Asset Management Plan

Township of Killaloe, Hagarty and Richards

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
$32.9 million

Replacement cost of infrastructure per household
$19,507 (2016)

Percentage of assets in fair or better condition
79%

Percentage of assets with assessed condition data
75%

Annual capital infrastructure deficit
$1 million

Recommended timeframe for eliminating annual infrastructure deficit
15-20 Years

Target reinvestment rate
4.0%

Actual reinvestment rate
0.9%

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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:

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 $32.9 million. 79% 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 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.

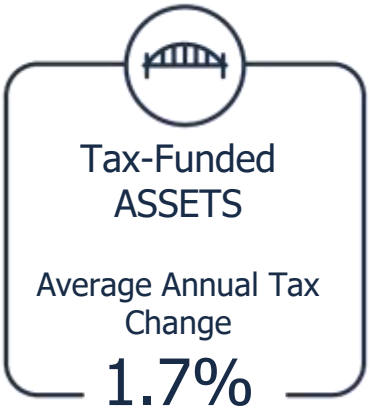
To meet capital replacement and rehabilitation needs for existing infrastructure, prevent infrastructure backlogs, and achieve long-term sustainability, the Township's average annual capital requirement totals $1.3 million. The annual requirements are broken out as such: $700,300 for the Road Network, $254,700 for Non-Core, $162,300 for Water Network, and $212,300 for Wastewater Network. Based on a historical analysis of sustainable capital funding sources, the Township is committing approximately $290,800 towards capital projects or reserves per year. As a result, there is currently an annual funding gap of $1 million.

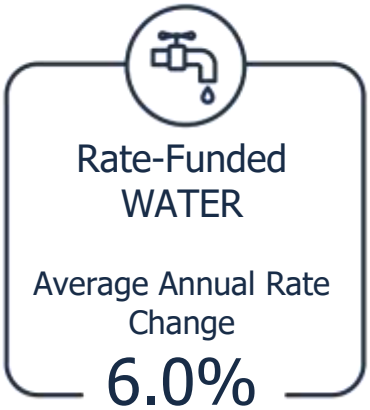
It is important to note that this AMP represents a snapshot in time and is based on the best available processes, data, and information at the Township. Strategic asset management planning is an ongoing and dynamic process that requires continuous improvement and dedicated resources.

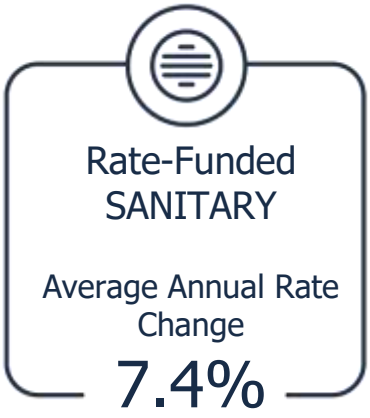
Annual Capital Funding Deficit Per Household

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 15-year plan for tax-funded assets and 20-year plan for rate-funded 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 inventory
- 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

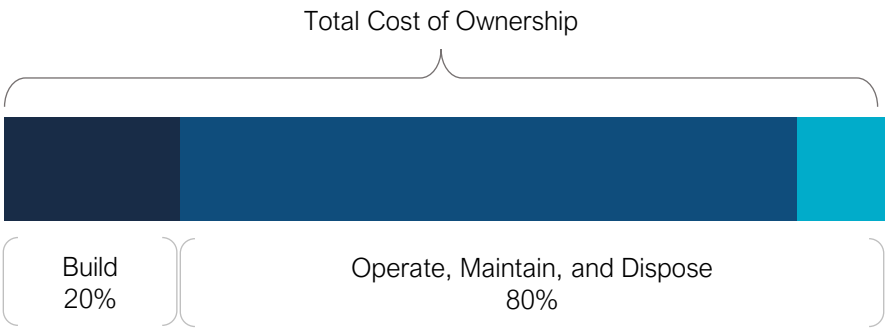
An asset management plan is a living document that should be updated regularly to inform long-term planning

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 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 Township adopted a "Strategic Asset Management Policy" on February 25, 2019, in accordance with Ontario Regulation 588/17.

The objectives of the policy include:

a) Fiscal Responsibilities
b) Delivery of Services/Programs
c) Public Input/Council Direction
d) 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 municipality 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 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:

e) State of Infrastructure
f) Asset Management Strategies
g) Levels of Service
h) 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 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 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 & 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

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)

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 - 5.2.1	Complete
Replacement cost of assets in each category	S.5(2), 3(ii)	4.1.1 - 5.2.1	Complete
Average age of assets in each category	S.5(2), 3(iii)	4.1.3 - 5.2.3	Complete
Condition of core assets in each category	S.5(2), 3(iv)	4.1.2 – 5.2.2	Complete
Description of municipality's approach to assessing the condition of assets in each category	S.5(2), 3(v)	4.1.2 – 5.2.2	Complete
Current levels of service in each category	S.5(2), 1(i-ii)	4.1.6 - 5.2.6	Complete for Core Assets Only
Current performance measures in each category	S.5(2), 2	4.1.6 - 5.2.6	Complete for Core Assets Only
Lifecycle activities needed to maintain current levels of service for 10 years	S.5(2), 4	4.1.4 - 5.2.4	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 4 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 Killaloe, Hagarty and Richards 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
Non-Core Assets (Buildings and 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:

i) **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

j) **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:

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

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 Township 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 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.

3 Portfolio Overview

Key Insights

The total replacement cost of the Township's asset portfolio is $32.9 million

The Township's target re-investment rate is 4.0%, and the actual re-investment rate is 0.9%, contributing to an expanding infrastructure deficit

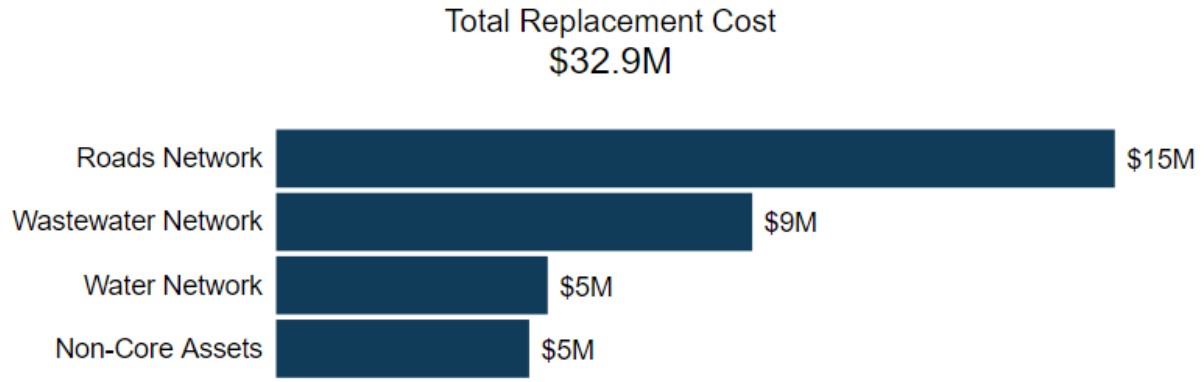
79% of all assets are in fair or better condition

16% of assets are projected to require replacement in the next 10 years

Average annual capital requirements total $1.3 million per year across all assets

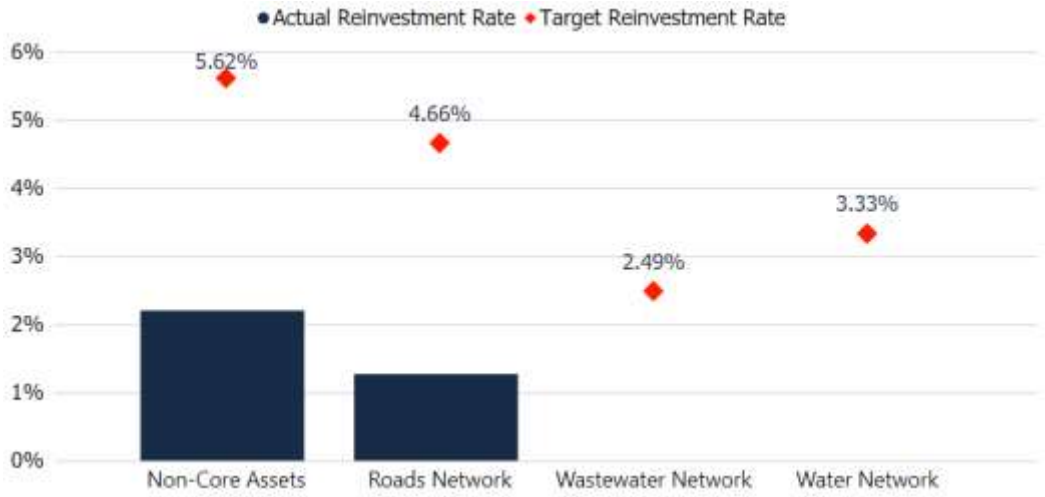
3.1 Total Replacement Cost of Asset Portfolio

The asset categories analyzed in this AMP have a total replacement cost of $32.9 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.



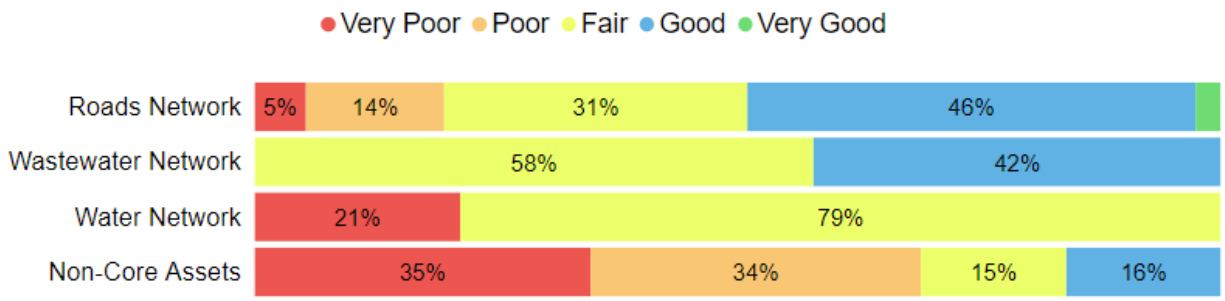
3.2 Target vs. Actual Reinvestment Rate

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 $1.3 million annually, for a target reinvestment rate of 4.0%. Actual annual spending on infrastructure totals approximately $290,800, for an actual reinvestment rate of 0.9%.



3.3 Condition of Asset Portfolio

The current condition of the assets is central to all asset management planning. Collectively, 79% of assets in Killaloe, Hagarty and Richards are in fair or better condition. This estimate relies on both age-based and field condition data.

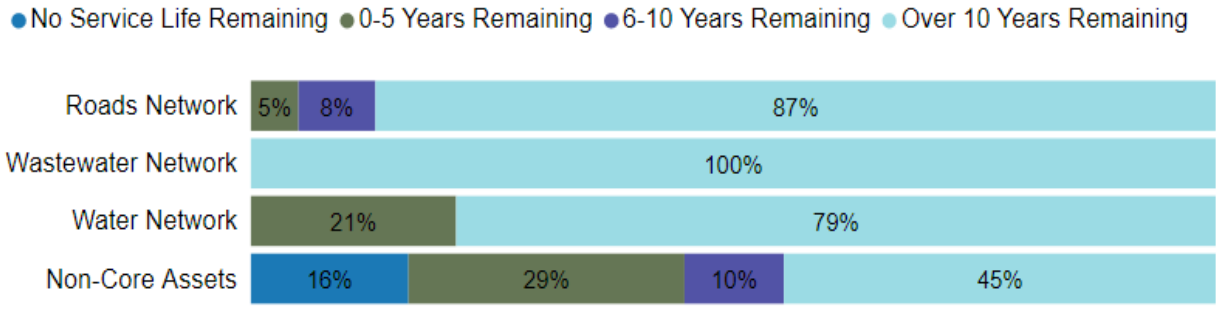


This AMP relies on assessed condition data for 75% of assets; for the remaining portfolio, age is used as an approximation of condition. Assessed condition data is invaluable in asset management planning as it reflects the true condition of the asset and its ability to perform its functions. The table below identifies the source of condition data used throughout this AMP.

