

Asset Management Plan

Township of Matachewan

2021

This Asset Management Plan was prepared by:



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

Key Statistics

Replacement cost of
asset portfolio

\$18.1 million

Replacement cost of
infrastructure per capita

\$80,000 (2016)

Percentage of assets in fair or
better condition

90%

Percentage of assets with
assessed condition data

75%

Annual capital
infrastructure deficit

\$237,000

Recommended timeframe
for eliminating annual
infrastructure deficit

20 Years

Target reinvestment
rate

1.68%

Actual reinvestment
rate

0.37%

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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 Township can ensure that public infrastructure is managed to support the sustainable delivery of municipal services.

This AMP include the following asset categories:

Asset Category

 Road Network	 Storm Sewer Network
 Water Network	

With the development of this AMP the Township 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 \$18.1 million. 90% of all assets analysed in this AMP are in fair or better condition and assessed condition data was available for 75% of assets. For the remaining 25% 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 Township's average annual capital requirement totals \$303,000. Based on a historical analysis of sustainable capital funding sources, the Township is committing approximately \$66,000 towards capital projects or reserves per year. As a result, there is currently an annual funding gap of \$237,000.

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 Township. 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 Township’s infrastructure deficit based on a 5-year plan for tax-funded assets and a 20-year plan for water assets:



Recommendations to guide continuous refinement of the Township’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
- Development and regularly review short- and long-term plans to meet capital requirements
- Measure current levels of service and identify sustainable proposed levels of service

1 Introduction & Context

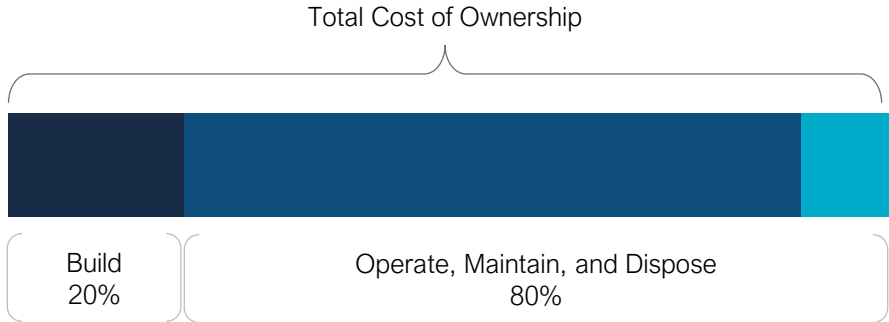
Key Insights

- The 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 Township'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 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 Township’s approach to asset management activities. It aligns with the organizational strategic plan and provides clear direction to municipal staff on their roles and responsibilities as part of the asset management program.

The Township adopted By-law 2008-15 Asset Management Policy in 2008 in accordance with Ontario Regulation 588/17. The objectives of the policy include:

- Fiscal Responsibilities
- Delivery of Services/Programs
- Public Input/Council Direction
- Risk/Impact Mitigation

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

The Township’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 Township’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 Township 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 Township'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 Township 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 Township as worth measuring and evaluating. The Township measures the level of service provided at two levels: Community Levels of Service, and Technical Levels of Service.

Community Levels of Service

Community levels of service are a simple, plain language description or measure of the service that the community receives. For core asset categories (Roads, Bridges & 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 Township 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 Township's asset management strategies on the physical condition of assets or the quality/capacity of the services they provide.

For core asset categories (Roads, Bridges & 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 Township plans to establish proposed levels of service over a 10-year period, in accordance with O. Reg. 588/17.

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

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

2024

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

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

2025

Asset Management Policy Update and an 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)	4.1.1 - 5.1.1	Complete
Replacement cost of assets in each category	S.5(2), 3(ii)	4.1.1 - 5.1.1	Complete
Average age of assets in each category	S.5(2), 3(iii)	4.1.3 - 5.1.3	Complete
Condition of core assets in each category	S.5(2), 3(iv)	4.1.2 – 5.1.2	Complete
Description of municipality’s approach to assessing the condition of assets in each category	S.5(2), 3(v)	4.1.2 – 5.1.2	Complete
Current levels of service in each category	S.5(2), 1(i-ii)	4.1.6 - 5.1.6	Complete for Core Assets Only
Current performance measures in each category	S.5(2), 2	4.1.6 - 5.1.6	Complete for Core Assets Only
Lifecycle activities needed to maintain current levels of service for 10 years	S.5(2), 4	4.1.4 - 5.1.4	Complete
Costs of providing lifecycle activities for 10 years	S.5(2), 4	Appendix B	Complete
Growth assumptions	S.5(2), 5(i-ii) S.5(2), 6(i-vi)	6.1-6.2	Complete

2 Scope and Methodology

Key Insights

- This asset management plan includes 3 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 Township of Matachewan 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 & culverts, water, wastewater, and stormwater).

The AMP summarizes the state of the infrastructure for the Township’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
Storm Sewer Network	
Water Network	User Rates

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

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

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

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

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

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 Township’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.

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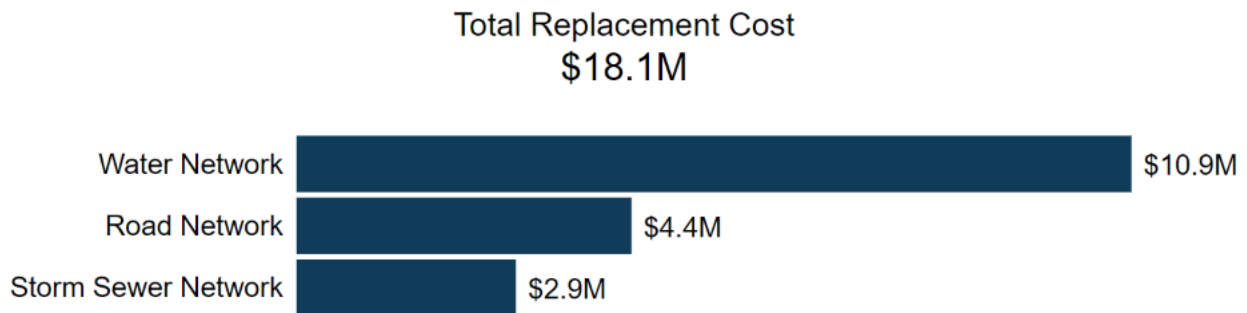
Portfolio Overview

Key Insights

- The total replacement cost of the Township's asset portfolio is \$18.1 million
- The Township's target re-investment rate is 1.68%, and the actual re-investment rate is 0.37%, contributing to an expanding infrastructure deficit
- 90% of all assets are in fair or better condition
- 1% of assets are projected to require replacement in the next 10 years
- Average annual capital requirements total \$303,000 per year across all assets

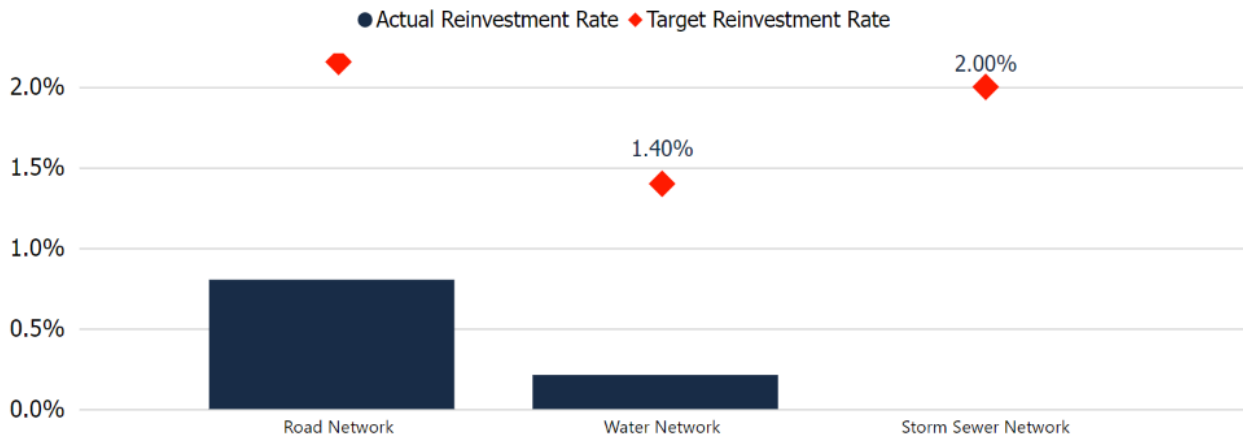
3.1 Total Replacement Cost of Asset Portfolio

The asset categories analyzed in this AMP have a total replacement cost of \$18.1 million based on inventory data from 2020. This total was determined based on a combination of user-defined costs and historical cost inflation. This estimate reflects replacement of historical assets with similar, not necessarily identical, assets available for procurement today.



