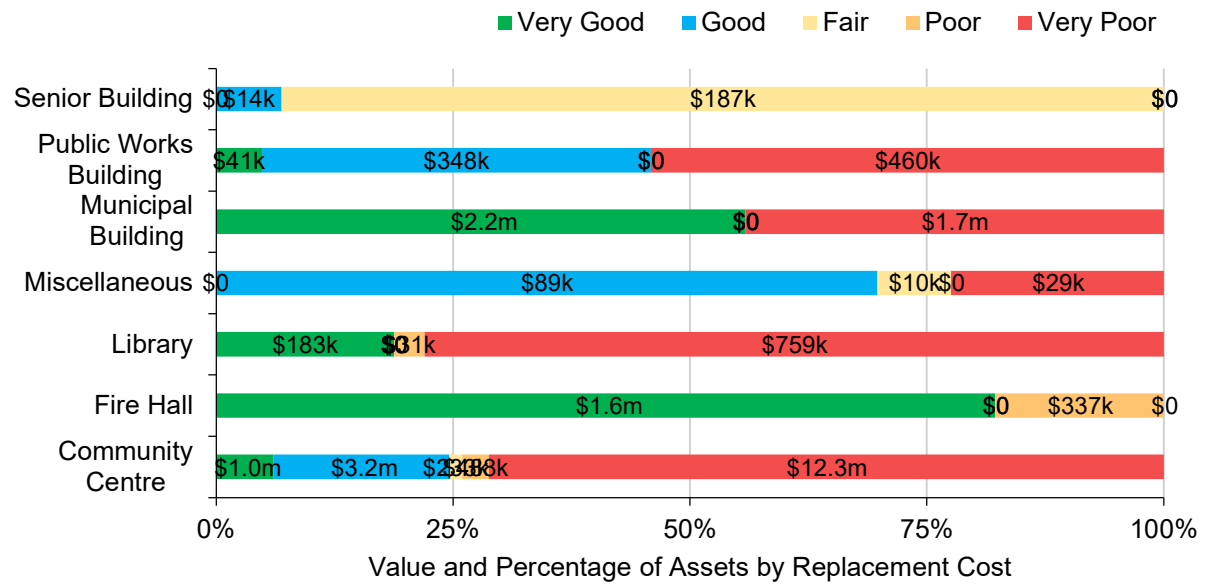
Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

7.2 Asset Condition & Age

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

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Condition
Community Centre	35	38.2	21% (poor)
Fire Hall	42	9.0	81% (Very Good)
Library	45	32.5	33% (poor)
Miscellaneous	19	12.6	52% (Fair)
Municipal Building	41	25.3	51% (Fair)
Public Works Building	45	30.9	34% (poor)
Senior Building	50	27.8	44% (Fair)
Average			**32% (poor)**

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



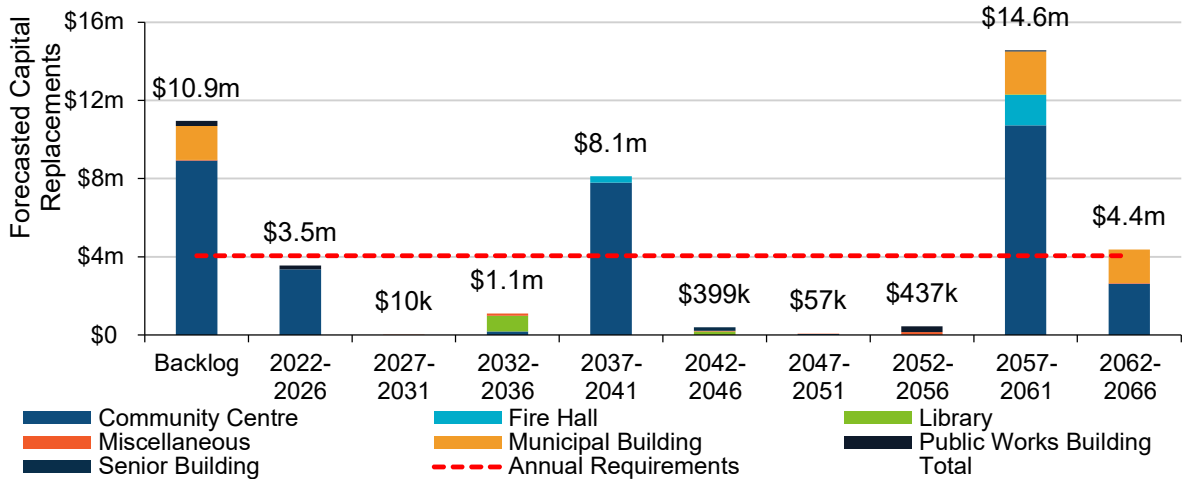
Building conditions are predominantly based on asset age, to better forecast capital improvements, condition assessments should be conducted.

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

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

7.3 Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Municipality should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 50 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average annual capital requirements.



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.

7.4 Asset Management Strategies

The documentation of lifecycle management strategies, current levels of service, and risk are critical to the development of a comprehensive asset management program. These components of the asset management plan support effective short- and long-term capital planning and contribute to more proactive asset management practices, thus extending the estimated useful life of many assets and providing a higher level of service.

In accordance with O. Reg. 588/17, the Municipality will continue to gather data and information in order to detail and review the lifecycle management strategies, levels of service, and risk of all non-core asset categories by July 1, 2024.

7.5 Recommendations

Asset Inventory

- The Municipality's asset inventory contains a single record for most buildings. 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.

Replacement Costs

- The majority of replacement costs are based on insurance appraisals. Although more accurate than simply inflating historical costs, these appraisals may not account for costs associated with the full scope of work to replace a facility. The Municipality should work towards identifying true market values for each facility.

Condition Assessment Strategies

- The Municipality should implement regular condition assessments for all facilities to better inform 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 Municipality 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:

- fire rescue vehicles to provide emergency services
- garbage trucks to deliver solid waste management services
- pick-up trucks to support the maintenance of the transportation network and address service requests for municipal parks
- trucks and plows to enable winter maintenance such as snow removal and sand spreading

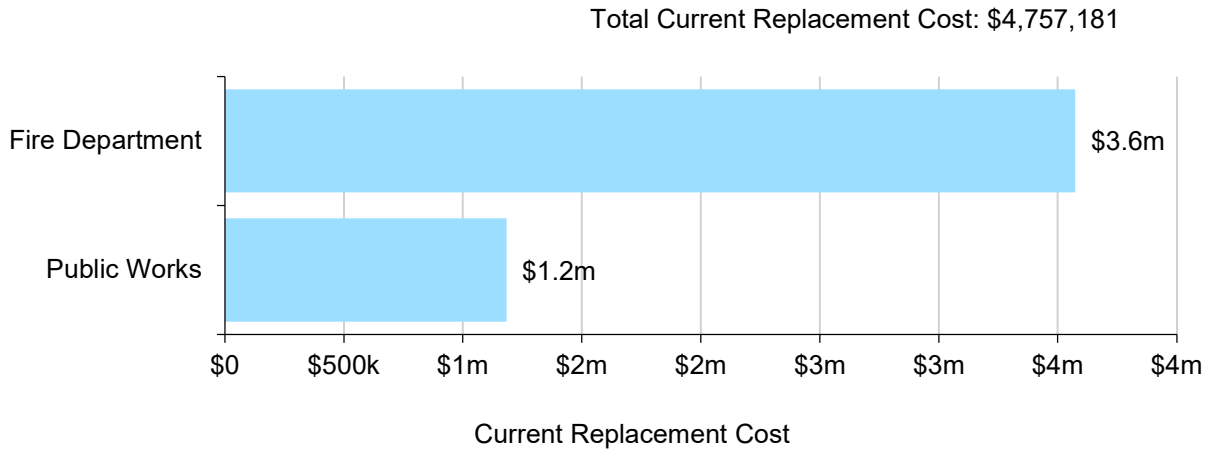
The state of the infrastructure for the vehicles is summarized in the following table.

Replacement Cost	Condition	Financial Capacity	
$4.8 million	Good (70%)	Annual Requirement:	$253,000
		Funding Available:	$7,000
		Annual Deficit:	$246,000

8.1 Asset Inventory & Costs

The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the Municipality's vehicles.

Asset Segment	Quantity	Replacement Cost	Annual Capital Requirement
Fire Department	11	$3,573,847	$166,702
Public Works	10	$1,183,334	$86,573
Total		**$4,757,181**	**$253,275**



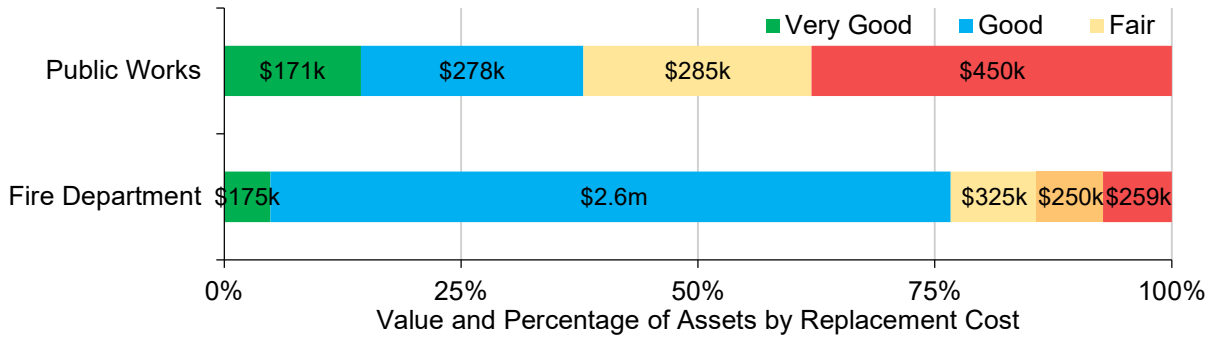
Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

8.2 Asset Condition & Age

The table below identifies the current average condition and source of available condition data for each asset segment. The average condition (%) is a weighted value based on replacement cost.

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Condition
Fire Department	24	15.9	70%
Public Works	14	13.8	55%
Average			**66%**

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

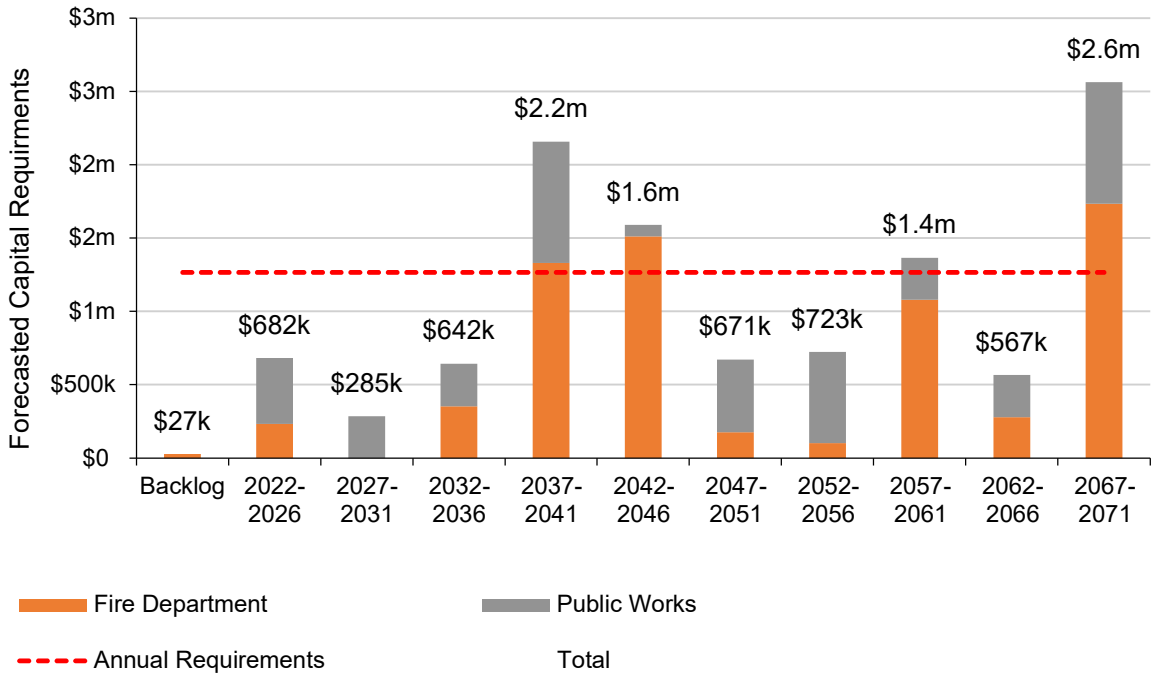


To ensure that the Municipality's vehicles continue to provide an acceptable level of service, the Municipality should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of maintenance,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

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

8.3 Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Municipality should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 50 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average annual capital requirements.



