Asset Management Plan

Township of Tay

2022

This Asset Management Program was prepared by:

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

Key Statistics

Replacement cost of asset portfolio
$302 million

Replacement cost of infrastructure per household
$57,015(2021)

Percentage of assets in fair or better condition
87%

Percentage of assets with assessed condition data
38%

Annual capital infrastructure deficit
$4.51 million

Recommended timeframe for eliminating annual infrastructure deficit
20 Years

Target reinvestment rate
2.8%

Actual reinvestment rate
1.3%

Table of Contents

Asset Management Plan .....
1 Introduction.....4
2 Scope and Methodology 13
3 Portfolio Overview 16
4 Road Network 20
5 Bridges & Culverts.....27
6 Stormwater Network.....34
7 Buildings 39
8 Land Improvements.....44
9 Vehicles 49
10 Equipment.....54
11 Water Network.....59
12 Wastewater Network.....65
13 Impacts of Growth.....72
14 Financial Strategy.....73
15 Appendices.....86

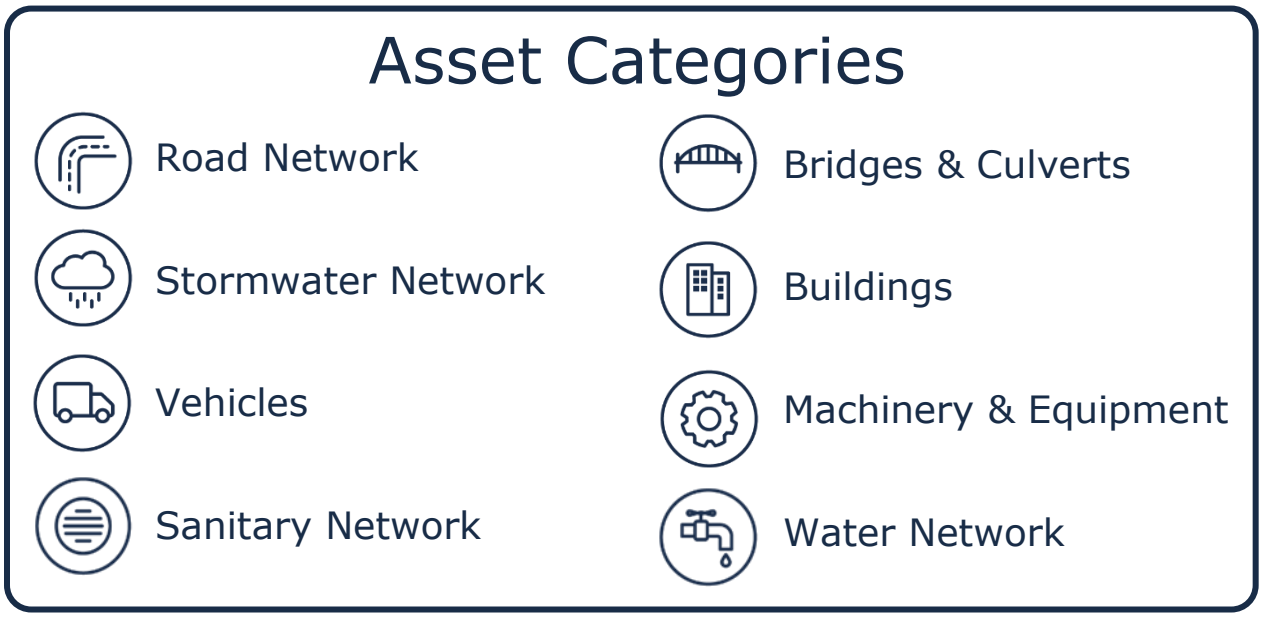
Executive Summary

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

Identifying the current practices and strategies that are in place to manage public infrastructure and making 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.

The following asset categories are addressed in further sections:



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 general infrastructure, 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 owned by Tay totals $302 million. 87% of all assets analysed are in fair or better condition and assessed condition data was available for 38% of assets. For the remaining 62% of assets, assessed condition data was unavailable, and asset age was used to approximate condition – a data gap that persists in most municipalities. Generally, age misstates the true condition of assets, making assessments essential to accurate asset management planning, and a recurring recommendation.

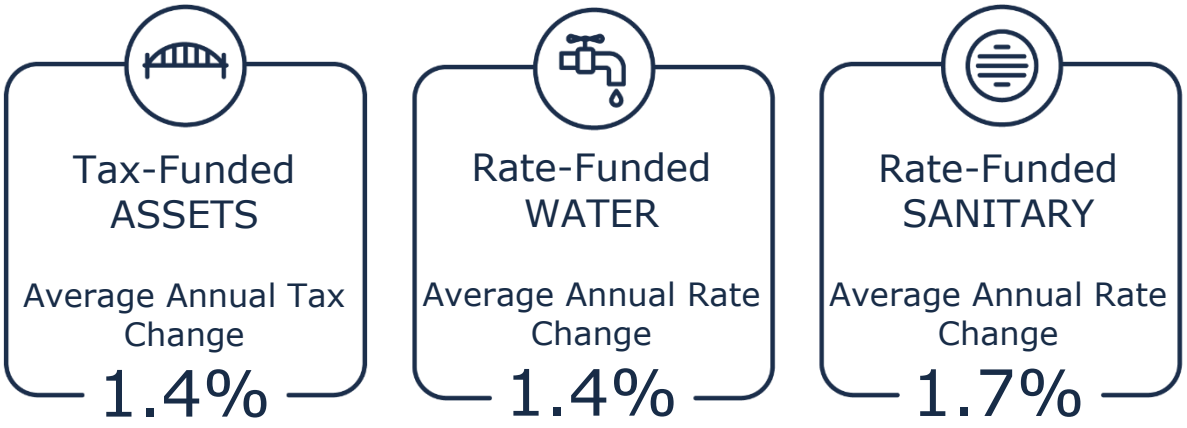
The development of a long-term, sustainable financial plan requires an analysis of whole lifecycle costs. By using a combination of proactive lifecycle strategies (roads) and replacement only strategies (all other assets) to determine the lowest cost option to maintain the current level of service.

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 $8.34 million. Based on a historical analysis of sustainable capital funding sources, the Township is committing approximately $3.82 million towards capital projects or reserves per year. As a result, there is currently an annual funding gap of $4.5 million.

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

Recommendations

A financial strategy was developed to address the annual capital funding gap. The annual tax/rate change required to eliminate the Township's infrastructure deficit based on a 20-year plan is:



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

- Review data to update and maintain a complete and accurate dataset
- Develop a condition assessment strategy with a regular schedule
- Review and update lifecycle management strategies
- Development and regularly review short- and long-term plans to meet capital requirements
- Measure current levels of service and identify sustainable proposed levels of service

1 Introduction

1.1 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

1.2 Tay Community Profile

Census Characteristic	Tay	Ontario
Population 2021	11,091	14,223,942
Population Change 2016-2021	10.5	5.8
Total Private Dwellings	5,301	5,929,250
Population Density	80.5/km^2	15.9/km^2
Land Area	187.86 km^2	892,411.76 km^2

Tay is a township in Central Ontario, Canada, located in Simcoe County in the southern Georgian Bay region. The township was named in 1822 after a pet dog of Lady Sarah Maitland (1792–1873), wife of Sir Peregrine Maitland, Lieutenant Governor of Upper Canada. Two other adjoining townships were also named for her pet dogs, Tiny and Flos (now Springwater Township).

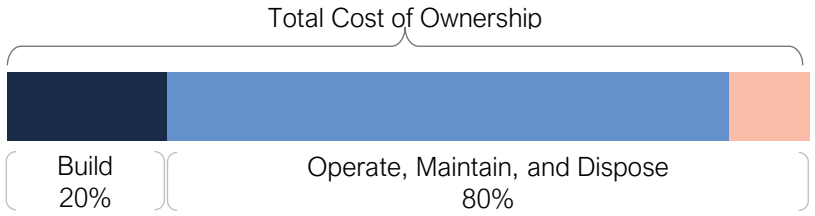
In 1994, under countywide municipal restructuring, the Villages of Port McNicoll and Victoria Harbour were amalgamated with Tay. The township comprises the villages and rural hamlets of Ebenezer, Elliots Corners, Melduf, Mertzs Corners, Ogden's Beach, Old Fort, Paradise Point, Port McNicoll, Riverside, Sturgeon Bay, Triple Bay Park, Vasey, Victoria Harbour, Waubaushene and Waverley.

Tay is a strong, cohesive rural community. We celebrate and promote our unique history, natural heritage, and recreational amenities as the cornerstone to our quality of life. Our unique villages and towns support a host of events, services and businesses that contribute to growing the local economy and create a unique destination experience for residents and visitors to the community.

1.3 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. The Township focused 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.

1.3.1 Asset Management Policy

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

The objective of the policy is to establish consistent standards and guidelines for management of the Township's assets by applying sound technical, social, and economic principles that consider present and future needs of users, and the service expected from the assets.

1.3.2 Asset Management Strategy

An asset management strategy outlines the translation of organizational objectives into asset management objectives and provides a strategic overview of the activities required to meet these objectives. It provides greater detail than the policy on how the Township plans to achieve asset management objectives through planned activities and decision-making criteria.

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

1.4 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.

1.4.1 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. 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.

1.4.2 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.

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

1.4.3 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, 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 the province, through O. Reg. 588/17, has provided qualitative descriptions that are required. For non-core asset categories, the Township must determine the qualitative descriptions that will be used by July 1, 2024. These descriptions can be found in the Levels of Service subsection within each asset category.

Technical Levels of Service

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

For core asset categories the province, through O. Reg. 588/17, has provided technical metrics that are required. For non-core asset categories, the Township must determine the technical metrics that will be used by July 1, 2024. The metrics can be found in the Levels of Service subsection within each asset category.

Current and Proposed Levels of Service

The Township is focusing 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.

1.5 Climate Change

Climate change can cause severe impacts on human and natural systems around the world. The effects of climate change include increasing temperatures, higher levels of precipitation, droughts, and extreme weather events. In 2019, Canada's Changing Climate Report (CCCR 2019) was released by Environment and Climate Change Canada (ECCC).

The report revealed that between 1948 and 2016, the average temperature increase across Canada was 1.7°C; moreover, during this period, Northern Canada experienced a 2.3°C increase. The temperature increase in Canada has doubled that of the global average. If emissions are not significantly reduced, the temperature could increase by 6.3°C in Canada by the year 2100 compared to 2005 levels. Observed precipitation changes in Canada include an increase of approximately 20% between 1948 and 2012.

By the late 21st century, the projected increase could reach an additional 24%. During the summer months, some regions in Southern Canada are expected to experience periods of drought at a higher rate. Extreme weather events and climate conditions are more common across Canada. Recorded events include droughts, flooding, cold extremes, warm extremes, wildfires, and record minimum arctic sea ice extent.

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

1.5.1 Tay Climate Profile

Tay Township is in southern Ontario on the shores of Georgian Bay. The Township is expected to experience notable effects of climate change which include higher average annual temperatures, an increase in total annual precipitation, and an increase in the frequency and severity of extreme events. According to Climatedata.ca – a collaboration supported by Environment and Climate Change Canada (ECCC) – the Township was not included in the data however, Port McNicoll was the data referenced as what trends the Township may experience. The following are the trends identified:

Higher Average Annual Temperature:

- Between the years 1981 and 2010 the annual average temperature was 6.8ºC
- Under a high emissions scenario, the annual average temperatures are projected to increase by 1.9 ºC by the year 2050 and by 5.3 ºC by the end of the century.

Increase in Total Annual Precipitation:

- Average annual precipitation for the 1951-1980 period was 939 mm.
- Under a high emissions scenario, Tay is projected to experience a 7% increase in precipitation by the year 2050 and a 15% increase by the end of the century.

Increase in Frequency of Extreme Weather Events:

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

1.5.2 Integrating Climate Change and Asset Management

Asset management practices aim to deliver sustainable service delivery - the delivery of services to residents today without compromising the services and well-being of future residents. Climate change threatens sustainable service delivery by reducing the useful life of an asset and increasing the risk of asset failure. Desired levels of service can be more difficult to achieve because of climate change impacts such as flooding, high heat, drought, and more frequent and intense storms.

To achieve the sustainable delivery of services, climate change considerations should be incorporated into asset management practices. The integration of asset management and climate change adaptation observes industry best practices and enables the development of a holistic approach to risk management.

1.6 Ontario Regulation 588/17

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

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

2019

Strategic Asset Management Policy

2022

Asset Management Plan for Core Assets with the following components:

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

2024

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

2025

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

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

1.6.1 O. Reg. 588/17 Compliance Review

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

Requirement	O. Reg. Section	AMP Section Reference	Status
Summary of assets in each category	S.5(2), 3(i)	4 - 12	Complete
Replacement cost of assets in each category	S.5(2), 3(ii)	4 - 12	Complete
Average age of assets in each category	S.5(2), 3(iii)	4 - 12	Complete
Condition of assets in each category	S.5(2), 3(iv)	4 - 12	Complete
Description of municipality's approach to assessing the condition of assets in each category	S.5(2), 3(v)	4 - 12	Complete
Current levels of service in each category	S.5(2), 1(i-ii)	4 - 12	Complete for Core Assets Only
Current performance measures in each category	S.5(2), 2	4 - 12	Complete for Core Assets Only
Lifecycle activities needed to maintain current levels of service for 10 years	S.5(2), 4	4 - 12	Complete
Costs of providing lifecycle activities for 10 years	S.5(2), 4	Appendix B	Complete
Growth assumptions	S.5(2), 5(i-ii) S.5(2), 6(i-vi)	13	Complete

2 Scope and Methodology

2.1 Key Insights

- Tay has 9 different 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

2.2 Asset Categories

To ensure compliance with Ontario Regulation 588/17 the July 2022 deadline under the regulation requires analysis of only core assets (roads, bridges and culverts, water, wastewater, and stormwater). Where the July 2024 requires analysis of all other assets.

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
Bridges & Culverts	
Buildings	
Land Improvements	
Vehicles	
Machinery & Equipment	
Stormwater Network	
Water Network	User Rates
Sanitary Network	

2.3 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. The two methodologies are:

- **User-Defined Cost and Cost/Unit**: Based on costs provided by municipal staff which could include average costs from recent contracts; data from engineering reports and assessments; staff estimates based on knowledge and experience
- **Cost Inflation/CPI Tables**: Historical cost of the asset is inflated based on Consumer Price Index or Non-Residential Building Construction Price Index

User-defined costs based on reliable sources are a reasonably accurate and reliable way to determine asset replacement costs. Cost inflation is typically used in the absence of reliable replacement cost data. It is a reliable method for recently purchased and/or constructed assets where the total cost is reflective of the actual costs that the Township incurred. As assets age, and new products and technologies become available, cost inflation becomes a less reliable method.

2.4 Estimated Useful Life and Service Life Remaining

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

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

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

2.5 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:

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

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

2.6 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 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.

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 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.

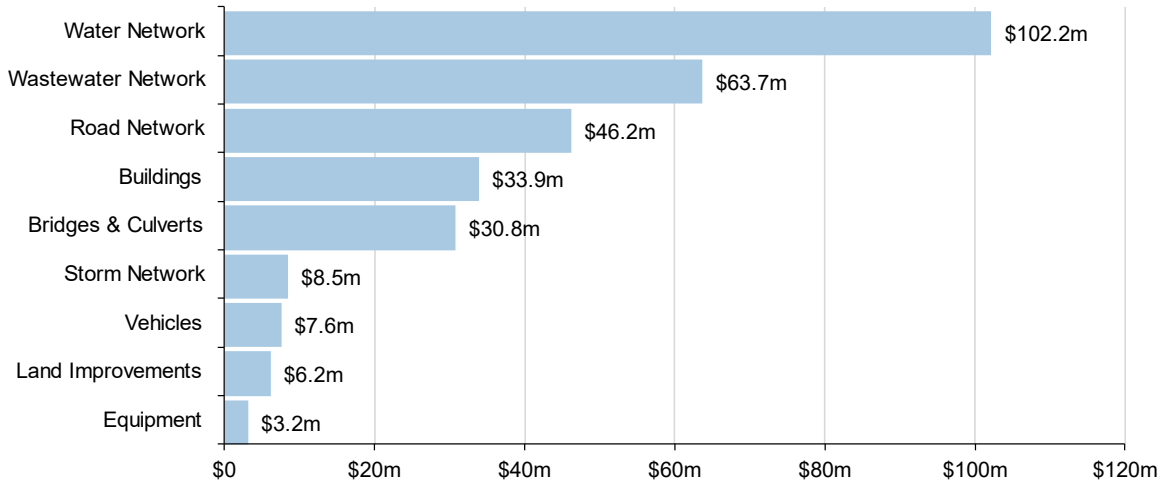
3 Portfolio Overview

3.1 Key Insights

- The total replacement cost of the Township's asset portfolio is $302 million
- The Township's target re-investment rate is 2.8%, and the actual re-investment rate is 1.3%, contributing to an expanding infrastructure deficit
- 87% of all assets are in fair or better condition
- 28% of assets are projected to require rehabilitation / replacement in the next 10 years
- Average annual capital requirements total $8.3 million per year across all assets

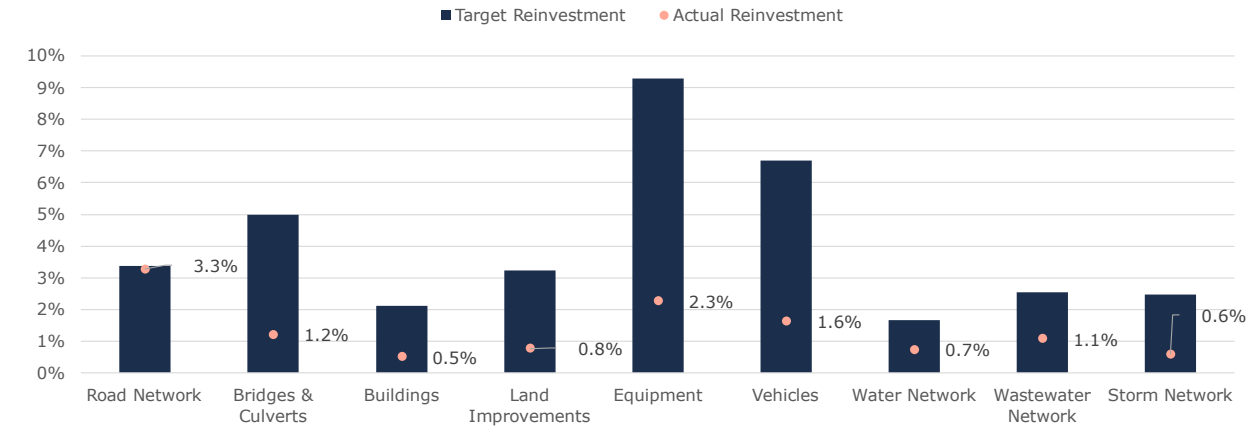
3.2 Total Replacement Cost of Asset Portfolio

The asset categories have a total replacement cost of $302 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.