Asset Category	Assets with Assessed Condition	Source of Condition Data
Road Network	85%	Staff Assessments
Non-Core Assets	74%	Staff Assessments
Water Network	79%	Staff Assessments
Wastewater Network	58%	Staff Assessments
Total	75%	Staff Assessments

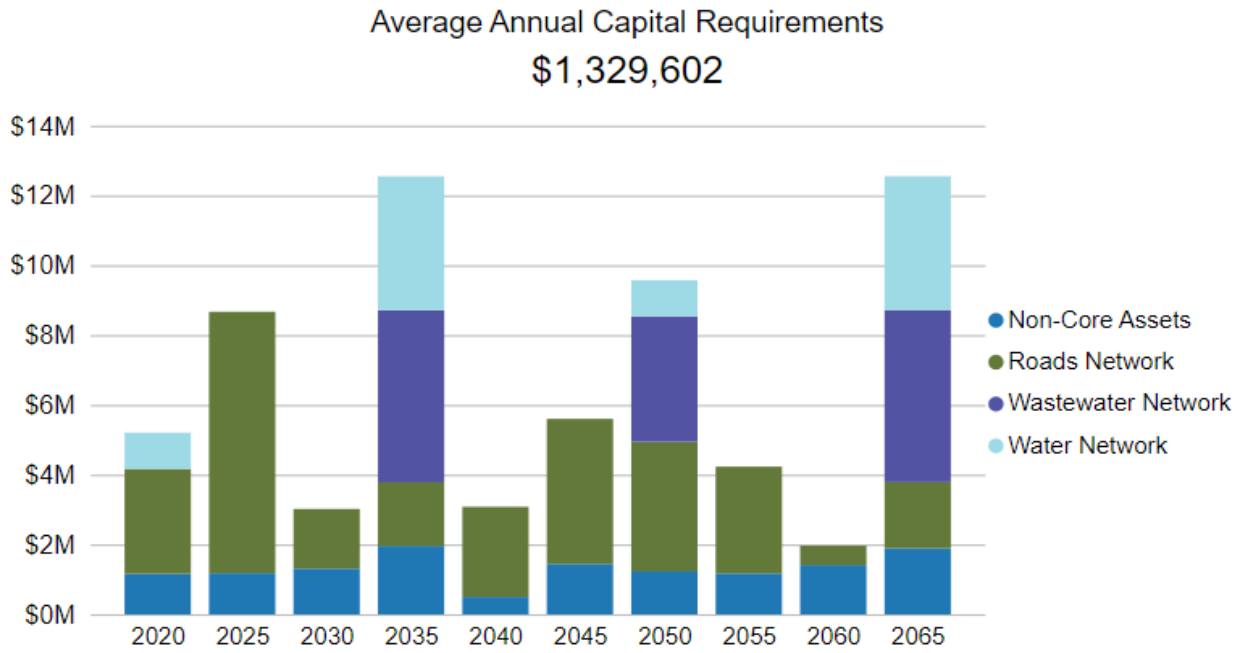
3.4 Service Life Remaining

Based on asset age, available assessed condition data and estimated useful life, 16% 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 50 years.



4 Analysis of Tax-funded Assets

Key Insights

Tax-funded assets are valued at $19.6 million

70% 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 $955,000

Critical assets should be evaluated to determine appropriate risk mitigation activities and treatment options

4.1 Road Network

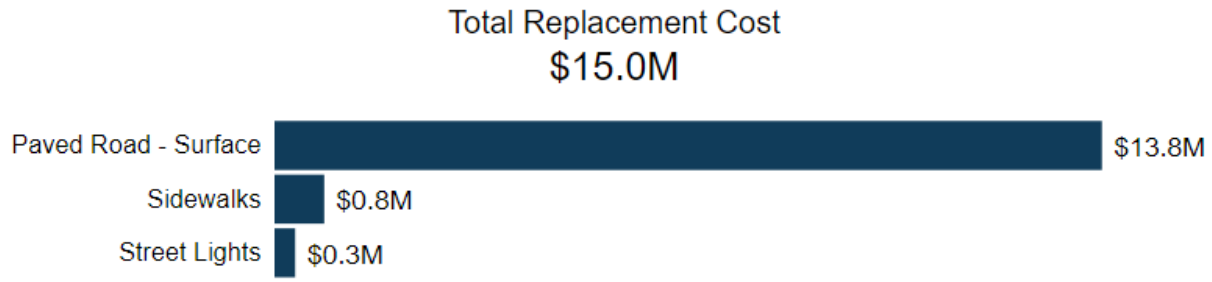
The Road Network is a critical component of the provision of safe and efficient transportation services and represents the highest value asset category in the Township's asset portfolio. It includes all municipally owned and maintained roadways in addition to supporting roadside infrastructure including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

The Township's roads are maintained by the Public Works department who is also responsible for winter snow clearing, ice control and snow removal operations.

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.

Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Paved Road - Surface	155 km	Use-Defined Cost	$13,839,960
Sidewalks	1	CPI Tables	$831,836
Street Lights	246	CPI Tables	$345,617
Unpaved Roads	102 km	Not Planned for Replacement[1]	
Total			**$15,017,413**

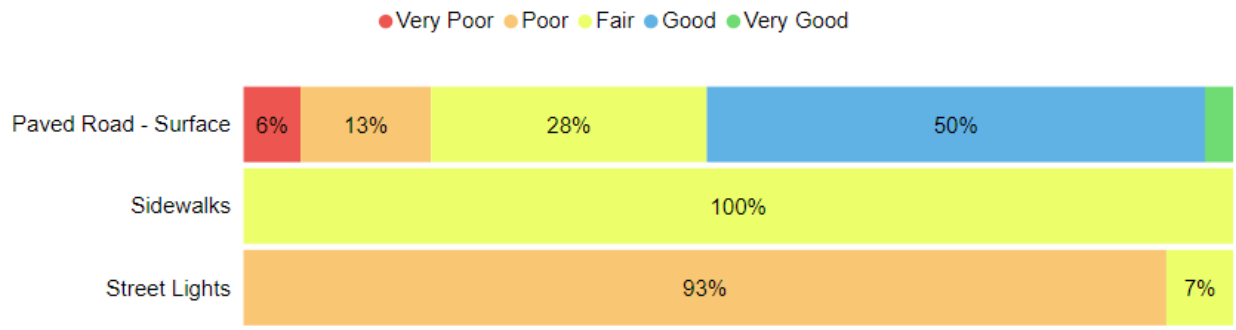


[1] Unpaved roads typically undergo perpetual maintenance activities to maintain them at an adequate state of repair.

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
Paved Road - Surface	69%	Good	78% Assessed
Sidewalks	80%	Very Good	100% Assessed
Street Lights	51%	Fair	93% Assessed
Average	**69%**	**Good**	**85% Assessed**



Current Approach to Condition Assessment

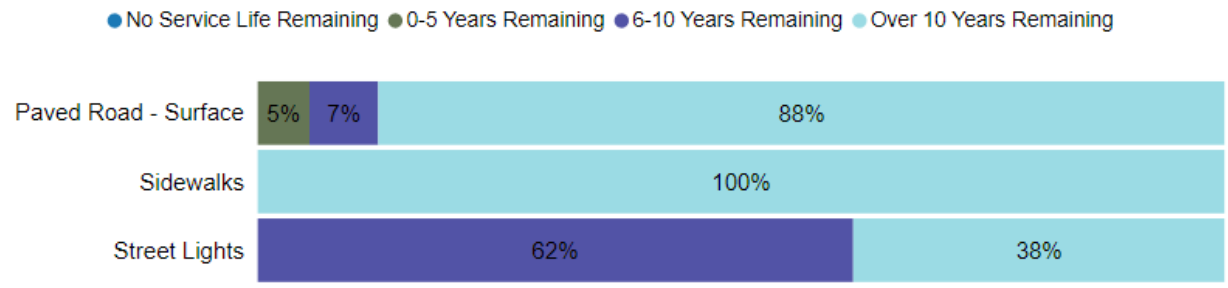
Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the municipality's current approach:

- The data in this AMP is not informed by a formal condition assessment strategy; the Township performs condition inspections of roads during road patrols and gather internal condition ratings
- Staff perform annual deficiency testing on their sidewalks to ensure their compliance with Minimum Maintenance Standards (MMS). Other road appearances are inspected on an as-needed basis for MMS compliance as well.

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. Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

Segment	Estimated Useful Life (Years)	Average Asset Age (Years)	Average Service Life Remaining (Years)
Paved Road - Surface	15-30 years	15.8	16.5
Sidewalks	20 years	70.1	15.8
Street Lights	15-20 years	5.9	7.3
Average		**9.8**	**10.8**



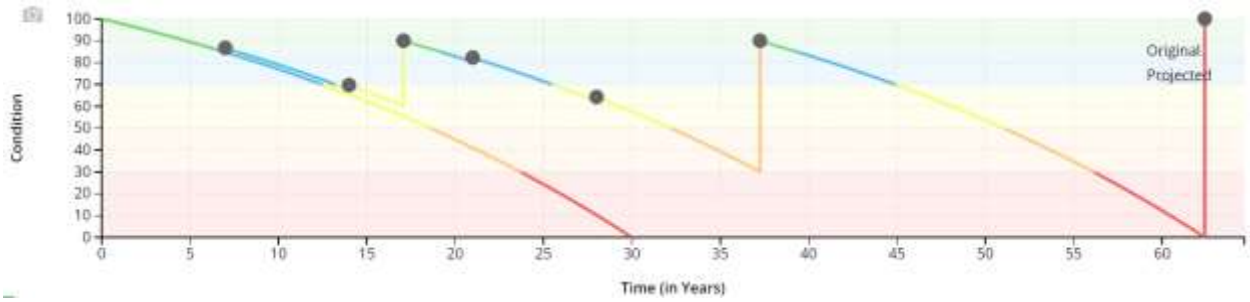
Each asset's Estimated Useful Life should be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

4.1.4 Lifecycle Management Strategy

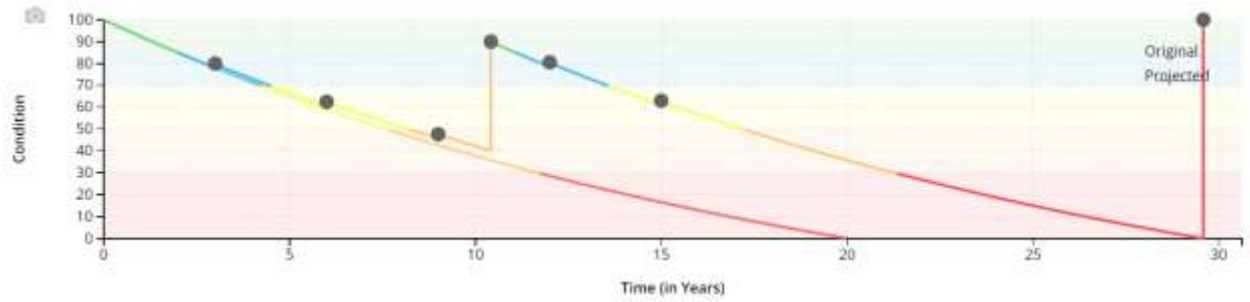
The condition or performance of most assets will deteriorate over time. This process is affected by a range of factors including an asset's characteristics, location, utilization, maintenance history and environment.