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.

8.4 Asset Management Strategies

The documentation of lifecycle management strategies, current levels of service, and risk are critical to the development of a comprehensive asset management program. These components of the asset management plan support effective short- and long-term capital planning and contribute to more proactive asset management practices, thus extending the estimated useful life of many assets and providing a higher level of service.

In accordance with O. Reg. 588/17, the Municipality will continue to gather data and information in order to detail and review the lifecycle management strategies, levels of service, and risk of all non-core asset categories by July 1, 2024.

8.5 Recommendations

Replacement Costs

- Continue to 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 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 Municipality 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

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

- Office and library equipment such as computers and furniture
- Machinery required for arena maintenance
- Landscaping equipment to maintain public parks
- Fire equipment to support the delivery of emergency services
- Plows and sand spreader to provide winter maintenance activities

Keeping machinery and equipment in an adequate state of repair is important to maintain a high level of service.

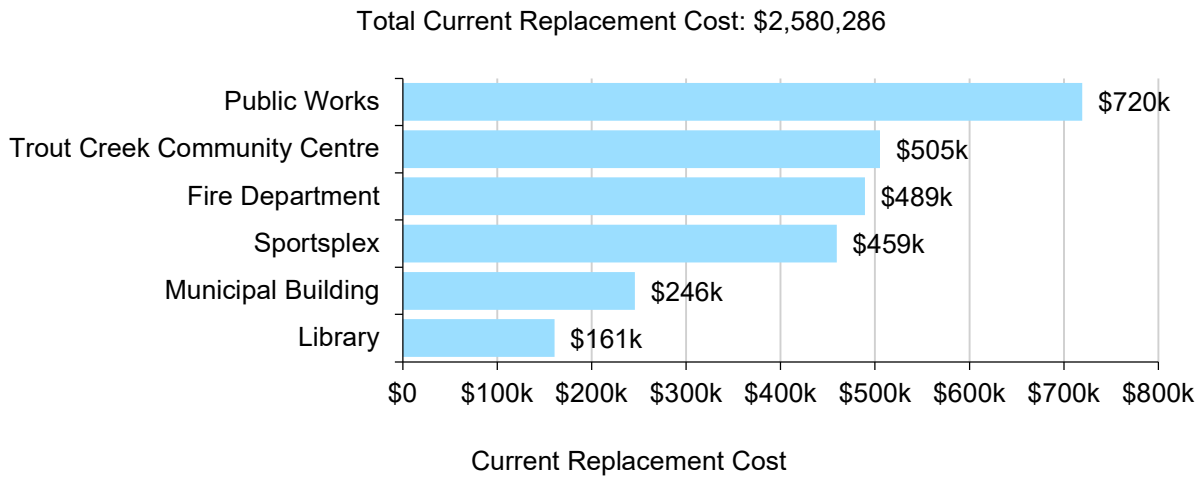
The state of the infrastructure for the machinery and equipment is summarized in the following table.

Replacement Cost	Condition	Financial Capacity	
$2.4 million	Fair (51%)	Annual Requirement:	$189,000
		Funding Available:	$6,000
		Annual Deficit:	$183,000

9.1 Asset Inventory & Costs

The table below includes the quantity, total replacement cost and annual capital requirements of each asset segment in the Municipality's machinery and equipment inventory.

Asset Segment	Quantity	Replacement Cost	Annual Capital Requirement
Fire Department	130	$489,353	$30,702
Library	53	$160,659	$23,138
Municipal Building	9	$245,920	$35,104
Public Works	15	$719,549	$51,557
Sportsplex	16	$459,452	$29,876
Trout Creek Community Centre	15	$505,353	$28,533
Total		**$2,580,286**	**$198,910**



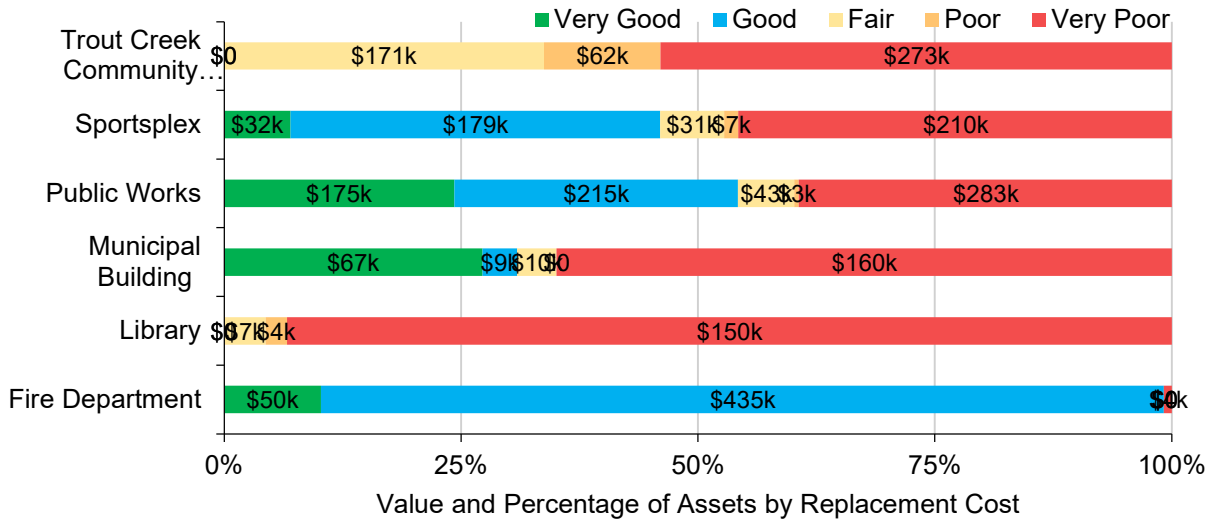
Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

9.2 Asset Condition & Age

The table below identifies the current average condition and source of available condition data for each asset segment. The average condition (%) is a weighted value based on replacement cost.

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Condition
Fire Department	17	8.8	81%
Library	7	19.2	4%
Municipal Building	9	10.3	33%
Public Works	12	9.5	67%
Sportsplex	19	9.2	50%
Trout Creek Community Centre	19	18.6	28%
Average			**81%**

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

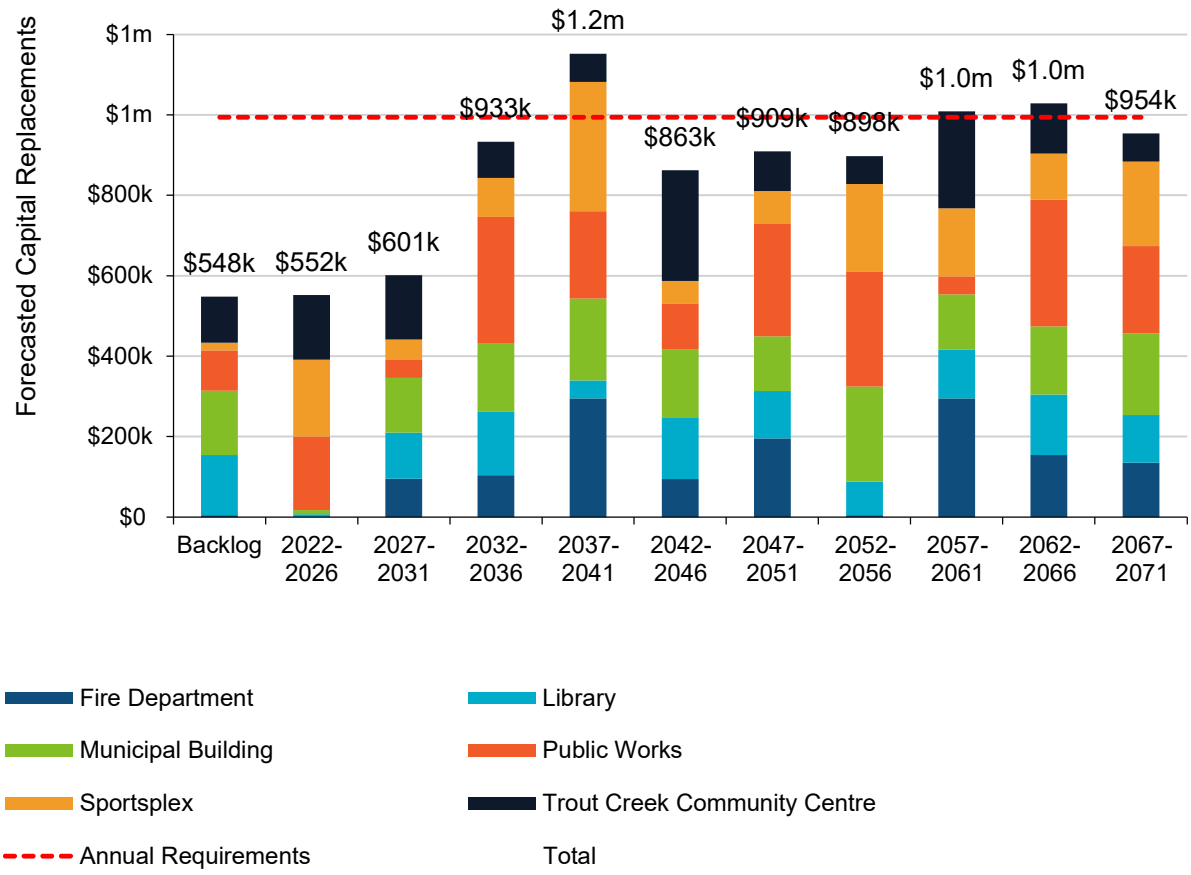


To ensure that the Municipality's machinery and equipment continues to provide an acceptable level of service, the Municipality should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination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

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

9.3 Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Municipality should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 50 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average annual capital requirements.



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.

9.4 Asset Management Strategies

The documentation of lifecycle management strategies, current levels of service, and risk are critical to the development of a comprehensive asset management program. These components of the asset management plan support effective short- and long-term capital planning and contribute to more proactive asset management practices, thus extending the estimated useful life of many assets and providing a higher level of service.

In accordance with O. Reg. 588/17, the Municipality will continue to gather data and information in order to detail and review the lifecycle management strategies, levels of service, and risk of all non-core asset categories by July 1, 2024.

9.5 Recommendations

Replacement Costs

- Continue to 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 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 Municipality 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 Municipality of Powassan owns a small number of assets that are considered land improvements. This category includes:

- Playground equipment
- Fencing and sheds
- Pool facilities and other miscellaneous assets

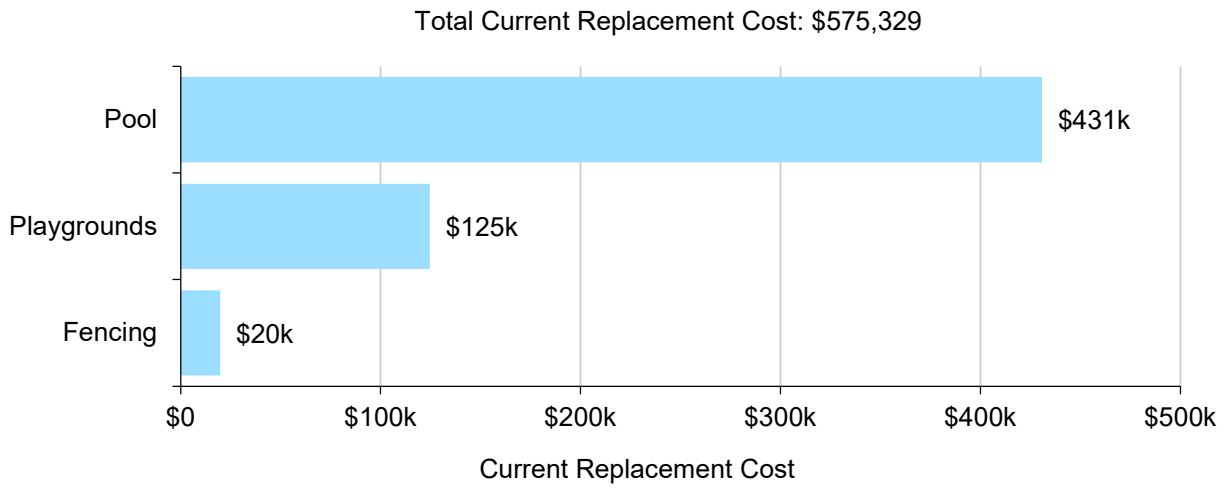
The state of the infrastructure for the land improvements is summarized in the following table.