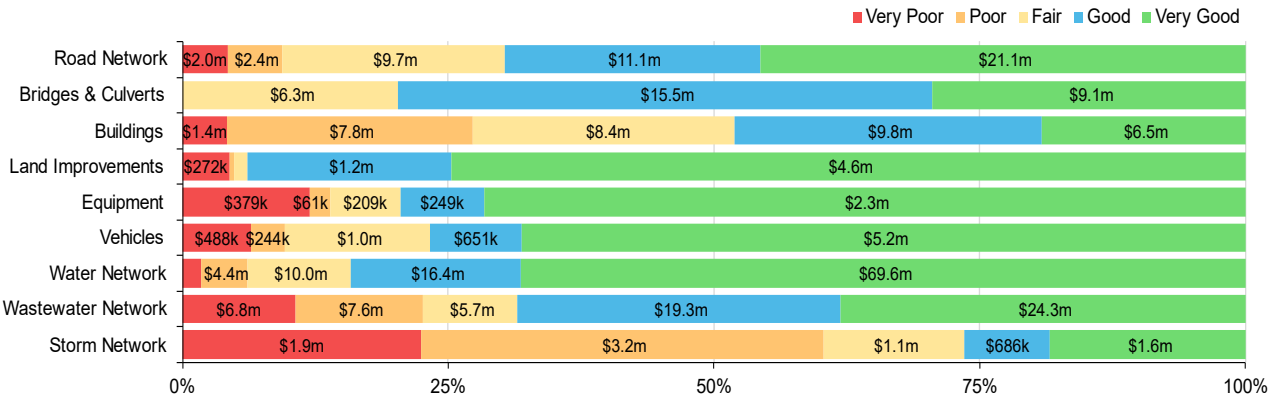
3.3 Target vs. Actual Reinvestment Rate

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 $8.3 million annually, for a target reinvestment rate of 2.8%. Actual annual spending on infrastructure totals approximately $3.8 million, for an actual reinvestment rate of 1.3%.



3.4 Condition of Asset Portfolio

The current condition of the assets is central to all asset management planning. Collectively, 88% of assets in Tay are in fair or better condition. This estimate relies on both age-based and field condition data.



Assessed condition data is available for 38% 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.

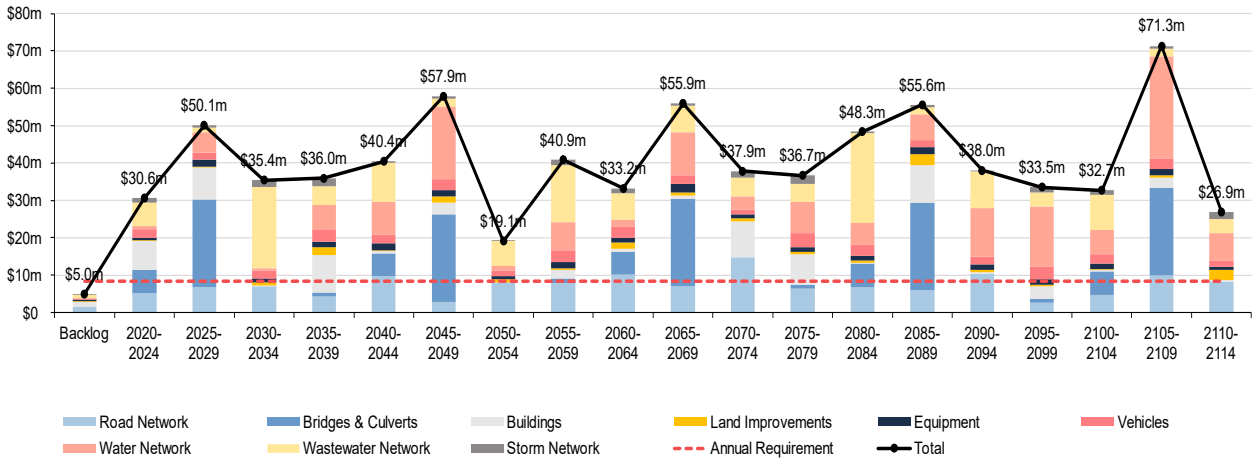
3.5 Service Life Remaining

Based on asset age, available assessed condition data and estimated useful life, 28% of the Township's assets will require rehabilitation / replacement within the next 10 years. Capital requirements over the next 10 years are identified in Appendix B.

3.6 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 95 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average annual capital requirements of $8.3 million.



3.7 Risk & Criticality

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

Capital Funding Strategies

Major capital rehabilitation and replacement projects are often entirely dependant on the availability of grant funding opportunities. When grants are not available, rehabilitation and replacement projects are often deferred.

Climate Change & Extreme Weather

Asset deterioration is accelerated due to extreme weather, which in some cases can cause unexpected failures. Freeze-thaw cycles, ice jams, and surface flooding from extreme rainfall have been experienced by the Township in recent years. These events make long-term planning difficult and can result in a lower level of service.

Asset Data & Information

There is a lack of confidence in the available inventory data and condition data. Staff have been prioritizing data refinement efforts to increase the accuracy and reliability of asset data and information. Staff find it a continuous challenge to dedicate resources and time towards data collection and condition assessments to ensure that condition and asset attribute data is regularly reviewed and updated.

4 Road Network

4.1 Key Insights

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 tax funded asset portfolio. It includes all municipally owned and maintained roadways in addition to supporting roadside infrastructure including sidewalks, guiderails and streetlights.

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

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

Replacement Cost	Condition	Financial Capacity	
$46,185,893	Good (76%)	Annual Requirement:	$1,561,992
		Funding Available:	$1,516,346
		Annual Deficit:	$45,646

4.2 Asset Inventory & Costs

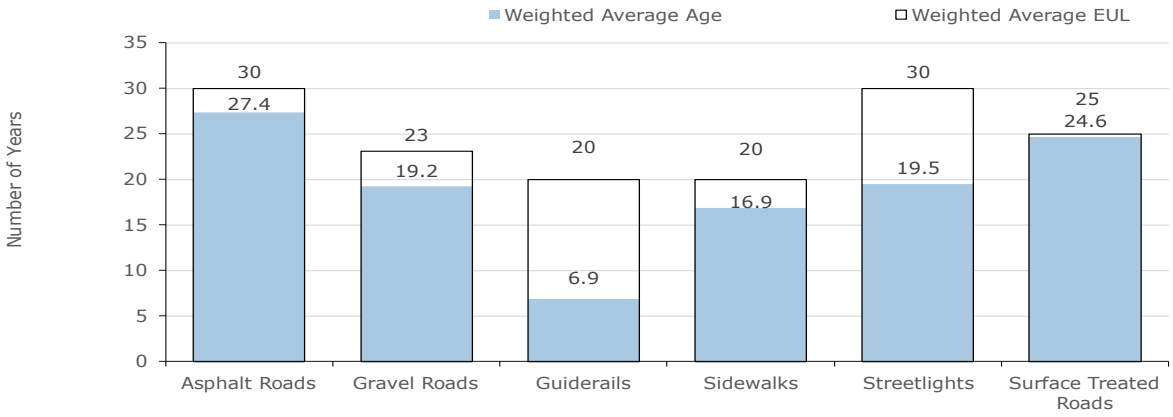
The table below includes the quantity and total replacement cost of each asset segment in the Township's road inventory.

Asset Segment	Quantity	Replacement Cost
Asphalt Roads	1,066,330m^2	$34,410,454
Gravel Roads	192,279m^2	$4,376,607
Guiderails	4	$173,889
Sidewalks	19,501m	$2,553,373
Streetlights	93	$1,501,396
Surface Treated Roads	298,229m^2	$3,170,174
Total		**$46,185,893**

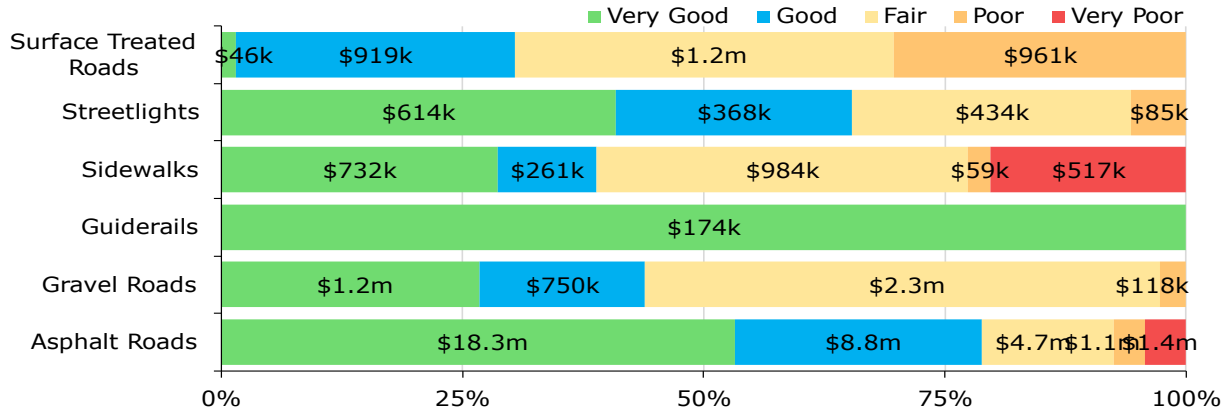
Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

4.3 Asset Condition & Age

The graph below identifies the average age, and the estimated useful life for each asset segment. It is all weighted by replacement cost.



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



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

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

4.3.1 Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The Township's current approach is the roads are assessed by staff internally to set priorities based on the current state.

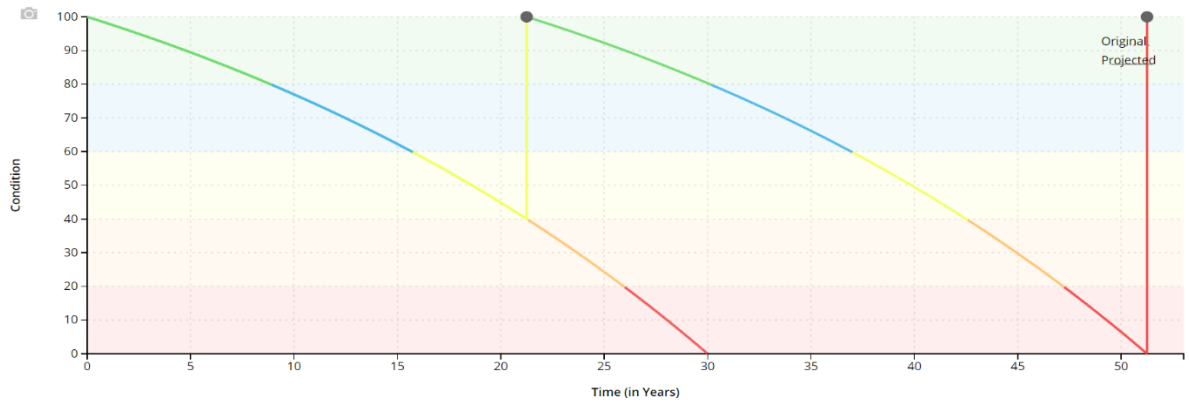
4.4 Lifecycle Management Strategy

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

The following lifecycle strategies have been developed as a proactive approach to managing the lifecycle of Township owned roads. Instead of allowing the roads to deteriorate until replacement is required, strategic rehabilitation is expected to extend the service life of roads at a lower total cost.

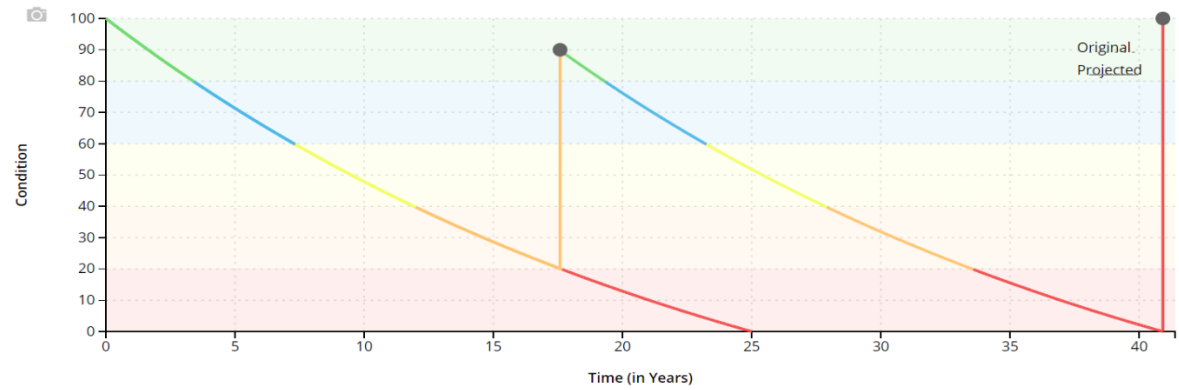
Asphalt Roads

Event Name	Event Class	Event Trigger
Mill & Pave	Rehabilitation	40 to 55 condition
Full Reconstruction	Replacement	0 to 20 condition

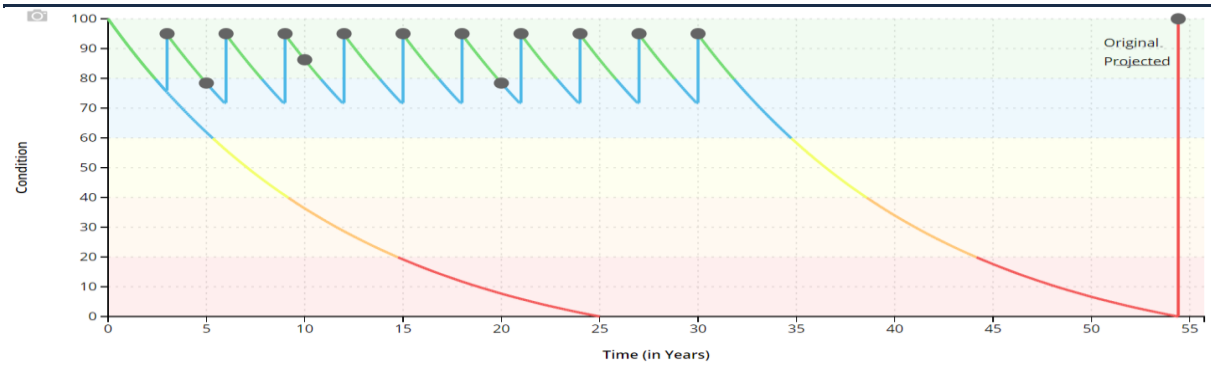


Surface Treated Roads

Event Name	Event Class	Event Trigger
Double Surface Treatment (DST)	Rehabilitation	20 – 30 condition
Full Reconstruction	Replacement	0 – 20 condition

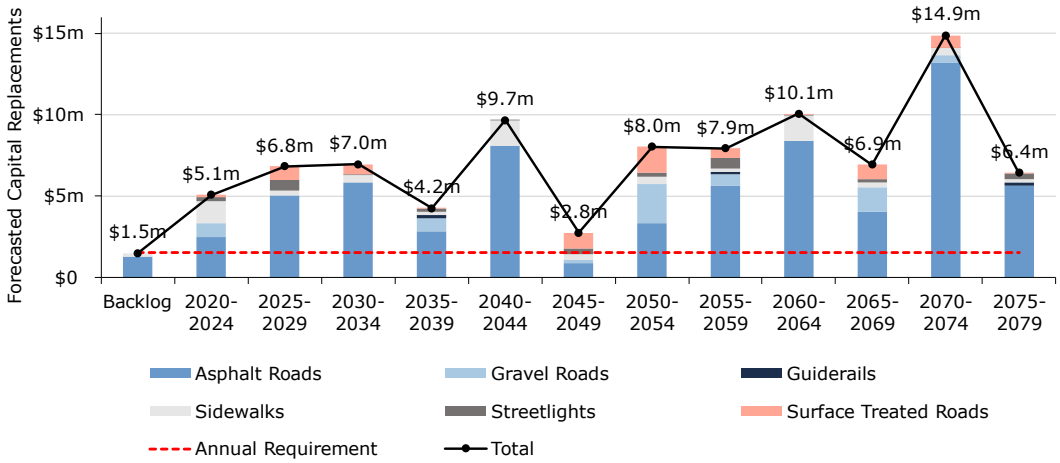


Gravel Roads		
Event Name	**Event Class**	**Event Trigger**
50-75mm of Gravel Added	Rehabilitation	Repeats every 3 years
Full Reconstruction	Replacement	0 – 20 condition



4.4.1 Forecasted Capital Requirements

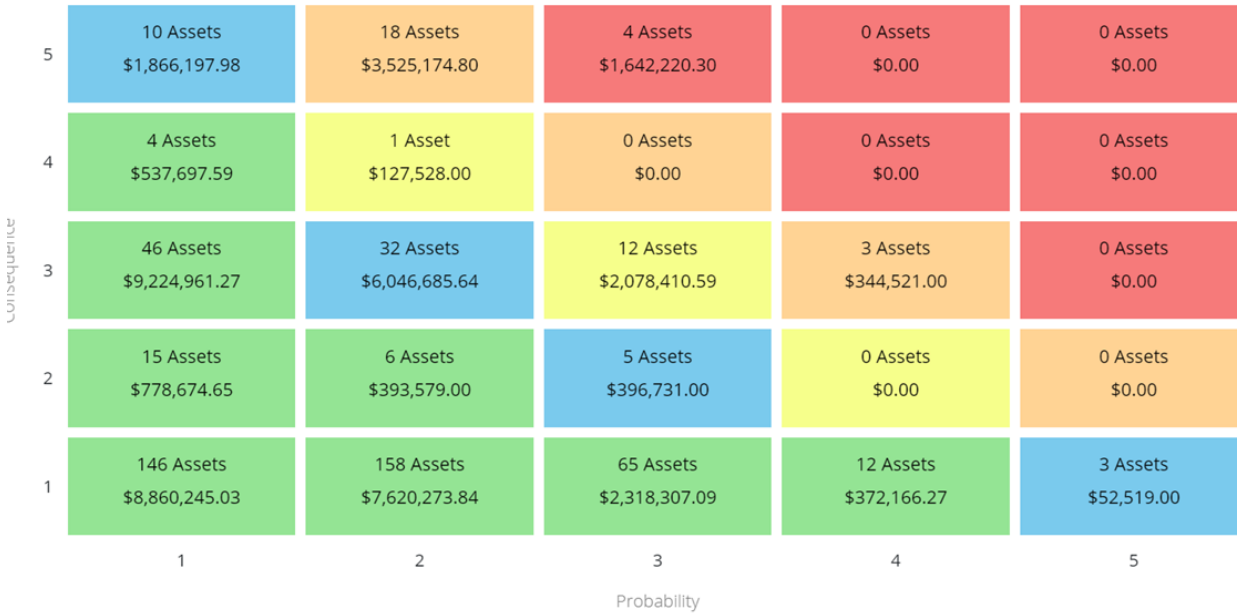
Based on the lifecycle strategies identified previously for roads, and assuming the end-of-life replacement of all other assets in this category, the following graph forecasts capital requirements for the road network. The annual capital requirement represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs. The following projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average annual capital requirement. For the road network the annual capital requirement is $1.56 million



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

4.5 Risk & Criticality

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2021 inventory data. See Appendix D for the criteria used to determine the risk rating of each asset.



This is a high-level model developed by Township staff and it should be reviewed and adjusted to reflect an evolving understanding of both the probability and consequences of asset failure.