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	Preventative Maintenance	7 Years (Repeated)
Single Mill & Pave	Rehabilitation	60 Condition
Double Mill & Pave	Rehabilitation	30 Condition
Full Reconstruction	Replacement	0 Condition



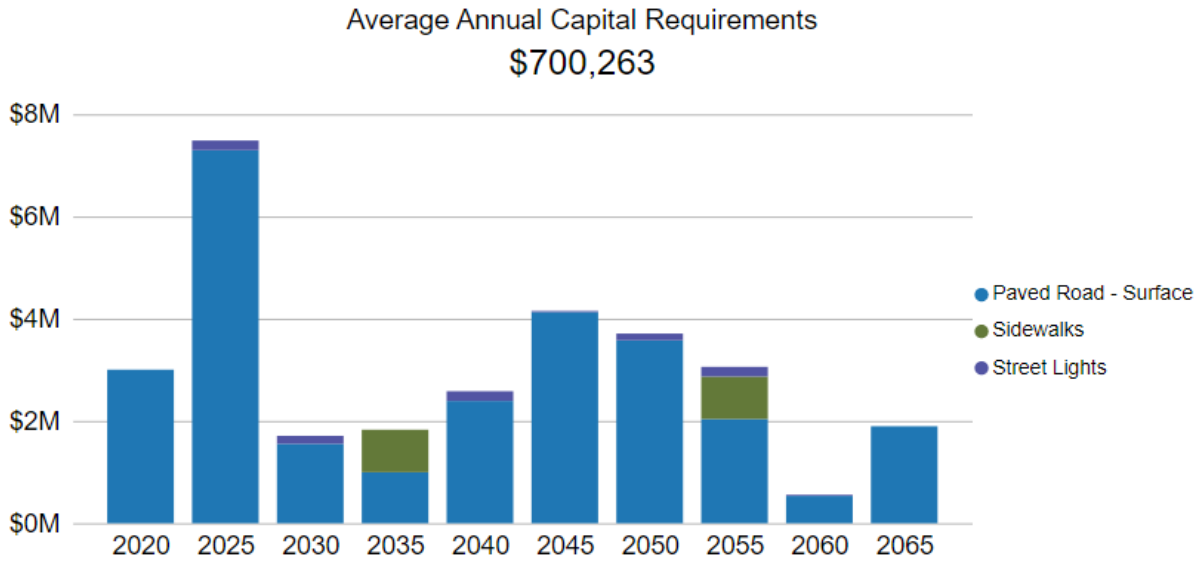
Paved Roads (LCB)		
Event Name	**Event Class**	**Event Trigger**
Crack Sealing	Preventative Maintenance	3 Years (Repeated)
Single Surface Treatment	Rehabilitation	40 Condition
Full Reconstruction	Replacement	50 Years



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 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.

Risks to Current Asset Management Strategies

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

Lifecycle Management Strategies

The current lifecycle management strategy for roads is considered more reactive than proactive. It is a challenge to find the right balance between maintenance, capital rehabilitation, and the reconstruction of roads. Staff hope to formally adopt better defined strategies as defined above that will replace inferior infrastructure design, extend pavement lifecycle, and the lower total cost. These strategies will require sustainable annual funding to minimize the deferral of capital works.

Extreme Weather Events

An increase in the frequency and intensity of precipitation events can result in flooding of sections of the road network, especially those in low lying areas or those near Round Lake. The drainage capacity of the road network is not always

sufficient to withstand heavy water flow, particularly on gravel 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.

4.1.6 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	Very Poor (0-20% condition): Widespread signs of deterioration. Requires remedial work to bring road up to standard. Level of service is affected. Poor (20-40% condition): Large portions of road exhibiting deterioration with rutting, potholes, distortions, longitude and lateral cracking. Road is mostly below desired level of service. Fair (40-60% condition): Some sections of road starting to deteriorate. Requires some remedial work and surface upgrade in the near future. Good (60-80% condition): Road is in overall good condition. Few sections are starting to show signs of minimal deterioration. Very Good (80-100% condition): Road is well maintained and in excellent condition. Surface was newly or recently upgraded. No signs of deterioration or remedial work required.

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)	0.18
	Lane-km of local roads (MMS classes 5 and 6) per land area (km/km^2)	0.59
Quality	Average pavement condition index for paved roads in the municipality	78% (Good)
	Average surface condition for unpaved roads in the municipality (e.g. excellent, good, fair, poor)	Poor/Fair
Performance	Capital reinvestment rate	1.3%

4.1.7 Recommendations

Asset Inventory

- Review road and sidewalk inventory to ensure full comprehensive inventory is accounted for and can be utilized for accurate capital planning.
- Review attribute information for assets, some metrics may be inaccurate or missing as it pertains to lengths, surface material, road class, and segmentation.
- The sidewalk inventory includes a single pooled asset that should be broken into discrete segments to allow for detailed planning and analysis.

Condition Assessment Strategies

k) The Township gathered staff assessed condition data for roads in 2020. Consider adopting a condition assessment strategy and gathering updated assessment of all roads every 1-3 years.

Lifecycle Management Strategies

l) Implement the identified lifecycle management strategies for paved roads to realize potential cost avoidance and maintain a high quality of road pavement condition.
m) Evaluate the efficacy of the Township's lifecycle management strategies at regular intervals to determine the impact cost, condition and risk.

Risk Management Strategies

n) 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.
o) 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 Non-Core Assets

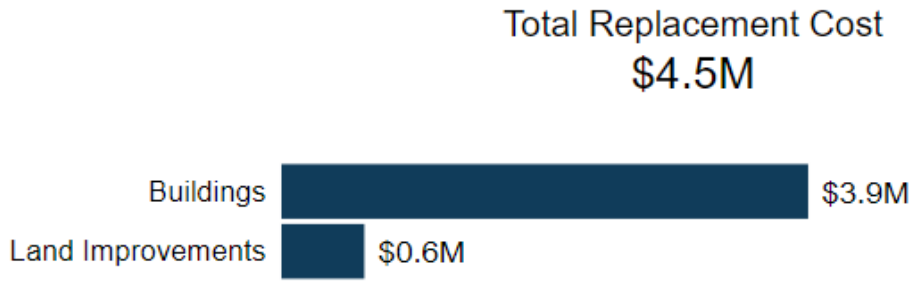
The Township of Killaloe, Hagarty and Richards owns and maintains several facilities and land improvements that provide key services to the community. These include:

p) Administrative offices
q) Fire stations and associated offices and facilities
r) Public works garages and storage sheds
s) Community centres and outdoor parks

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 Non-Core asset inventory.

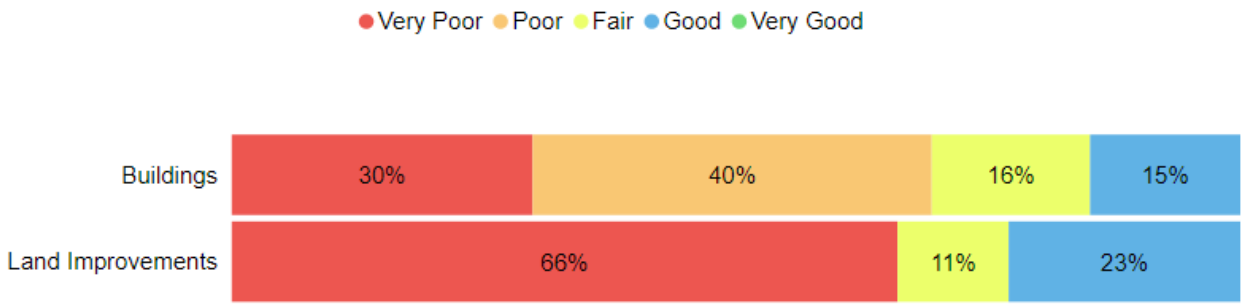
Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Buildings	37	CPI Tables	$3,916,595
Land Improvements	7	CPI Tables	$618,031
Total			**$4,534,626**



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.

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Buildings	38%	Poor	74% Assessed
Land Improvements	22%	Poor	77% Assessed
Average	**36%**	**Poor**	**74% Assessed**

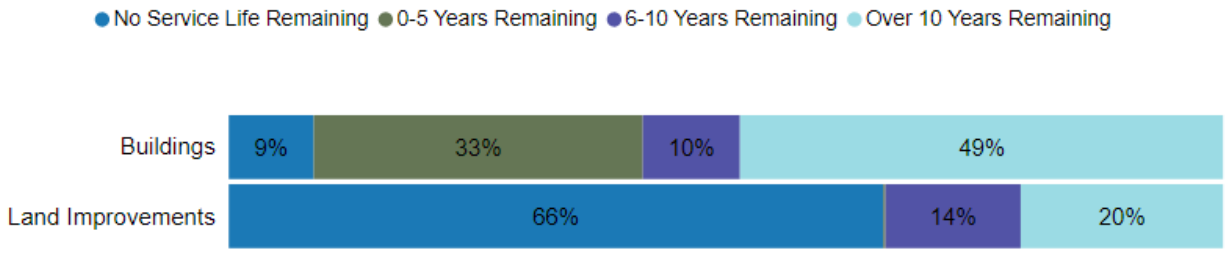


To ensure that the Township's non-core assets continues to provide an acceptable level of service, the Township should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of maintenance,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

4.2.3 Estimated Useful Life & Average Age

The Estimated Useful Life for Non-core 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. Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

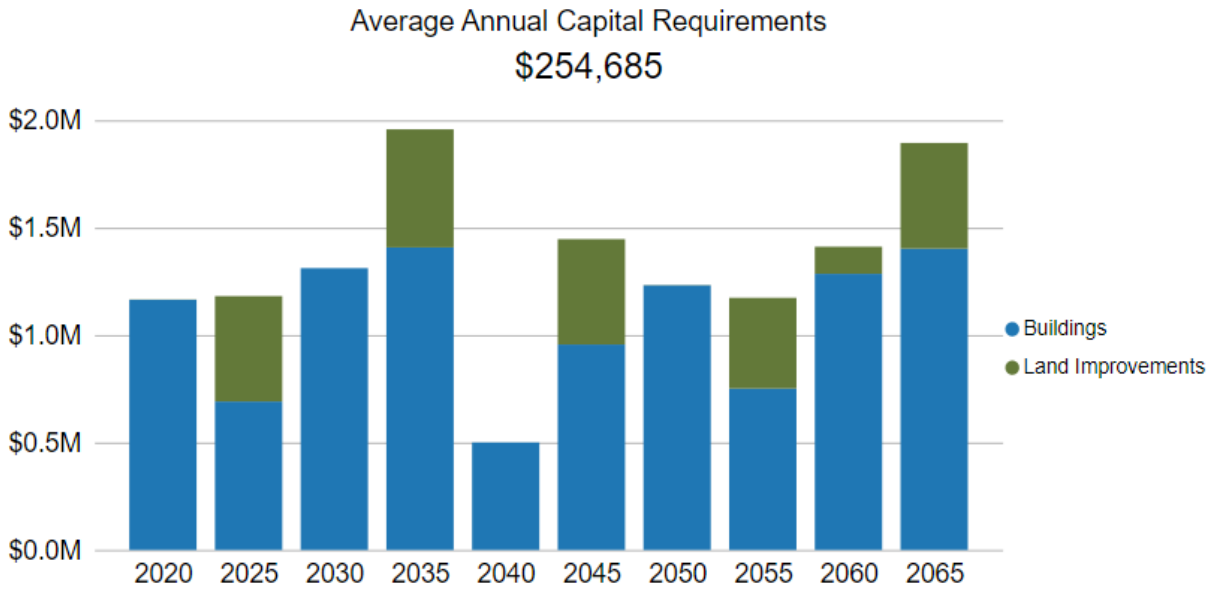
Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Buildings	8-30 years	20.5	9.8
Land Improvements	10-25 years	13.7	5.1
Average		**19.4**	**9.0**



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.