Replacement Cost	Condition	Financial Capacity	
$575,000	Poor (27%)	Annual Requirement:	$21,000
		Funding Available:	$1,000
		Annual Deficit:	$20,000

10.1 Asset Inventory & Costs

The table below includes the quantity, total replacement cost and annual capital requirements of each asset segment in the Municipality's land improvements inventory.

Asset Segment	Quantity	Replacement Cost	Annual Capital Requirement
Fencing	1	$19,847	$1,985
Playgrounds	6	$124,643	$10,831
Pool	3	$430,838	$8,617
Landfill	1	N/A[8]	
Total		**$575,329**	**$21,433**



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

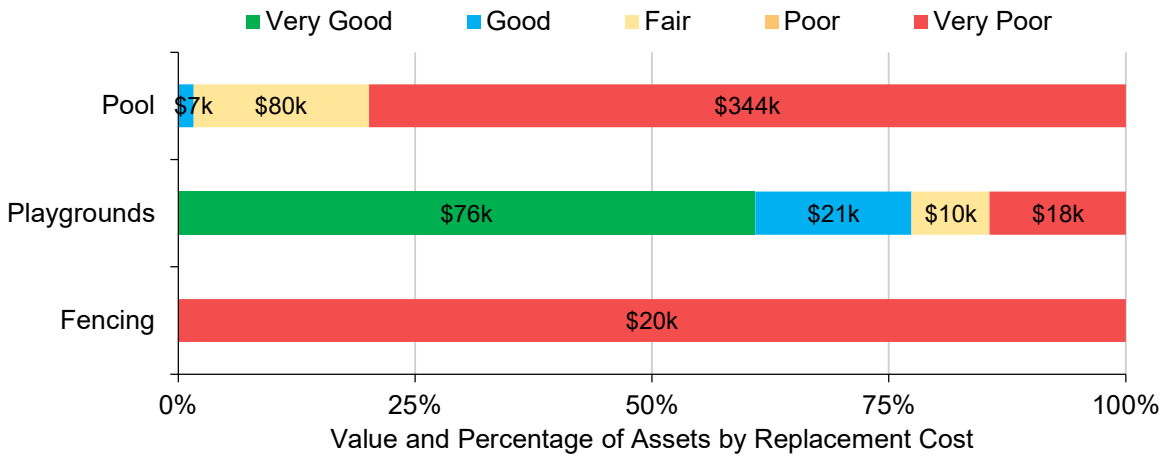
[8] The Municipality owns a landfill with an unknown number of assets with an unknown value.

10.2 Asset Condition & Age

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

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Condition
Fencing	10	27.0	0%
Playgrounds	12	9.0	65%
Pool	50	41.2	18%
Average			**27%**

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

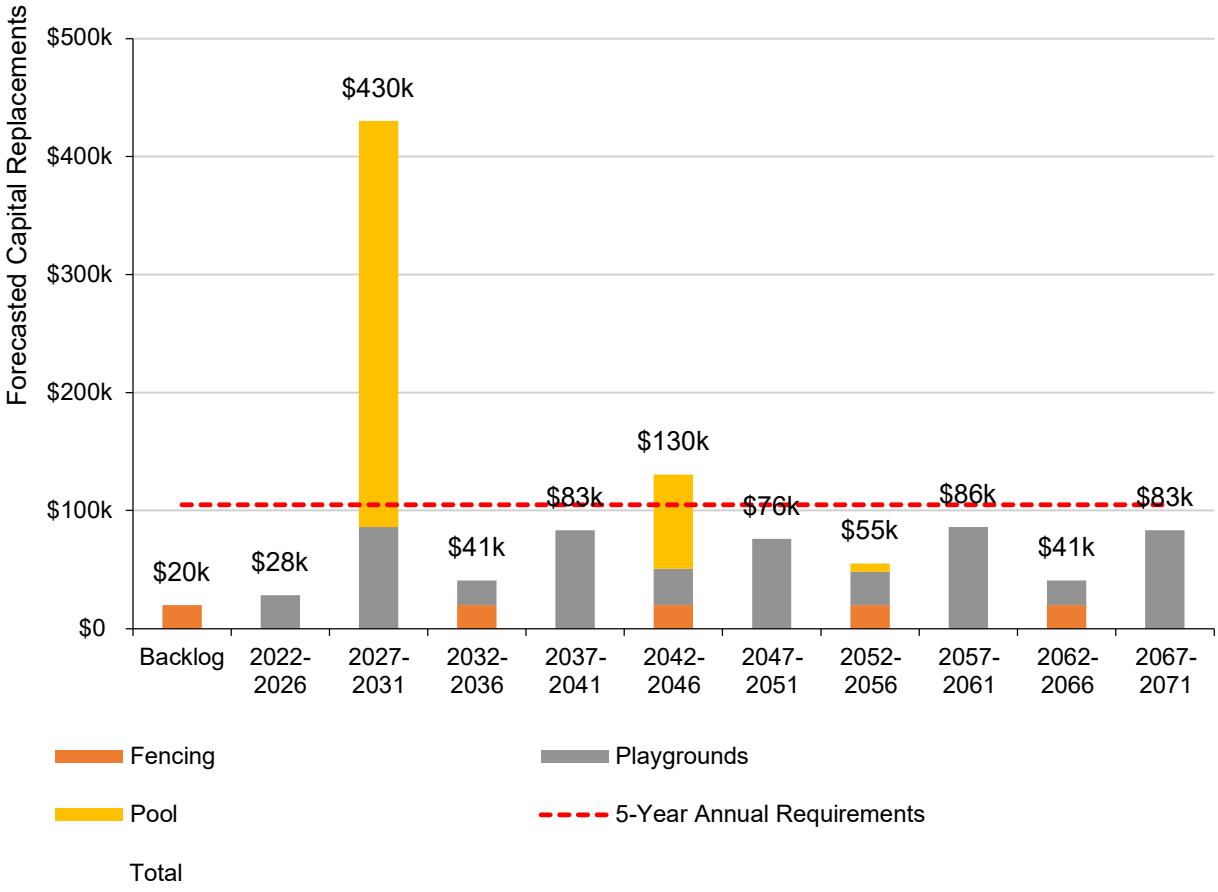


To ensure that the Municipality's land improvements continue to provide an acceptable level of service, the Municipality should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of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

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

10.3 Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Municipality should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 50 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average annual capital requirements.



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.

10.4 Asset Management Strategies

The documentation of lifecycle management strategies, current levels of service, and risk are critical to the development of a comprehensive asset management program. These components of the asset management plan support effective short- and long-term capital planning and contribute to more proactive asset management practices, thus extending the estimated useful life of many assets and providing a higher level of service.

In accordance with O. Reg. 588/17, the Municipality will continue to gather data and information in order to detail and review the lifecycle management strategies, levels of service, and risk of all non-core asset categories by July 1, 2024.

10.5 Recommendations

Asset Inventory

- There is little information related to the landfill. Capacity assessments should be consulted to estimate the condition and remaining useful life. The cost of closure, and other retirement obligations, as well as related costs for acquiring and opening a new landfill; should be considered to determine a suitable replacement cost.

Replacement Costs

- Continue to 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 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 Municipality 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 water services provided by the Municipality are managed and operated by OCWA (Ontario Clean Water Association) and municipal staff. The Municipality is responsible for over 9 km of water mains and OCWA manages the water well supply and water reservoir.

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

Replacement Cost	Condition	Financial Capacity	
$8.1 million	Poor (36%)	Annual Requirement:	$202,000
		Funding Available:	$37,000
		Annual Deficit:	$165,000

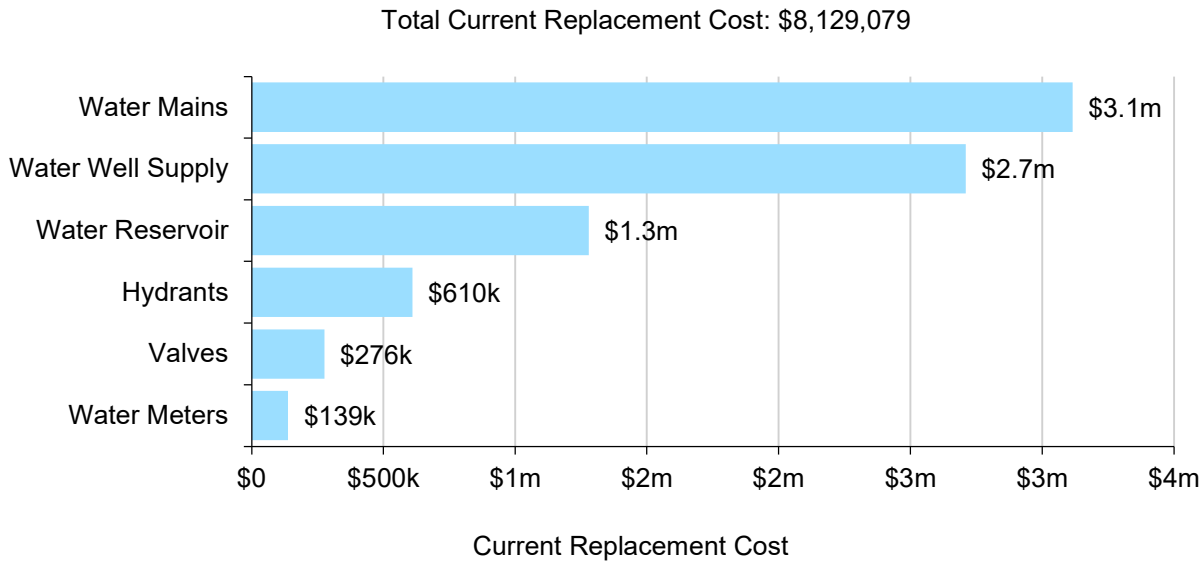
The following core values and level of service statements are a key driving force behind the Municipality's asset management planning:

Service Attribute	Level of Service Statement
Scope	The Municipal water is conveniently accessible to 18.63% of the community in sufficient capacity (does not exceed maximum use). The Municipal fire flow system is accessible via tanker truck to 93.2% of the community in sufficient capacity.
Quality/Reliability	The water network is in poor condition with occasional reports of low water quality, however, there are minimal unplanned service interruptions due to main breaks and boil water advisories.

11.1 Asset Inventory & Costs

The table below includes the quantity, replacement cost method, and annual capital requirements of each asset segment in the Municipality's water network inventory.

Asset Segment	Quantity (Component)	Replacement Cost	Annual Capital Requirement
Hydrants	61	$610,000	$12,200
Valves	92	$276,000	$10,800
Water Mains	9,456 m	$3,115,065	$41,534
Water Meters	433	$138,560	$6,928
Water Reservoir	3	$1,279,219	$40,115
Water Well Supply	3	$2,710,235	$90,341
Total		**$8,129,079**	**$201,919**



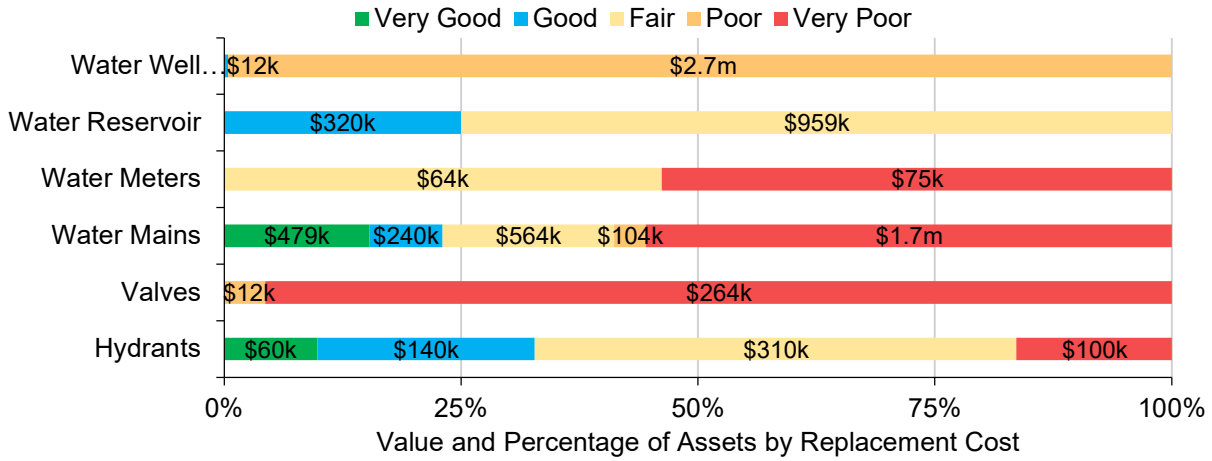
Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

11.2 Asset Condition & Age

The table below identifies the current average condition, the average age, and the estimated useful life for each asset segment. The average condition (%) is a weighted value based on replacement cost. The water well supply had the condition assessed in 2018 by the Well Technician; all other assets rely on age and useful life to determine condition.