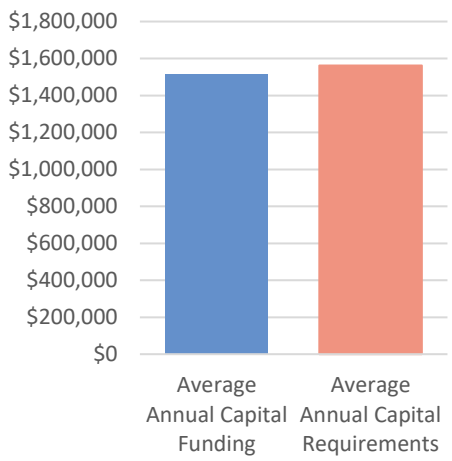
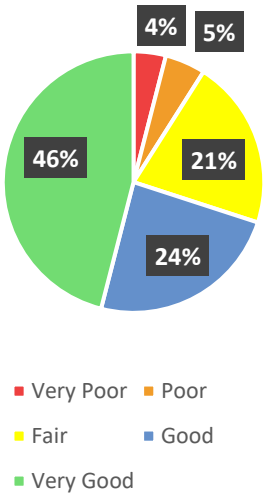
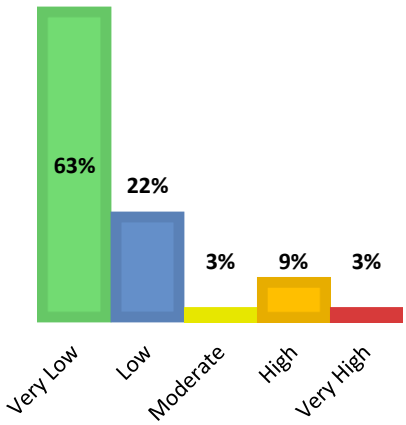
The asset-specific attributes that municipal staff utilize to define and prioritize the criticality of the road network are documented below:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition (Structural)	Replacement Cost (Economic)
Service Life Remaining (Functional)	

The identification of critical assets allows the Township to determine appropriate risk mitigation strategies and treatment options. Risk mitigation may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data.

4.6 Levels of Service

The following tables identify the Township's current level of service for the roads.

Cost	Performance (Average Condition)	Risk
		

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.

4.6.1 Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS
Scope	Description, which may include maps, of the road network in the municipality and its level of connectivity	See Appendix C
Quality	Description or images that illustrate the different levels of road class pavement condition	The Township staff provide surface condition with a rating as follows: 0 – 20 Very Poor 20 – 40 Poor 40 – 60 Fair 60 – 80 Good 80 – 100 Very Good

4.6.2 Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS
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
	Lane-km of local roads (MMS classes 5 and 6) per land area (km/km^2)	1%
Quality	Average pavement condition index for paved roads in the municipality	Good (73%)
	Average surface condition for unpaved roads in the municipality (e.g. excellent, good, fair, poor)	Good

4.7 Recommendations

Condition Assessment Strategies

- The last comprehensive assessment of the road network was completed in 2017. Consider completing an updated assessment of all roads within the next 1-2 years.

Risk Management Strategies

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

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 Bridges & Culverts

5.1 Key Insights

The township owns 9 bridges and 5 culverts. Bridges are further categorized as either road bridges or trail bridges, and the asset inventory includes 6 road bridges that are used by motorized vehicles and 3 trail bridges only accessible to non-motorized vehicles or foot traffic.

The township only includes culverts with a span greater than 3 meters in the inventory and does not currently track smaller culverts. The state of the infrastructure for bridges and culverts is summarized in the following table.

Replacement Cost	Condition	Financial Capacity	
$30,819,881	Good (69%)	Annual Requirement:	$1,540,994
		Funding Available:	$376,994
		Annual Deficit:	$1,164,000

5.2 Asset Inventory & Costs

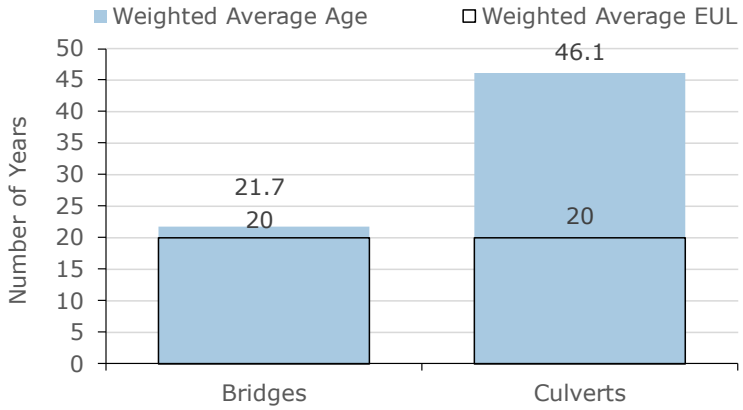
The table below includes the quantity, total replacement cost and annual capital requirements of each asset segment in the Township's bridges and culverts inventory.

Asset Segment	Quantity	Replacement Cost	Annual Capital Requirement
Bridges	11	$27,645,854	$1,382,293
Culverts	5	$3,174,027	$158,701
Total		**$30,819,881**	**$1,540,994**

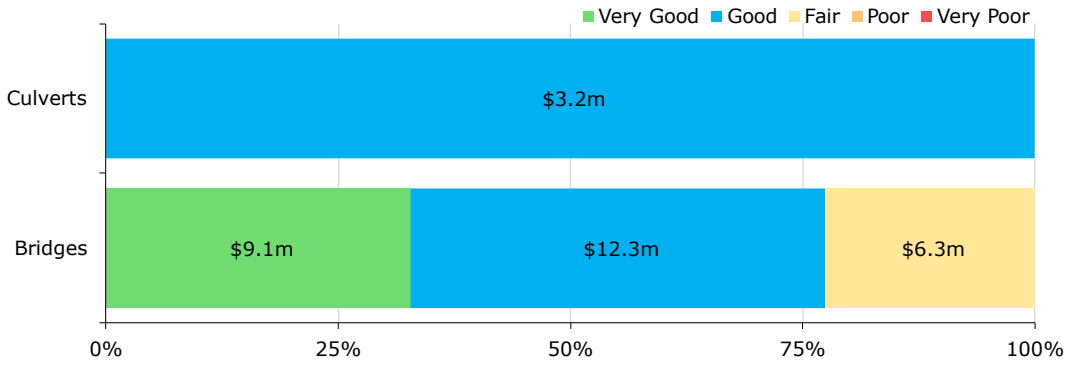
Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

5.3 Asset Condition & Age

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



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



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

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

5.3.1 Current Approach to Condition Assessment

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

- Condition assessments of all bridges and culverts with a span greater than or equal to 3 meters are completed every 2 years in accordance with the Ontario Structure Inspection Manual (OSIM)

5.4 Lifecycle Management Strategy

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

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

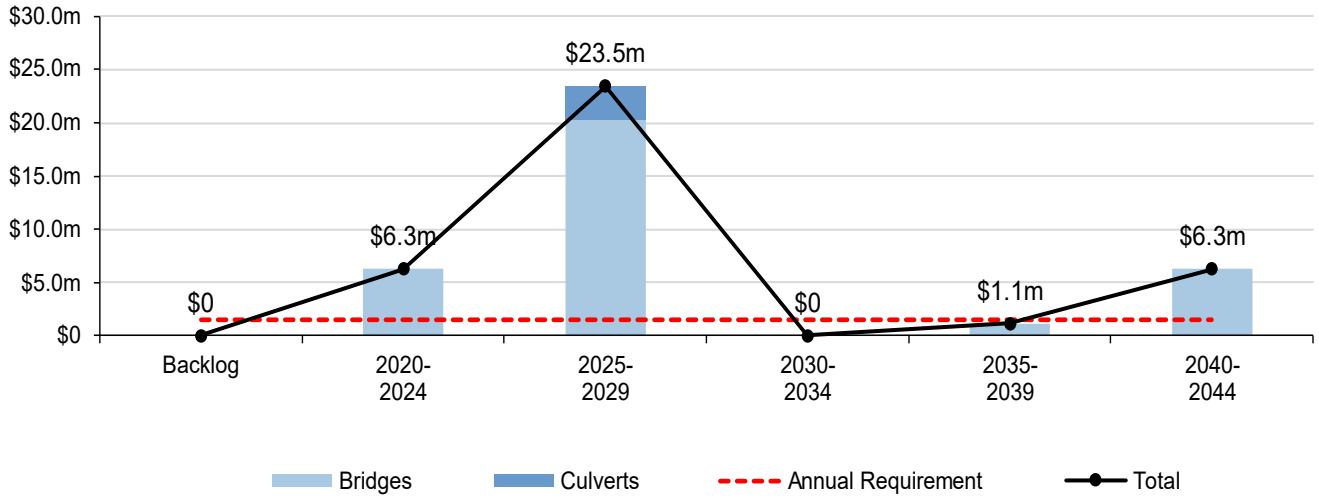
Activity Type	Description of Current Strategy
Minor Maintenance	Inspections, monitoring, sweeping, winter control, etc.
Major Maintenance	Repairing cracked or spalled concrete, damaged expansion joints, bent or damaged railings, etc.
Rehabilitation	Structural reinforcement of structural elements, deck replacement, etc.
Replacement	Full structure reconstruction

The Bridge Code includes theoretical replacement years by structure type. With proper maintenance, the anticipated service life of a bridge is 75 years, and a culvert is between 35-50 years. For the purposes of asset management, we have assumed a 50 year life for road bridges and culverts, and a 75 year life for trail bridges. This lifespan agrees to our accounting data, which was adjusted to reflect this information, and can be broken down into quarters for the purpose of illustrating lifecycle events. The lifecycle activities shown in the table above represent the maintenance and rehabilitation events required to maintain the current levels of service for bridges and culverts in the township.

5.4.1 Forecasted Capital Requirements

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

For Bridges and culverts the average annual capital requirement is $1,540,994.



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

5.5 Risk & Criticality

The risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2020 inventory data. See Appendix D for the criteria used to determine the risk rating of each asset.

This is a high-level model developed by Township staff should review and adjust the risk model to reflect an evolving understanding of both the probability and consequences of asset failure.

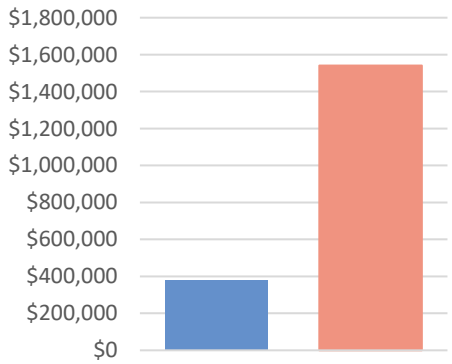
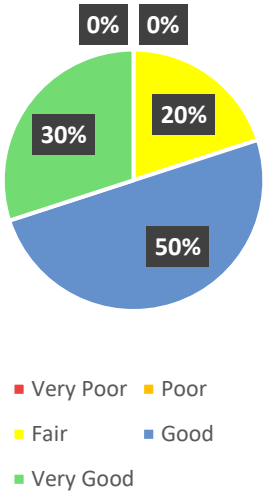
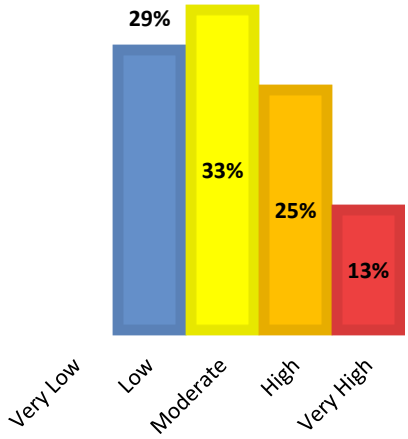
The asset-specific attributes that municipal staff utilize to define and prioritize the criticality of bridges and culverts are documented below:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition	Replacement Cost (Economic)
Service Life Remaining	

The identification of critical assets allows the Township to determine risk mitigation strategies and treatment options. Risk mitigation may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data.

5.6 Levels of Service

The following tables identify the Township's current level of service for bridges and culverts.

Cost	Performance (Average Condition)	Risk
		

The metrics included below are 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.

5.6.1 Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS
Scope	Description of the traffic that is supported by municipal bridges (e.g. heavy transport vehicles, motor vehicles, emergency vehicles, pedestrians, cyclists)	Bridges and structural culverts are a key component of the municipal transportation network.
Quality	Description or images of the condition of bridges and culverts and how this would affect use of the bridges and culverts	See Appendix C

5.6.2 Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS
Scope	% of bridges in the Town with loading or dimensional restrictions	0
Quality	Average bridge condition index value for bridges	65.3
	Average bridge condition index value for structural culverts	69.7

5.7 Recommendations

Data Review/Validation

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

Risk Management Strategies

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

Lifecycle Management Strategies

- The Township should work towards identifying projected capital rehabilitation and renewal costs for bridges and culverts and integrating these costs into long-term planning.

Levels of Service

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

6 Stormwater Network

6.1 Key Insights

The Township is responsible for owning and maintaining a storm system in the community which is generally made up of storm mains, catch basins, and manholes.

Staff are working towards improving the accuracy and reliability of their stormwater network inventory to assist with long-term asset management planning as well as assessing the system for capacity and resiliency.

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

Replacement Cost	Condition	Financial Capacity	
$8,502,809	Good (67%)	Annual Requirement:	$209,785
		Funding Available:	$51,323
		Annual Deficit:	$158,463

6.2 Asset Inventory & Costs

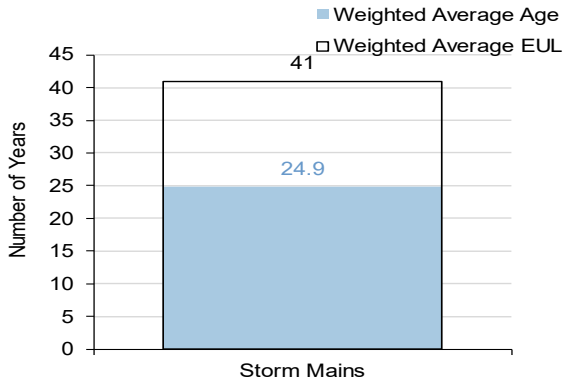
The table below includes the quantity, total replacement cost and annual capital requirements of each asset segment in the Township's stormwater network inventory.

Asset Segment	Quantity	Replacement Cost	Annual Capital Requirement
Storm Mains	12,147	$8,502,809	$209,785
Total		**$8,502,809**	**$209,785**

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

6.3 Asset Condition & Age

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



The average condition for each asset segment on a very good to very poor for the storm network in the Township all segments are in very good condition. To ensure that the Township's stormwater network continues to provide an acceptable level of service, the Township should monitor the average condition of all assets.

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

6.3.1 Current Approach to Condition Assessment

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

- Assets currently only get assessed if in line with a road project or an issue has occurred.

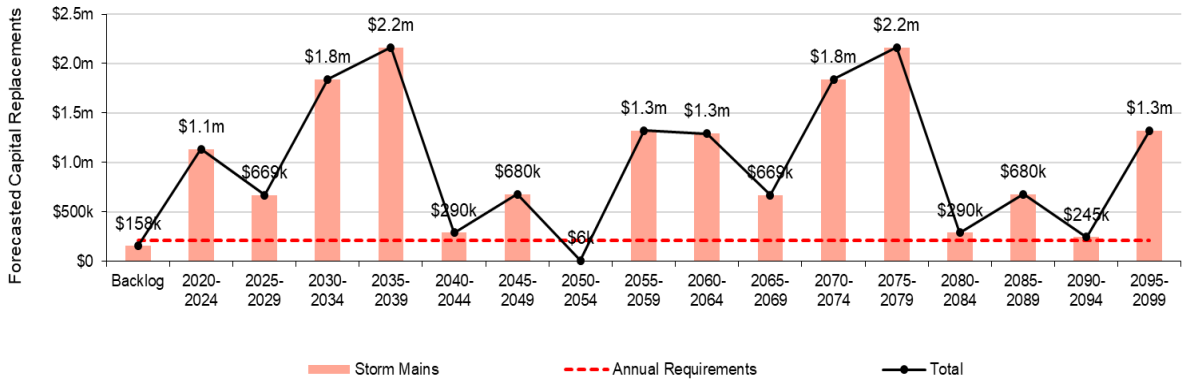
6.4 Lifecycle Management Strategy

To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration. The following table outlines the Township's current lifecycle management strategy.

Activity Type	Description of Current Strategy
Minor Maintenance	Inspections, monitoring, cleaning and flushing, zoom camera and CCTV inspections, etc.
Major Maintenance	Repairing manholes and replacing small sections of pipe
Rehabilitation	Structural lining of pipes are cost effective and may extend the useful life upto 75 or more years
Replacement	Pipe replacement

6.4.1 Forecasted Capital Requirements

The annual capital requirement represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs for the storm system. The projection used looks all the out to the year 2099 as it ensures that every asset has gone through one full iteration of replacement. The forecasted annual capital requirement for the storm network is $209,785.



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

6.5 Risk & Criticality

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.

Consequence	1	2	3	4	5
5	3 Assets $1,285,060.00	5 Assets $3,027,395.00	2 Assets $1,158,031.00	0 Assets $0.00	0 Assets $0.00
4	3 Assets $613,550.00	6 Assets $1,031,387.00	1 Asset $221,662.00	0 Assets $0.00	0 Assets $0.00
3	4 Assets $301,000.00	2 Assets $140,126.00	5 Assets $386,694.00	0 Assets $0.00	0 Assets $0.00
2	1 Asset $42,000.00	3 Assets $103,250.00	3 Assets $122,220.00	0 Assets $0.00	0 Assets $0.00
1	9 Assets $6,300.00	2 Assets $41,706.00	1 Asset $22,428.00	0 Assets $0.00	0 Assets $0.00

Probability

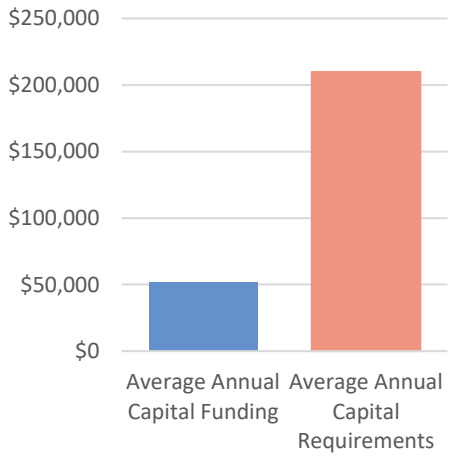
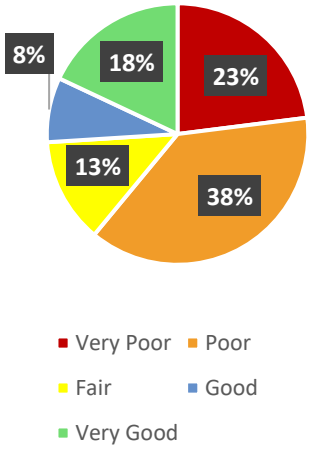
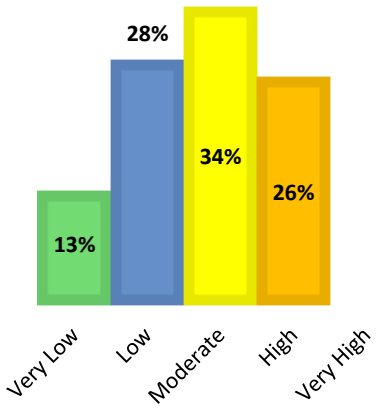
This is a high-level model developed by Township staff and should be reviewed and adjusted to reflect an evolving understanding of both the probability and consequences of asset failure. The asset-specific attributes that municipal staff utilize to define and prioritize the criticality of the storm system are documented below:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition	Replacement Cost (Economic)
Service Life Remaining	Diameter(Operational)

The identification of critical assets allows the Township to determine risk mitigation strategies and treatment options. Risk mitigation may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data.