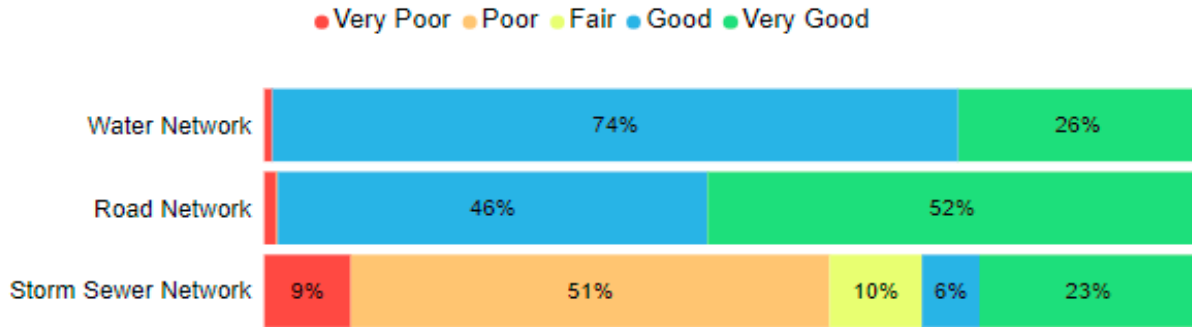
3.2 Target vs. Actual Reinvestment Rate

The graph below depicts funding gaps or surpluses by comparing target vs actual reinvestment rate. To meet the long-term replacement needs, the Township should be allocating approximately \$302,881 annually, for a target reinvestment rate of 1.68%. Actual annual spending on infrastructure totals approximately \$66,000, for an actual reinvestment rate of 0.37%.



3.3 Condition of Asset Portfolio

The current condition of the assets is central to all asset management planning. Collectively, 87% of assets in Matachewan 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 69% 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.

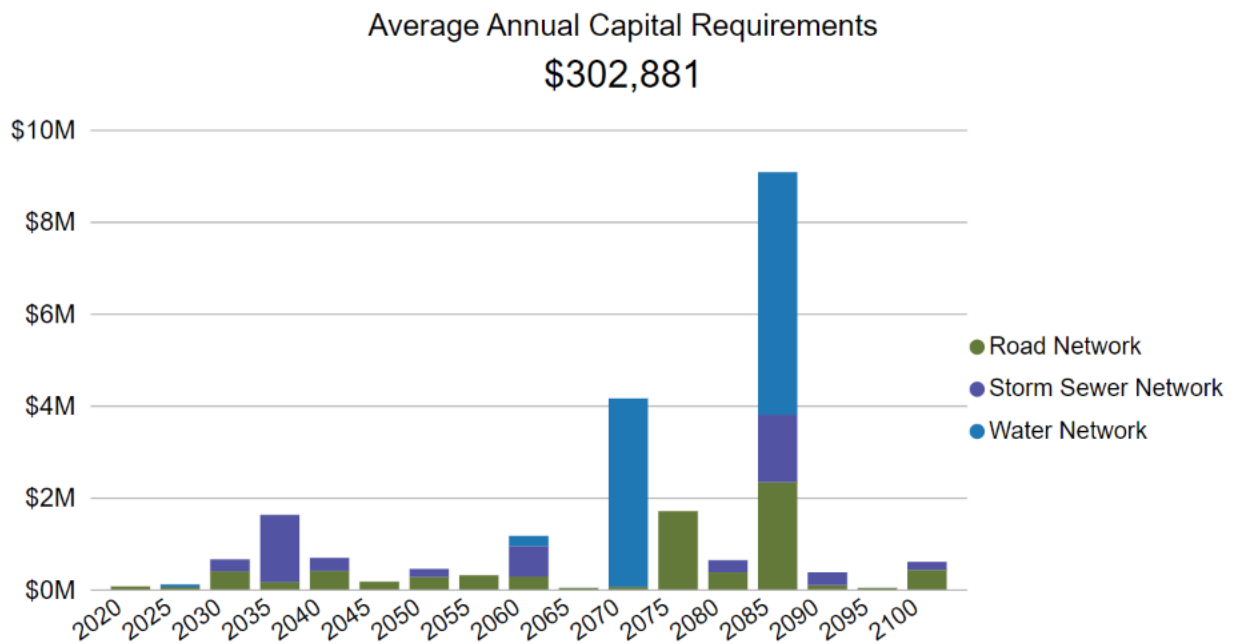
Asset Category	Asset Segment	% of Assets with Assessed Condition	Source of Condition Data
Road Network	All	0%	N/A
Storm Sewer Network	All	100%	Staff Assessments
Water Network	All	98%	Staff Assessments

3.4 Service Life Remaining

Based on asset age, available assessed condition data and estimated useful life, 1% of the Township's assets will require replacement within the next 10 years. Capital requirements over the next 10 years are identified 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 Township can produce an accurate long-term capital forecast. The following graph identifies capital requirements over the next 80 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins.



4 Analysis of Tax-funded Assets

Key Insights

- Tax-funded assets are valued at \$7.2 million
- 75% of tax-funded assets are in fair or better condition
- The average annual capital requirement to sustain the current level of service for tax-funded assets is approximately \$150,991
- Critical assets should be evaluated to determine appropriate risk mitigation activities and treatment options

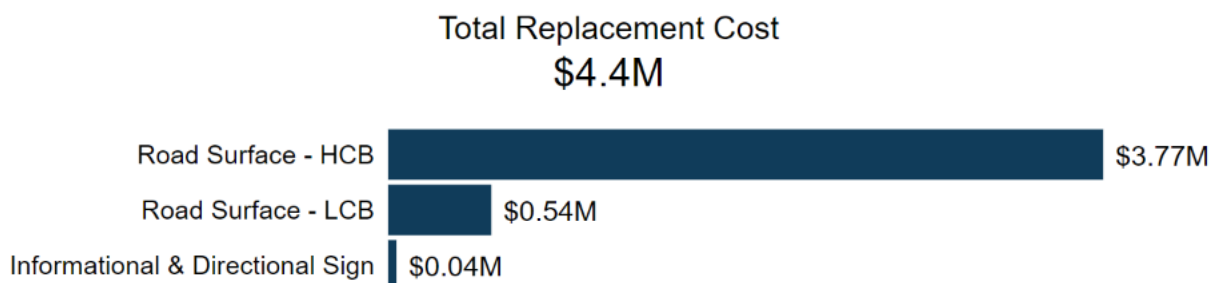
4.1 Road Network

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 Township’s asset portfolio. It includes all municipally owned and maintained roadways in addition to supporting roadside infrastructure.

4.1.1 Asset Inventory & Replacement Cost

The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the Township’s Road Network inventory. The Township also owns and maintains over 2 km of gravel roads; however, they are not included in this AMP since they are funded through the operating budget.

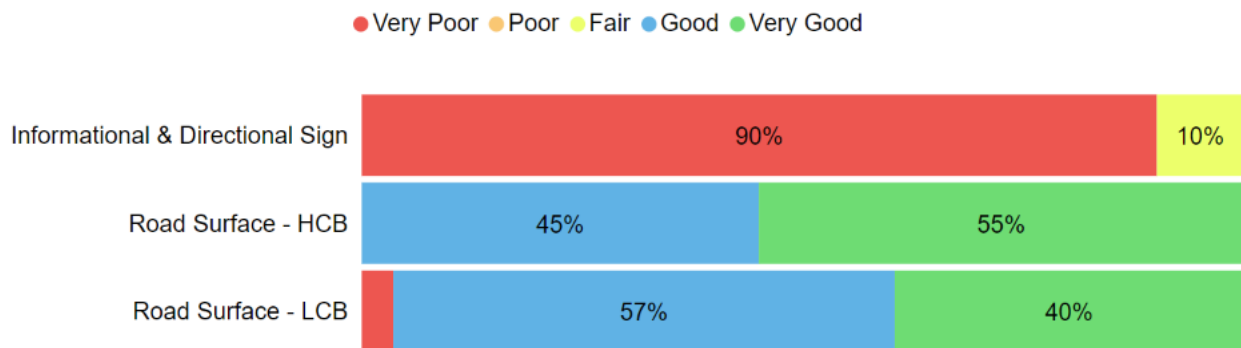
Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Informational & Directional Sign	5	CPI Tables	\$43,551
Road Surface - HCB	6,283 m	Cost/Unit	\$3,770,040
Road Surface - LCB	1,555 m	Cost/Unit	\$544,320
			\$4,357,911



4.1.2 Asset Condition

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	Average Condition	Average Condition Rating	Condition Source
Informational & Directional Sign	5%	Very Poor	Age-Based
Road Surface - HCB	84%	Very Good	Age-Based
Road Surface - LCB	74%	Good	Age-Based
Average	82%	Very Good	Age-Based



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 Township's current approach:

- Roads are visually inspected on a daily basis. There is no formal condition assessment program in place, however, the Township may consider contracting a third-party assessor to provide formal condition ratings for roads on a 5-year cycle.