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Condition
Hydrants	50	113.1	47%
Valves	26	66.7	1%
Water Mains	75	50.3	33%
Water Meters	20	11.5	21%
Water Reservoir	32	12.9	60%
Water Well Supply	30	39.9	29%
Average			**36%**

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



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

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

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 Municipality's current approach:

- Staff primarily rely on the age, material, pipe size, and breaks per segment of water mains to determine the projected condition of water mains. However, a condition index is yet to be developed.
- Fire hydrants are assessed in accordance with NFPA guidelines.
- The water reservoir and water well supply are inspected by OCWA staff on a regular basis and include a comprehensive annual assessment.

In this AMP the following rating criteria is used to determine the current condition of water network assets and forecast future capital requirements:

Condition	Rating
Very Good	80-100
Good	60-80
Fair	40-60
Poor	20-40
Very Poor	0-20

11.3 Lifecycle Management Strategy

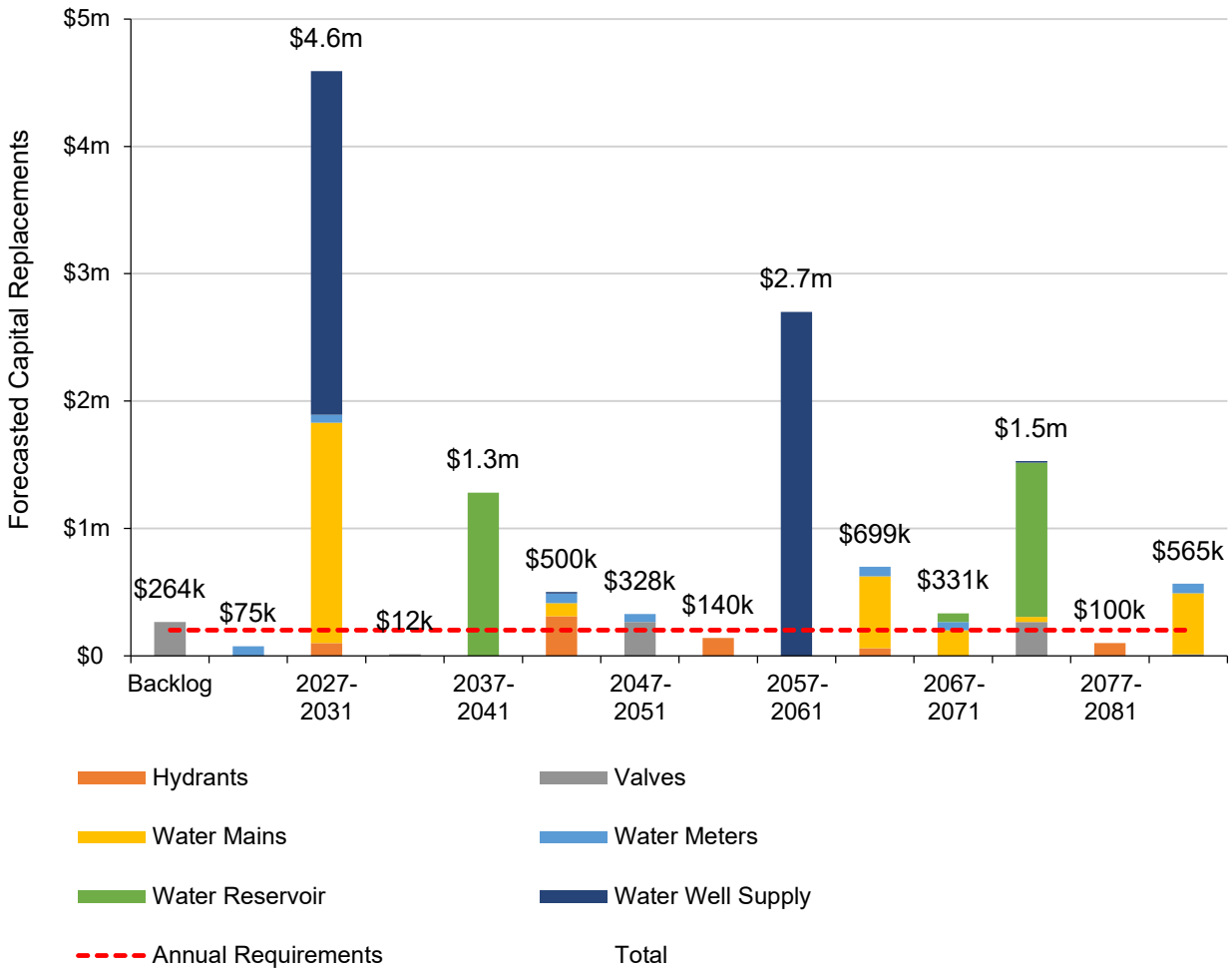
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Maintenance	Main flushing and valve exercises are completed annually using in-house resources.
	Hydrants are flushed following use.
Rehabilitation	Trenchless re-lining of water mains presents significant challenges and is not always a viable option.
Replacement	In the absence of mid-lifecycle rehabilitative events, most mains are simply maintained with the goal of full replacement once it reaches its end-of-life.
	Replacement activities are identified based on an analysis of the main break rate as well as any issues identified during regular maintenance activities. Replacement of underground infrastructure is typically coordinated with above ground asset replacement.

11.3.1 Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Municipality 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 at least one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average annual capital requirements.



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.

11.4 Risk & Criticality

11.4.1 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 2021 inventory data.

This is a high-level model developed for the purposes of this AMP and Municipality 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	Replacement Cost

The identification of critical assets allows the Municipality 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.

11.4.2 Risks to Current Asset Management Strategies

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

Water Quality

The water network includes some dead-end lines and other issues that lead to complaints related to the water quality, and taste and odor. Staff are seeking to identify problem areas and improve the municipal flushing program. Infrastructure upgrades will be prioritized based on asset criticality and water quality.

Capital Funding Strategies

Many of the assets in the water network are beyond the expected useful life. Staff capacity is sometimes insufficient to deploy optimal maintenance and assessment strategies. Major capital rehabilitation projects may also be deferred depending on the availability of grant funding opportunities. A long-term capital funding strategy can reduce dependency on grant funding and help prevent deferral of necessary capital works.

11.5 Levels of Service

The following tables identify the Municipality'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 Municipality has selected for this AMP.

11.5.1 Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2020)
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	The Municipality has not experienced any service interruptions in 2020. The Municipality follows Ontario's Drinking Water Quality Management Standard (DWQMS). The Municipality delivers boil water advisories to affected households.

11.5.2 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 (2020)
Scope	% of properties connected to the municipal water system	18.63%
	% of properties where fire flow is available	93.2%
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	0.5%

11.6 Recommendations

Replacement Costs

- Only half of the asset inventory has accurate and up-to-date replacement costs. 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.
- It can be challenging to gather assessed condition for watermains. Consider developing a condition index using age, material, soil type, history of main breaks, etc.

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 Municipality 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 Wastewater Network

The wastewater services provided by the Municipality are managed and operated by OCWA and municipal staff. The Municipality is responsible for over 7 km of wastewater mains and OCWA manages the lagoons and pump stations.

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

Replacement Cost	Condition	Financial Capacity	
$3.8 million	Fair (55%)	Annual Requirement:	$57,000
		Funding Available:	$37,000
		Annual Deficit:	$20,000

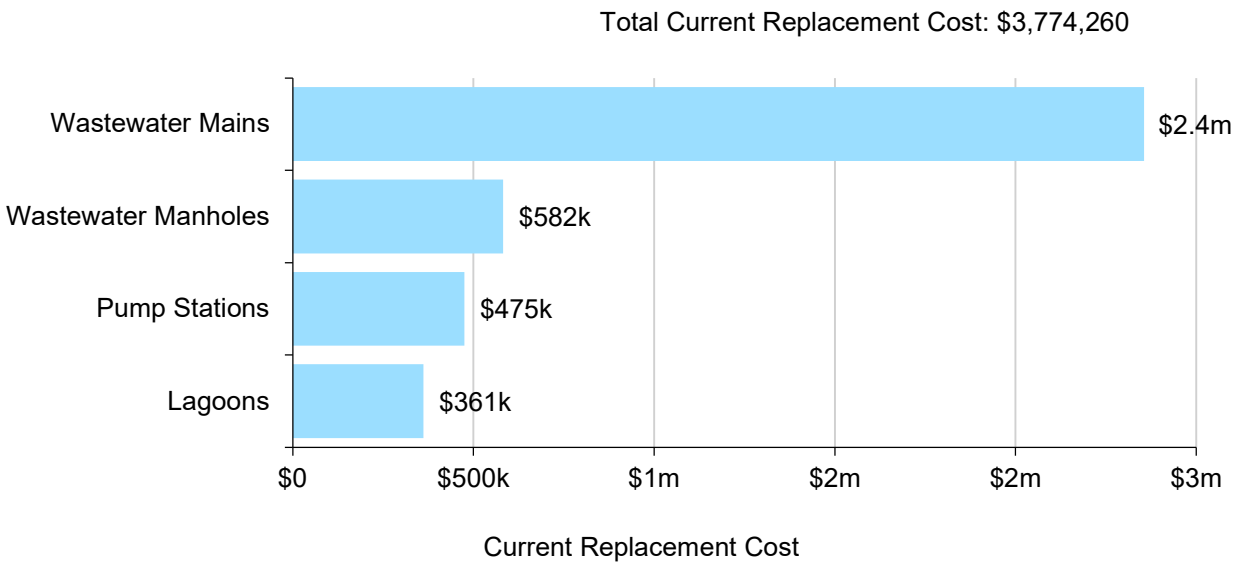
The following core values and level of service statements are a key driving force behind the Municipality's asset management planning.

Service Attribute	Level of Service Statement
Scope	The Municipal wastewater system is accessible to 18.63% of the community in sufficient capacity (does not exceed maximum capacity). The Municipal stormwater system is accessible to the community in sufficient capacity but will likely need expansion in the near future.
Quality/Reliability	The wastewater network is in fair condition with minimal unplanned service interruptions due to backups and effluent violations.

12.1 Asset Inventory & Costs

The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the Municipality's wastewater network inventory.

Asset Segment	Quantity	Replacement Cost	Annual Capital Requirement
Lagoons[9]	3	$361,419	$3,614
Pump Stations	2	$475,073	$14,055
Wastewater Mains	7,064 m	$2,355,767	$31,410
Wastewater Manholes	97	$582,000	$7,760
Total		**$3,774,259**	**$56,839**



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

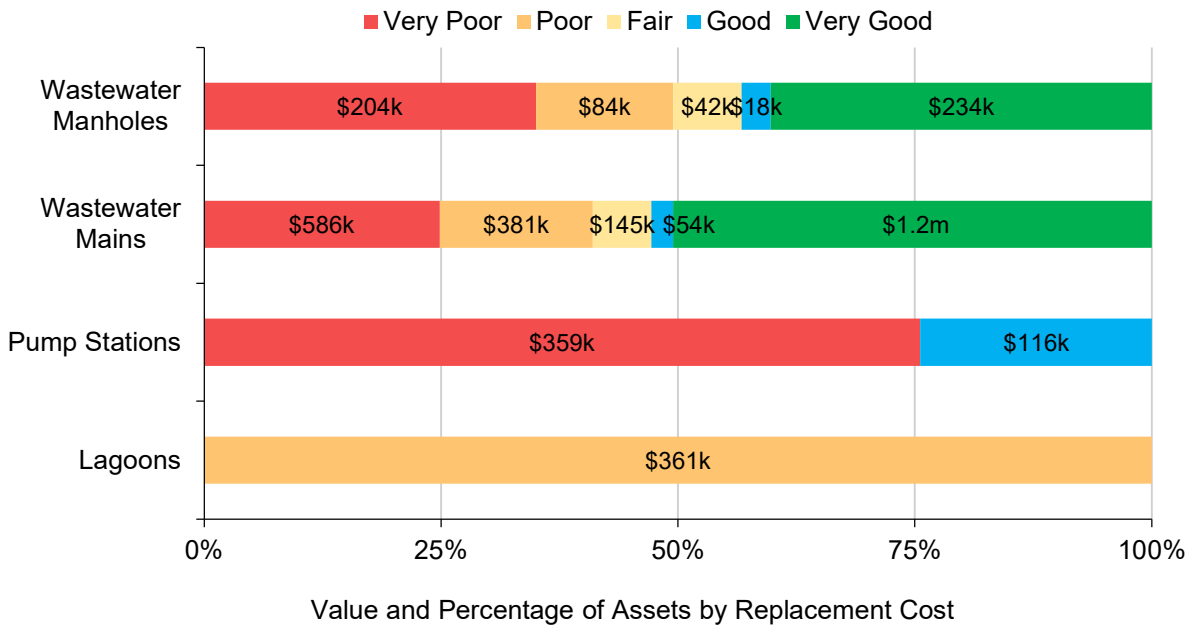
[9] The replacement cost of the lagoon is currently unknown. Instead, the cost to conduct a class EA to upgrade the wastewater treatment facility has been used as a placeholder.