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.

4.2.4 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.

4.2.5 Asset Management Strategies

The documentation of lifecycle management strategies, current levels of service, and risk is 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 a providing a higher level of service.

In accordance with O. Reg. 588/17, the Township will continue 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.

4.2.6 Recommendations

Asset Inventory

t) The Township's asset inventory contains pooled assets for facilities. Facilities consist of several separate capital components that have unique estimated useful lives and require asset-specific lifecycle strategies. Staff should work towards a component-based inventory of all facilities to allow for component-based lifecycle planning.

Condition Assessment Strategies

u) The most recent condition assessment took place in 2013. The Township should implement regular condition assessments for all facilities and land improvements to better inform short- and long-term capital requirements.

Risk Management Strategies

v) 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.

w) 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 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 $13.4 million

92% 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 $375,000

Critical assets should be evaluated to determine appropriate risk mitigation activities and treatment options

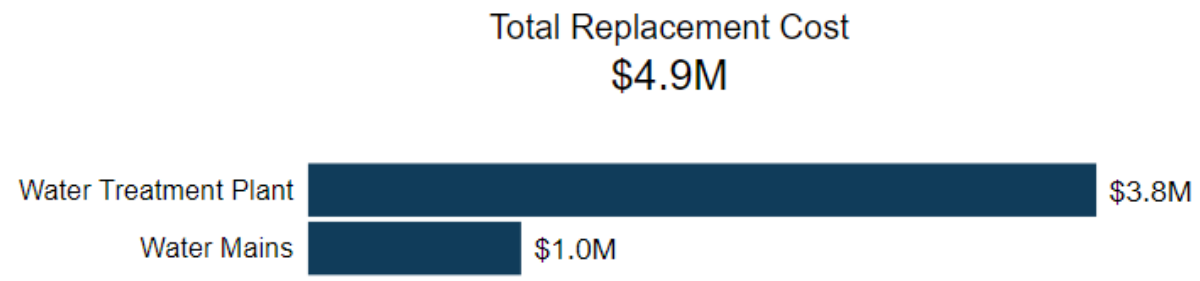
5.1 Water Network

The water services provided by the Township are overseen by municipal staff and Ontario Clean Water Agency (OCWA). They are responsible for the water treatment plant and underground infrastructure.

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.

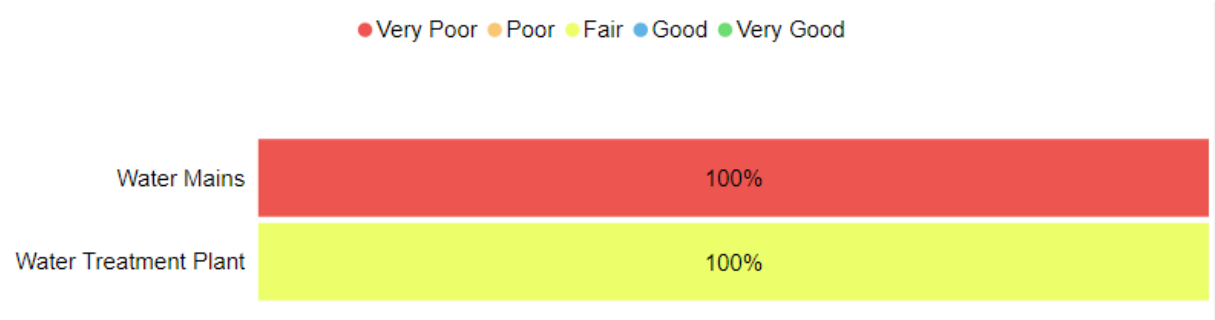
Asset Segment	Quantity (Components)	Replacement Cost Method	Total Replacement Cost
Water Mains	2.4 km	User-Defined Cost	$1,036,201
Water Treatment Plant	1 (15)	CPI Tables	$3,830,599
Total			**$4,866,800**



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 Mains	10%	Very Poor	Age-based
Water Treatment Plant	56%	Fair	100% Assessed
Average	**46%**	**Fair**	**79% 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 municipality's current approach:

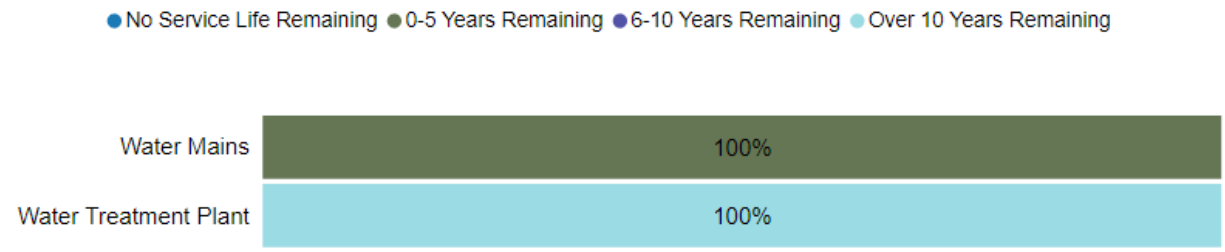
x) Staff primarily rely on the age, pipe material, and number of watermain breaks to determine the projected condition of the pipes.

y) There are no formal condition assessment programs in place for the Water Network. Assets are inspected on an as-needed basis or in accordance with regulations within the Safe Drinking Water Act in the case of the treatment plant.

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. Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Water Mains	27-30 years	26.8	2.9
Water Treatment Plant	30 years	27.1	16.9
Average		**26.8**	**3.9**



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

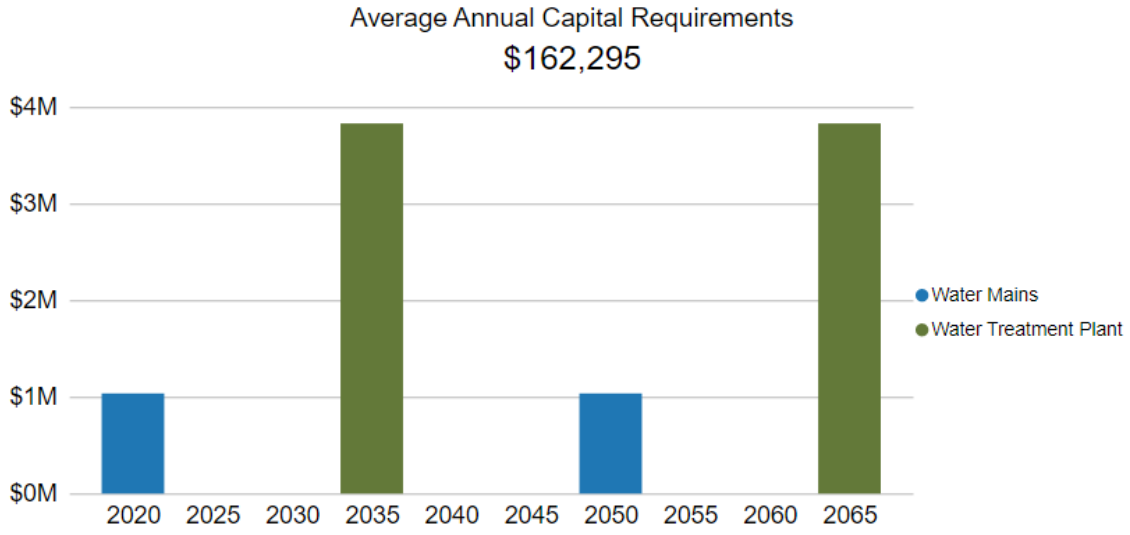
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Maintenance	Periodic pressure testing is done to identify deficiencies and potential leaks.
Rehabilitation	Trenchless re-lining of water mains presents significant challenges and is not always a viable option. Staff assess its viability on a case-by-case basis. Components of the treatment plant are repaired and/or replaced proactively with the goal of extending the life of the assets.
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.

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:

Asset Data & Information

There is a lack of confidence in asset data and information for the Water Network. Staff is actively working towards improving the quality of the available inventory data for the water network. Staff plan to prioritize data refinement efforts to increase confidence in the accuracy and reliability of asset data and information. Staff also plan to improve the accuracy of condition data for above ground asset components. Once completed there will be greater confidence in the development of data-driven strategies to address infrastructure needs.

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	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 Township delivers boil water advisories to all residents by posting a notice on the municipal website, sharing the information with local news stations, and posting a paper flyer at each household.

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	6.4%
	% of properties where fire flow is available	6.4%[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%

[2] Assumes all 108 properties connected to the water system have adequate fire flow protection.

5.1.7 Recommendations

Asset Inventory

- There are a number of pooled watermain assets that require further segmentation and length measurements to allow for asset-specific lifecycle planning and costing.
- The Township's asset inventory contains a single pooled assets the Water Treatment Plant. 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.
- Inventory other water assets that may be part of the system such as valves, hydrants, etc. for a more comprehensive view of the entire water network portfolio.

Condition Assessment Strategies

- Identify condition assessment strategies for high value and high-risk water network assets.
- Utilize pipe age, material, size, breakage rate, depth, soil type, and/or top road surface to estimate condition for water mains.

Risk Management Strategies

z) 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.

aa) 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.

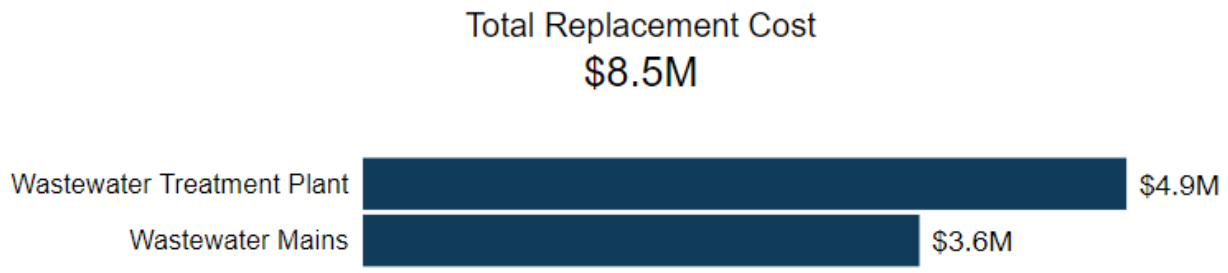
5.2 Wastewater Network

The wastewater services provided by the Township are overseen by municipal staff and Ontario Clean Water Agency (OCWA). They are also responsible for the wastewater treatment plant and underground infrastructure.

5.2.1 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 Wastewater Network inventory.