4.1.3 Estimated Useful Life & Average Age

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

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)
Informational & Directional Sign	10	9.0
Road Surface - HCB	30	6.8
Road Surface - LCB	30	6.8
Average		7.2

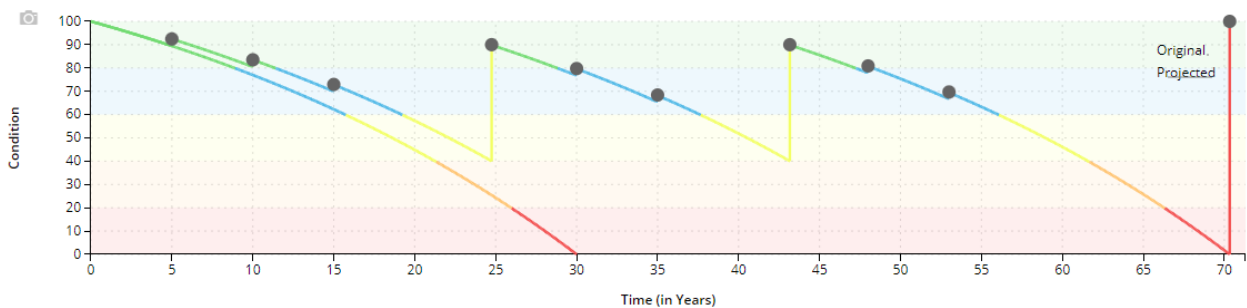
Each asset's Estimated Useful Life should be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

4.1.4 Lifecycle Management Strategy

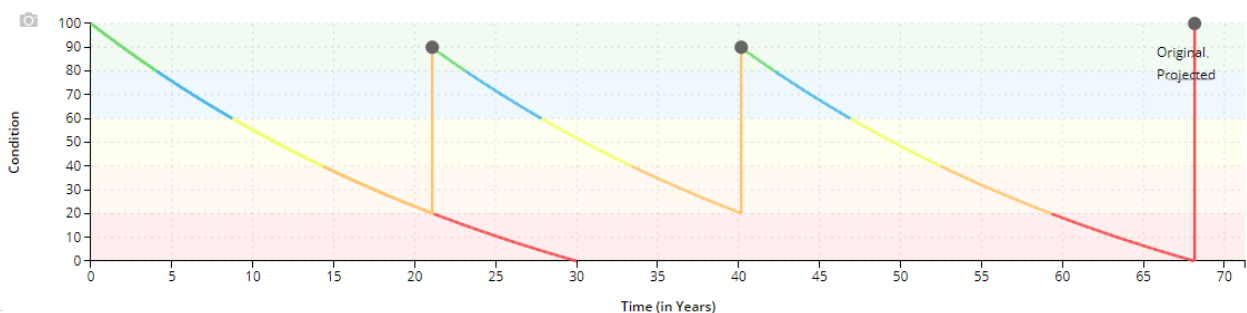
The condition or performance of most assets will deteriorate over time. This process is affected by a range of factors including an asset’s characteristics, location, utilization, maintenance history and environment.

The following lifecycle strategies have been developed as a proactive approach to managing the lifecycle of LCB and HCB 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	Maintenance	5 Years (Repeated)
Double Mill and Pave	Rehabilitation	40% Condition, Two applications
End of Life Replacement	Replacement	0% Condition



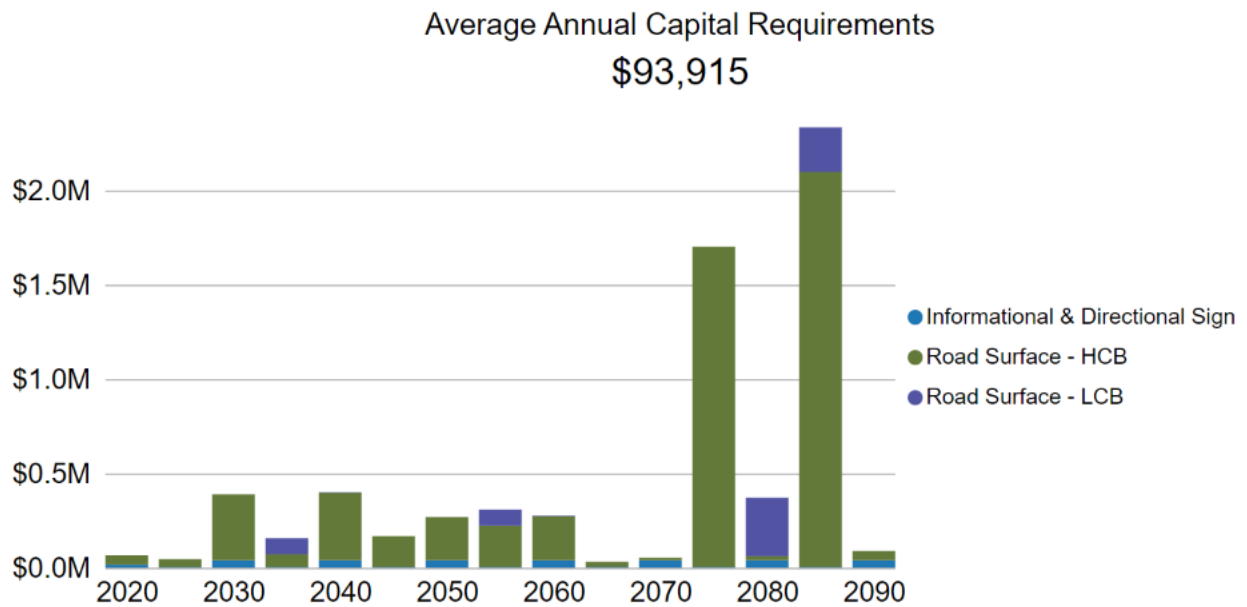
Paved Roads (LCB)		
Event Name	Event Class	Event Trigger
Double Surface Treatment	Rehabilitation	20% Condition, Two applications
End of Life Replacement	Replacement	0% Condition



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. It is worth noting, the Township has a relatively new road network which will not likely require significant capital funding in the short-term.

The annual capital requirement represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs to meet future capital needs.



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.

4.1.5 Risk & Criticality

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 2020 inventory data. See Appendix D for the criteria used to determine the risk rating of each asset.

		0 Assets -	0 Assets -	0 Assets -	0 Assets -	0 Assets -
5		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
	4	0 Assets -	6 Assets 870.30 m \$522,180.00	0 Assets -	0 Assets -	0 Assets -
4		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
	3	2 Assets 235.40 m \$141,240.00	4 Assets 487.40 m \$292,440.00	0 Assets -	0 Assets -	0 Assets -
3		\$141,240.00	\$292,440.00	\$0.00	\$0.00	\$0.00
	2	27 Assets 3,218.30 m \$1,930,980.00	12 Assets 1,472.00 m \$883,200.00	0 Assets -	0 Assets -	0 Assets -
2		\$1,930,980.00	\$883,200.00	\$0.00	\$0.00	\$0.00
	1	5 Assets 615.10 m \$215,285.00	6 Assets 884.40 m \$309,540.00	2 Assets 2.00 unit(s) \$4,285.00	0 Assets -	4 Assets 58.70 unit(s), m \$58,761.00
1		\$215,285.00	\$309,540.00	\$4,285.00	\$0.00	\$58,761.00
		1	2	3	4	5
		Probability				

Risks to Current Asset Management Strategies

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



Extreme Weather

The roads experience accelerated deterioration as a result of heavy snow fall and the ensuing snow and salt removal processes. Many of the roads also have poor drainage resulting in accelerated deterioration caused by freeze/thaw cycles. To improve asset resiliency, Staff should identify problem areas and improve drainage through enhanced lifecycle strategies.