12.2 Asset Condition & Age

The table below identifies the current average condition, the average age, and the estimated useful life for each asset segment. The average condition (%) is a weighted value based on replacement cost. The wastewater mains and manholes have been assessed using CCTV inspections, and the lagoons are approximated by the remaining capacity; other assts rely on age and useful life.

Asset Segment	Estimated Useful Life (Years)	Average Age	Average Condition (%)
Lagoons	100	48.0	40%
Pump Stations	36	35.8	16%
Wastewater Mains	75	122.0	64%
Wastewater Manholes	75	122.0	55%
Average			**55%**

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



To ensure that the Municipality's wastewater network continues to provide an acceptable level of service, the Municipality 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 wastewater network.

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

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 Municipality's current approach:

- CCTV inspections are completed for wastewater mains. The Municipality receives video footage and asset condition ratings that are used to support short- and long-term financial planning.
- The lagoons and pumping stations are inspected by OCWA staff on a regular basis which includes a comprehensive annual assessment.

In this AMP the following rating criteria is used to determine the current condition of sewer network assets and forecast future capital requirements:

Condition	Rating
Very Good	80-100
Good	60-80
Fair	40-60
Poor	20-40
Very Poor	0-20

12.3 Lifecycle Management Strategy

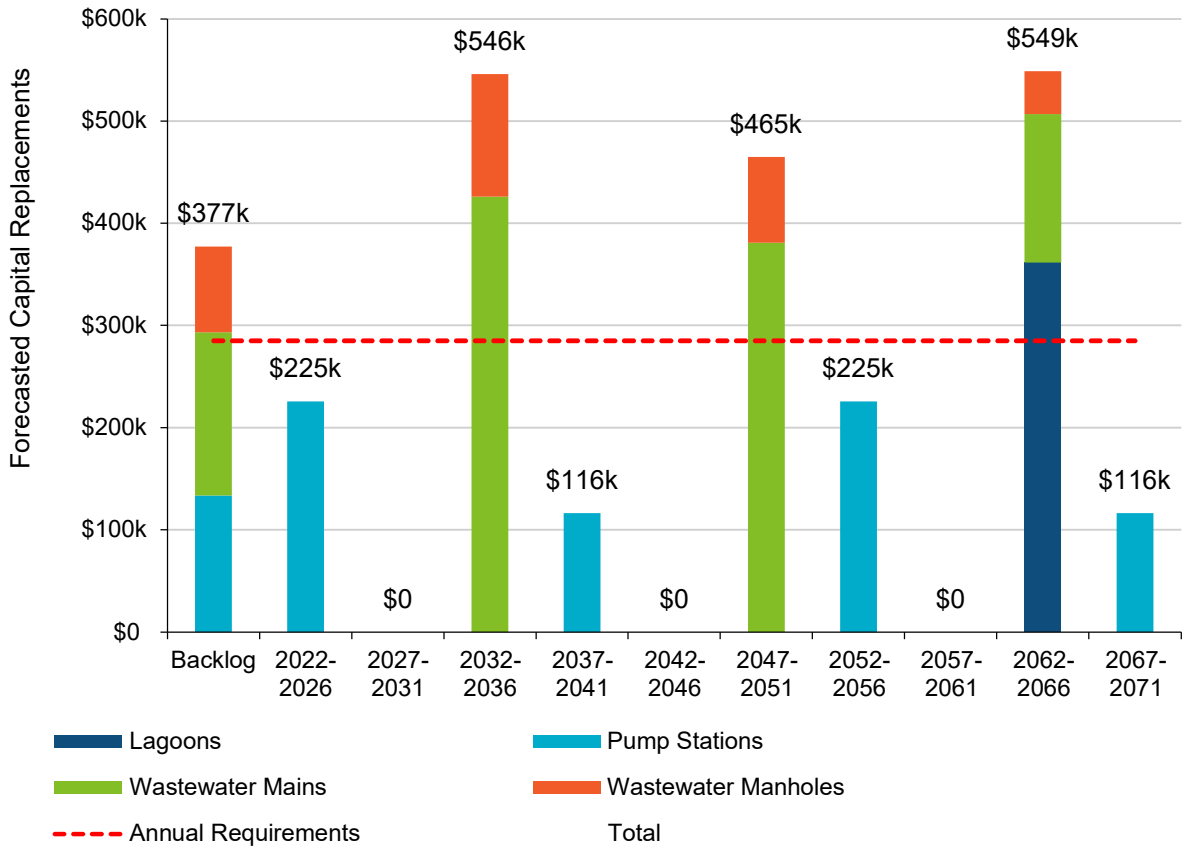
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Maintenance	Main flushing is completed on an annual basis using contracted services.
	Lagoons are dredged every 10 years.
Rehabilitation	Mid-scale trenchless re-lining of wastewater mains has been conducted in the past, but it is not a common practice.
Replacement	In the absence of mid-lifecycle rehabilitative events, most mains are simply maintained with the goal of full replacement once it reaches its end-of-life.
	Replacement activities are identified based on an analysis of the plug/back-up events as well as any issues identified during regular maintenance activities.

12.3.1 Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Municipality should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 75 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average annual capital requirements.



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.

12.4 Risk & Criticality

12.4.1 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 2021 inventory data.

This is a high-level model developed for the purposes of this AMP and Municipality 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 wastewater network are documented below:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition	Replacement Cost (Financial)

The identification of critical assets allows the Municipality 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.

12.4.2 Risks to Current Asset Management Strategies

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

System Capacity & Growth

The wastewater system cannot keep up with the current flow, causing bypasses at the pumping stations. System capacity issues are possibly the result of growth, inflow and infiltration, and illegal connections. The Municipality will conduct smoke tests and other strategies to identify problem areas. This information will guide prioritization of infrastructure upgrades.

Capital Funding Strategies

Many of the assets in the wastewater network are beyond the expected useful life. Staff capacity is sometimes insufficient to deploy optimal maintenance and assessment strategies. Major capital rehabilitation projects may also be deferred depending on the availability of grant funding opportunities. A long-term capital funding strategy can reduce dependency on grant funding and help prevent deferral of necessary capital works.

12.5 Levels of Service

The following tables identify the Municipality's current level of service for wastewater 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 Municipality has selected for this AMP.

12.5.1 Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2020)
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 Municipality does not own any combined sewers
	Description of the frequency and volume of overflows in combined sewers in the municipal wastewater system that occur in habitable areas or beaches	The Municipality does not own any combined sewers
	Description of how stormwater can get into sanitary sewers in the municipal wastewater system, causing sewage to	Stormwater can enter into 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 (2020)
	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 stormwater infiltration	The Municipality 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 Biochemical oxygen demand. The Environmental Compliance Approval (ECA) identifies the effluent criteria for municipal wastewater treatment plants.

12.5.2 Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2020)
Scope	% of properties connected to the municipal wastewater system	18.63%
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	N/A
	# of connection-days per year having wastewater backups compared to the total number of properties connected to the municipal wastewater system	0
	# of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system	0
Performance	Capital re-investment rate	1.0%

12.6 Recommendations

Condition Assessment Strategies

- Identify condition assessment strategies for high value and high-risk wastewater network assets. Continue to gather condition data through CCTV inspections and upload information into Citywide to better support lifecycle management strategies.

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 wastewater 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 Municipality’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 Municipality 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 Municipality to more effectively plan for new infrastructure, and the upgrade or disposal of existing infrastructure
- Moderate population fluctuation 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 Municipality 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 Powassan Official Plan (November 2005)

The Municipality adopted their Official Plan in 2003 with minister modifications from 2005. The Official Plan is intended to guide decision making with respect to future land use and economic development in the Municipality. The Plan supports the protection of physical and natural resources to provide sustainability.

The Powassan Urban Area represents an opportunity for sustainable growth making use of existing public infrastructure. The Plan states that residential growth is expected at an average of 25 persons per year. The Plan notes that housing is likely sufficient to support expected population growth.

The predictions from the plan align moderately well with census data between 2001 and 2021. The table below shows historical population and housing values and the annual growth figures.

Year	2001	2006	2011	2016	2021
Total Population	3,252	3,309	3,378	3,455	3,346
Annual Population Change	N/A	1.8%	2.1%	2.3%	-3.2%
Total Private Dwellings	N/A	1,382	1,369	1,381	1,381
Annual Private Dwellings Change	N/A	N/A	-0.9	0.9%	0%

The census data indicates steady 2% population growth between 2001 and 2016 with a decline between 2016 and 2021 of around 3%. The number of private dwellings has not changed in the last two decades and according to the 2005 Official Plan the number of vacant households at the time would have been sufficient to withstand the experienced growth between 2001 and 2021.

13.2 Impact of Growth on Lifecycle Activities

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

14 Financial Strategy

Key Insights

- The Municipality is committing approximately $404,000 towards capital projects per year from sustainable revenue sources
- Given the annual capital requirement of $3,253,000, there is currently a funding gap of $2,849,000 annually
- For tax-funded assets, we recommend increasing tax revenues by 2.9% each year for the next 20 years to achieve a sustainable level of funding for capital needs
- For the wastewater network, we recommend increasing rate revenues by 1.1% annually for the next 10 years to achieve a sustainable level of funding for capital needs
- For the water network, we recommend no rate increase for capital needs
- Further revenues may be required to fully fund operating needs

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 Municipality of Powassan 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
3. Use of non-traditional sources of municipal funds:
    a. Reallocated budgets
    b. Partnerships
    c. Procurement methods
4. Use of Senior Government Funds:
    a. Gas tax
    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 Municipality's approach to the following:

1. In order to reduce financial requirements, consideration has been given to revising service levels downward.

2. All asset management and financial strategies have been considered. For example:
    a. If a zero-debt policy is in place, is it warranted? If not, the use of debt should be considered.
    b. 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 Municipality 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 Municipality must allocate approximately $3 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 Municipality's roads. The development of these strategies allows for a comparison of potential cost avoidance if the strategies were to be implemented. The following table compares two scenarios for the road network:

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 Municipality is committing approximately $404,000 towards capital projects per year from sustainable revenue sources. Given the annual capital requirement of $3,043,000, there is currently a funding gap of $2,639,000 annually.

14.2 Funding Objective

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

1. **Tax Funded Assets:** Road Network, Stormwater Network, Bridges & Culverts, Buildings, Machinery & Equipment, Land Improvements Vehicles
2. **Rate-Funded Assets:** Water Network, Wastewater 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, Powassan'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				Annual Deficit
		Taxes	CCBF	OCIF	Total Available	
Road Network	1,068,000	27,000	209,000	45,000	281,000	787,000
Stormwater Network	54,000	1,000			1,000	53,000
Bridges & Culverts	587,000	15,000			15,000	572,000
Buildings	812,000	20,000			20,000	792,000
Machinery & Equipment	199,000	5,000			5,000	194,000
Land Improvements	21,000	1,000			1,000	20,000
Vehicles	253,000	6,000			6,000	247,000
TOTAL	**2,994,000**	**75,000**	**209,000**	**45,000**	**329,000**	**2,665,000**

The average annual investment requirement for the above categories is $2,994,000. Annual revenue currently allocated to these assets for capital purposes is $329,000 leaving an annual deficit of $2.7 million. Put differently, these infrastructure categories are currently funded at 11.0% of their long-term requirements.