6.6 Levels of Service

The following tables identify the Township's current level of service for the stormwater network.

Cost	Performance (Average Condition)	Risk
		

The metrics included below are 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.

6.6.1 Community Levels of Service

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

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

6.6.2 Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS[i]
Scope	% Properties in municipality resilient to a 100-year storm	40%
	% The municipal stormwater management system is resilient to a 5-year storm	65%

6.7 Recommendations

Asset Inventory

- The Township's stormwater network inventory remains at a basic level of maturity. The development of a comprehensive inventory of the stormwater network should be priority as well as determining the design criteria used and the level of resiliency built into the system.

Risk Management Strategies

- Implement risk-based decision-making as part of asset management planning and budgeting processes.

Levels of Service

- Measure current levels of service in accordance with the metrics that the Township has established.
- Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

7 Buildings

7.1 Key Insights

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

- administrative offices
- fire stations
- a medical clinic
- public works garages and storage sheds
- an arena, rinks, and community centres

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

Replacement Cost	Condition	Financial Capacity	
$33,937,034	Fair (55%)	Annual Requirement:	$714,889
		Funding Available:	$174,893
		Annual Deficit:	$539,996

7.2 Asset Inventory & Costs

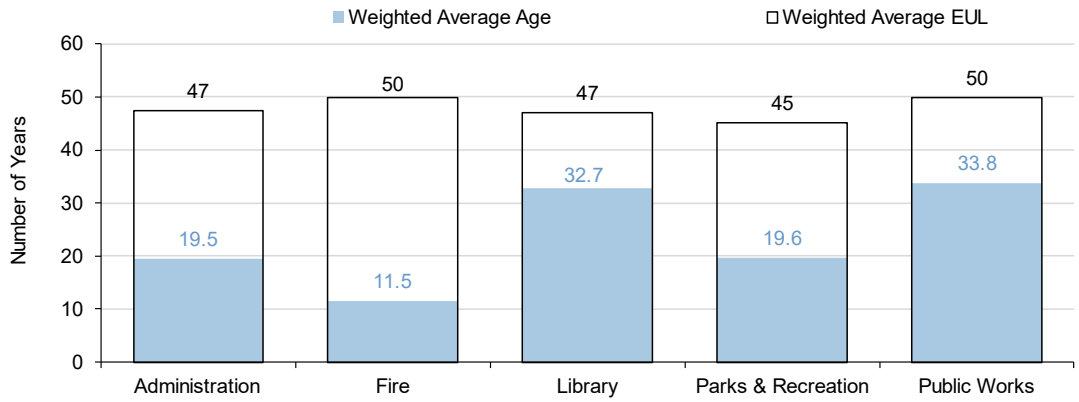
The table below includes the quantity, total replacement cost and annual capital requirements of each asset segment in the Township's buildings inventory.

Asset Segment	Quantity	Replacement Cost	Annual Capital Requirement
Administration	2	$5,780,975	$124,611
Fire	4	$12,970,403	$261,394
Library	3	$2,417,162	$55,952
Parks & Recreation	10	$7,528,002	$167,850
Public Works	2	$5,240,492	$105,081
Total		**$33,937,034**	**$714,889**

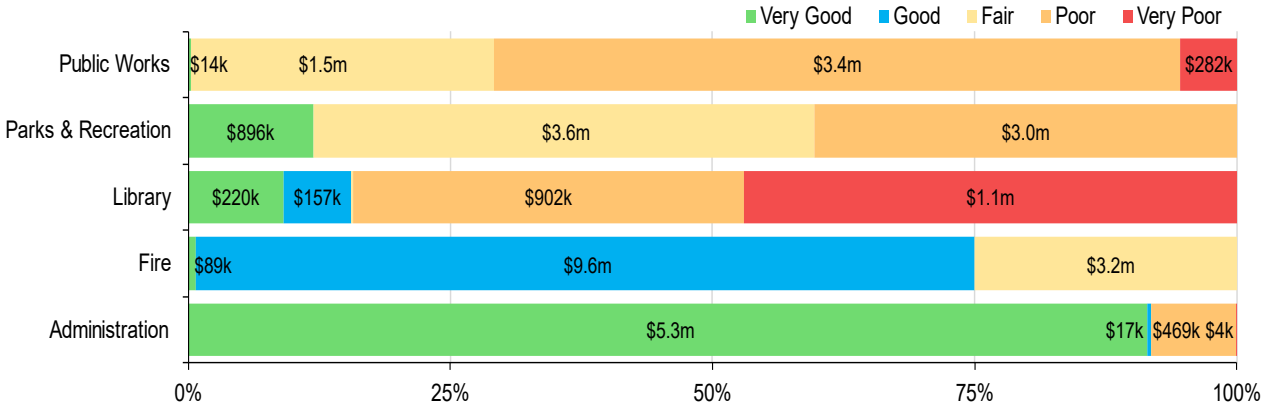
Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

7.3 Asset Condition & Age

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



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



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

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

7.3.1 Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The Township's current approach is staff performing regular assessments identify deficiencies and repairs.

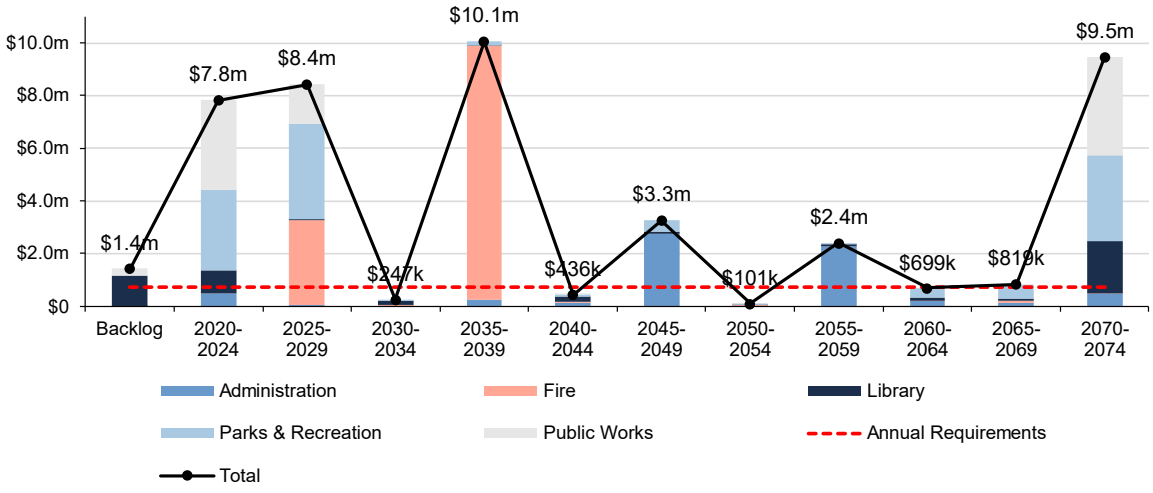
7.4 Lifecycle Management Strategy

To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration. The following table outlines the Township's current lifecycle management strategy.

Activity Type	Description of Current Strategy
Maintenance / Rehabilitation	Municipal buildings are subject to regular inspections to identify health & safety requirements
	Maintenance of buildings is dealt with on a case-by-case basis
Replacement	Assessments are completed strategically as buildings approach their end-of-life to determine whether replacement or rehabilitation is appropriate

7.4.1 Forecasted Capital Requirements

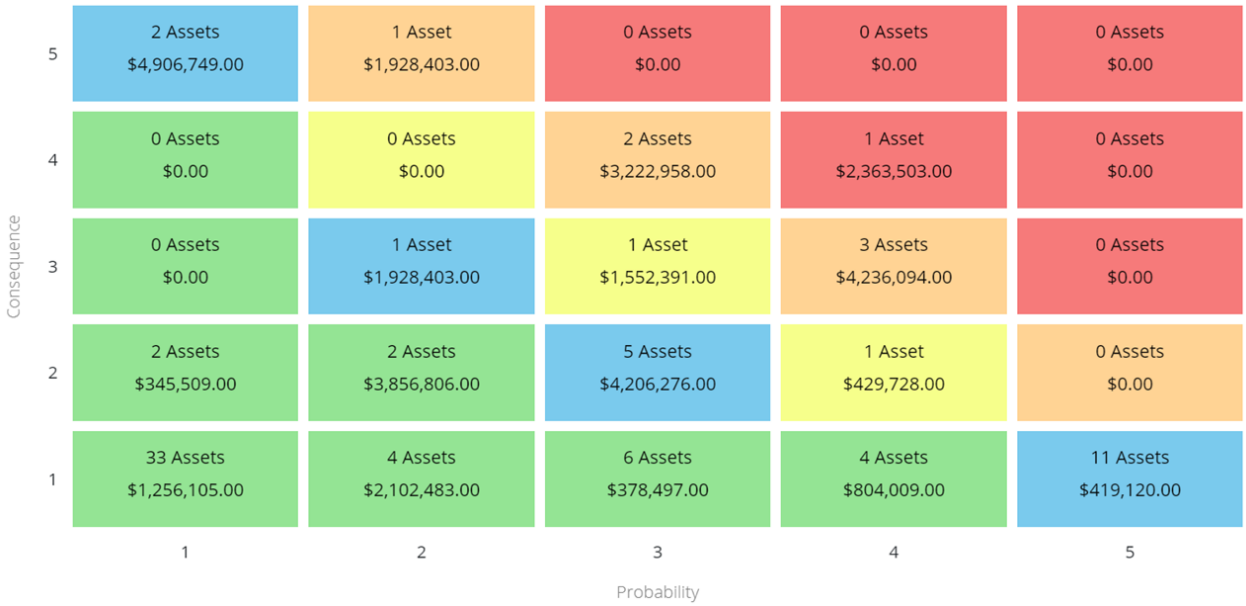
The annual capital requirement represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 45 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average capital requirements at $345,800.



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

7.5 Risk & Criticality

The risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2020 inventory data. See Appendix D for the criteria used to determine the risk rating of each asset.



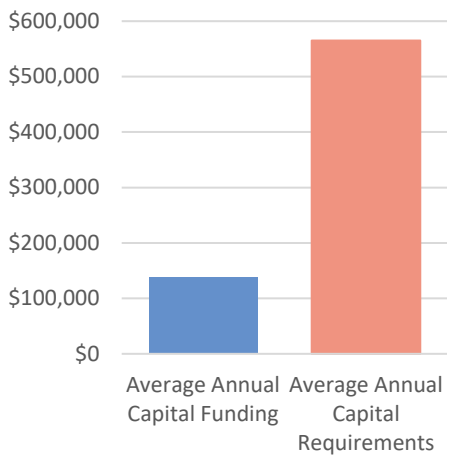
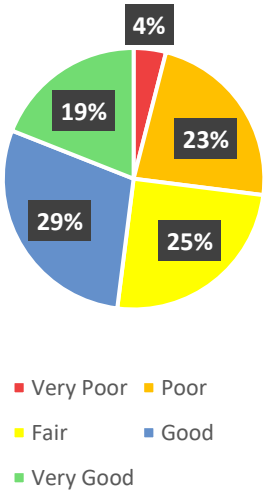
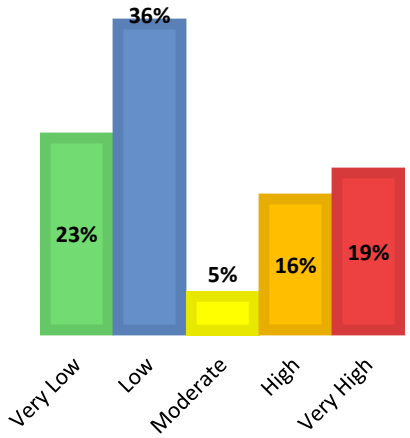
This is a high-level model developed by Township staff and should be reviewed and adjusted to reflect an evolving understanding of both the probability and consequences of asset failure.

The identification of critical assets allows the Township to determine risk mitigation strategies and treatment options. Risk mitigation may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data.

7.6 Levels of Service

Buildings are considered a non-core asset category and as such, the Township has until July 1, 2024, to determine the qualitative descriptions and technical metrics that measure the current level of service provided.

The following tables identify the Township's current level of service for the building assets as a starting point for determining the technical and community level of service metrics that are required as part of O. Reg. 588/17.

Cost	Performance (Average Condition)	Risk
		

7.7 Recommendations

Asset Inventory

- The Township's asset inventory contains a high-level breakdown of building components. Facilities consist of several separate capital components that have unique estimated useful lives and require asset-specific lifecycle strategies. Staff should work towards a more detailed component-based inventory of all buildings to allow for component-based lifecycle planning and inventory consistency.

Replacement Costs

- Gather accurate replacement costs and update on a regular basis to ensure the accuracy of capital projections.

Condition Assessment Strategies

- The Township should implement regular condition assessments for all facilities to better inform short- and long-term capital requirements.

Levels of Service

- Establish current levels of service in accordance with O.Reg. 588/17 as well as additional metrics as they are determined to provide meaningful and reliable inputs into asset management planning.
- Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

8 Land Improvements

8.1 Key Insights

The Township of Tay owns and maintains many types of land improvements that provide key services to the community. These include:

- Playground structures
- Parking lots
- Park Lighting
- General site improvements

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

Replacement Cost	Condition	Financial Capacity	
$6,182,399	Very Good (84%)	Annual Requirement:	$199,546
		Funding Available:	$48,818
		Annual Deficit:	$150,729

8.2 Asset Inventory & Costs

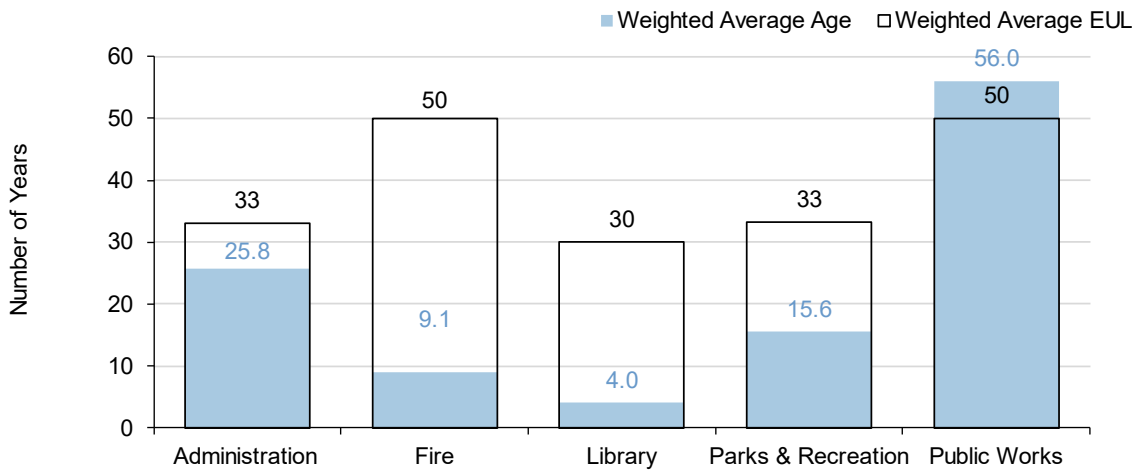
The table below includes the quantity, total replacement cost and annual capital requirements of each asset segment in the Township's waste management inventory.

Asset Segment	Quantity	Replacement Cost	Annual Capital Requirement
Administration	2	$59,620	$1,869
Fire	6	$370,169	$7,403
Library	1	$10,921	$364
Parks & Recreation	932	$5,654,259	$188,162
Public Works	1	$87,430	$1,749
Total		**$6,182,399**	**$199,546**

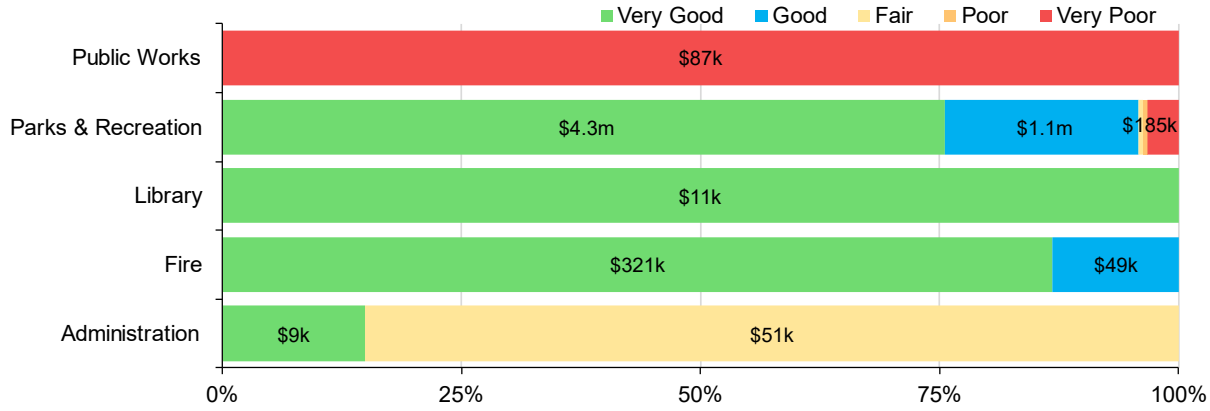
Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

8.3 Asset Condition & Age

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



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



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

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

8.3.1 Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The Township's current approach is to conduct inspections; however, the types of assets have very different characteristics and as such are monitored accordingly.

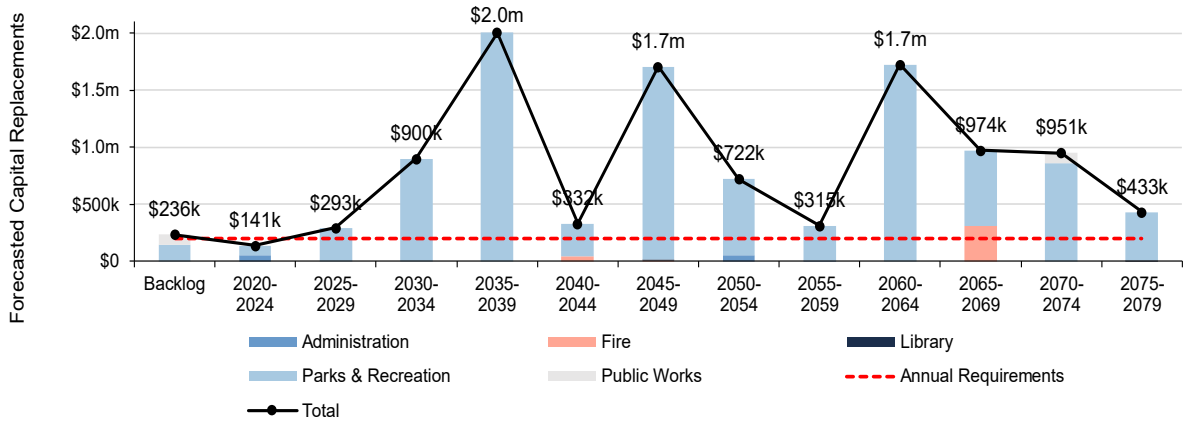
8.4 Lifecycle Management Strategy

To ensure that Township assets are performing as expected and meeting the needs of residents, 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, Rehabilitation & Replacement	Assessments, repairs and replacements are completed as identified

8.4.1 Forecasted Capital Requirements

The annual capital requirement represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 55 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average annual capital requirements which are $199,546.