Capital Funding Strategies

Major capital rehabilitation projects for roads are sometimes dependant on the availability of grant funding opportunities. When grants are not available, road rehabilitation and replacement projects may be deferred. An annual capital funding strategy can reduce dependency on grant funding and help prevent deferral of capital works.

4.1.6 Levels of Service

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

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

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)	0.003
	Lane-km of collector roads (MMS classes 3 and 4) per land area (km/km ²)	0
	Lane-km of local roads (MMS classes 5 and 6) per land area (km/km ²)	0.031
Quality	Average pavement condition index for paved roads in the municipality	HCB: 84% LCB: 74%
	Average surface condition for unpaved roads in the municipality (e.g. excellent, good, fair, poor)	Poor
Performance	Current capital reinvestment rate	0.80%

4.1.7 Recommendations

Condition Assessment Strategies

- Condition in this AMP is based on age for all road network assets. Consider developing a condition assessment strategy to determine accurate condition ratings for road surfaces and appurtenances. The routine road patrol process should have documented findings that can be translated into cursory condition scores.

Lifecycle Management Strategies

- Implement the identified lifecycle management strategies for HCB and LCB roads to realize potential cost avoidance and maintain a high quality of road pavement condition.
- Evaluate the efficacy of the Township'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 Township 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.

4.2 Storm Sewer Network

The Township is responsible for owning and maintaining over 10 km of storm mains and other stormwater management infrastructure such as culverts and ditches.

4.2.1 Asset Inventory & Replacement Cost

The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the Township’s Storm Sewer Network inventory. The drainage system below is a combination of pipes, culverts, and ditches. Currently, there is not enough detail in the inventory to separate the system by pipes, culverts, and ditches.

Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Drainage System	10,060 m	User-Defined Cost	\$2,853,780
Total			\$2,853,780

Total Replacement Cost
\$2.9M

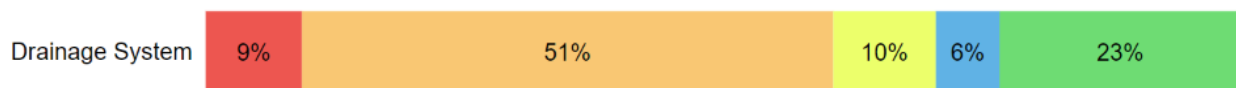


4.2.2 Asset Condition

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.

	Average Condition (%)	Average Condition Rating	Condition Source
Drainage System	44%	Fair	100% Assessed
Total	44%	Fair	100% Assessed

● Very Poor ● Poor ● Fair ● Good ● Very Good



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

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 Township’s current approach:

- There are no formal condition assessment programs in place for the Storm Sewer Network. Culverts and ditches are visually inspected on an annual basis and defects are noted to inform lifecycle activities. Condition scores in this plan are from a network-wide assessment in 2016.

4.2.3 Estimated Useful Life & Average Age

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

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)
Drainage System	50	46
Average		46

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

4.2.4 Lifecycle Management Strategy

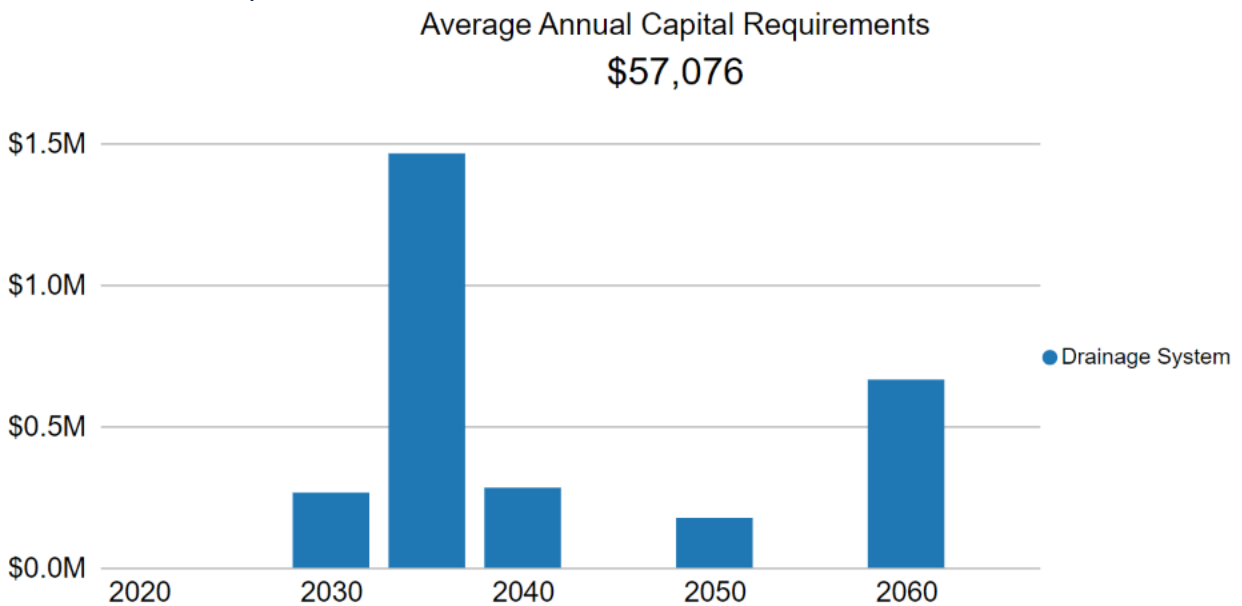
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

The following table outlines the Township’s current lifecycle management strategy.

Activity Type	Description of Current Strategy
Maintenance	Primary activities include catch basin cleaning and storm main flushing, but only a small percentage of the entire network is completed per year. CCTV inspections and cleaning may be completed as budget becomes available and this information will be used to drive forward rehabilitation and replacement plans.
Rehabilitation	Due to the relatively small size of the piped network, no mid-life interventions are performed.
Replacement	Without the availability of up-to-date condition assessment information replacement activities are purely reactive in nature

Forecasted Capital Requirements

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



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.

4.2.5 Risk & Criticality

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 2020 inventory data. See Appendix D for the criteria used to determine the risk rating of each asset.



Risks to Current Asset Management Strategies

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



Aging Infrastructure

As municipal storm system continues to age, there are a handful of assets that are approaching their original useful life. There is currently no decision-making process in place to determine how to plan for structures that will require replacement or disposal.



Extreme Weather

Staff need a better sense of the impacts of extreme weather on the stormwater network to inform retrofitting and replacement planning. Additional data 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 and snow events. Incorporating a monitoring and maintenance program

for all stormwater infrastructure into the asset management plan can further support infrastructure resiliency and reduce risk.

4.2.6 Levels of Service

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

Community Levels of Service

The following table outlines the qualitative descriptions that determine the community levels of service provided by Storm Sewer 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

Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2020)
Scope	% of properties in municipality resilient to a 100-year storm	100% ¹
	% of the municipal stormwater management system resilient to a 5-year storm	100% ²
Performance	Current capital reinvestment rate	0%

¹ The Township does not currently have data available to determine this technical metric. The rate of properties that are expected to be resilient to a 100-year storm is expected to be low.

² This is based on the observations of municipal staff.

4.2.7 Recommendations

Asset Inventory

- The Township's Storm Sewer Network inventory remains at a basic level of maturity. The development of a comprehensive inventory of the Storm Sewer Network should be priority.
- Staff should identify specific quantities, size, and material of individual stormwater components – such as the pipes, culverts, ditches and drains. Further componentization will allow for better costing, and more accurate capital projections.

Condition Assessment Strategies

- The development of a comprehensive inventory should be accompanied by a system-wide assessment of the condition of all assets in the Storm Sewer Network through a combination of CCTV inspections and visual inspections.

Risk Management Strategies

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

Lifecycle Management Strategies

- Document and review lifecycle management strategies for the Storm Sewer 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 Township 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.

5

Analysis of Rate-funded Assets

Key Insights

- Rate-funded assets are valued at \$10.9 million
- 99% of rate-funded assets are in fair or better condition
- The average annual capital requirement to sustain the current level of service for rate-funded assets is approximately \$152,000
- Critical assets should be evaluated to determine appropriate risk mitigation activities and treatment options

5.1 Water Network

The water services provided by the Township are managed and operated by OCWA and municipal staff. The Township is responsible for almost 10 km of watermains and OCWA manages the water treatment plant.

5.1.1 Asset Inventory & Replacement Cost

The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the Township’s Water Network inventory.

Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Water Treatment ³	2	CPI Tables	\$4,324,809
Watermain	9,205m	User-Defined Cost	\$6,539,363
Total			\$10,864,172

Total Replacement Cost
\$10.9M

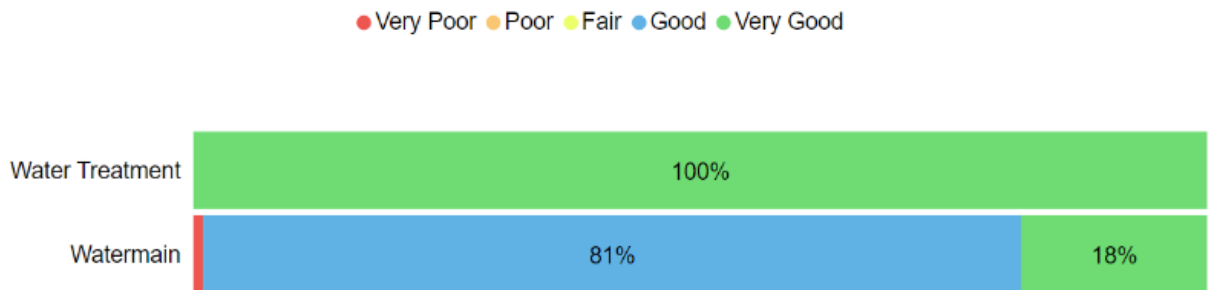


³ The Township owns a water treatment plant and a water tower.

5.1.2 Asset Condition

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	Average Condition (%)	Average Condition Rating	Condition Source
Water Treatment	95%	Very Good	95% Assessed
Watermain	68%	Good	100% Assessed
Total	70%	Very Good	75% Assessed



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

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 Township’s current approach:

- Staff primarily rely on the age and material of water mains to determine the projected condition of watermains. There are no formal condition assessment programs in place for watermains.
- The most recent condition assessment for the water treatment plant was complete in 2020. OCWA conducts visual assessments are a regular basis to note defects and guide lifecycle activities.

5.1.3 Estimated Useful Life & Average Age

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

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)
Water Treatment	50	26.5
Watermain	100	35.2
Average		34.9

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

5.1.4 Lifecycle Management Strategy

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

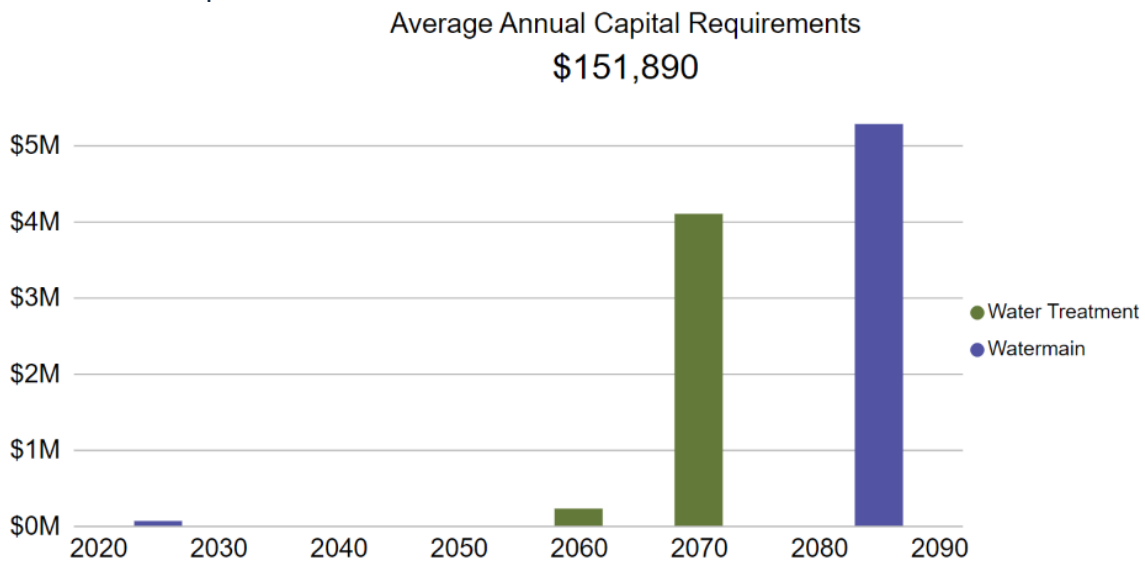
The following table outlines the Township’s current lifecycle management strategy.

Activity Type	Description of Current Strategy
Maintenance	Main flushing is completed on 100% of the network every 2 years.
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

OCWA is responsible for the maintenance, rehabilitation, and replacement of the water treatment plant.

Forecasted Capital Requirements

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



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.

5.1.5 Risk & Criticality

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 2020 inventory data. See Appendix D for the criteria used to determine the risk rating of each asset.



Risks to Current Asset Management Strategies

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



Aging Infrastructure & Capital Funding

As watermains continue to age, there are a handful of assets that are approaching their original useful life. There is currently no decision-making process in place to determine how to plan for structures that will require replacement or disposal. Replacement is often deferred due to limited funding. A long-term capital funding strategy for the aging inventory can help prevent deferral of necessary capital projects.

5.1.6 Levels of Service

The following tables identify the Township’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 Township has selected for this AMP.

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	Water connectivity in the Township mirrors road & fire flow connectivity. 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 Town follows Ontario's Drinking Water Quality Management Standard (DWQMS). The Municipality delivers boil water advisories to affected households.

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	74%
	% of properties where fire flow is available	74%
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	Current capital re-investment rate	0.32%

5.1.7 Recommendations

Asset Inventory

- The water tower and water treatment plant are each pooled under a single asset. These pooled assets require further segmentation to allow for asset-specific lifecycle planning and costing.

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 Township 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.

6

Impacts of Growth

Key Insights

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

6.1 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 Township 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.

6.1.1 Matachewan Community & Economic Development Strategic Plan (April 2013)

The Township of Matachewan adopted a Strategic Plan in 2013. The Township is a small rural Township in Northeast Ontario, located on the shores of the Montreal River. The Township encompasses an active gold mine which is a critical component of the local economy.

Key actions items in the strategy include beautification, development of residential units, improve fiscal sustainability, and sustain the current level of service and municipal infrastructure. This AMP aligns with the objectives defined in the Township's Strategic Plan by supporting efficient management of capital assets and a sustainable level of service.

6.1.2 Matachewan Official Plan (May 2015)

The Township adopted the Official Plan in May of 2015. The purpose of the Plan is to set out goals and objectives to manage growth and development and the effects on the social, economic, and natural environment of the Township. The Plan is intended to guide development and manage evolving demand in the Township in a sustainable way that reflects community values.

The Official Plan is aligned with the 2011 Growth Plan for Northern Ontario and has been prepared through a lens of sustainability. Though the projected population growth is minimal, the Township is focused on efficient development.

The Township's economy and population are strongly tied to local mining activity. Matachewan supports mineral mining exploration within the Township and will pursue opportunities to utilize the community as a service centre for workers, manufacturing, research, and servicing hub for any existing and potential mine established in the area. Growth may also be promoted through tourism, forestry, park development, and green energy industries.

The 2016 Census reported Matachewan's population at 225, down from 409 in 2011. There are currently 166 private dwellings in the Township. The Township is not expected to experience population growth; however, demand will likely evolve, thus requiring a change in asset management practices.

6.2 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.

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

7

Financial Strategy

Key Insights

- The Township is committing approximately \$66,000 towards capital projects per year from sustainable revenue sources
- Given the annual capital requirement of \$303,000, there is currently a funding gap of \$237,000 annually
- For tax-funded assets, we recommend increasing tax revenues by 1.7% each year for the next 5 years to achieve a sustainable level of funding
- For the Water Network, we recommend increasing rate revenues by 5.3% annually for the next 20 years to achieve a sustainable level of funding

7.1 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 Township of Matachewan 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 Township's approach to the following:

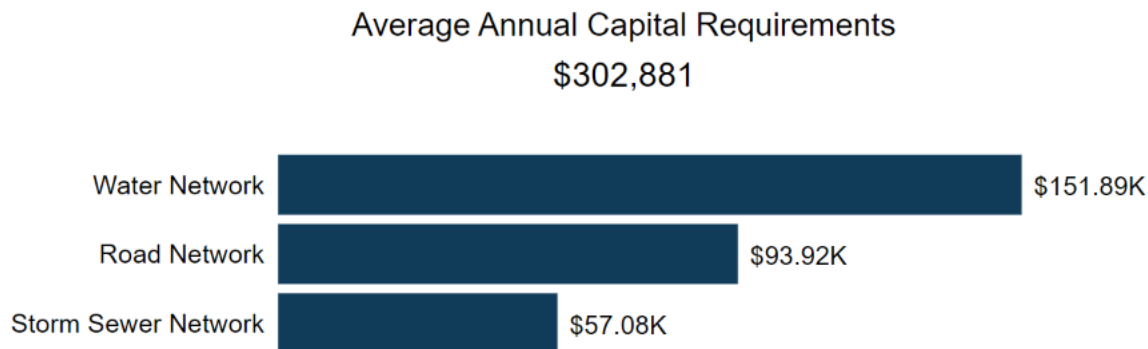
1. In order to reduce financial requirements, consideration has been given to revising service levels downward.