14.3.2 Full Funding Requirements

In 2021, Municipality of Powassan has annual tax revenues of $3.3 million. 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
Road Network	23.7%
Stormwater Network	1.6%
Bridges & Culverts	17.3%
Buildings & Facilities	23.9%
Machinery & Equipment	5.9%
Land Improvements	0.6%
Vehicles	7.5%
	80.5%

The following changes in costs and/or revenues over the next number of years should also be considered in the financial strategy:

a) Powassan's formula based OCIF grant is scheduled to remain constant at $100,000
b) Powassan's debt payments for these asset categories will be decreasing by $25,000 over the next 5 years and by $81,000 over the next 10 years. Although not shown in the table, debt payment decreases will be $83,000 and $204,000 over the next 15 and 20 years respectively.

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:

	Without Capturing Changes				With Capturing Changes			
	5 Years	10 Years	15 Years	20 Years	5 Years	10 Years	15 Years	20 Years
Infrastructure Deficit	2,665,000	2,665,000	2,665,000	2,665,000	2,665,000	2,665,000	2,665,000	2,665,000
Change in Debt Costs	N/A	N/A	N/A	N/A	-25,000	-81,000	-83,000	-204,000
Change in OCIF Grants	N/A	N/A	N/A	N/A	0	0	0	0
Resulting Infrastructure Deficit	2,665,000	2,665,000	2,665,000	2,665,000	2,640,000	2,584,000	2,582,000	2,250,000
Tax Increase Required	80.4%	80.4%	80.4%	80.4%	79.6%	77.9%	77.9%	74.2%
Annually	12.6%	6.1%	4.1%	3.0%	12.5%	6.0%	4.0%	2.9%

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 to the infrastructure deficit as outlined above.
b) increasing tax revenue by 2.9% 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) Consider transferring to and from reserves to meet requirements in years where the proposed tax increase would exceed or fail to meet requirements.
d) allocating the current gas tax and OCIF revenue as outlined previously.
e) 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[10].
2. We realize that raising tax revenues by the amounts recommended above for infrastructure purposes will be very 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 capital expenditure 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 a pent-up investment demand of $258,000 for the road network, $589,000 for bridges & culverts, $64,000 for stormwater network, $10,948,000 for the buildings & facilities, $27,000 for vehicles, $548,000 for machinery & equipment, and $20,000 for land improvements.

[10] The Municipality 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.

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 Municipality may consider taking on more debt to reduce the burden on taxes.

14.4 Financial Profile: Rate Funded Assets

14.4.1 Current Funding Position

The following tables show, by asset category, Powassan'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	Annual Funding Available					Annual Deficit
		Rates	To Operations	CCBF	OCIF	Total Available	
Water Network	202,000	380,000	-343,000	0	0	37,000	165,000
Wastewater network	57,000	174,000	-165,000	23,000	5,000	37,000	20,000
	259,000	**1,210,000**	**-1,000,000**	**23,000**	**5,000**	**74,000**	**185,000**

The average annual investment requirement for the above categories is $259,000 Annual revenue currently allocated to these assets for capital purposes is $74,000 leaving an annual deficit of $185,000. Put differently, these infrastructure categories are currently funded at 28.6% of their long-term requirements.

14.4.2 Full Funding Requirements

In 2021, Powassan had annual wastewater revenues of $174,000 and annual water revenues of $380,000. 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	Rate Change Required for Full Funding
Water Network	43.4%
Wastewater network	11.5%

In the following tables, we have expanded the above scenario to present multiple options. Due to the significant increases required, we have provided phase-in options of up to 20 years:

Water Network								
	Without Capturing Changes				With Capturing Changes			
	5 Years	10 Years	15 Years	20 Years	5 Years	10 Years	15 Years	20 Years
Infrastructure Deficit	165,000	165,000	165,000	165,000	165,000	165,000	165,000	165,000
Change in Debt Costs	N/A	N/A	N/A	N/A	-173,000	-173,000	-173,000	-173,000
Resulting Infrastructure Deficit	**165,000**	**165,000**	**165,000**	**165,000**	**-8,000**	**-8,000**	**-8,000**	**-8,000**
Tax Increase Required	43.4%	43.4%	43.4%	43.4%	0%	0%	0%	0%
Annually	**7.5%**	**3.7%**	**2.5%**	**1.9%**	**0%**	**0%**	**0%**	**0%**

Wastewater Network								
	Without Capturing Changes				With Capturing Changes			
	5 Years	10 Years	15 Years	20 Years	5 Years	10 Years	15 Years	20 Years
Infrastructure Deficit	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
Change in Debt Costs	N/A	N/A	N/A	N/A	0	0	0	0
Resulting Infrastructure Deficit	**20,000**	**20,000**	**20,000**	**20,000**	**20,000**	**20,000**	**20,000**	**20,000**
Tax Increase Required	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%
Annually	**2.2%**	**1.1%**	**0.8%**	**0.6%**	**2.2%**	**1.1%**	**0.8%**	**0.6%**

14.4.3 Financial Strategy Recommendations

Considering all of the above information, we recommend the 5-year option for the water network, & the 10-year option for the wastewater network. This involves full funding being achieved over the phase-in period by:

a) when realized, reallocating the debt cost reductions to the infrastructure deficit as outlined above.

b) no annual rate revenue increases are required for the purpose of phasing in full funding for the water network.
c) increasing rate revenues by 1.1% for wastewater services each year for the next 10 years.
d) these rate revenue increases are solely for the purpose of phasing in full funding to the respective asset categories covered in this AMP.
e) 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. This periodic funding should not be incorporated into an AMP unless there are firm commitments in place.
2. We realize that raising rate revenues for infrastructure purposes will be very difficult to do. However, considering a longer phase-in window may have even greater consequences in terms of infrastructure failure.
3. Any increase in rates required for operations would be in addition to the above recommendations.

Although this strategy achieves full capital expenditure funding for rate-funded assets over 10 years, the recommendation does require prioritizing capital projects to fit the annual funding available. Current data shows a pent-up investment demand of $264,000 for the water network and $377,000 for the wastewater network.

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 Municipality may consider taking on more debt to reduce the burden on rate requirements.

14.5 Use of Debt

For reference purposes, the following table outlines the premium paid on a project if financed by debt. For example, a $1M project financed at 3.0%[11] over 15 years would result in a 26% premium or $260,000 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.

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%

Although interest rates have been at a historical low for a few years, they are steadily increasing. A change in 15-year rates from 3% to 6% would change the premium from 26% to 54%. Such a change would have a significant impact on a financial plan.

The following tables outline how Powassan has historically used debt for investing in the asset categories as listed. There is currently $6,372,000 of debt outstanding for the assets covered by this AMP with corresponding principal and interest payments of $569,000.

Asset Category	Current Debt Outstanding	Use of Debt in the Last Five Years				
		2016	2017	2018	2019	2020
Road Network	1,101,000	0	0	0	0	0

[11] Current municipal Infrastructure Ontario rates for 15-year money is 3.2%.

Stormwater Network	0	0	0	0	0	0
Bridges & Culverts	137,000	0	0	0	0	0
Buildings & Facilities	3,814,000	428,000	0	0	3,461,000	0
Machinery & Equipment	572,000	123,000	0	0	0	0
Land Improvements	87,000	0	0	0	0	0
Vehicles	22,000	0	0	0	50,000	0
Total Tax Funded	**5,733,000**	**551,000**	**0**	**0**	**3,511,000**	**0**
Water Network	639,000	0	0	0	0	0
Wastewater network	0	0	0	0	0	0
Total Rate Funded	**639,000**	**0**	**0**	**0**	**0**	**0**

Asset Category	Principal & Interest Payments in the Next Ten Years						
	2021	2022	2023	2024	2025	2026	2031
Road Network	19,000	134,000	132,000	130,000	128,000	126,000	49,000
Stormwater Network	0	0	0	0	0	0	0
Bridges & Culverts	1,000	11,000	11,000	11,000	11,000	11,000	11,000
Buildings & Facilities	310,000	273,000	273,000	262,000	227,000	226,000	223,000
Machinery & Equipment	50,000	100,000	94,000	79,000	77,000	51,000	25,000
Land Improvements	1,000	7,000	7,000	7,000	7,000	7,000	7,000
Vehicles	15,000	14,000	9,000	0	0	0	0
Total Tax Funded	**396,000**	**539,000**	**526,000**	**489,000**	**450,000**	**421,000**	**315,000**

Water Network	173,000	173,000	173,000	173,000	173,000	0	0
Wastewater network	0	0	0	0	0	0	0
Total Rate Funded	**173,000**	**173,000**	**173,000**	**173,000**	**173,000**	0	**0**

The revenue options outlined in this plan allow Powassan 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 Powassan. Since the reserves are not dedicated to a specific asset category, with the exception of buildings, we have distributed reserve amounts equally among categories. In reality, the Municipality will allocate reserves to categories as needs aris.

Asset Category	Balance at December 31, 2020
Road Network	98,000
Stormwater Network	98,000
Bridges & Culverts	98,000
Buildings & Facilities	103,000
Machinery & Equipment	98,000
Land Improvements	98,000
Vehicles	98,000
Total Tax Funded	**691,000**
Water Network	842,000
Wastewater network	948,000
Total Rate Funded	**1,790,000**

There is considerable debate in the municipal sector as to the appropriate level of reserves that a Municipality should have on hand. There is no clear guideline that has gained wide acceptance. Factors that municipalities should take into account 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 Powassan'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 Powassan 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	$20.7	Fair	Annual Requirement:	$ 891,000
			Funding Available:	$281,000
			Annual Deficit:	**$610,000**
Bridges & Culverts	$21.2	Poor	Annual Requirement:	$ 587,000
			Funding Available:	$21,000
			Annual Deficit:	**$566,000**
Stormwater Network	$2.4	Good	Annual Requirement:	$ 54,000
			Funding Available:	$2,000
			Annual Deficit:	**$52,000**
Buildings & Facilities	$25.2	Poor	Annual Requirement:	$ 812,000
			Funding Available:	$12,000
			Annual Deficit:	**$800,000**
Machinery & Equipment	$2.4	Fair	Annual Requirement:	$ 189,000
			Funding Available:	$6,000
			Annual Deficit:	**$183,000**
Vehicles	$4.5	Good	Annual Requirement:	$230,000
			Funding Available:	$7,000
			Annual Deficit:	**$223,000**
Land Improvements	$0.6	Poor	Annual Requirement:	$21,000
			Funding Available:	$1,000
			Annual Deficit:	**$20,000**
Water Network	$8.1	Poor	Annual Requirement:	$202,000
			Funding Available:	$37,000
			Annual Deficit:	**$165,000**
Wastewater network	$3.8	Fair	Annual Requirement:	$57,000
			Funding Available:	$37,000
			Annual Deficit:	**$185,000**
Overall	**$88.9**	**Fair**	Annual Requirement:	$3,043,000
			Funding Available:	$404,000
			Annual Deficit:	**$2,639,000**

Appendix B: 10-Year Capital Requirements

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

Road Network											
Asset Segment	Backlog	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
HCB Roads	$0	$129k	$144k	$260k	$424k	$585k	$552k	$528k	$357k	$1.2m	$955k
LCB Roads	$258k	$2.1m	$2.6m	$5.1m	$3.0m	$3.8m	$244k	$325k	$705k	$1.2m	$1.5m
		$0	$0	$0	$45k	$695k	$0	$0	$45k	$695k	$0
Sidewalks	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$258k**	**$2.3m**	**$76k**	**$543k**	**$767k**	**$819k**	**$616k**	**$1.2m**	**$1.1m**	**$1.5m**	**$447k**

Bridges & Culverts											
Asset Segment	Backlog	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Bridges	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Structural Culverts	$1.2m	$0	$0	$0	$0	$109k	$206k	$0	$0	$0	$275k
Total	**$1.2m**	**$0**	**$0**	**$0**	**$0**	**$109k**	**$206k**	**$0**	**$0**	**$0**	**$275k**

Stormwater Network											
Asset Segment	Backlog	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Catch Basins	$2.0m	$0	$0	$0	$210k	$61k	$100k	$203k	$855k	$50k	$492k
Cross Culverts	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Storm Mains	$189k	$0	$0	$0	$132k	$0	$56k	$0	$0	$0	$0
Storm Mains - unknown date/condition	$0k	$0	$0	$0	$0k	$0	$0k	$0	$0	$0	$0
Storm Manholes	$6k	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Storm Manholes - Unknown date/condition	$0k	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$2.2m**	**$0**	**$0**	**$0**	**$343k**	**$61k**	**$156k**	**$203k**	**$855k**	**$50k**	**$492k**