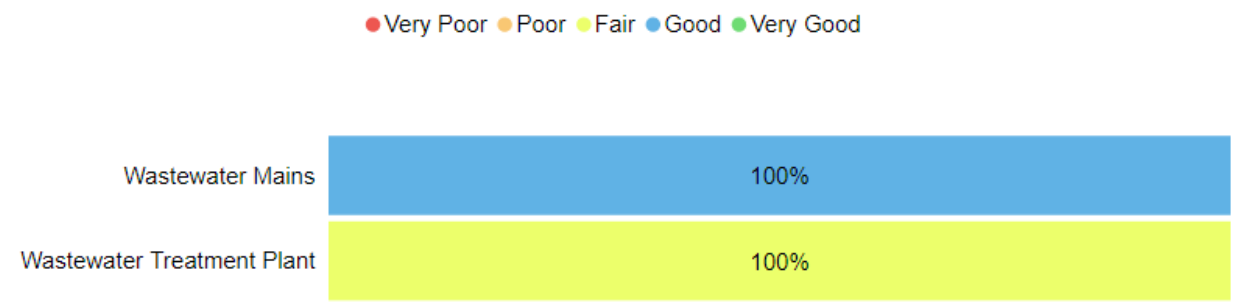
Asset Segment	Quantity (components)	Replacement Cost Method	Total Replacement Cost
Wastewater Mains	8.5 km	User-Defined Cost	$3,595,556
Wastewater Treatment Plant	1 (5)	CPI Tables	$4,932,558
			$8,528,114



5.2.2 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.

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Wastewater Mains	84%	Very Good	Age-based
Wastewater Treatment Plant	56%	Fair	100% Assessed
Average	**68%**	**Good**	**58% Assessed**



To ensure that the Township's Wastewater 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 Wastewater 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 municipality's current approach:

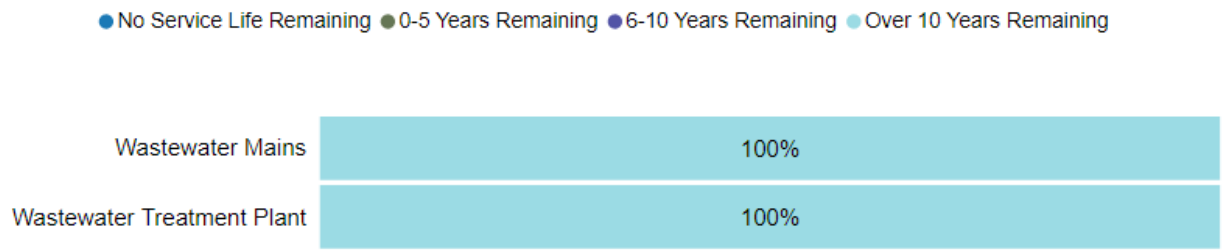
- Staff primarily rely on the age, pipe material, and any CCTV inspection results that have been conducted to determine the projected condition of the pipes.
- There are no formal condition assessment programs in place for the Wastewater Network. Staff assess assets on an as-needed basis, or in accordance with the Ministry of Environment, Conservation and Parks (MECP) regulations.

5.2.3 Estimated Useful Life & Average Age

The Estimated Useful Life for Wastewater 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.

Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has been assigned an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Wastewater Mains	75 years	41.1	33.9
Wastewater Treatment Plant	30 years	41.1	16.9
Average		**41.1**	**33.3**



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.

5.2.4 Lifecycle Management Strategy

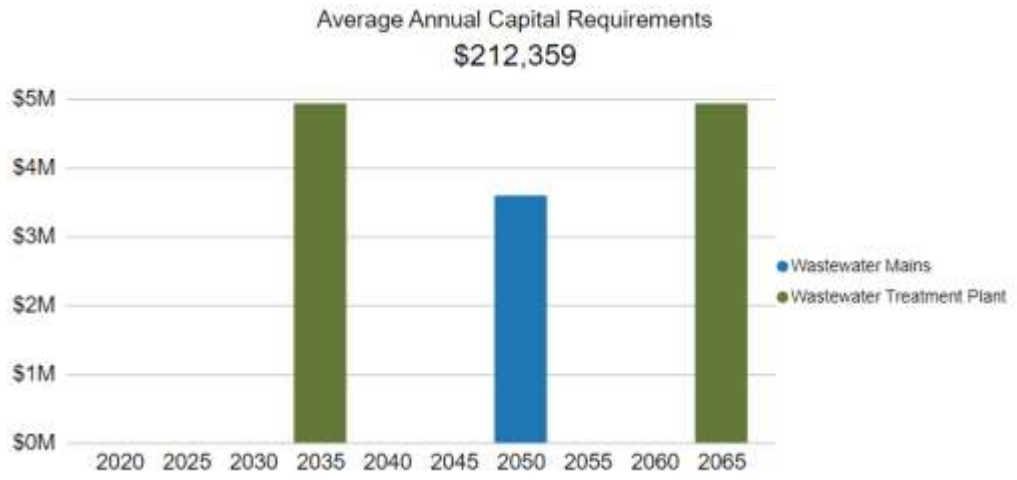
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Maintenance	Smoke testing and pressure testing are performed when required. Flushing is performed on an annual basis.
Rehabilitation	Trenchless re-lining of wastewater 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.
	Components of the wastewater treatment plan are repaired/replaced as needed to ensure the operation of the plant meets MECP requirements.
	Replacement activities are identified based on an analysis of the main break rate as well as any issues identified during regular maintenance activities.

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.

5.2.5 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:

Asset Data & Information

There is a lack of confidence in asset data and information for the Wastewater Network. There is a lack of confidence in the available inventory data for the sanitary sewer network. Staff plan to prioritize data refinement efforts to increase confidence in the accuracy and reliability of asset data and information. Staff hope to improve the accuracy of condition data by advancing their CCTV inspection program and utilizing the information to provide a condition rating for underground assets. Once completed there will be greater confidence in the development of data-driven strategies to address infrastructure needs.

Infrastructure Design

A portion of the wastewater network is made up of combined sewers. Combined sewers can lead to overflows and sanitary water backups in people's homes and other habitable areas such as beaches. Storm water flow into combined sewers reduces the overall capacity available for the sanitary system, and places greater demands on the treatment system. The Township is dedicated to proactively separating wastewater and storm water sewers in accordance with provincial regulations. However, this is a costly and timely endeavour.

5.2.6 Levels of Service

The following tables identify the Township'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 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 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	Not Applicable. No 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	Not Applicable. No Combined Sewers
	Description of how stormwater can get into sanitary sewers in the municipal wastewater system,	Stormwater can enter into sanitary sewers due to cracks in sanitary mains or through indirect connections (e.g.

Service Attribute	Qualitative Description	Current LOS (2020)
	causing sewage to overflow into streets or backup into homes	weeping tiles). In the case of heavy rainfall events, sanitary sewers may experience a volume of water and 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 biological oxygen demand. The Environmental Compliance Approval (ECA) identifies the effluent criteria for municipal wastewater treatment plants.

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	18.9%
Reliability	# of events per year where combined sewer flow in the municipal wastewater system exceeds system capacity compared to the total number of properties connected to the municipal wastewater system	0
	# 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	0%

5.2.7 Recommendations

Asset Inventory

- The Township's asset inventory contains a single pooled assets the Wastewater Treatment Plant. 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.

Condition Assessment Strategies

- Identify condition assessment strategies for high value and high-risk wastewater assets. Consider conducting CCTV inspections for underground assets to gather condition data for wastewater mains.

Risk Management Strategies

bb) 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.

cc) 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

dd) A trenchless re-lining strategy is expected to extend the service life of sanitary mains at a lower total cost of ownership and should be implemented to extend the life of infrastructure at the lowest total cost of ownership.

ee) Evaluate the efficacy of the Township'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 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.

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

Very mild population growth is expected

The costs of growth should be considered in long-term funding strategies that are designed to maintain the current level of service

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 County of Renfrew Official Plan (March 2020)

The County of Renfrew adopted a new Official Plan in March 2020 to replace the 2002 Official Plan. The County is responsible for the allocation of growth to the local municipalities, which includes twelve Townships and five Towns.

The objectives of the Plan include the promotion of efficient and cost-effective development – consistent with the needs for growth – to ensure the financial viability of infrastructure and public services as demonstrated through asset management planning. The Plan specifies that development of new infrastructure must be support by the municipality's asset management plan to ensure financial viability of its lifecycle.

Killaloe, Hagarty and Richards, along with 11 other municipalities in the region, utilize the County's Official Plan as their detail Official Plan. The following table provides population growth projections based on 2011 Census data.

Municipality	Base Year Population (2011)	Scenerio	2016	2021	2026	2031	2036
Renfrew County	86,534	Low	88,904	91,360	93,906	96,546	99,282
		High	90,257	94,178	98,308	102,659	107,245
Killaloe, Hagarty and Richards	2,402	Low	2,414[3]	2,426	2,438	2,450	2,463
		High	2,438	2,475	2,512	2,550	2,589

The Township of Killaloe, Hagarty and Richards is expected to experience mild growth, making up less than 1% of the growth across the County.

[3] The most recent Census data available at the time of drafting this AMP is from 2016. The recorded population of Killaloe, Hagarty and Richards in 2016 is 2,420, which aligns with the low growth scenario.

6.2 Impact of Growth on Lifecycle Activities

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

The Township has developed and adopted a number of documents to guide strategic planning and promote efficient growth and development. Such documents include the Wellhead Protection Area Study (2003), Emergency Plan (2017), Accessibility Plan (2013), and the Multi-Year Accessibility Plan (2017).

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

7 Financial Strategy

Key Insights

The Township is committing approximately $290,800 towards capital projects per year from sustainable revenue sources

Given the annual capital requirement of $1.3 million, there is currently a funding gap of $1 million annually

For tax-funded assets, we recommend increasing tax revenues by 1.7% each year for the next 15 years to achieve a sustainable level of funding

For the Water Network, we recommend increasing rate revenues by 6.0% annually for the next 20 years to achieve a sustainable level of funding

For the Wastewater Network, we recommend increasing rate revenues by 7.4% 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 a long-term financial plan (LTFP). The development of a comprehensive financial plan will allow Township of Killaloe-Hagarty-Richards to identify the financial resources required for sustainable asset management based on existing asset inventories, desired levels of service, and projected growth requirements.

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

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

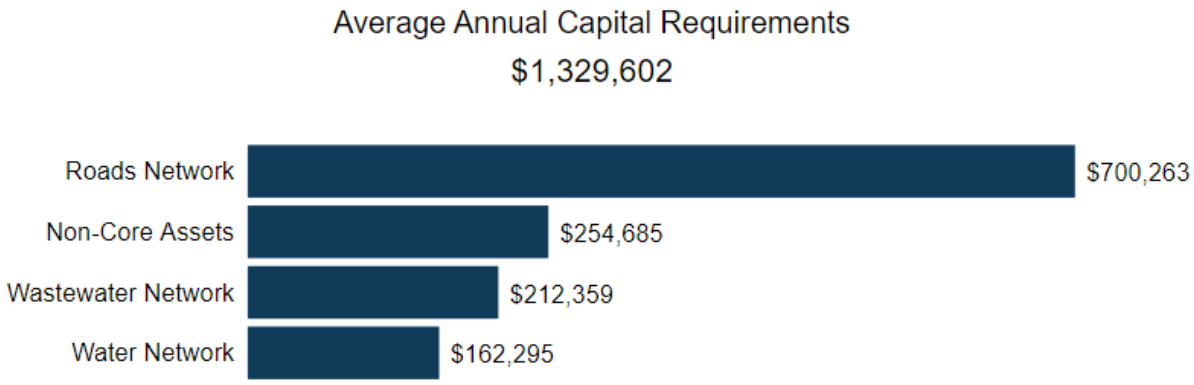
1. In order to reduce financial requirements, consideration has been given to revising service levels downward.