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

8.5 Risk & Criticality

The risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2020 inventory data. See Appendix D for the criteria used to determine the risk rating of each asset.

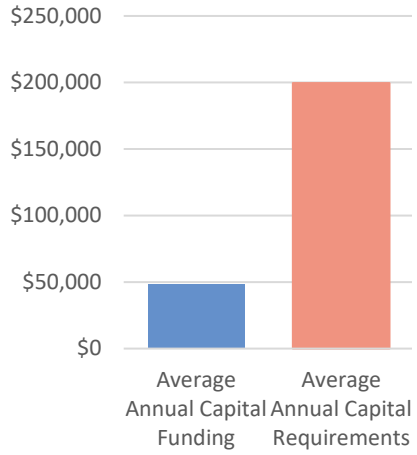
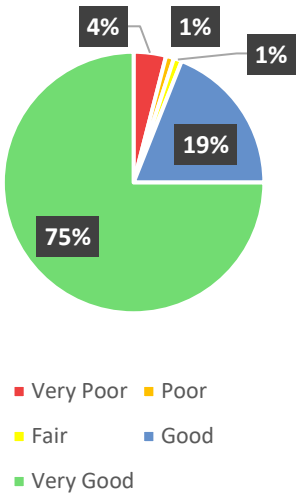
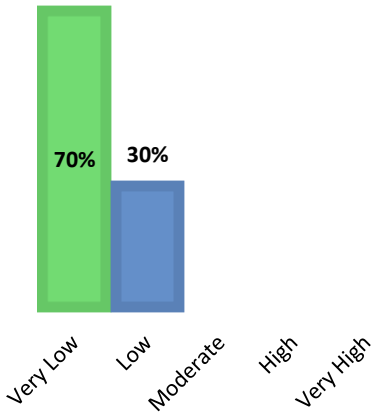
This is a high-level model developed by Township staff and should be reviewed and adjusted to reflect an evolving understanding of both the probability and consequences of asset failure.

The identification of critical assets allows the Township to determine risk mitigation strategies and treatment options. Risk mitigation may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data.

8.6 Levels of Service

Waste Management is considered a non-core asset category and as such, the Township has until July 1, 2024, to determine the qualitative descriptions and technical metrics that measure the current level of service provided.

The following tables identify the Township's current level of service for the waste management assets as a starting point for determining the technical and community level of service metrics that are required as part of O. Reg. 588/17.

Cost	Performance (Average Condition)	Risk
		

8.7 Recommendations

Replacement Costs

- Gather accurate replacement costs and update on a regular basis to ensure the accuracy of capital projections.

Risk Management Strategies

- Implement risk-based decision-making as part of asset management planning and budgeting processes. This should include the regular review of high-risk assets to determine appropriate risk mitigation strategies.

Levels of Service

- Establish current levels of service in accordance with O. Reg. 588/17 as well as additional metrics as they are determined to provide meaningful and reliable inputs into asset management planning.
- Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

9 Vehicles

9.1 Key Insights

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

- tandem axle trucks for winter control activities
- fire rescue vehicles to provide emergency services
- waste collection vehicles to provide environmental services
- pick-up trucks to support the maintenance of all departments

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

Replacement Cost	Condition	Financial Capacity	
$7,587,808	Good (79%)	Annual Requirement:	$509,143
		Funding Available:	$124,559
		Annual Deficit:	$384,585

9.2 Asset Inventory & Costs

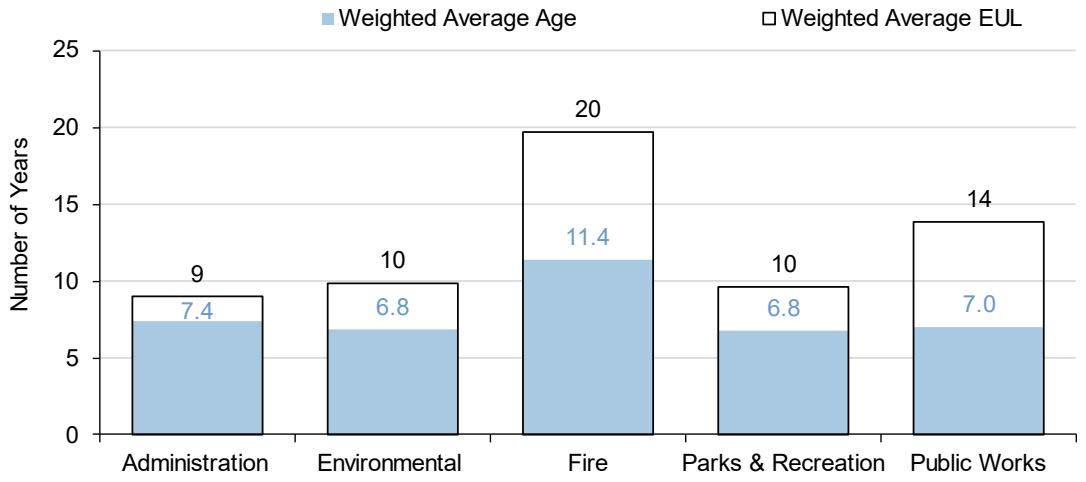
The table below includes the quantity, total replacement cost and annual capital requirements of each asset segment in the Township's vehicle inventory.

Asset Segment	Quantity	Replacement Cost	Annual Capital Requirement
Administration	3	$91,975	$10,530
Environmental	6	$198,568	$19,857
Fire	13	$3,416,804	$176,387
Parks & Recreation	5	$206,267	$21,860
Public Works	23	$3,674,194	$280,509
Total		**$7,587,808**	**$509,143**

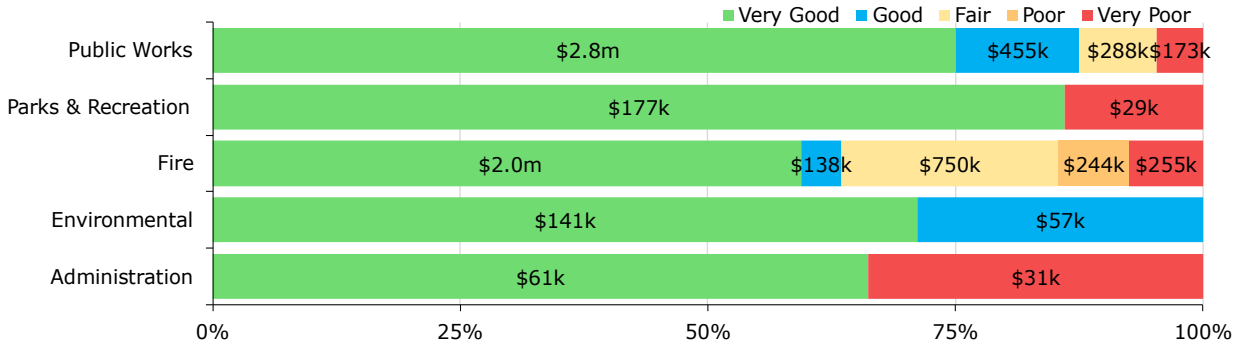
Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

9.3 Asset Condition & Age

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



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



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

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

9.3.1 Current Approach to Condition Assessment

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

- Staff complete regular visual inspections of vehicles to ensure they are in state of adequate repair prior to operation

The rating criteria used to determine the current condition and forecast future capital requirements is consistent with all other asset categories at 0 – 100.

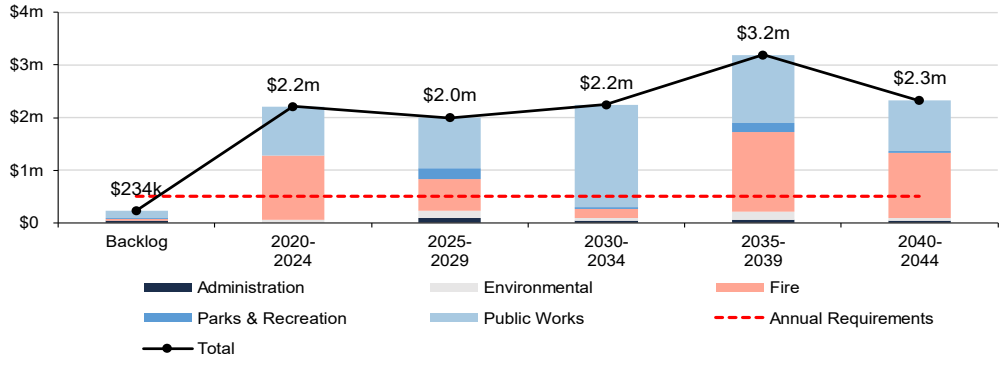
9.4 Lifecycle Management Strategy

The condition or performance of assets will deteriorate over time, to ensure vehicles are performing as expected, 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 / Rehabilitation	Visual inspections completed and documented daily
	Every 4-7000km includes an inspection and oil changed
Replacement	Vehicle replacements are based on age, usage and annual repair costs are all considered when determining appropriate treatment options

9.4.1 Forecasted Capital Requirements

The annual capital requirement represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 25 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average annual capital requirements at $509,143.



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

9.5 Risk & Criticality

The risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2020 inventory data. See Appendix D for the criteria used to determine the risk rating of each asset.

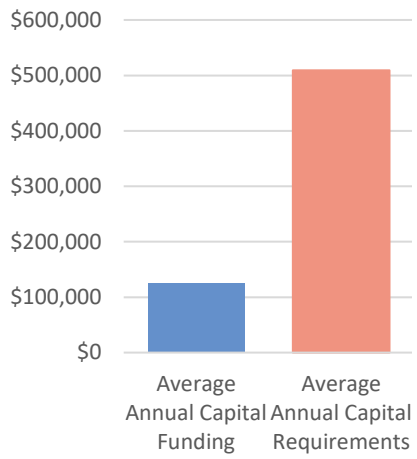
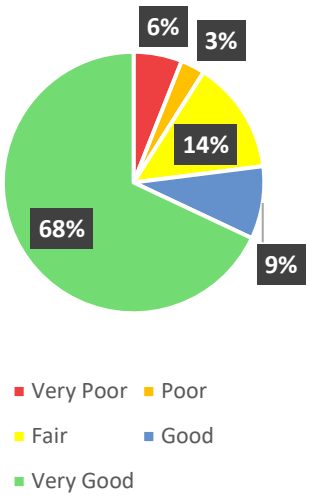
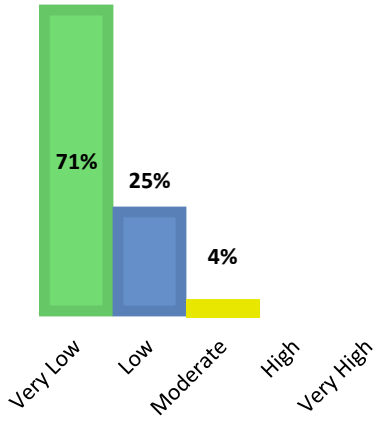
This is a high-level model developed by the Township staff and should be reviewed and adjusted to reflect an evolving understanding of both the probability and consequences of asset failure.

The identification of critical assets allows the Township to determine appropriate risk mitigation strategies and treatment options. Risk mitigation may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data.

9.6 Levels of Service

Vehicles are considered a non-core asset category. As such, the Township has until July 1, 2024, to determine the qualitative descriptions and technical metrics that measure the current level of service provided.

The following tables identify the Township's current level of service for the vehicle assets as a starting point for determining the technical and community level of service metrics that are required as part of O. Reg. 588/17.

Cost	Performance (Average Condition)	Risk
		

9.7 Recommendations

Replacement Costs

- Gather accurate replacement costs and update on a regular basis to ensure the accuracy of capital projections.

Condition Assessment Strategies

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

Risk Management Strategies

- Implement risk-based decision-making as part of asset management planning and budgeting processes. This should include the regular review of high-risk assets to determine appropriate risk mitigation strategies.

Levels of Service

- Establish current levels of service in accordance with O. Reg. 588/17 as well as additional metrics as they are determined to provide meaningful and reliable inputs into asset management planning.
- Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

10 Equipment

10.1 Key Insights

To maintain the quality stewardship of Tay's infrastructure and support the delivery of services, Township staff own and employ various types of equipment. This includes:

- Computer hardware, software, and phone systems to support all Township services
- Landscaping equipment to maintain public parks
- Fire equipment to support the delivery of emergency services
- Equipment to enable the provision of recreational services

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

Replacement Cost	Condition	Financial Capacity	
$3,162,244	Good (74%)	Annual Requirement:	$293,673
		Funding Available:	$71,845
		Annual Deficit:	$221,828

10.2 Asset Inventory & Costs

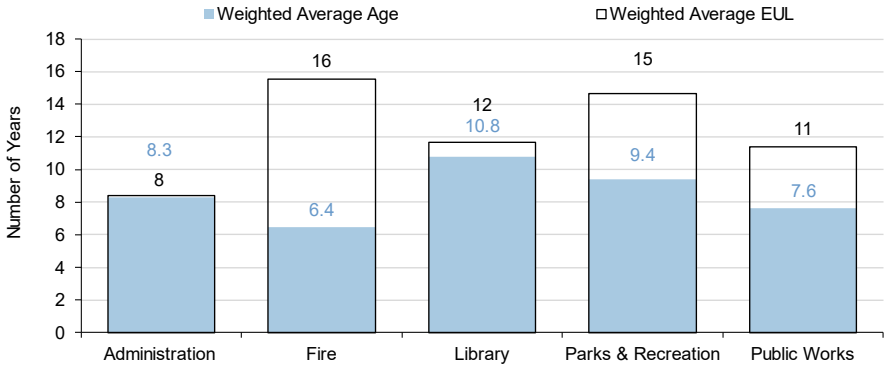
The table below includes the quantity, total replacement cost and annual capital requirements of each asset segment in the Township's equipment inventory.

Asset Segment	Quantity	Replacement Cost	Annual Capital Requirement
Administration	48	$496,948	$72,880
Fire	88	$1,623,824	$124,545
Library	44	$392,125	$46,128
Parks & Recreation	14	$532,968	$39,590
Public Works	12	$116,379	$10,530
Total		**$3,162,244**	**$293,673**

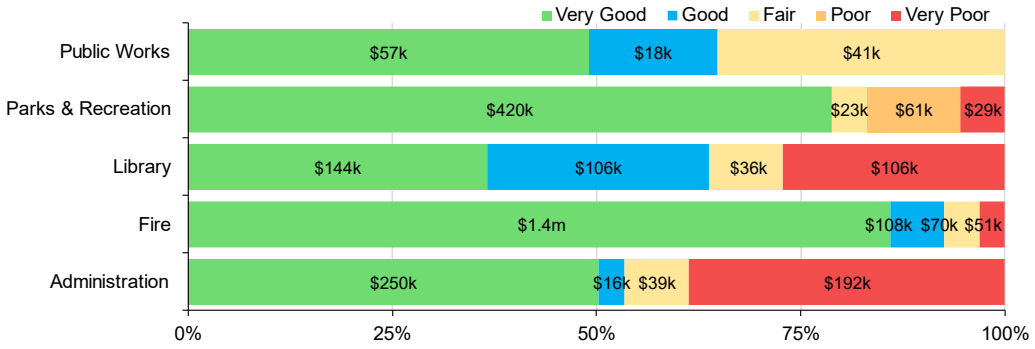
Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

10.3 Asset Condition & Age

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



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



To ensure that the Township's equipment continues to provide an acceptable level of service, the Township should continue to monitor the average condition. 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.

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

10.3.1 Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The broad range of types of equipment included in this category, there are some types with very established assessments (i.e. Fire Equipment) but also many don't have any assessment procedures.

10.4 Lifecycle Management Strategy

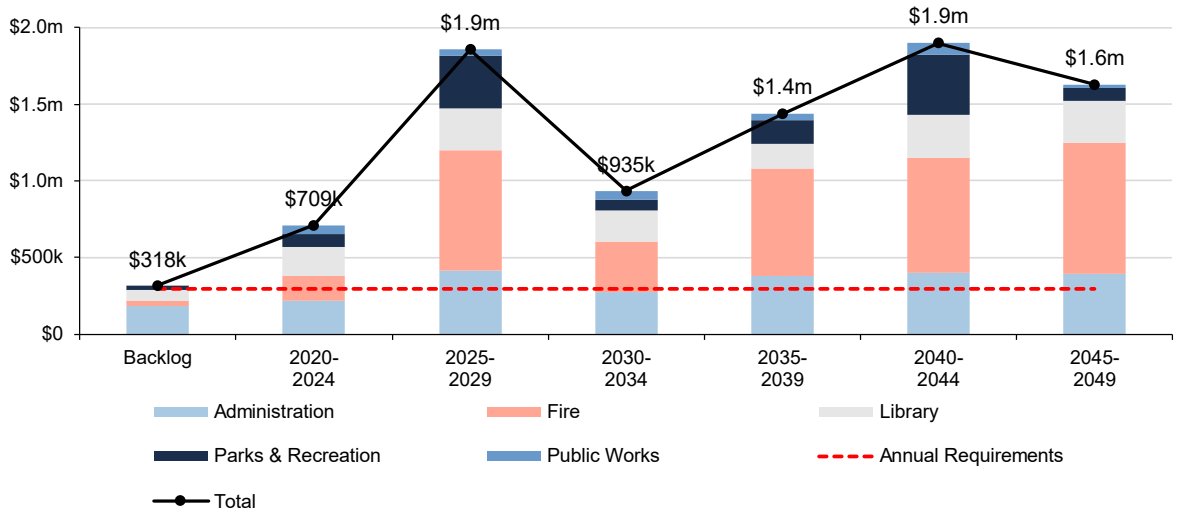
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Maintenance/ Rehabilitation	Maintenance program varies by department
	Fire equipment is subject to a much more rigorous inspection and maintenance program compared to most other departments
	Equipment is maintained according to manufacturer recommended actions and supplemented by the expertise of municipal staff
Replacement	The replacement of equipment depends on deficiencies identified

10.4.1 Forecasted Capital Requirements

The following graph identifies capital requirements over the next 30 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average annual capital requirements at $293,673.



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

10.5 Risk & Criticality

The risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for the assets within this asset category based on 2020 inventory data. See Appendix D for the criteria used to determine the risk rating of each asset.