Buildings											
Asset Segment	Backlog	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Community Centre	$8.9m	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Fire Hall	$0	$0	$0	$307k	$0	$0	$0	$0	$0	$0	$0
Library	$0	$0	$0	$0	$0	$0	$0	$0	$56k	$0	$0
Miscellaneous	$29k	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Municipal Building	$1.8m	$0	$0	$2.6m	$0	$0	$0	$0	$0	$0	$0
Public Works Building	$182k	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Senior Building	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$10.9m**	**$0**	**$0**	**$2.9m**	**$0**	**$0**	**$0**	**$0**	**$56k**	**$0**	**$0**

Vehicles											
Asset Segment	Backlog	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Fire Department	$27k	$232	$0	$0	$0	$0	$0	$0	$0	$0	$0
Public Works	$0	$0	$0	$0	$450k	$0	$0	$219k	$0	$0	$66k
Total	**$27k**	$232k	$0	$0	$450k	$0	$0	$219k	$0	$0	$66k

Land Improvements											
Asset Segment	Backlog	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Fencing	$9k	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Playgrounds	$0	$0	$0	$0	$0	$0	$0	$0	$0	$31k	$0
Pool	$15k	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$64k**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$31k**	**$0**

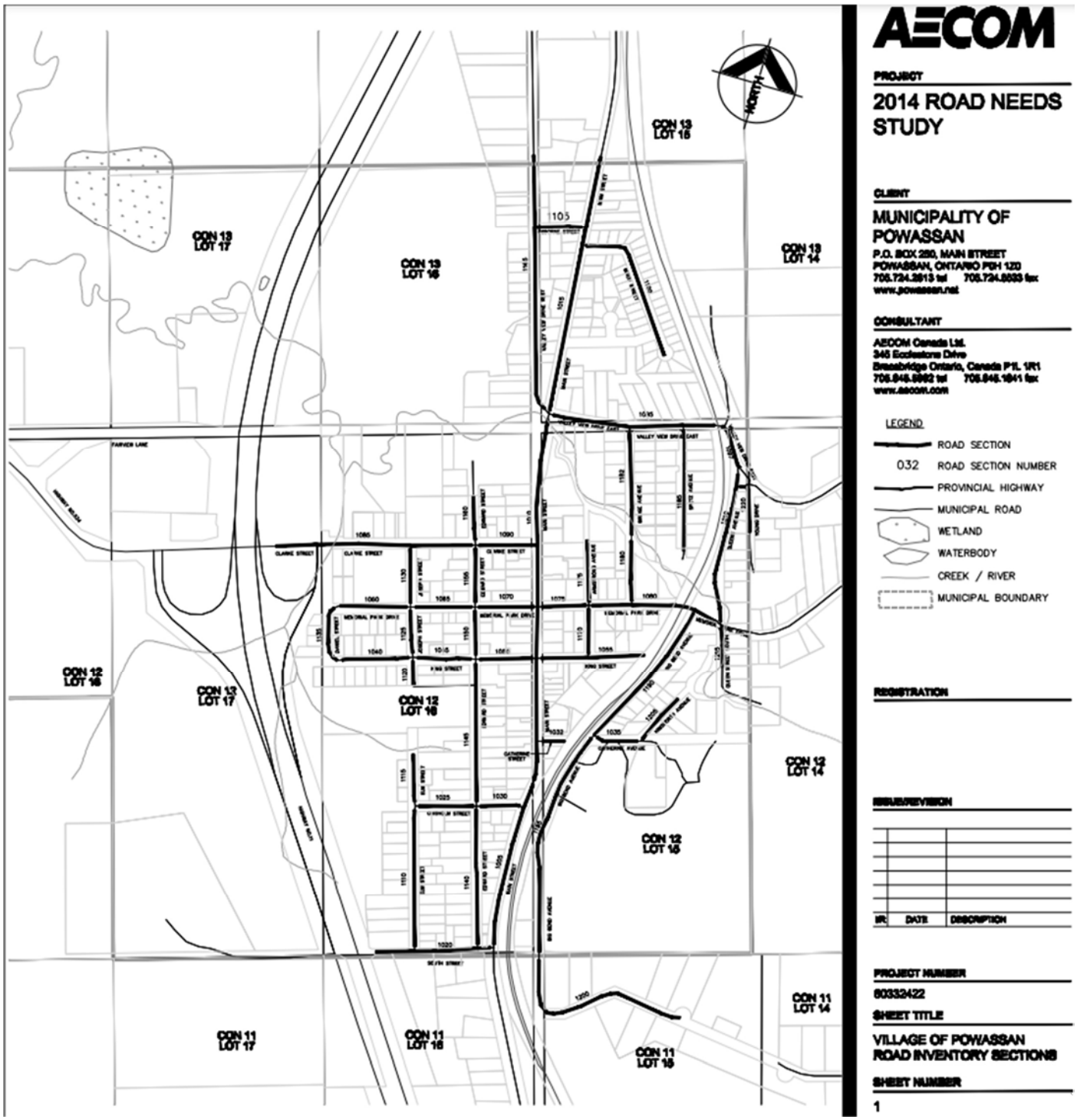
Machinery & Equipment											
Asset Segment	Backlog	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Fire Department	$0	$0	$0	$0	$0	$0	$0	$0	$95k	$0	$0
Library	$0	$0	$0	$0	$7k	$41k	$0	$74k	$0	$0	$0
Municipal Building	$0	$0	$0	$10k	$0	$117k	$0	$0	$19k	$0	$0
Public Works	$172k	$0	$0	$11k	$0	$31k	$3k	$0	$0	$10k	$172k
Sportsplex	$0	$19k	$49k	$0	$123k	$7k	$19k	$17k	$7k	$0	$0
Trout Creek Community Centre	$0	$9k	$28k	$3k	$121k	$68k	$0	$92k	$0	$0	$0
Total	**$172k**	**$28k**	**$77k**	**$24k**	**$251k**	**$265k**	**$23k**	**$182k**	**$121k**	**$10k**	**$172k**

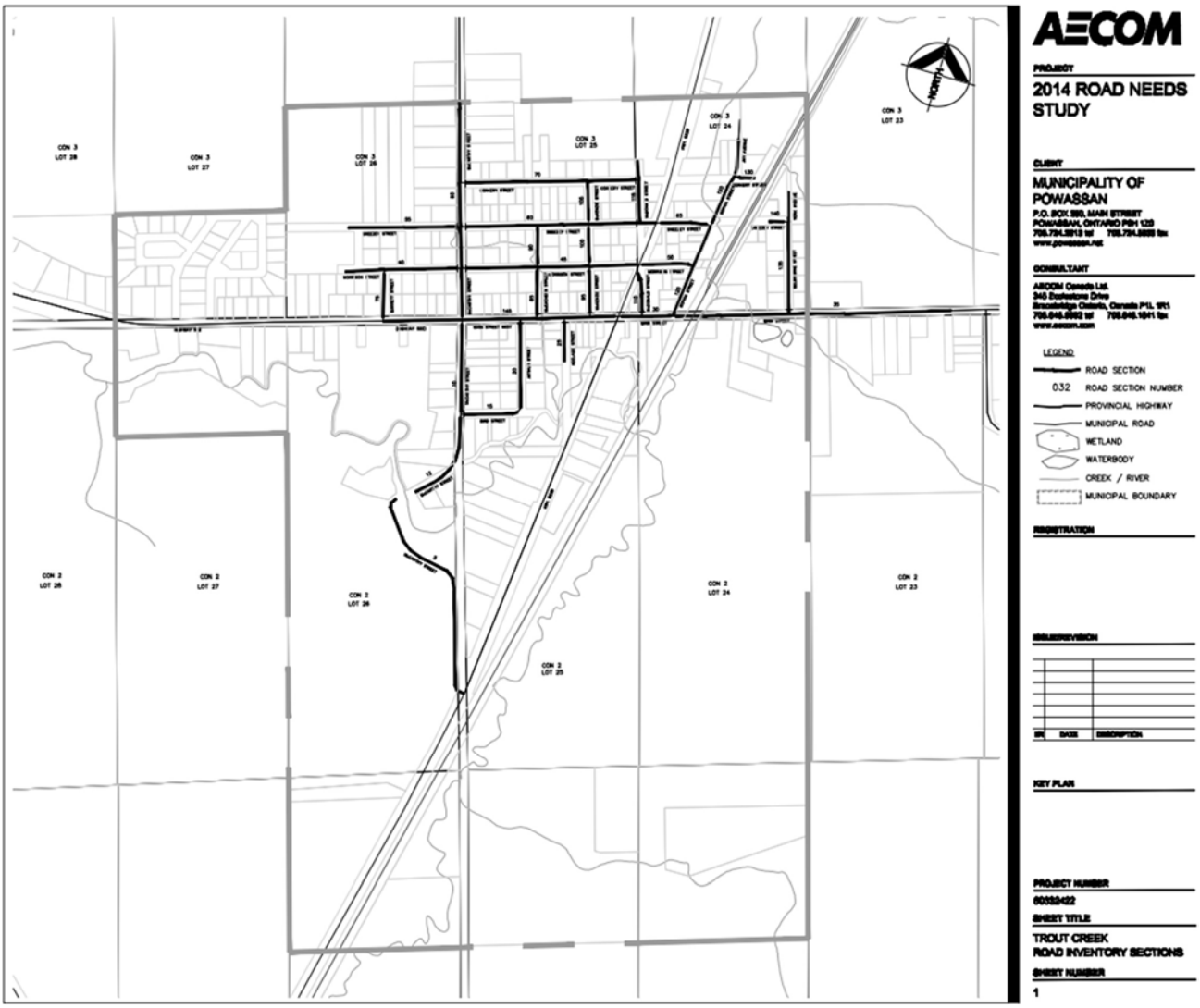
Water Network											
Asset Segment	Backlog	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Hydrants	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$100k
Valves	$264k	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Mains	$0	$0	$0	$0	$0	$0	$0	$0	$1.7m	$0	$0
Water Meters	$0	$0	$75k	$0	$0	$0	$0	$0	$0	$64k	$0
Water Reservoir	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Well Supply	$0	$0	$0	$0	$0	$0	$0	$0	$0	$2.7m	$0
Total	**$264k**	**$0**	**$75k**	**$0**	**$0**	**$0**	**$0**	**$0**	**$1.7m**	**$2.8m**	**$100k**

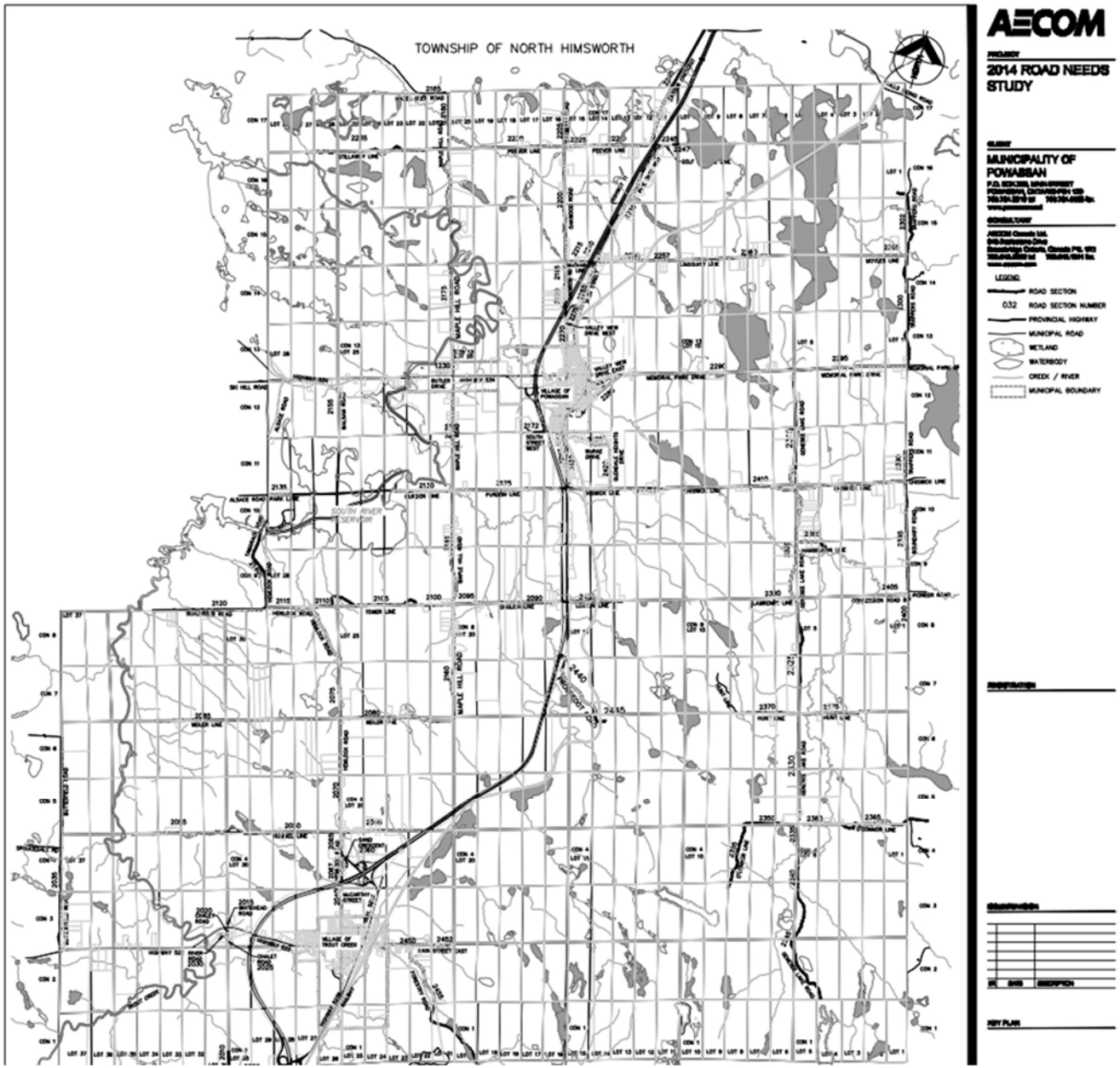
Wastewater Network											
Asset Segment	Backlog	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Lagoons	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Pump Stations	$134k	$0	$225k	$0	$0	$0	$0	$0	$0	$0	$0
Wastewater Mains	$160k	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Wastewater Manholes	$84k	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$377k**	**$0**	**$225k**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