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.

7.1.1 Annual Requirements & Capital Funding

Annual Requirements

The annual requirements represent the amount the Township should allocate annually to each asset category to meet replacement needs as they arise, prevent infrastructure backlogs and achieve long-term sustainability. In total, the Township must allocate approximately \$229,107 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 Township’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:

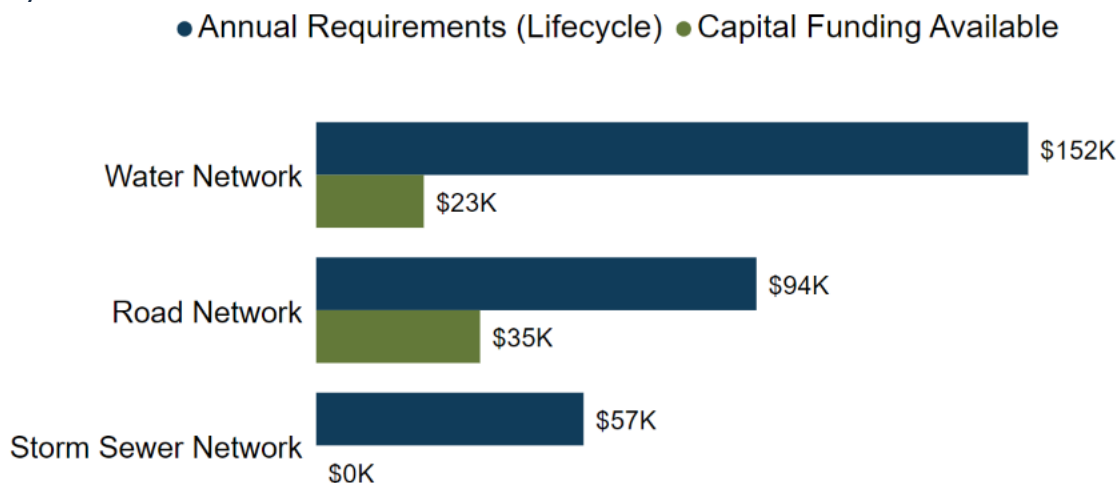
1. **Replacement Only Scenario:** Based on the assumption that assets deteriorate and – without regularly scheduled maintenance and rehabilitation – are replaced at the end of their service life.
2. **Lifecycle Strategy Scenario:** Based on the assumption that lifecycle activities are performed at strategic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

Asset Category	Annual Requirements (Replacement Only)	Annual Requirements (Lifecycle Strategy)	Difference
Road Network	\$148,167	\$93,915	\$54,252

The implementation of a proactive lifecycle strategy for roads leads to a potential annual cost avoidance of over \$54,000 for the Road Network. This represents an overall reduction of the annual requirements by 57.8%. As the lifecycle strategy scenario represents the lowest cost option available to the Township, we have used these annual requirements in the development of the financial strategy.

Annual Funding Available

Based on a historical analysis of sustainable capital funding sources, the Township is committing approximately \$66,000 towards capital projects per year from sustainable revenue sources. Given the annual capital requirement of \$303,000, there is currently a funding gap of \$237,000 annually.



7.2 Funding Objective

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

1. **Tax Funded Assets:** Road Network, Storm Sewer Network
2. **Rate-Funded Assets:** Water Network

Note: For the purposes of this AMP, we have excluded gravel roads since they are a perpetual maintenance asset and end of life replacement calculations do not normally apply. If gravel roads are maintained properly, they can theoretically have a limitless service life.

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

7.3 Financial Profile: Tax Funded Assets

7.3.1 Current Funding Position

The following tables show, by asset category, Matachewan'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	Gas Tax	OCIF	Total Available	
Road Network	94,000	8,000	0	27,000	35,000	59,000
Stormwater Network	57,000	0	0	0	0	57,000
Total	151,000	8,000		27,000	35,000	116,000

The average annual capital expenditure requirement for the above categories is \$151,000. Annual revenue currently allocated to these assets for capital purposes is \$35,000 leaving an annual deficit of \$116,000. Put differently, these infrastructure categories are currently funded at 23% of their long-term requirements.

7.3.2 Full Funding Requirements

In 2020, Township of Matachewan has annual tax revenues of \$1.36 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	4.3%
Storm Sewer Network	4.2%
	8.5%

The Township’s debt and OCIF funding is not expended to change in next number of years. The table below outlines several scenarios to address the infrastructure deficit outlined above.

Without Capturing Changes				
	5 Years	10 Years	15 Years	20 Years
Infrastructure Deficit	116,000	116,000	116,000	116,000
Change in Debt Costs	N/A	N/A	N/A	N/A
Change in OCIF Grants	N/A	N/A	N/A	N/A
Resulting Infrastructure Deficit	116,000	116,000	116,000	116,000
Tax Increase Required	8.5%	8.5%	8.5%	8.5%
Annually	1.7%	0.9%	0.6%	0.4%

7.3.3 Financial Strategy Recommendations

Considering all the above information, we recommend the 5-year option. This involves full capital expenditure funding being achieved over 5 years by:

- a) when realized, reallocating the debt cost reductions to the infrastructure deficit as outlined above.
- b) increasing tax revenue by 1.7% each year for the next 5 years solely for the purpose of phasing in full funding to the asset categories covered in this section of the AMP.
- c) adjusting tax revenue increases in future year(s) when allocations to capital expenditure exceed or fail to meet budgeted amounts.
- d) allocating the current gas tax and OCIF revenue as outlined previously.
- e) allocating the scheduled OCIF grant increases to the infrastructure deficit as they occur.
- f) reallocating appropriate revenue from categories in a surplus position to those in a deficit position.
- g) 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 any applicable OCIF formula-based funding since this funding is a multi-year commitment⁴.
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 \$43,000 for the Road 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 results of the condition-based analysis may require otherwise.

⁴ The Township 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. This review may impact its availability.

7.4 Financial Profile: Rate Funded Assets

7.4.1 Current Funding Position

The following tables show, by asset category, Matachewan'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	OCIF	Total Available	
Water Network	152,000	114,000	-114,000	31,000	31,000	121,000
Total	152,000	114,000	-114,000	31,000	31,000	121,000

The average annual capital expenditure requirement for the above categories is \$78,000. Annual revenue currently allocated to these assets for capital purposes is \$23,000 leaving an annual deficit of \$55,000. Put differently, these infrastructure categories are currently funded at 29.5% of their long-term requirements.

7.4.2 Full Funding Requirements

In 2020, Matachewan had annual water revenues of \$114,000. 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	106.1%

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			
	5 Years	10 Years	15 Years	20 Years
Infrastructure Deficit	121,000	121,000	121,000	121,000
Rate Increase Required	106.1%	106.1%	106.1%	106.1%
Annually	21.2%	10.6%	7.1%	5.3%

7.4.3 Financial Strategy Recommendations

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

- a) increasing rate revenues by 5.3% for the Water Network each year for the next 20 years.
- b) these rate revenue increases are solely for the purpose of phasing in full funding to the respective asset categories covered in this AMP.

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 20 years, the recommendation does require prioritizing capital projects to fit the annual funding available.