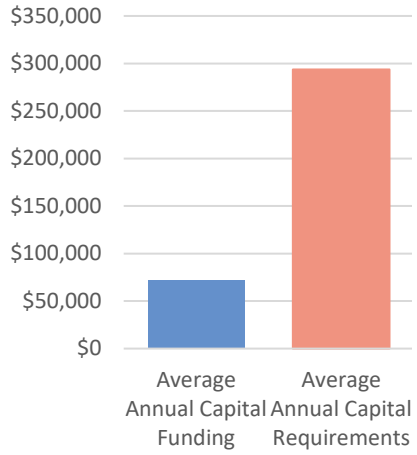
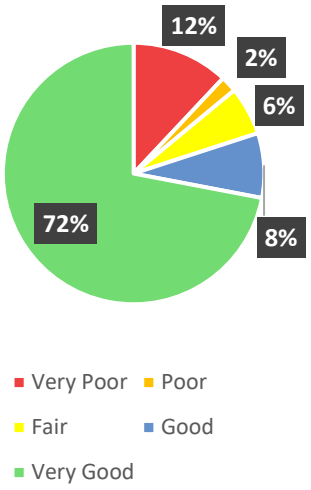
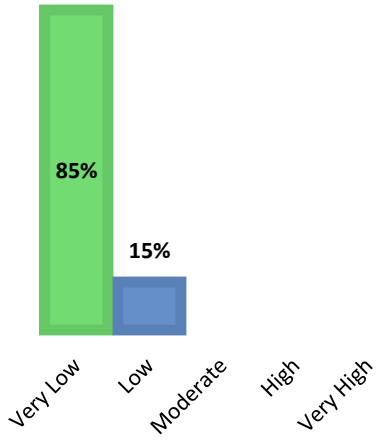
This is a high-level model developed by Township staff and should be reviewed and adjusted to reflect an evolving understanding of both the probability and consequences of asset failure.

The identification of critical assets allows the Township to determine appropriate risk mitigation strategies and treatment options. Risk mitigation may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data.

10.6 Levels of Service

Equipment is considered a non-core asset category, as such, the Township has until July 1, 2024, to determine the qualitative descriptions and technical metrics that measure the current level of service provided.

The following tables identify the Township's current level of service for the machinery and equipment assets as a starting point for determining the technical and community level of service metrics that are required as part of O. Reg. 588/17.

Cost	Performance (Average Condition)	Risk
		

10.7 Recommendations

Replacement Costs

- All replacement costs are based on the inflation of historical cost. These costs should be evaluated to determine their accuracy and reliability. Replacement costs should be updated according to the best available information on the cost to replace the asset in today's value.

Condition Assessment Strategies

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

Risk Management Strategies

- Implement risk-based decision-making as part of asset management planning and budgeting processes. This should include the regular review of high-risk assets to determine appropriate risk mitigation strategies.

Levels of Service

- Establish current levels of service in accordance with O. Reg. 588/17 as well as additional metrics as they are determined to provide meaningful and reliable inputs into asset management planning.
- Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

11 Water Network

11.1 Key Insights

The water services provided by the Township are overseen by the Ontario Clean Water Agency (OCWA). The public works department works with OCWA to ensure the responsible management for the following:

- Water Treatment Plant
- Distribution System
- Booster Stations
- Water Storage Tank

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

Replacement Cost	Condition	Financial Capacity	
$102,177,381	Very Good (83%)	Annual Requirement:	$1,696,697
		Funding Available:	$764,191
		Annual Deficit:	$932,506

11.2 Asset Inventory & Costs

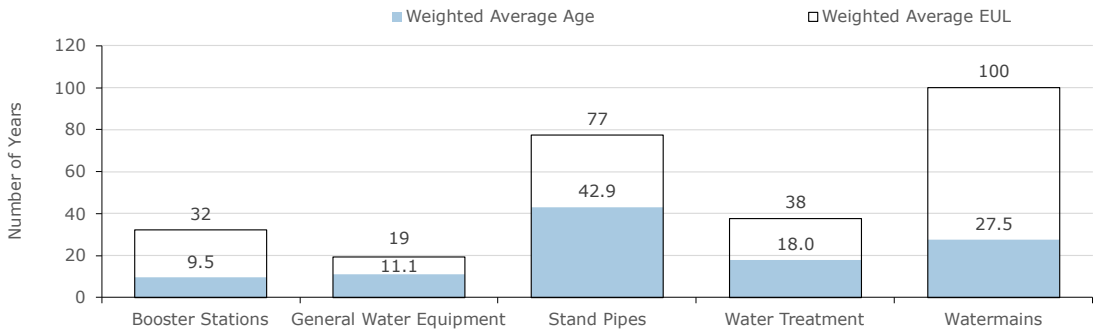
The table below includes the quantity, replacement cost method, and annual capital requirements of each asset segment in the Township's water network inventory.

Asset Segment	Quantity (Component)	Replacement Cost	Annual Capital Requirement
Booster Stations	25	$3,541,320	$96,987
General Water Equipment	8	$109,917	$5,999
Stand Pipes	6	$11,033,911	$149,020
Water Treatment	62	$20,167,675	$703,751
Watermains	96,178m	$67,324,558	$740,940
Total		**$102,177,381**	**$1,696,697**

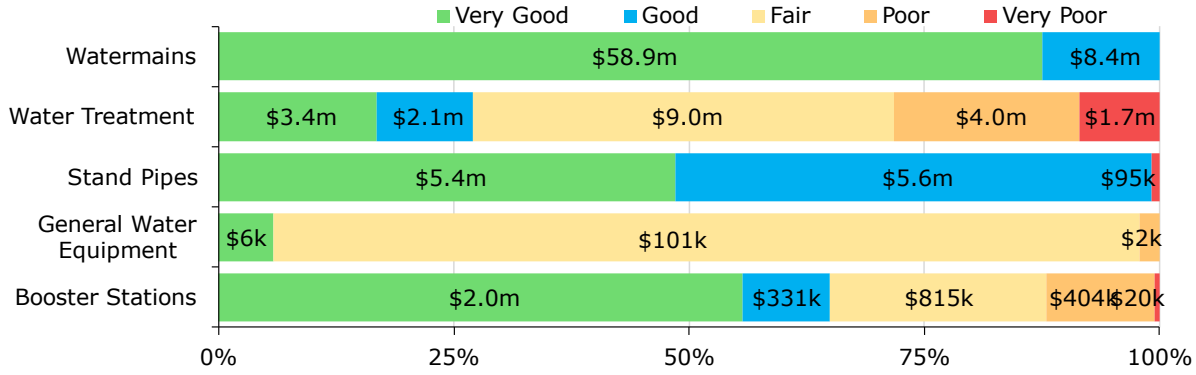
Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

11.3 Asset Condition & Age

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



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



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 the lifecycle management strategy to determine what combination of activities is required to increase the overall condition of the water network.

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

11.3.1 Current Approach to Condition Assessment

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

- For watermains staff rely on the age, material, and break history to estimate the condition of water mains

11.4 Lifecycle Management Strategy

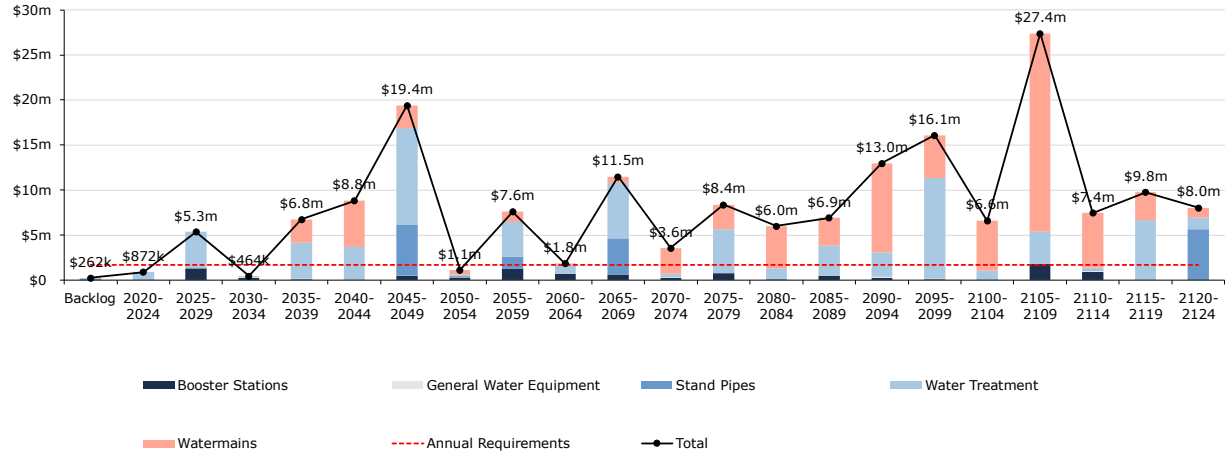
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Minor Maintenance	Inspections, monitoring, cleaning and flushing, hydrant flushing, pressure tests, etc.
Major Maintenance	Repairing water main breaks, repairing valves, replacing individual small sections of pipe, etc.
Rehabilitation	Structural lining of pipes and a cathodic protection program to slow the rate of pipe deterioration
Replacement	Pipe Replacement

11.4.1 Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Town should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 100 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average annual capital requirements at $1,696,697.



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

11.5 Risk & Criticality

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.

This is a high-level model developed by Township staff and should be reviewed and adjusted to reflect an evolving understanding of both the probability and consequences of asset failure.

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

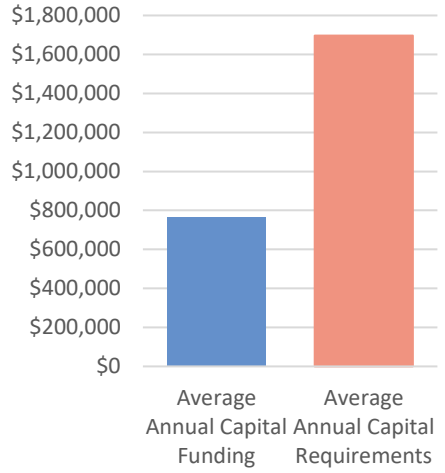
Probability of Failure (POF)	Consequence of Failure (COF)
Condition	Replacement Cost (Economic)
Service Life Remaining	Diameter (Operational) for pipes only

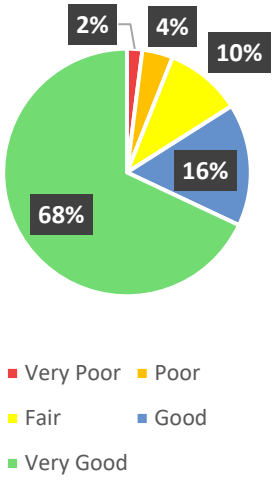
The identification of critical assets allows the Township to determine appropriate risk mitigation strategies and treatment options. Risk mitigation may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data.

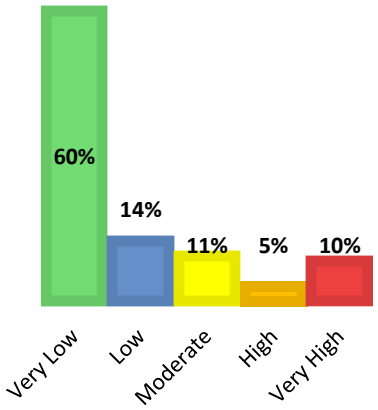
11.6 Levels of Service

The following tables identify the Township's current level of service for water network.

Cost	Performance (Average Condition)	Risk







These metrics include the technical and community level of service metrics that are required as part of O. Reg. 588/17 as well as any additional performance measures that the Town has selected.

11.6.1 Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS
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	4 boil water advisories and 8 service interruptions in 2021

11.6.2 Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS
Scope	% of properties connected to the municipal water system	58%
	% of properties where fire flow is available	50%
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	4
	# 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	5

11.7 Recommendations

Replacement Costs

- Gather accurate replacement costs and update on a regular basis to ensure the accuracy of capital projections.

Risk Management Strategies

- Implement risk-based decision-making as part of asset management planning and budgeting processes. This should include the regular review of high-risk assets to determine appropriate risk mitigation strategies.

Levels of Service

- Continue to measure current levels of service. 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 se

12 Wastewater Network

12.1 Key Insights

The Wastewater Network owned by the Township are overseen by the public works department with OCWA (Ontario Clean Water Agency). The department is responsible for the following:

- Treatment Plants
- Pumping stations
- Sanitary collection system

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

Replacement Cost	Condition	Financial Capacity	
$63,681,795	Very Good (60%)	Annual Requirement:	$1,612,903
		Funding Available:	$696,844
		Annual Deficit:	$916,059

12.2 Asset Inventory & Costs

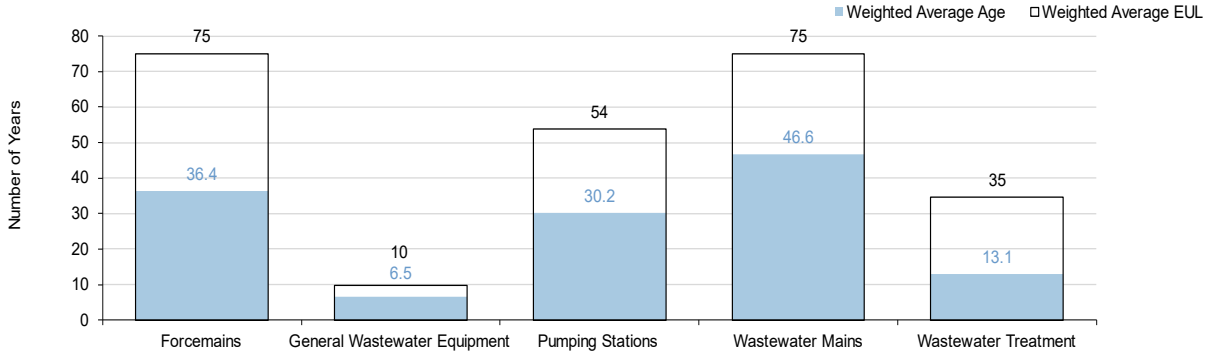
The table below includes the quantity, replacement cost and annual capital requirement for each asset segment in the Township's sanitary network inventory.

Asset Segment	Quantity (components)	Replacement Cost	Annual Capital Requirement
Forcemains	31,198m	$21,838,250	$436,765
General Wastewater Equipment	5	$11,637	$1,198
Pumping Stations	42	$8,914,166	$201,927
Wastewater Mains	13,927m	$9,748,592	$114,997
Wastewater Treatment	61	$23,169,150	$858,017
Total		**$63,681,795**	**$1,612,903**

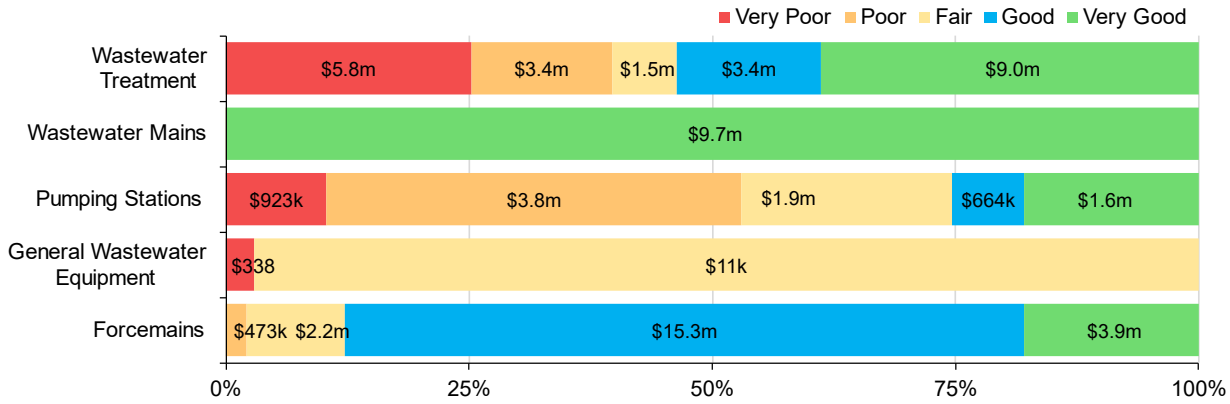
Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurate represent realistic capital requirements.

12.3 Asset Condition & Age

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



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



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 activities is required to increase the overall condition of the wastewater network.

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

12.3.1 Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The Township's current approach is to have OCWA manages all condition assessments and make recommendations. The rating criteria used to determine the current condition of sewer network assets and forecast future capital requirements is the same as other categories 0-100.

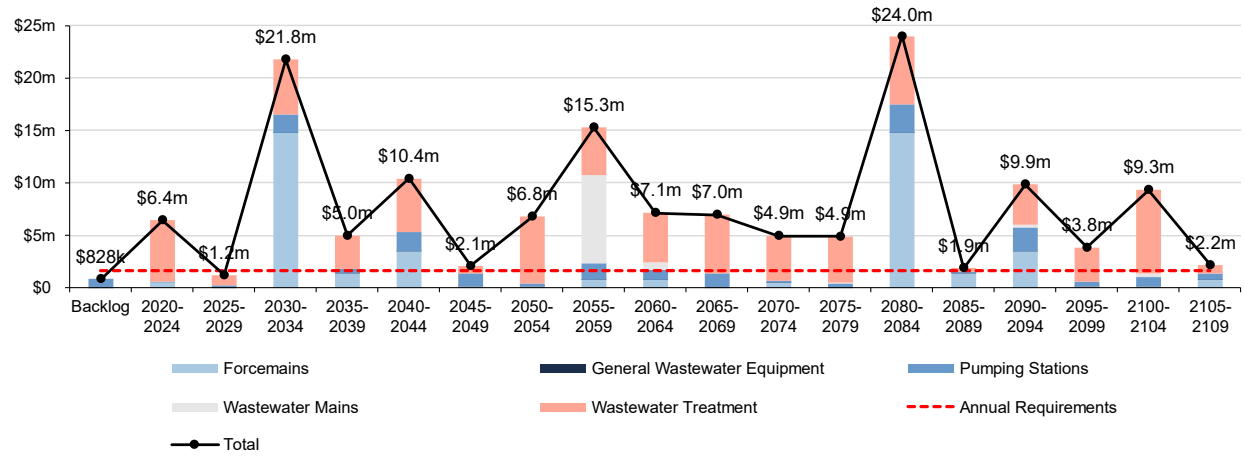
12.4 Lifecycle Management Strategy

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

Activity Type	Description of Current Strategy
Minor Maintenance	Inspections, monitoring, cleaning and flushing, zoom camera and CCTV inspections, etc.
Major Maintenance	Repairing manholes and replacing small sections of pipe
Rehabilitation	Structural lining of pipes are cost effective and may extend the useful life upto 75 or more years
Replacement	Pipe replacement

12.4.1 Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 100 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average annual capital requirements at $1,612,903.



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

12.5 Risk & Criticality

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.