Appendix C: Levels of Service Maps & Images

Road Network Map




AECOM
PROJECT
2014 ROAD NEEDS STUDY
CLIENT
MUNICIPALITY OF POWASSAN
P.O. BOX 250, MAIN STREET
POWASSAN, ONTARIO P0H 1Z0
705.724.3813 tel 705.724.3888 fax
www.powassan.net
CONSULTANT
AECOM Canada Ltd.
340 Ecclestone Drive
Bracebridge Ontario, Canada P1L 1P1
705.645.6992 tel 705.645.1041 fax
www.aecom.com
LEGEND
ROAD SECTION
0.32 ROAD SECTION NUMBER
PROVINCIAL HIGHWAY
MUNICIPAL ROAD
WETLAND
WATERBODY
CREEK / RIVER
MUNICIPAL BOUNDARY
REGISTRATION
ISSUE/REVISION
NO. DATE DESCRIPTION
KEY PLAN
PROJECT NUMBER
60332422
SHEET TITLE
TROUT CREEK
ROAD INVENTORY SECTIONS
SHEET NUMBER
1
CON 3 LOT 28
CON 3 LOT 27
CON 3 LOT 26
CON 3 LOT 25
CON 3 LOT 24
CON 3 LOT 23
CON 2 LOT 28
CON 2 LOT 27
CON 2 LOT 26
CON 2 LOT 25
CON 2 LOT 24
CON 2 LOT 23


TOWNSHIP OF NORTH HIMSWORTH
AECOM
2014 ROAD NEEDS STUDY
MUNICIPALITY OF POWASSAN
LEGEND
ROAD SECTION
0.32 ROAD SECTION NUMBER
PROVINCIAL HIGHWAY
MUNICIPAL ROAD
WETLAND
WATERBODY
CREEK / RIVER
MUNICIPAL BOUNDARY

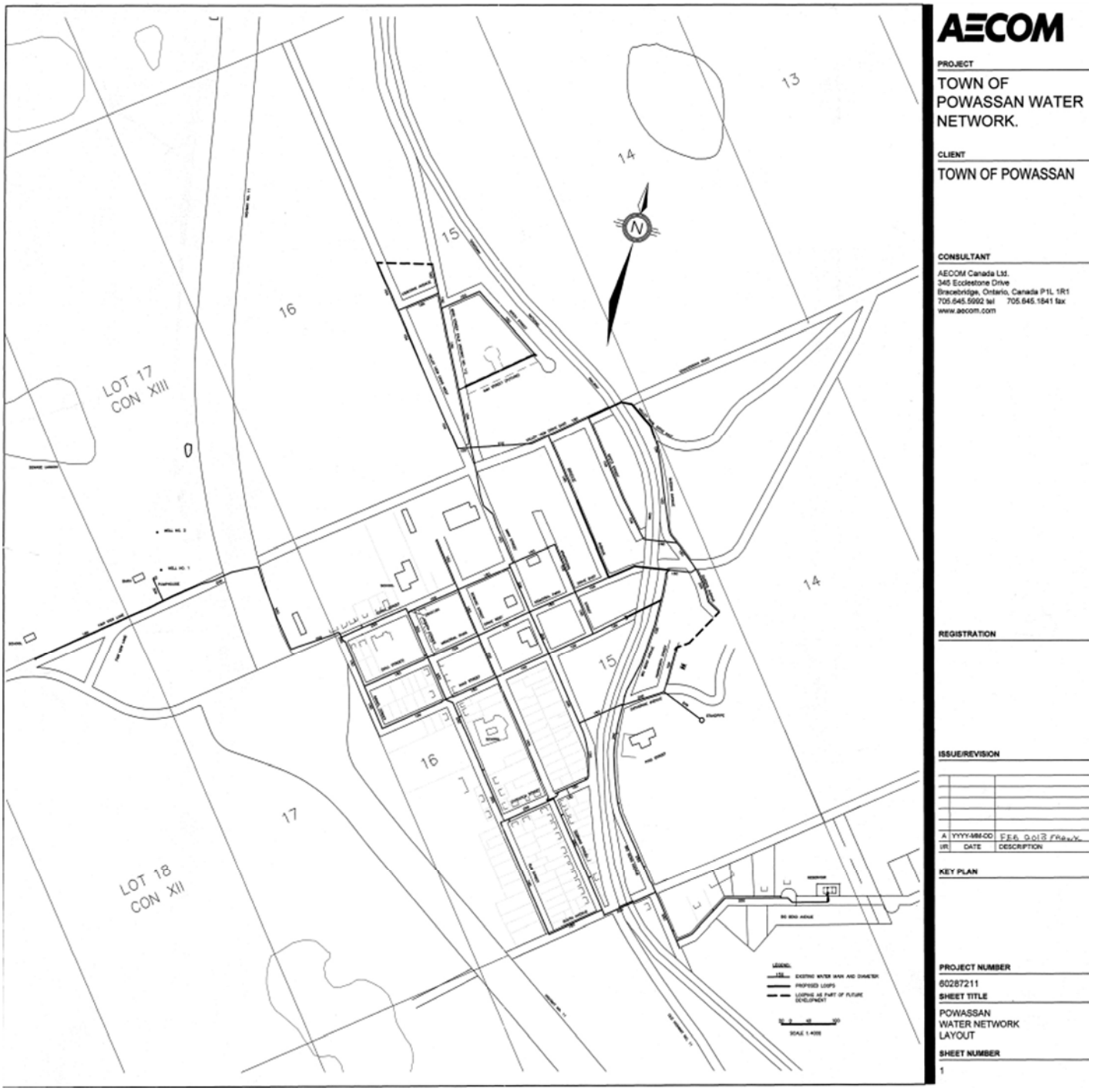
Images of Bridge

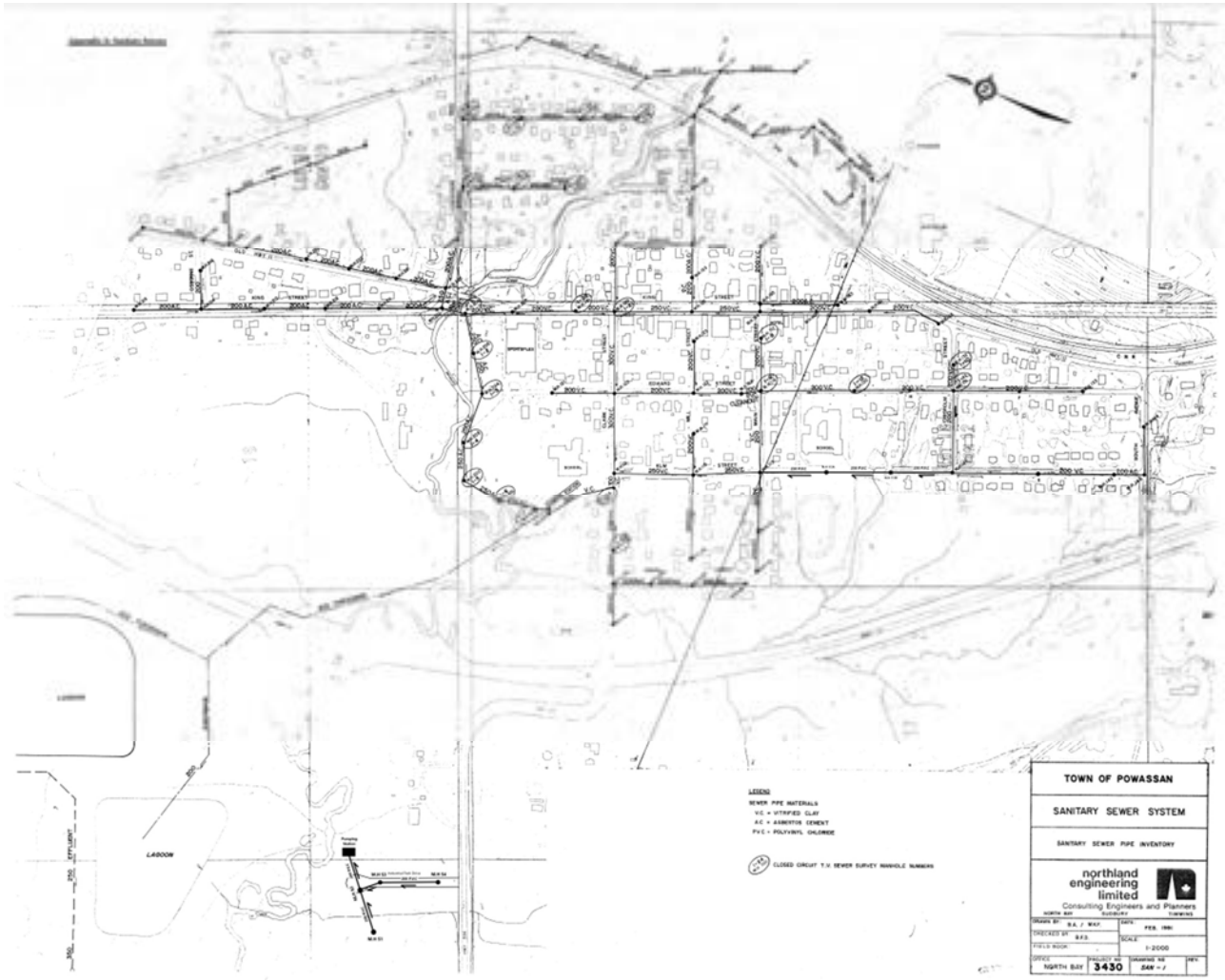
Bridge in Good Condition

Culvert in Poor Condition

Stormwater Network Map

Water Network Map




LAGOON
EFFLUENT
LEGEND
SEWER PIPE MATERIALS
VC = VITRIFIED CLAY
AC = ASBESTOS CEMENT
PVC = POLYVINYL CHLORIDE
CLOSED CIRCUIT T.V. SEWER SURVEY MANHOLE NUMBERS
TOWN OF POWASSAN
SANITARY SEWER SYSTEM
SANITARY SEWER PIPE INVENTORY
northland engineering limited
Consulting Engineers and Planners
NORTH BAY
SUDBURY
TIMMINS
DRAWN BY B.A. / MAY
DATE FEB. 1991
CHECKED BY B.P.S.
SCALE 1:2000
FIELD BOOK
OFFICE NORTH BAY
PROJECT NO. 3430
DRAWING NO. SAN - 1
REV.

Appendix E: 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 Municipality'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 Municipality'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 Municipality 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 Municipality 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 Municipality 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 Municipality 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