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 $1.3 million annually to address capital requirements for the assets included in this AMP.



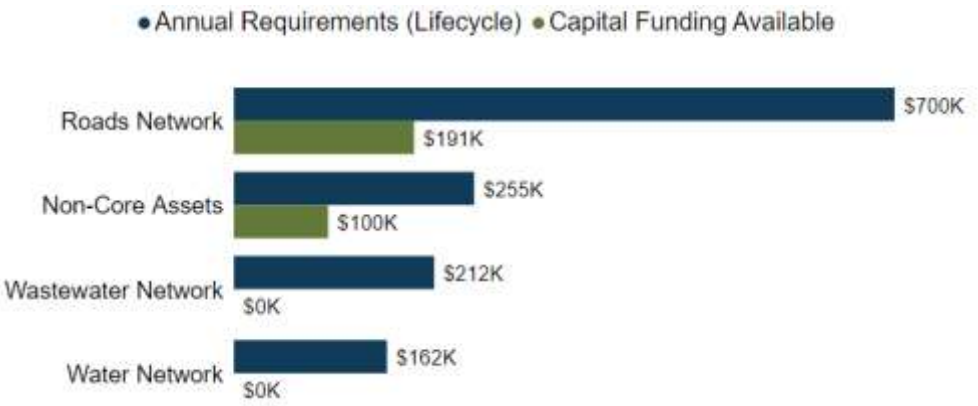
For most asset categories the annual requirement has been calculated based on a "replacement only" scenario, in which capital costs are only incurred at the construction and replacement of each asset.

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 Township's roads and sanitary sewer mains respectively. The development of these strategies allows for a comparison of potential cost avoidance if the strategies were to be implemented.

The implementation of a proactive lifecycle strategy can lead to direct and indirect cost savings. Potential cost savings are influenced by current rehabilitation and reconstruction costs, the coordination of projects, and the criticality of the assets. Beyond cost avoidance, having proactive lifecycle strategies can also improve other valuable levels of service to the Township such as lowering health and safety hazards, decreasing the number of complaints received, and meeting Public expectations.

Annual Funding Available

Based on a historical analysis of sustainable capital funding sources, the Township is committing approximately $291k towards capital projects per year. Given the annual capital requirement of $1.3 million, there is currently a funding gap of $1 million annually.



7.2 Funding Objective

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

1. **Tax Funded Assets:** Road Network, Non-Core Assets
2. **Rate-Funded Assets:** Water Network, Wastewater Network

Note: For the purposes of this AMP, we have excluded unpaved 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, Killaloe-Hagarty-Richards's average annual asset capital expenditure 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	
Non-Core Assets	254,685	100,072	-	-	100,072	154,613
Road Network	700,263	17,164	73,414	100,141	190,719	509,544
Total	**954,948**	**117,236**	**73,414**	**100,141**	**290,791**	**664,157**

The average annual capital expenditure requirement for the above categories is $955k. Annual revenue currently allocated to these assets for capital purposes is $291k leaving an annual deficit of $664k. Put differently, these infrastructure categories are currently funded at 30.5% of their long-term requirements.

7.3.2 Current Funding Position

In 2020, Township of Killaloe-Hagarty-Richards has annual tax revenues of $2.59 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
Non-Core Assets	6.0%
Road Network	19.7%
Total	**25.7%**

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

a) Killaloe-Hagarty-Richards's formula based OCIF grant is scheduled to remain at from $100k in 2021.
b) Killaloe-Hagarty-Richards currently has no debt payments for these asset categories.

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:

Tax Funded Assets				
	5 Years	10 Years	15 Years	20 Years
Infrastructure Deficit	664,157	664,157	664,157	664,157
Change in Debt Costs	-	-	-	-
Change in OCIF Grants	-	-	-	-
Resulting Infrastructure Deficit	**664,157**	**664,157**	**664,157**	**664,157**
Tax Increase Required	25.7%	25.7%	25.7%	25.7%
Average Annual Increase Required	**5.1%**	**2.6%**	**1.7%**	**1.3%**

7.3.3 Financial Strategy Recommendations

Considering all the above information, we recommend the 15-year option. This involves full capital expenditure funding being achieved over 15 years by:

a) increasing tax revenue by 1.7% each year for the next 15 years solely for the purpose of phasing in full funding to the asset categories covered in this section of the AMP.
b) allocating the current gas tax and OCIF revenue as outlined previously.
c) allocating the scheduled OCIF grant increases to the infrastructure deficit as they occur.
d) reallocating appropriate revenue from categories in a surplus position to those in a deficit position.
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 any applicable OCIF formula-based funding since this funding is a multi-year commitment[4].
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 $698k for Non-Core Assets.
Prioritizing future projects will require the current data to be replaced with 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, Killaloe-Hagarty-Richards's average annual asset capital expenditure requirements, current funding positions, and funding increases required to achieve full funding on assets funded by user rates.

Asset Category	Avg. Annual Requirement	Annual Funding Available			Annual Deficit
		Rates	To Operations	Total Available	
Water Network	162,295	135,525	-135,525	-	162,295
Wastewater Network	212,359	143,020	-143,020	-	212,359
	374,654	**278,545**	**-278,545**	**-**	**374,654**

The average annual capital expenditure requirement for the above categories is $375k. Currently, no annual revenue is allocated to these assets for capital purpose. Put differently, these infrastructure categories are currently funded at 0% of their long-term capital requirements.

7.4.2 Full Funding Requirements

In 2020, Killaloe-Hagarty-Richards had annual water revenues of $135k and annual wastewater revenues of $143k. 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	119.8%
Wastewater Network	148.5%

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				Wastewater Network			
	5 Years	10 Years	15 Years	20 Years	5 Years	10 Years	15 Years	20 Years
Infrastructure Deficit	162,295	162,295	162,295	162,295	212,359	212,359	212,359	212,359
Tax Increase Required	119.8%	119.8%	119.8%	119.8%	148.5%	148.5%	148.5%	148.5%
Annually:	**24.0%**	**12.0%**	**8.0%**	**6.0%**	**29.7%**	**14.9%**	**9.9%**	**7.4%**

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 6.0% for the Water Network each year for the next 20 years and 7.4% for the Wastewater 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.
c) increasing existing and future infrastructure budgets by the applicable inflation index on an annual basis in addition to the deficit phase-in.

Notes:

1. 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. Current data shows no pent-up investment demand for the Water & Wastewater Networks.

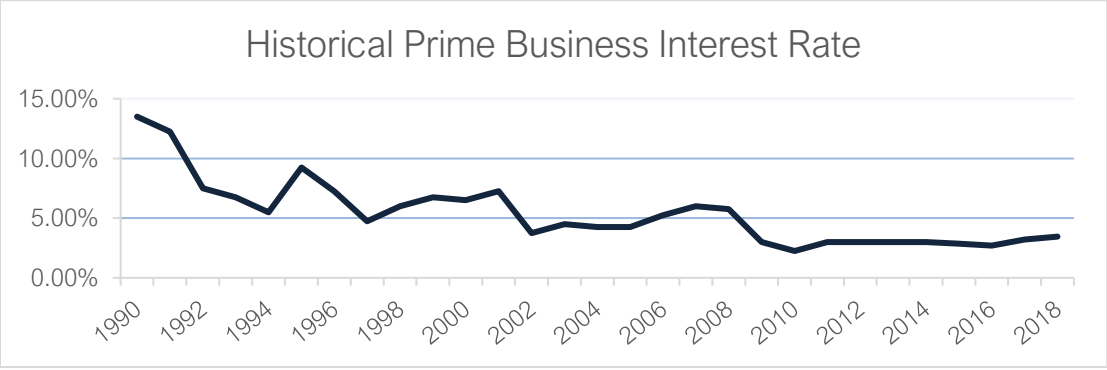
Prioritizing future projects will require the current data to be replaced by condition-based data. Although our recommendations include no further use of debt, the results of the condition-based analysis may require otherwise.

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%.

Killaloe-Hagarty-Richards has no historical use of debt for investing in the asset categories as listed. The revenue options outlined in this plan allow Killaloe-Hagarty-Richards to fully fund its long-term infrastructure requirements without further use of debt.

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 Killaloe-Hagarty-Richards.

Asset Category	Balance at December 31, 2020
Non-Core Assets	3,295,000
Road Network	511,000
Total Tax Funded	**3,806,000**
Water Network	22,000
Wastewater Network	-
Total Rate Funded	**22,000**

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 consider when determining their capital reserve requirements include:

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

These reserves are available for use by applicable asset categories during the phase-in period to full funding. This coupled with Killaloe-Hagarty-Richards'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 2025, Ontario Regulation 588/17 will require Killaloe-Hagarty-Richards 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	$15	Fair	Annual Requirement:	$700,000
			Funding Available:	$X
			Annual Deficit:	**$X**
Non-Core	$4.5	Fair	Annual Requirement:	$255,000
			Funding Available:	$X
			Annual Deficit:	**$X**
Water Network	$4.9	Good	Annual Requirement:	$162,000
			Funding Available:	$X
			Annual Deficit:	**$X**
Wastewater Network	$8.5	Fair	Annual Requirement:	$212,000
			Funding Available:	$X
			Annual Deficit:	**$X**
Overall	$32.9	Fair	Annual Requirement:	$1,329,000
			Funding Available:	$X
			Annual Deficit:	**$X**

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.

Tax-Funded Assets

Road Network											
Segment	Backlog	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Paved Road - Surface	$0	$863,591	$23,276	$656,551	$25,418	$1,435,127	$952	$1,282,187	$8,240	$6,007,537	$76
Sidewalks	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Street Lights	$0	$0	$0	$0	$0	$0	$0	$0	$189,423	$0	$0
Total	**$0**	**$863,591**	**$23,276**	**$656,551**	**$25,418**	**$1,435,127**	**$952**	**$1,282,187**	**$197,663**	**$6,007,537**	**$76**

Non-Core Assets											
Segment	Backlog	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Buildings	$291,752	$43,336	$43,052	$432,496	$645,546	$0	$173,894	$0	$0	$177,440	$244,178
Land Improvements	$406,615	$0	$0	$0	$1,336	$0	$0	$0	$0	$0	$83,957
Total	**$698,367**	**$43,336**	**$43,052**	**$432,496**	**$646,882**	**$0**	**$173,894**	**$0**	**$0**	**$177,440**	**$328,135**