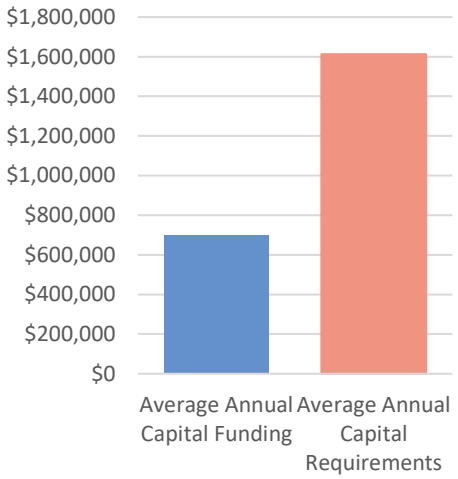
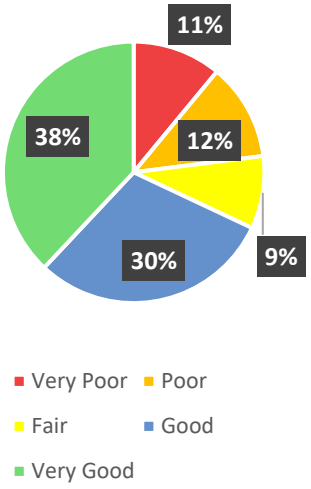
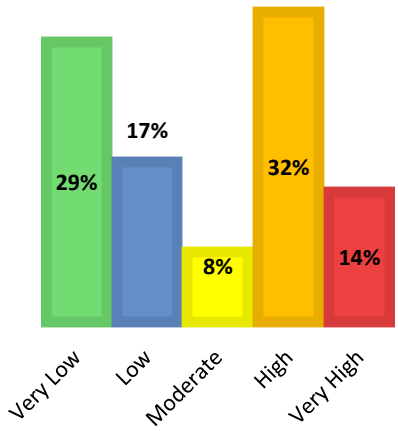
This is a high-level model developed by Township staff and should be reviewed and adjusted to reflect an evolving understanding of both the probability and consequences of asset failure. The asset-specific attributes that municipal staff utilize to define and prioritize the criticality of the wastewater network are documented below:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition	Replacement Cost (Economic)
Remaining Service Life	Diameter (Operational 50%)

The identification of critical assets allows the Township to determine appropriate risk mitigation strategies and treatment options. Risk mitigation may include asset-specific lifecycle strategies, condition assessment strategies, or simply the need to collect better asset data.

12.6 Levels of Service

The following tables identify the Township's current level of service for the sanitary network.

Cost	Performance (Average Condition)	Risk
		

These metrics include the technical and community level of service metrics that are required as part of O. Reg. 588/17.

12.6.1 Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS
Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal wastewater system	See Appendix C
Reliability	Description of how combined sewers in the municipal wastewater system are designed with overflow structures in place which allow overflow during storm events to prevent backups into homes	The Township does not own any combined sewers
	Description of the frequency and volume of overflows in combined sewers in the municipal wastewater system that occur in habitable areas or beaches	The Township does not own any combined sewers
	Description of how stormwater can get into sanitary sewers in the municipal wastewater system, causing sewage to overflow into streets or backup into homes	Stormwater can enter into wastewater network due to cracks in wastewater mains or through indirect connections (e.g. weeping tiles). In the case of heavy rainfall events, wastewater mains may experience a volume of water and sewage that exceeds its designed capacity.
	Description of how sanitary sewers in the municipal wastewater system are designed to be resilient to stormwater infiltration	The Township follows a series of design standards that integrate servicing requirements and land use considerations when constructing or replacing wastewater mains.
	Description of the effluent that is discharged from sewage treatment plants in the municipal wastewater system	Effluent refers to water pollution that is discharged from a wastewater treatment plant, and may include suspended solids, total phosphorous and biological oxygen demand. The Environmental Compliance Approval (ECA) identifies the effluent criteria for municipal wastewater treatment plants.

12.6.2 Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS
Scope	% of properties connected to the municipal wastewater system	41%
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	3 days
	# 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

12.7 Recommendations

Condition Assessment Strategies

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

Risk Management Strategies

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

Levels of Service

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

13 Impacts of Growth

13.1 Key Insights

- Understanding the key drivers of growth and demand will allow the Township to plan for new infrastructure more effectively, and the upgrade or disposal of existing infrastructure

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

13.2 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 plan for new infrastructure, as well as the upgrade or dispose of existing infrastructure. Increases or decreases in demand can affect what assets are needed and what level of service meets the needs of the community.

13.3 Impact of Growth on Lifecycle Activities

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

Planning for forecasted population growth may require the expansion of existing infrastructure and services. As growth-related assets are constructed or acquired, they should be integrated into the Township's asset management program.

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.

14 Financial Strategy

14.1 Key Insights

- The Township is committing approximately $3,825,813 towards capital projects per year from sustainable revenue sources
- Given the annual capital requirement of $8,339,623, there is currently a funding gap of $4,513,811 annually
- For tax-funded assets, we recommend increasing tax revenues by 1.4% each year for the next 20 years to achieve a sustainable level of funding and reallocating available debt payments to capital funding
- For the water network, we recommend increasing rate revenues by 1.4% annually for the next 20 years to achieve a sustainable level of funding
- For the sanitary network, we recommend increasing rate revenues by 1.7% annually for the next 20 years to achieve a sustainable level of funding

14.2 Financial Strategy Overview

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

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

1. The financial requirements for:
    a. Existing assets
    b. Existing service levels
    c. Requirements of contemplated changes in service levels (none identified for this plan)
    d. Requirements of anticipated growth (none identified for this plan)
2. Use of traditional sources of municipal funds:
    a. Tax levies
    b. User fees
    c. Reserves
    d. Debt

3. Use of non-traditional sources of municipal funds:
    a. Reallocated budgets
    b. Partnerships
    c. Procurement methods
4. Use of Senior Government Funds:
    a. Canada Community Building Fund (CCBF)
    b. Annual grants

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

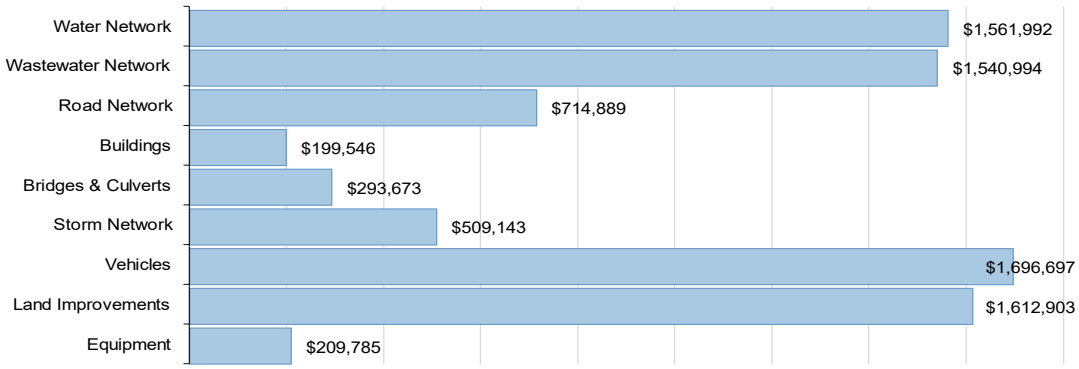
If the financial plan component results in a funding shortfall, the province requires the inclusion of a specific plan as to how the impact of the shortfall will be managed. In determining the legitimacy of a funding shortfall, the province may evaluate a Township's approach to the following:

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

14.3 Annual Requirements & Capital Funding

14.3.1 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 allocation is approximately $8.3 million annually.



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. The development of these strategies allows for a comparison of potential cost avoidance if the strategies were to be implemented. The following table compares two scenarios for the road network:

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

Asset Category	Annual Requirements (Replacement Only)	Annual Requirements (Lifecycle Strategy)	Difference
Road Network	$1,657,624	$1,561,992	$95,632

The implementation of a proactive lifecycle strategy for roads leads to a potential annual cost avoidance of approximately $95,632 for the road network. This represents an overall reduction of the annual requirements by 6%. As the lifecycle strategy scenario represents the lowest cost option available to the Township, we have used this annual requirement in the development of the financial strategy.

14.3.2 Annual Funding Available

Based on a historical analysis of sustainable capital funding sources, the Township is committing approximately $3,825,813 towards capital projects per year from sustainable revenue sources. Given the annual capital requirement of $8,339,623, there is currently a funding gap of $4,513,811 annually.

14.4 Funding Objective

A scenario has been developed that would enable Tay to achieve full funding within 1 to 20 years for the following assets:

1. **Tax Funded Assets:** Road Network, Bridges & Culverts, Stormwater Network, Buildings, Land Improvements, Equipment, & Vehicles
2. **Rate Funded Assets:** Water Network, & Wastewater Network

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

14.5 Financial Profile: Tax Funded Assets

14.5.1 Current Funding Position

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

Asset Category	Avg. Annual Requirement	Annual Funding Available				Annual Deficit
		Taxes	CCBF	OCIF	Total	
Road Network	1,561,992	382,131	625,202	509,013	1,516,346	45,646
Bridges & Culverts	1,540,994	376,994			376,994	1,164,000
Buildings	714,889	174,893			174,893	539,996
Land Improvements	199,546	48,818			48,818	150,729
Equipment	293,673	71,845			71,845	221,828
Vehicles	509,143	124,559			124,559	384,585
Storm Network	209,785	51,323			51,323	158,463
	5,030,023	1.231m	625,202	509,013	2,364,778	2,665,245

The average annual investment requirement for tax funded assets is 5,030,023. Annual revenue allocated to these assets for capital purposes is 2,364,778 leaving an annual deficit of $2,665,245. Put differently, these infrastructure categories are currently funded at 47% of their long-term requirements.

14.5.2 Full Funding Requirements

In 2022, Township of Tay will have an annual tax revenue of 8,107,580. As illustrated in the following table, without consideration of any other sources of revenue or cost containment strategies, full funding would require the following tax change over time:

Asset Category	Tax Change Required for Full Funding
Road Network	0.6%
Bridges & Culverts	14.4%
Buildings	6.7%
Land Improvements	1.9%
Equipment	2.7%
Vehicles	4.7%
Storm Network	2.0%
	32.9%

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

	Without Capturing Changes				With Capturing Changes			
	5 Years	**10 Years**	**15 Years**	**20 Years**	**5 Years**	**10 Years**	**15 Years**	**20 Years**
Infrastructure Deficit	2,665,245	2,665,245	2,665,245	2,665,245	2,665,245	2,665,245	2,665,245	2,665,245
Change in Debt Costs	n/a	n/a	n/a	n/a	-44,852	-44,852	-113,798	-113,798
Resulting Infrastructure Deficit	2,665,245	2,665,245	2,665,245	2,665,245	2,620,394	2,620,394	2,551,447	2,551,447
Tax Increase Required	32.9%	32.9%	32.9%	32.9%	32.3%	32.3%	31.5%	31.5%
Annually	5.8%	2.9%	1.9%	1.4%	5.8%	2.8%	1.8%	1.4%

14.5.3 Financial Strategy Recommendations

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

a) when realized, reallocating the debt cost reductions to the infrastructure deficit as outlined above.
b) allocating the current CCBF and OCIF revenue as outlined previously.
c) reallocating appropriate revenue from categories in a surplus position to those in a deficit position.
d) increasing existing and future infrastructure budgets by the applicable inflation index on an annual basis.

Notes:

1. As in the past, periodic senior government infrastructure funding will most likely be available during the phase-in period. By Provincial AMP rules, this periodic funding cannot be incorporated into an AMP unless there are firm commitments in place. We have included OCIF formula-based funding, if applicable since this funding is a multi-year commitment[1].
2. 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 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.

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.

[1] 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. Depending on the outcome of this review, there may be changes that impact its availability.

14.6 Financial Profile: Rate Funded Assets

14.6.1 Current Funding Position

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

Asset Category	Avg. Annual Requirement	Annual Funding Available			Annual Deficit
		Rates	To Operating	Total Available	
Water Network	1,696,697	2,977,094	-2,212,903	764,191	932,506
Sanitary Network	1,612,903	2,322,094	-1,625,251	696,844	916,059
	3,309,600	**5,299,188**	**-3,838,153**	**1,461,035**	**1,848,565**

The average annual investment requirement for the above categories is $3,309,600. Annual revenue currently allocated to these assets for capital purposes is $1,461,035 leaving an annual deficit of $1,848,565. Put differently, these categories are currently funded at 44% of their long-term requirements.

14.6.2 Full Funding Requirements

In 2022, Township of Tay has annual water network and wastewater network revenues of $2,977,094 & $2,322,094 respectively. As illustrated in the following table, without consideration of any other sources of revenue or cost containment strategies, full funding would require the following rate change over time:

Asset Category	Tax Change Required for Full Funding
Water Network	31.3%
Sanitary Network	39.4%

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

Water Network				
	5 Years	**10 Years**	**15 Years**	**20 Years**
Infrastructure Deficit	932,506	932,506	932,506	932,506
Rate Revenue Increase Required	31.3%	31.3%	31.3%	31.3%
Annually	5.6%	2.8%	1.8%	1.4%

Sanitary Network				
	5 Years	**10 Years**	**15 Years**	**20 Years**
Infrastructure Deficit	916,059	916,059	916,059	916,059
Rate Revenue Increase Required	39.4%	39.4%	39.4%	39.4%
Annually	6.9%	3.4%	2.2%	1.7%

14.6.3 Financial Strategy Recommendations

Considering the above information, we recommend the 20-year option for the water network & the sanitary network. This involves full capital funding being achieved over 20 years by:

a) increasing rate revenues by 1.4% for the Water Network each year for the next 20 years.
b) increasing rate revenues by 1.7% for the Sanitary Network each year for the next 20 years.
c) these rate revenue increases are solely for the purpose of phasing in full funding to the respective rate funded asset categories.
d) increasing existing and future infrastructure budgets by the applicable inflation index on an annual basis in addition to the deficit phase-in.

Notes:

1. As in the past, periodic senior government infrastructure funding will most likely be available during the phase-in period. This periodic funding should not be incorporated into an AMP unless there are firm commitments in place.
2. 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.

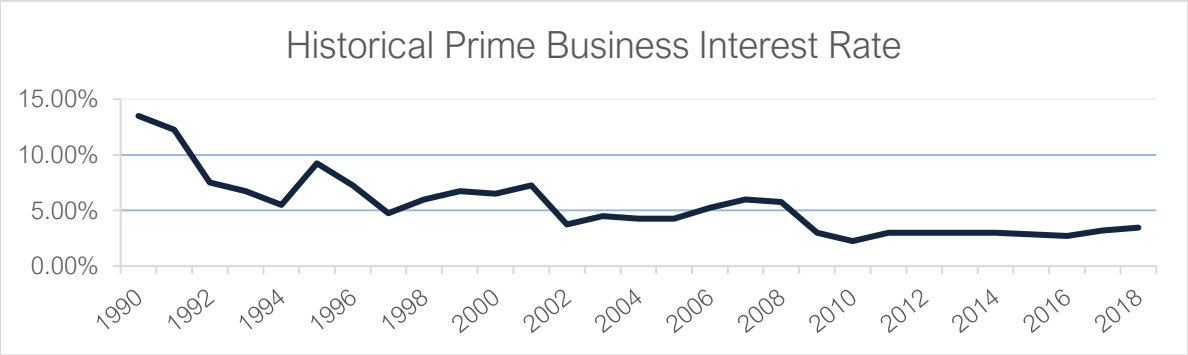
Although this strategy achieves full capital funding for rate-funded assets over 20 years, the recommendation does require prioritizing capital projects to fit the annual funding available. Prioritizing future projects will require the current data to be replaced by condition-based data. The recommendations include no further use of debt, the results of the condition-based analysis may require otherwise.

14.7 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%[2] 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:



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

A change in 15-year rates from 3% to 6% would change the premium from 26% to 54%. Such a change would have a significant impact on a financial plan.

The following tables outline how Tay has historically used debt for investing in the asset categories as listed.

Asset Category	Current Debt	Use of Debt in the Last Five Years				
		2016	2017	2018	2019	2020
Protective Services	1,599,353	1,380,000	1,795,000	1,748,540	1,700,483	1,650,773
Bridge Infrastructure	765,996	964,156	927,105	888,807	849,218	808,296
Recreation	43,947	246,602	208,246	168,833	128,332	86,713
Total Tax funded	2,409,296	2,590,758	2,930,352	2,806,180	2,678,033	2,545,782
Wastewater System	3,359,305	2,864,389	3,978,844	3,832,240	3,680,236	3,522,714
Water System	1,483,357	3,797,451	3,378,090	2,938,059	2,476,325	1,991,804
Total Rate Funded	4,842,662	6,661,840	7,356,935	6,770,300	6,156,561	5,514,518

Asset Category	Principal & Interest Payments in the Next Ten Years						
	2021	2022	2023	2024	2025	2026	2031
Protective Services	107,276	107,276	107,276	107,276	107,276	107,276	107,276
Bridge	68,947	68,947	68,947	68,947	68,947	68,947	68,947
Recreation	44,852	44,852	0	0	0	0	0
Total Tax Funded	**221,075**	**221,075**	**176,223**	**176,223**	**176,223**	**176,223**	**176,223**
Wastewater System	162,320	162,320	162,320	162,320	162,320	162,320	162,320
Water System	90,665	90,665	90,665	90,665	90,665	90,665	90,665
Total Rate Funded	**252,985**	**252,985**	**252,985**	**252,985**	**252,985**	**252,985**	**252,985**
Total Funded:	**474,060**	**474,060**	**429,209**	**429,209**	**429,209**	**429,209**	**429,209**

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

14.8 Use of Reserves

14.8.1 Available Reserves

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

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

The table below outlines the details of the reserves currently available to Township's asset categories.

Asset Category	Balance on December 31, 2021
Wastewater Capital Reserve	(669,032.66)
Water Capital Reserve	614,955.10
Water & Wastewater Vehicle Reserve Fund	(23,073)
Water Capital Reserve Fund - Midland Customers	(2,000)
Modernization Funding	12,477.87
Contingency Reserve	118,700.89
Future Capital Reserve	(50,000)
Policing Reserve Fund	81,011.53
Municipal Buildings Reserve Fund	(74,768.73)
Municipal Eqiupment Reserve Fund	(31,861.44)
Municipal Fleet & Equipment - Bylaw Vehicle	(1,500)
Municipal Fleet & Equipment - Fire Capital	159,093.78
Municipal Fleet - Public Works	(142,417.85)
Municipal Fleet & Equipment- Building Vehicles	(5,000)
Parks & Recreation Reserve Fund	62,311.96
Tay Shore Trail/Albert Street Docks Reserve Fund	(53,000)
Studies And Hearings Reserve Fund	(10,000)
Infrastructure/Bridges Reserve Fund	(64,554.40)
Streetlighting Reserve Fund	(11,224.47)
Total Reserve Funds:	**(89,881.42)**

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:

- breadth of services provided
- age and condition of infrastructure
- use and level of debt
- economic conditions and outlook
- 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 Tay' judicious use of debt in the past, allows the scenarios to assume that, if required, available reserves and debt capacity can be used for high priority and emergency infrastructure investments in the short- to medium-term.