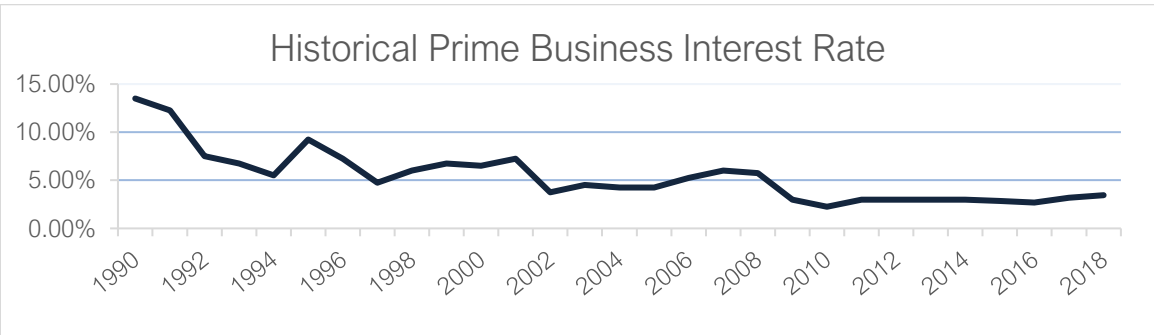
Prioritizing future projects will require the current data to be replaced by condition-based data. Although our recommendations include no further use of debt, the results of the condition-based analysis may require otherwise.

7.5 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%⁵ 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%

It should be noted that current interest rates are near all-time lows. Sustainable funding models that include debt need to incorporate the risk of rising interest rates. The following graph shows where historical lending rates have been:



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.

⁵ Current municipal Infrastructure Ontario rates for 15-year money is 3.2%.

7.6 Use of Reserves

7.6.1 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 Matachewan.

Asset Category	Balance on December 31, 2020
Road Network	1,209,000
Storm Sewer Network	136,000
Total Tax Funded	1,345,000
Water Network	318,000
Total Rate Funded	318,000

There is considerable debate in the municipal sector as to the appropriate level of reserves that a Township 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 Matachewan'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.

7.6.2 Recommendation

In 2024, Ontario Regulation 588/17 will require Matachewan 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.

8

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 identifies the criteria used to calculate risk for each asset category
- Appendix E 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	\$4.4	Very Good	Annual Requirement:	\$94,000
			Funding Available:	\$35,000
			Annual Deficit:	\$59,000
Storm Sewer Network	\$2.9	Fair	Annual Requirement:	\$57,000
			Funding Available:	\$0
			Annual Deficit:	\$57,000
Water Network	\$10.9	Good	Annual Requirement:	\$152,000
			Funding Available:	\$31,000
			Annual Deficit:	\$237,000
Overall	\$18.1	Good	Annual Requirement:	\$303,000
			Funding Available:	\$66,000
			Annual Deficit:	\$237,000

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.

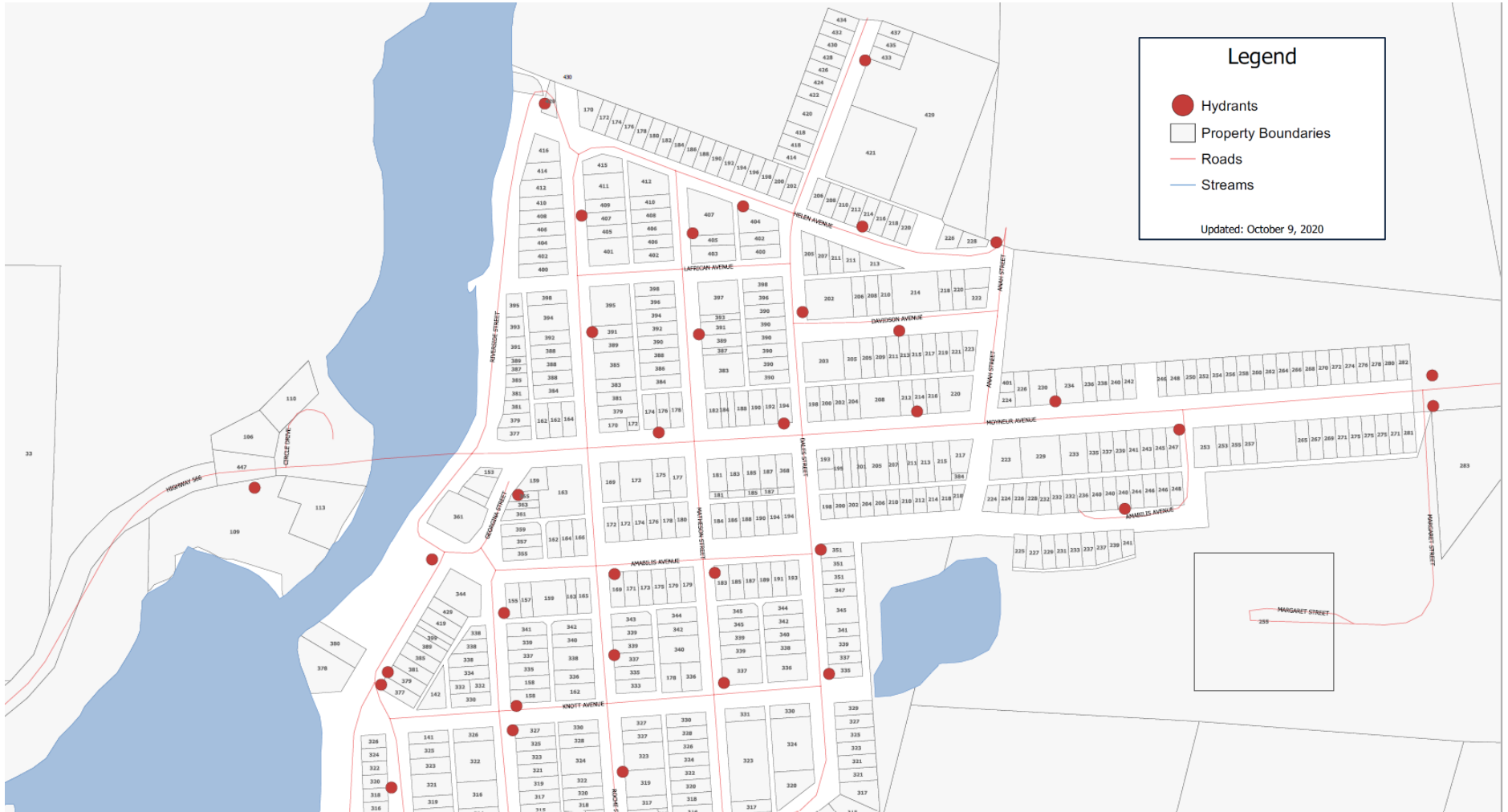
Road Network											
Segment	Backlog	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Informational & Directional Sign	\$23,255	\$0	\$12,891	\$0	\$3,120	\$0	\$4,285	\$0	\$0	\$0	\$0
Road Surface - HCB	\$0	\$4,071	\$23,790	\$1,390	\$8,003	\$13,012	\$4,071	\$23,790	\$1,390	\$8,003	\$4,503
Road Surface - LCB	\$19,495	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total	\$42,750	\$4,071	\$36,681	\$1,390	\$11,123	\$13,012	\$8,356	\$23,790	\$1,390	\$8,003	\$4,503

Storm Sewer Network											
Segment	Backlog	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Storm Mains	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