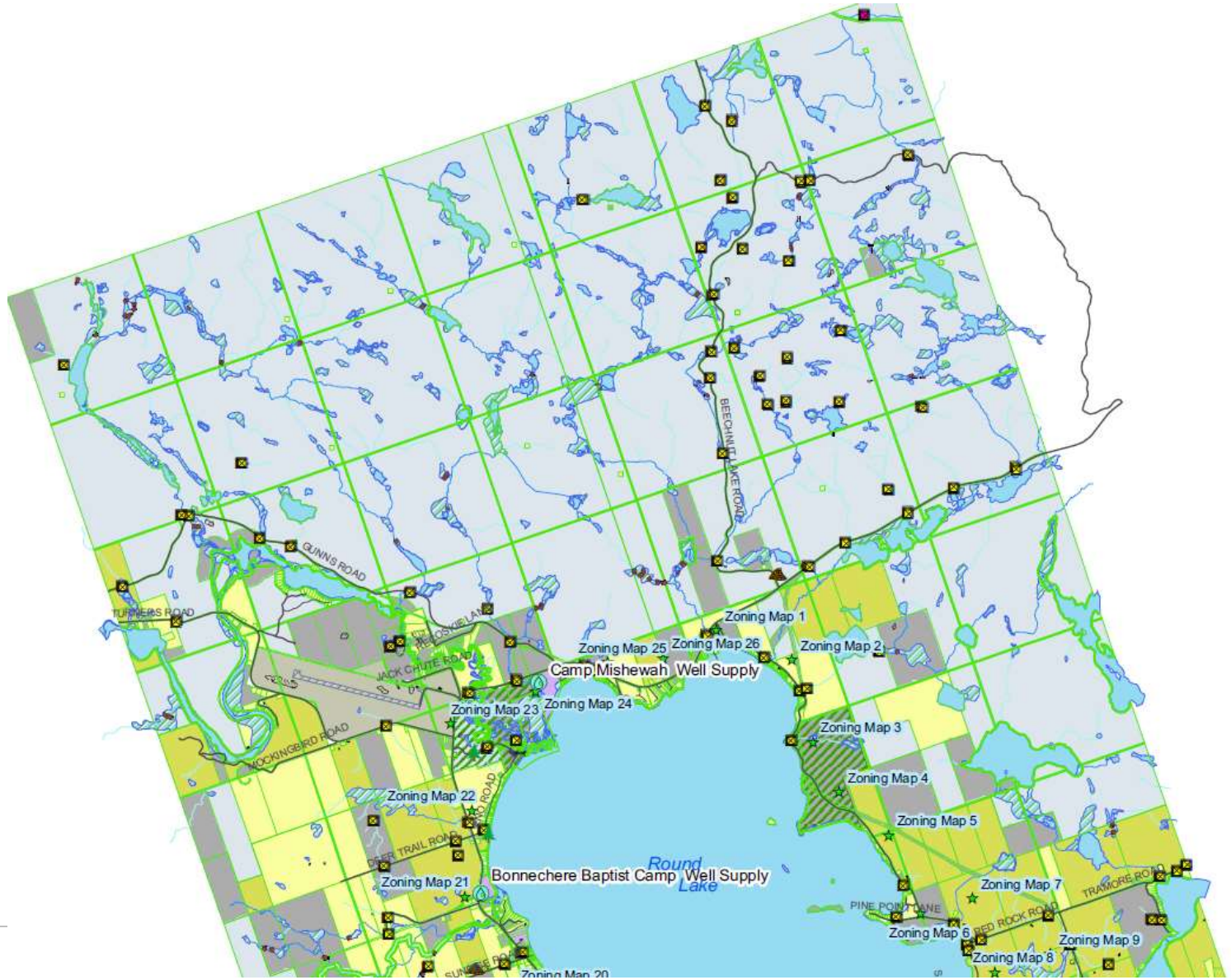
Rate-Funded Assets

Water Network											
Segment	Backlog	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Water Mains	$0	$0	$0	$0	$1,036,201	$0	$0	$0	$0	$0	$0
Water Treatment Plant	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$0**	**$0**	**$0**	**$0**	**$1,036,201**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

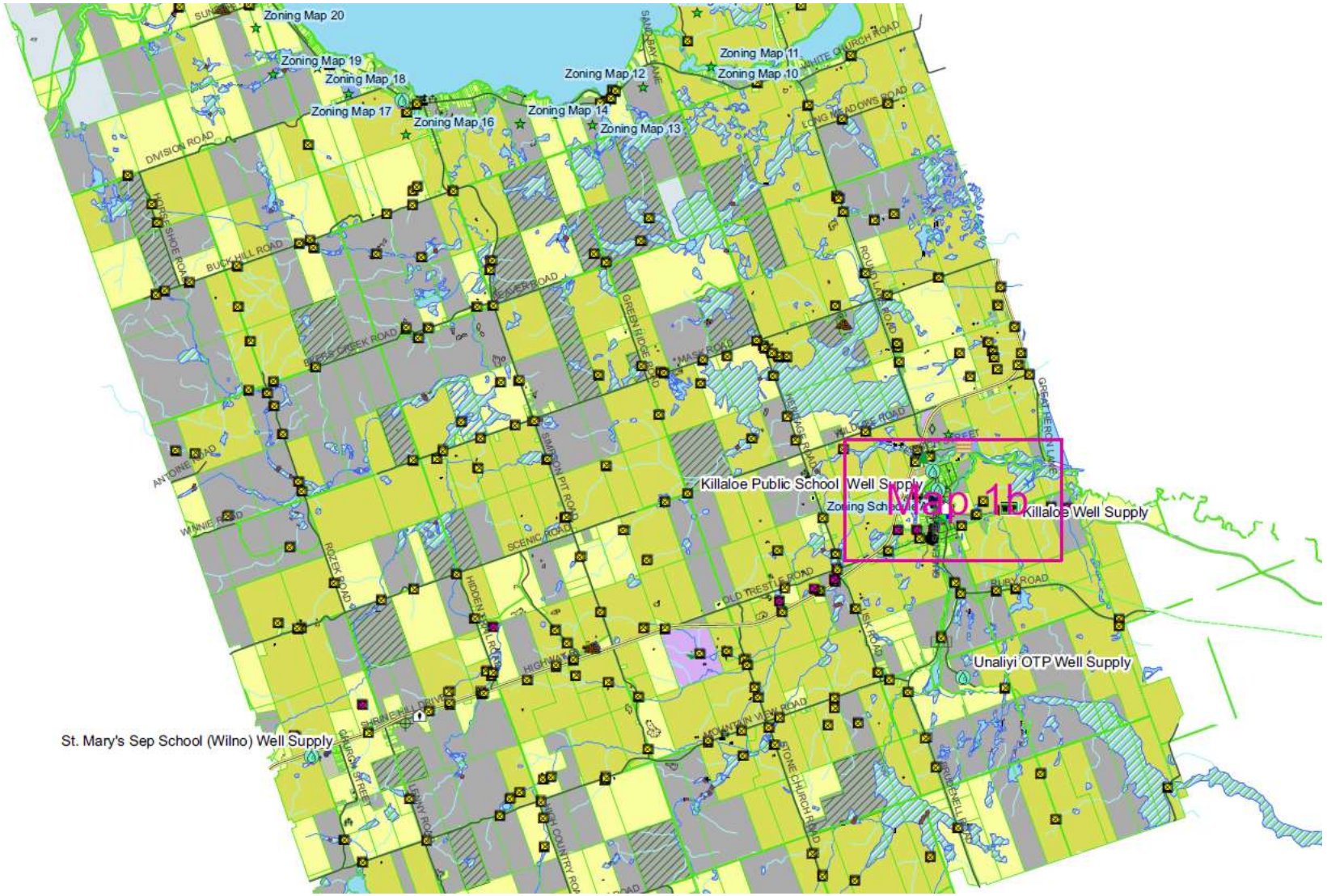
Wastewater Network											
Segment	Backlog	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Wastewater Mains	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Wastewater Treatment Plant	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