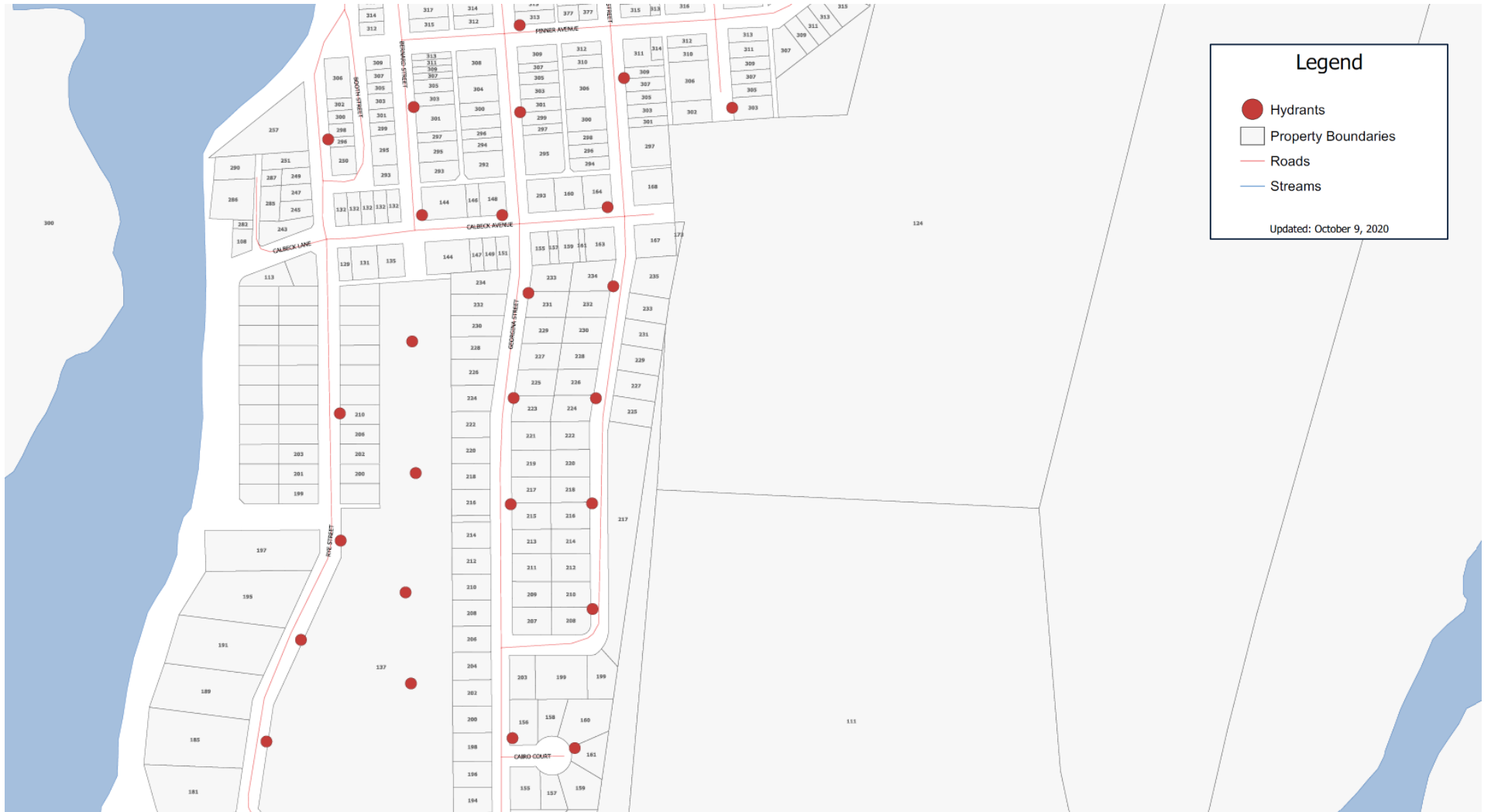
Water Network											
Segment	Backlog	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Water Treatment	\$0	\$0	\$0	\$0	\$0	\$0	\$62,398	\$0	\$0	\$0	\$0
Watermain	\$0	\$0	\$0	\$0	\$0	\$0	\$62,398	\$0	\$0	\$0	\$0
Total	\$0	\$0	\$0	\$0	\$0	\$0	\$124,796	\$0	\$0	\$0	\$0

Appendix C: Level of Service Maps

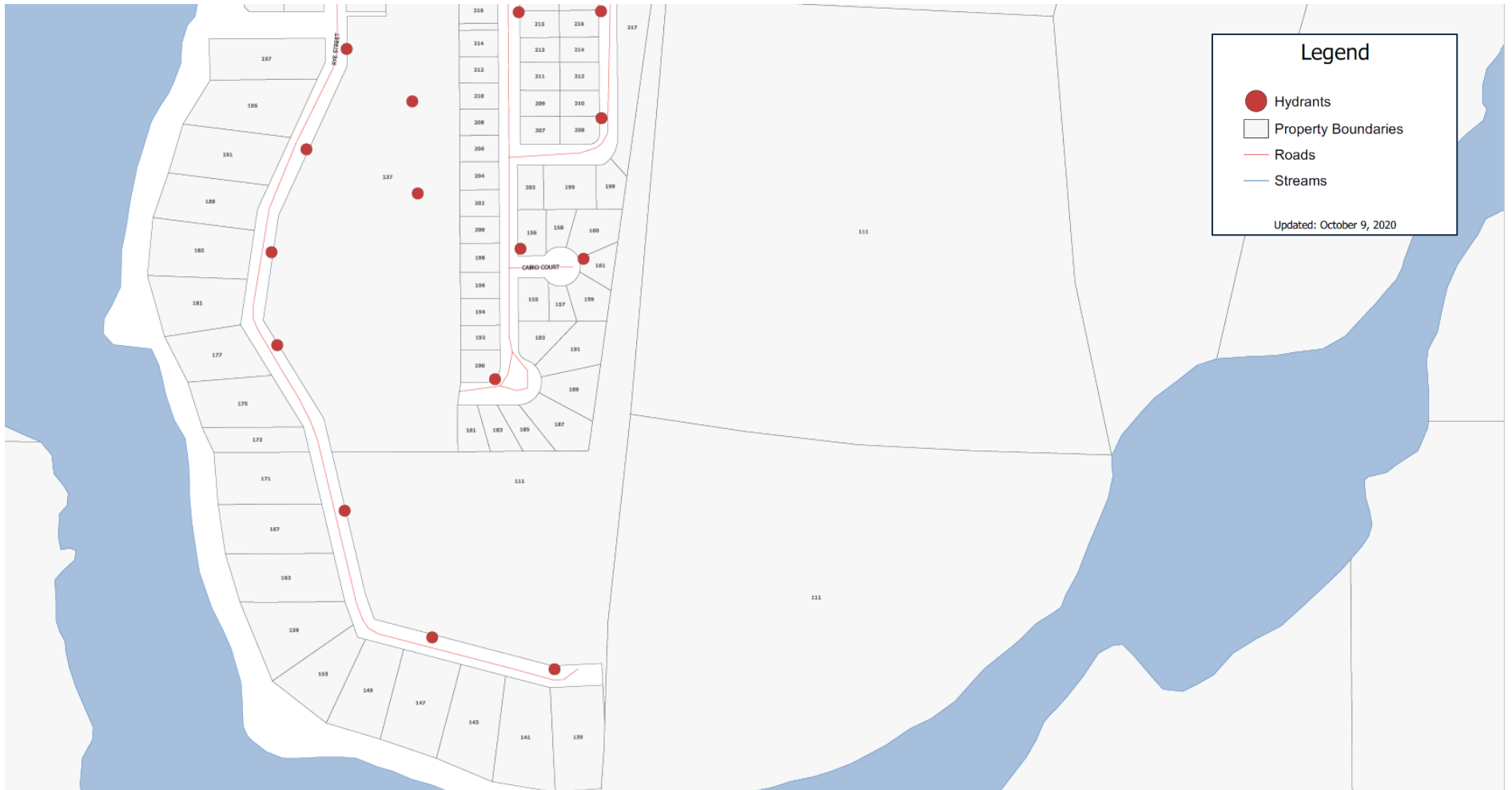
Road & Fire Flow Connectivity Map – Part 1



Road & Fire Flow Connectivity Map – Part 2



Road & Fire Flow Connectivity Map – Part 3



Appendix D: Risk Rating Criteria

Probability of Failure

Asset Category	Risk Classification	Risk Criteria	Value/Range	Probability of Failure Score
Road Network Storm Sewer Network	Structural	Condition (100%)	80-100	1
			60-79	2
			40-59	3
			20-39	4
			0-19	5
Water Network	Structural	Condition (60%)	80-100	1
			60-79	2
			40-59	3
			20-39	4
			0-19	5
		Asset Materials (40%)	Ductile Iron	4
			CPPR	3
		PVC, PEX	2	

Consequence of Failure

Asset Category	Risk Classification	Risk Criteria	Value/Range	Consequence of Failure Score
Road Network	Economic	Road Class (50%)	Local	1
			Collector	3
			Arterial	5
		Asset Material (50%)	LCB	2
			HCB	4
Storm Sewer Mains	Economic	Replacement Cost (100%)	\$0-\$100,000	1
			\$100,001-\$250,000	2
			\$250,001-\$500,000	3
			\$500,001-\$1,000,000	4
			\$1,000,000+	5
Waterlines	Economic	Number of Hydrants (40%)	50	1
			100	2
			150	3
			200	4
			250	5
		Diameter (mm) (60%)	0	1
			1	2
			2	3
			3	4
		4	5	

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 Township's condition assessment strategy should outline several key considerations, including:

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

Role of Asset Condition Data

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

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

Guidelines for Condition Assessment

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

Condition assessments must include a quantitative or qualitative assessment of the current condition of the asset, collected according to specified condition rating criteria, in a format that can be used for asset management decision-making. As a result, it is important that staff adequately define the condition rating criteria that should be used and the assets that require a discrete condition rating. When engaging with external consultants to complete condition assessments, it is critical that these details are communicated as part of the contractual terms of the project.

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

Developing a Condition Assessment Schedule

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

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