Appendix C: Level of Service Maps

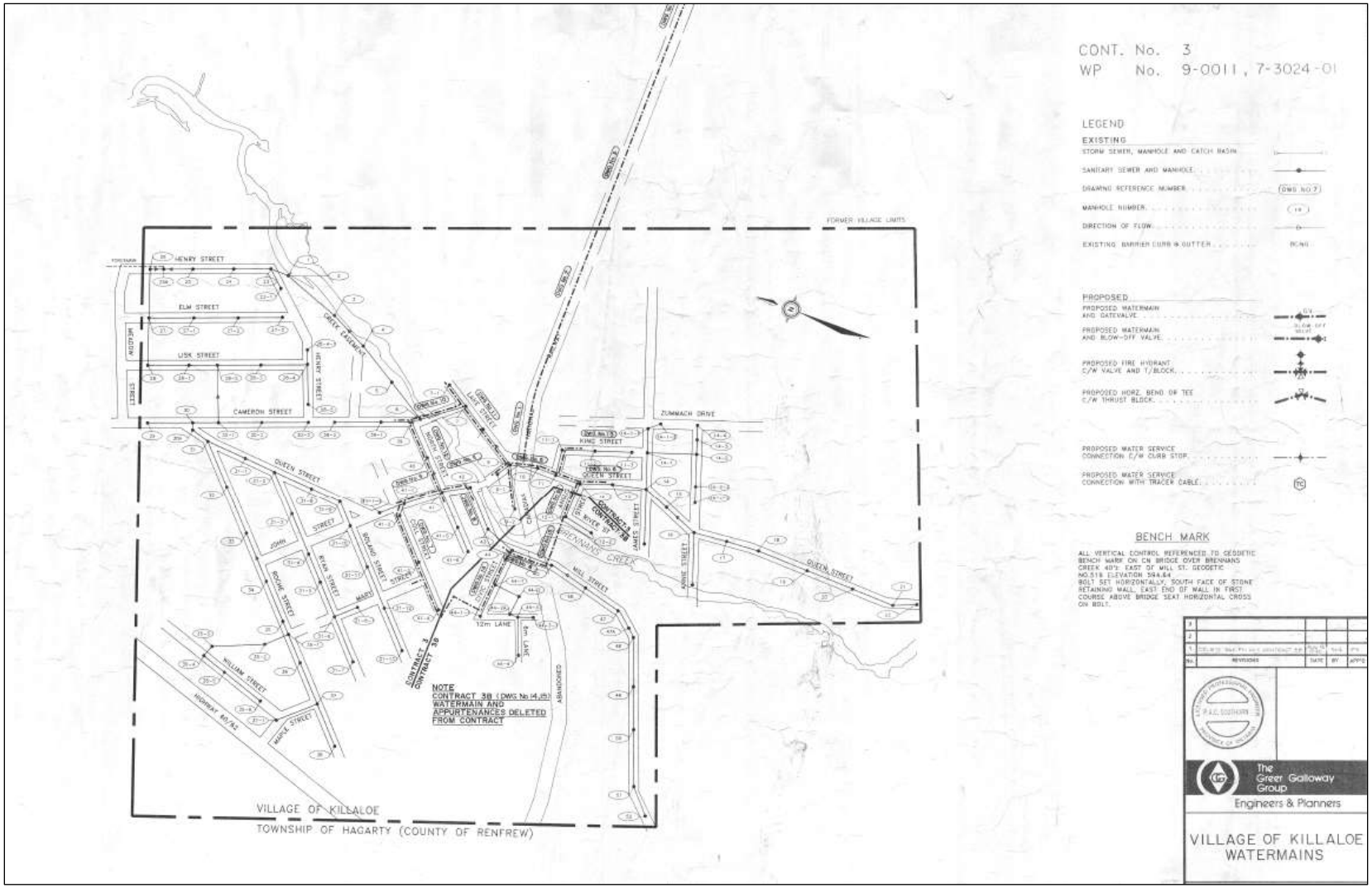
Road Network Map – Pt 1



Road Network Map – Pt 2

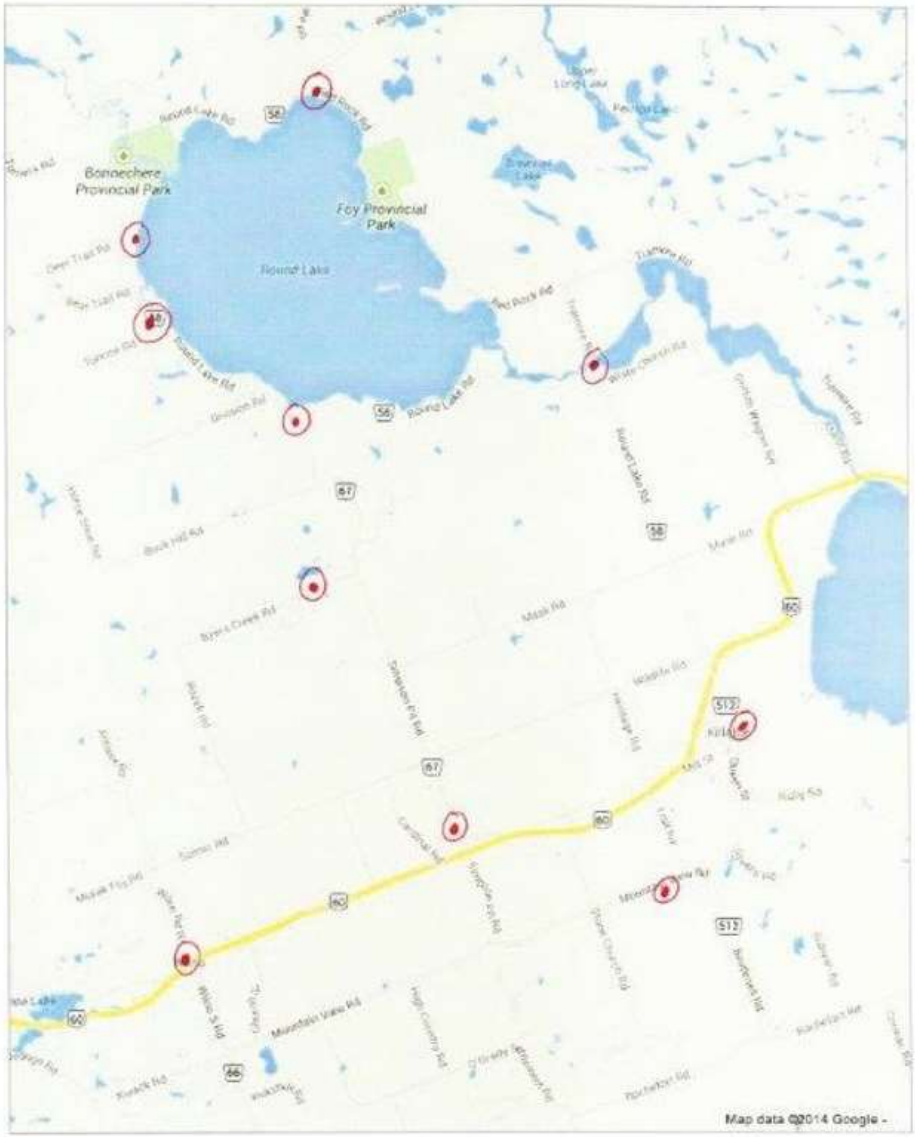


Water and Wastewater– Distribution & Collection Network

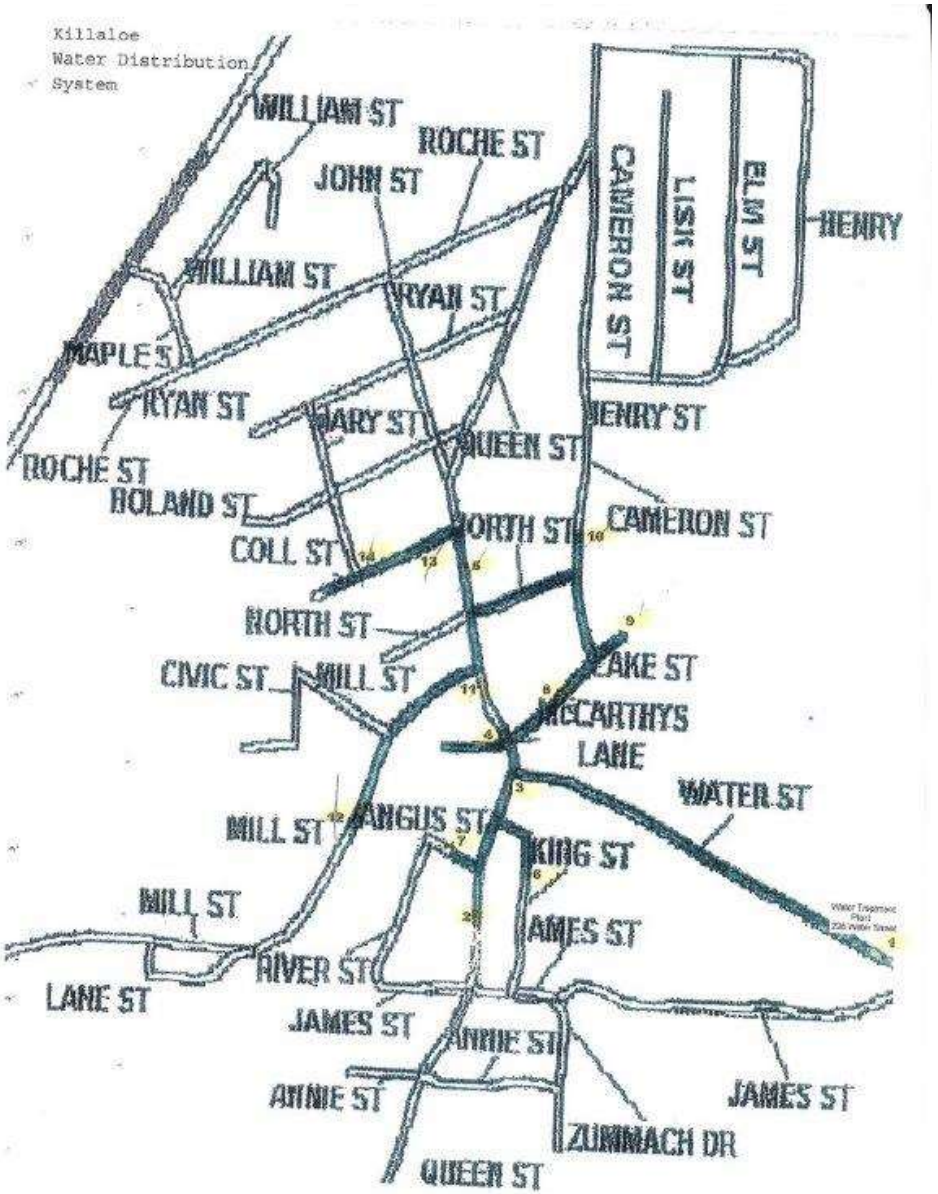


Water Network – Hydrant Maps

1. Dry Hydrants



2. Wet Hydrants



Appendix D: Risk Rating Criteria

Probability of Failure

Asset Category	Risk Classication	Risk Criteria	Value/Range	Probability of Failure Score
Road Network (Roads)	Structural (50%)	Condition (50%)	85	1
			70	2
			50	3
			30	4
			0	5
		Service Life Remaining (Years) (25%)	20	1
			10	2
			5	3
			1	4
			0	5
		Surface Material (25%)	HCB/Hot Mix	2
			LCB/Cold Mix	3
			CM/Gravel	4
			Gravel	5
	Environmental (50%)	Exposure (Events/Year)	50+	1
			20-50	2
			10-20	3
			Annual	4
			Multiple Events per Year	5
		Vulnerability	1	1
			2	2
			3	3
			4	4
			5	5

Asset Category	Risk Classication	Risk Criteria	Value/Range	Probability of Failure Score
Water Network (Mains)	Structural (50%)	Service Life Remaining (Years) (60%)	50	1
			30	2
			20	3
			10	4
			0	5
		Pipe Material (40%)	PVC	1
			Plastic	2
			Ductile Iron	3
			Cast Iron	4
	Environmental (50%)	Exposure (Events/Year) (50%)	50+	1
			20-50	2
			10-20	3
			Annual	4
			Multiple Events per Year	5
		Vulnerability (50%)	1	1
			2	2
			3	3
			4	4
			5	5

Asset Category	Risk Classication	Risk Criteria	Value/Range	Probability of Failure Score
Wastewater Network (Mains)	Structural (50%)	Service Life Remaining (Years) (50%)	50	1
			30	2
			20	3
			10	4
			0	5
		Piper Material (50%)	PVC	1
			Plastic	2
			Ductile Iron	3
			Cast Iron	4

Asset Category	Risk Classication	Risk Criteria	Value/Range	Probability of Failure Score
	Environmental (50%)	Exposure (Events/Year) (50%)	50+	1
			20-50	2
			10-20	3
			Annual	4
			Multiple Events per Year	5
		Vulnerability (50%)	1	1
			2	2
			3	3
			4	4
			5	5

Asset Category	Risk Classication	Risk Criteria	Value/Range	Probability of Failure Score
Facilities Land Improvements	Structural	Condition	80	1
			60	2
			40	3
			20	4
			0	5

Consequence of Failure

Asset Category	Risk Classication	Risk Criteria	Value/Range	Probability of Failure Score
Road Netowrk (Roads)	Economic (70%)	Unit Replacement Cost ($/m2) (60%)	0	1
			25	2
			50	3
			100	4
			150	5
		Roadside Environment (40%)	Rural	2
			Semi-Urban	3
			Urban	5
	Social I (30%)	AADT (50%)	0	1
			100	2
			300	3
			750	4
			2,000	5
		Design Class (50%)	6	1
			5	2
			4, 3	3
			2	4
			1	5

Asset Category	Risk Classication	Risk Criteria	Value/Range	Probability of Failure Score
Water Network (Mains)	Economic (60%)	Replacement Cost (100%)	5,000	1
			20,000	2
			50,000	3
			85,000	4
			100,000	5
	Operational (40%)	Pipe Diamter (inches) (50%)	4	2
			6	3
			8	4

Asset Category	Risk Classication	Risk Criteria	Value/Range	Probability of Failure Score
			10	5
		Proximity to Critical Services (50%)	Rural	1
			Commcercial/Residential	2
			Schools	3
			Major Commcericial/Industrial	4
			Hospitals/Care Facilities, Railway, Towers/Wells	5

Asset Category	Risk Classication	Risk Criteria	Value/Range	Probability of Failure Score
Wastewater Network (Mains)	Economic (60%)	Replacement Cost (100%)	5,000	1
			20,000	2
			50,000	3
			100,000	4
			250,000	5
	Operational (40%)	Pipe Diamter (inches) (50%)	4	2
			6	3
			8	4
			10	5

Asset Category	Risk Classication	Risk Criteria	Value/Range	Probability of Failure Score
Facilities	Economic (75%)	Replacement Cost	80	1
			100,000	2
			500,000	3
			2,000,000	4
			10,000,000	5
	Operational (10%)	Population Affected	0	1
			5	2
			20	3
			50	4
			100	5

Asset Category	Risk Classication	Risk Criteria	Value/Range	Probability of Failure Score
	Social (15%)	Facility Type (50%)	Cemetery, Storage	1
			Tourist	2
			Library, Municipal Offices, Garages	3
			Hoch Park Recreation	4
			Treatment Plants, Fire Halls	5
		Facility Purpose (50%)	Educational	2
			Quality	3
			Security	4
			Public Health	5

Asset Category	Risk Classication	Risk Criteria	Value/Range	Probability of Failure Score
Facilities	Economic (75%)	Replacement Cost	80	1
			100,000	2
			500,000	3
			2,000,000	4
			10,000,000	5
	Park Type (25%)	Facility Type (50%)	Naturalized	1
			Trails, Parkette	2
			Neighborhood Park	3
			Special Use Park	4
			Community Park, Landfill Sites/Waste Disposal	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:

f) The role of asset condition data in decision-making
g) Guidelines for the collection of asset condition data
h) 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