14.9 Recommendation

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

15 Appendices

15.1 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	Asset Condition	Financial Capacity	
Road Network	$46,185,893	Good (76%)	Annual Requirement:	$1,561,992
			Funding Available:	$1,516,346
			Annual Deficit:	**$45,646**
Bridges & Culverts	$30,819,881	Good (69%)	Annual Requirement:	$1,540,994
			Funding Available:	$376,994
			Annual Deficit:	**$1,164,000**
Buildings	$33,937,034	Fair (55%)	Annual Requirement:	$714,889
			Funding Available:	$174,893
			Annual Deficit:	**$539,996**
Land Improvements	$6,182,399	Very Good (84%)	Annual Requirement:	$199,546
			Funding Available:	$48,818
			Annual Deficit:	**$150,729**
Vehicles	$7,587,808	Good (79%)	Annual Requirement:	$509,143
			Funding Available:	$124,559
			Annual Deficit:	**$384,585**
Equipment	$3,162,244	Good (74%)	Annual Requirement:	$293,673
			Funding Available:	$71,845
			Annual Deficit:	**$221,828**
Storm Network	$8,502,809	Good (67%)	Annual Requirement:	$209,785
			Funding Available:	$51,323
			Annual Deficit:	**$158,463**
Water Network	$102,177,381	Very Good (83%)	Annual Requirement:	$1,696,697
			Funding Available:	$764,191
			Annual Deficit:	**$932,506**
Wastewater Network	$63,681,795	Very Good (60%)	Annual Requirement:	$1,612,903
			Funding Available:	$696,844
			Annual Deficit:	**$916,059**
Overall	$302,237,244	Good (78%)	Annual Requirement:	$8,339,623
			Funding Available:	$3,825,813
			Annual Deficit:	**$4,513,811**

Appendix B: 10-Year Capital Requirements

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

Category	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Road Network	$685k	$295k	$1.9m	$993k	$1.2m	$1.4m	$1.3m	$2.0m	$1.4m	$724k
Bridges & Culverts	$0	$0	$0	$5.2m	$1.1m	$979k	$3.6m	$10.9m	$0	$8.0m
Buildings	$0	$3k	$7.8m	$0	$0	$8k	$307k	$2k	$8.1m	$27k
Land Improvements	$36k	$27k	$0	$27k	$51k	$25k	$0	$0	$18k	$250k
Equipment	$60k	$166k	$158k	$114k	$211k	$188k	$594k	$483k	$358k	$233k
Vehicles	$254k	$244k	$288k	$519k	$904k	$153k	$134k	$1.1m	$196k	$420k
Water Network	$58k	$0	$38k	$47k	$729k	$2.1m	$3.2m	$0	$0	$0
Wastewater Network	$74k	$4.3m	$2.1m	$0	$0	$12k	$894k	$280k	$0	$5k
Storm Network	$63k	$0	$0	$977k	$96k	$222k	$22k	$331k	$43k	$52k
Total	**$1.2m**	**$5.0m**	**$12.3m**	**$7.8m**	**$4.2m**	**$5.2m**	**$10.1m**	**$15.1m**	**$10.1m**	**$9.7m**

Road Network

Segment	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Asphalt Roads	$400k	$133k	$809k	$301k	$867k	$862k	$1.1m	$1.5m	$1.2m	$335k
Gravel Roads	$0	$17k	$821k	$0	$0	$0	$0	$0	$0	$0
Guiderails	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sidewalks	$285k	$59k	$308k	$559k	$117k	$4k	$137k	$74k	$47k	$66k
Streetlights	$0	$85k	$0	$133k	$32k	$270k	$0	$82k	$67k	$202k
Surface Treated Roads	$0	$0	$0	$1k	$146k	$294k	$60k	$360k	$19k	$121k
Total	**$685k**	**$295k**	**$1.9m**	**$993k**	**$1.2m**	**$1.4m**	**$1.3m**	**$2.0m**	**$1.4m**	**$724k**

Bridges & Culverts										
Segment	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**
Culverts	$0	$0	$0	$5.2m	$1.1m	$521k	$2.3m	$9.5m	$0	$8.0m
Bridges	$0	$0	$0	$0	$0	$458k	$1.4m	$1.4m	$0	$0
Total	**$0**	**$0**	**$0**	**$5.2m**	**$1.1m**	**$979k**	**$3.6m**	**$10.9m**	**$0**	**$8.0m**

Land Improvements										
Segment	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**
Administration	$0	$0	$0	$0	$51k	$0	$0	$0	$0	$0
Fire	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Library	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Parks & Recreation	$36k	$27k	$0	$27k	$0	$25k	$0	$0	$18k	$250k
Public Works	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$36k**	**$27k**	**$0**	**$27k**	**$51k**	**$25k**	**$0**	**$0**	**$18k**	**$250k**

Buildings										
Segment	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**
Administration	$0	$0	$469k	$0	$0	$0	$9k	$0	$17k	$0
Fire	$0	$0	$0	$0	$0	$0	$0	$0	$3.2m	$0
Library	$0	$3k	$902k	$0	$0	$8k	$0	$2k	$11k	$22k
Parks & Recreation	$0	$0	$3.0m	$0	$0	$0	$298k	$0	$3.3m	$5k
Public Works	$0	$0	$3.4m	$0	$0	$0	$0	$0	$1.5m	$0
Total	**$0**	**$3k**	**$7.8m**	**$0**	**$0**	**$8k**	**$307k**	**$2k**	**$8.1m**	**$27k**

Storm Network										
Segment	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**
Storm Mains	$63k	$0	$0	$977k	$96k	$222k	$22k	$331k	$43k	$52k
Total	**$63k**	**$0**	**$0**	**$977k**	**$96k**	**$222k**	**$22k**	**$331k**	**$43k**	**$52k**

Equipment										
Segment	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**
Administration	$11k	$28k	$29k	$24k	$124k	$69k	$31k	$111k	$142k	$58k
Fire	$13k	$42k	$28k	$61k	$17k	$29k	$450k	$50k	$147k	$112k
Library	$36k	$34k	$38k	$24k	$56k	$23k	$70k	$76k	$69k	$41k
Parks & Recreation	$0	$61k	$23k	$0	$0	$52k	$34k	$247k	$0	$6k
Public Works	$0	$2k	$39k	$5k	$14k	$15k	$9k	$0	$0	$17k
Total	**$60k**	**$166k**	**$158k**	**$114k**	**$211k**	**$188k**	**$594k**	**$483k**	**$358k**	**$233k**

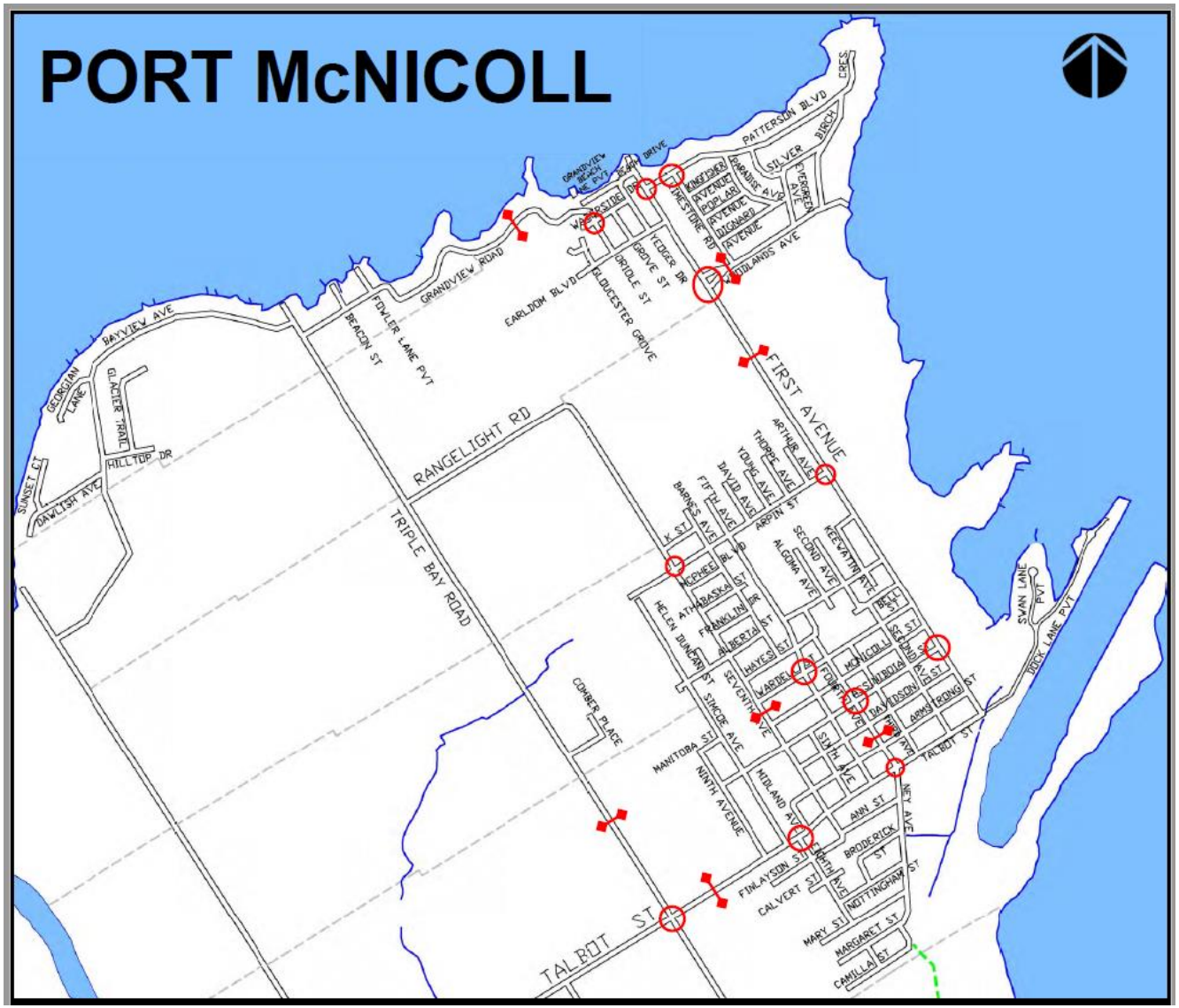
Vehicles										
Segment	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**
Administration	$0	$0	$0	$0	$0	$0	$30k	$62k	$0	$0
Environmental	$0	$0	$0	$29k	$29k	$80k	$34k	$27k	$0	$0
Fire	$219k	$244k	$0	$375k	$375k	$0	$0	$174k	$0	$420k
Parks & Recreation	$0	$0	$0	$0	$0	$28k	$70k	$68k	$41k	$0
Public Works	$35k	$0	$288k	$115k	$500k	$45k	$0	$767k	$155k	$0
Total	**$254k**	**$244k**	**$288k**	**$519k**	**$904k**	**$153k**	**$134k**	**$1.1m**	**$196k**	**$420k**

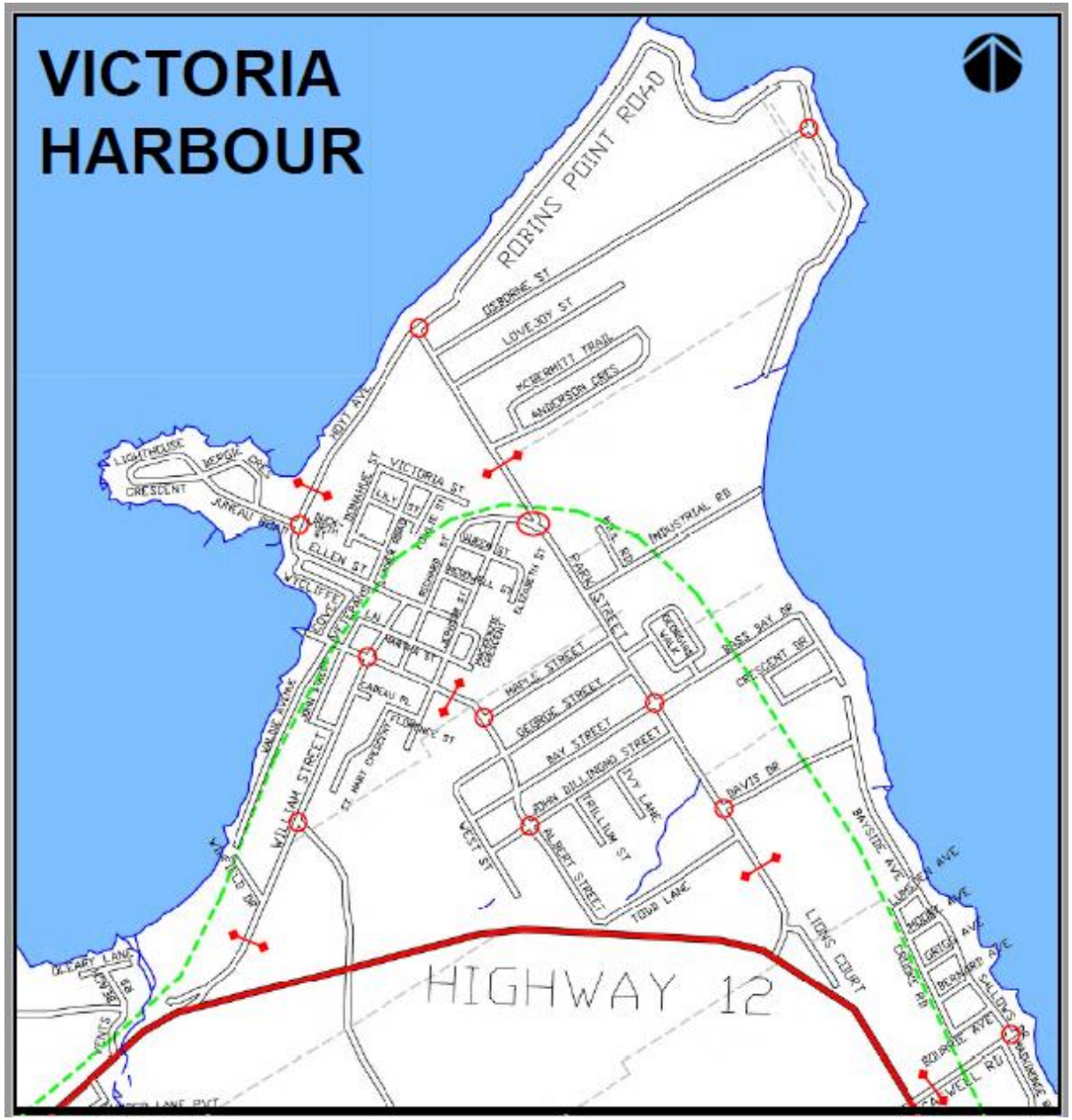
Water Network										
Segment	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**
Booster Stations	$0	$0	$0	$0	$0	$791k	$499k	$0	$0	$0
General Water Equipment	$0	$0	$0	$0	$2k	$4k	$5k	$0	$0	$0
Stand Pipes	$0	$0	$38k	$0	$0	$0	$0	$0	$0	$0
Water Treatment	$58k	$0	$0	$47k	$727k	$1.3m	$2.7m	$0	$0	$0
Watermains	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$58k**	**$0**	**$38k**	**$47k**	**$729k**	**$2.1m**	**$3.2m**	**$0**	**$0**	**$0**

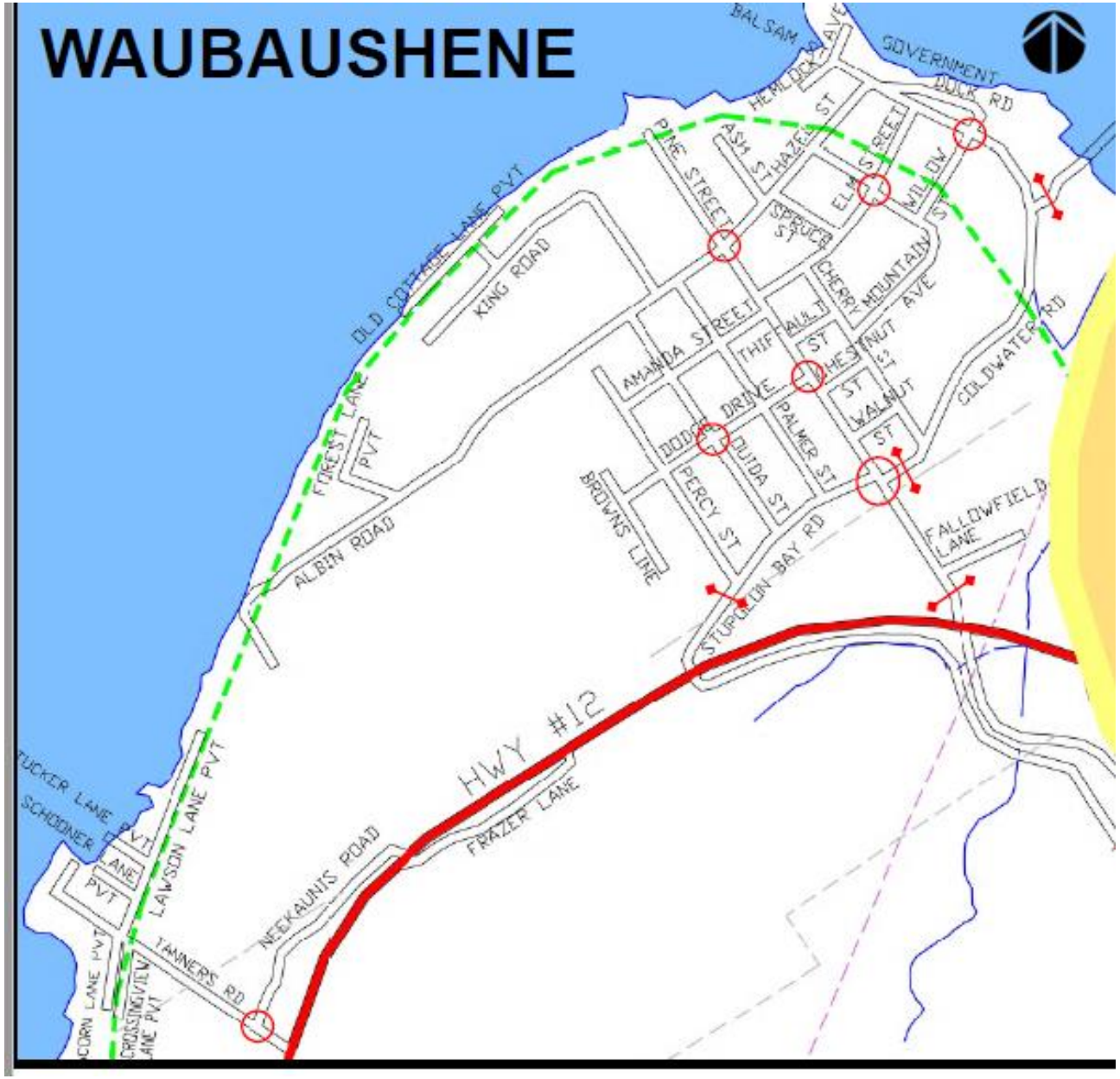
Wastewater Network										
Segment	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**
Forcemains	$0	$0	$473k	$0	$0	$0	$0	$0	$0	$0
General Wastewater Equipment	$0	$0	$0	$0	$0	$5k	$7k	$0	$0	$0
Pumping Stations	$74k	$23k	$0	$0	$0	$7k	$164k	$0	$0	$0
Wastewater Mains	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Wastewater Treatment	$0	$4.2m	$1.6m	$0	$0	$0	$723k	$280k	$0	$5k
Total	**$74k**	**$4.3m**	**$2.1m**	**$0**	**$0**	**$12k**	**$894k**	**$280k**	**$0**	**$5k**

Appendix C: Level of Service Maps

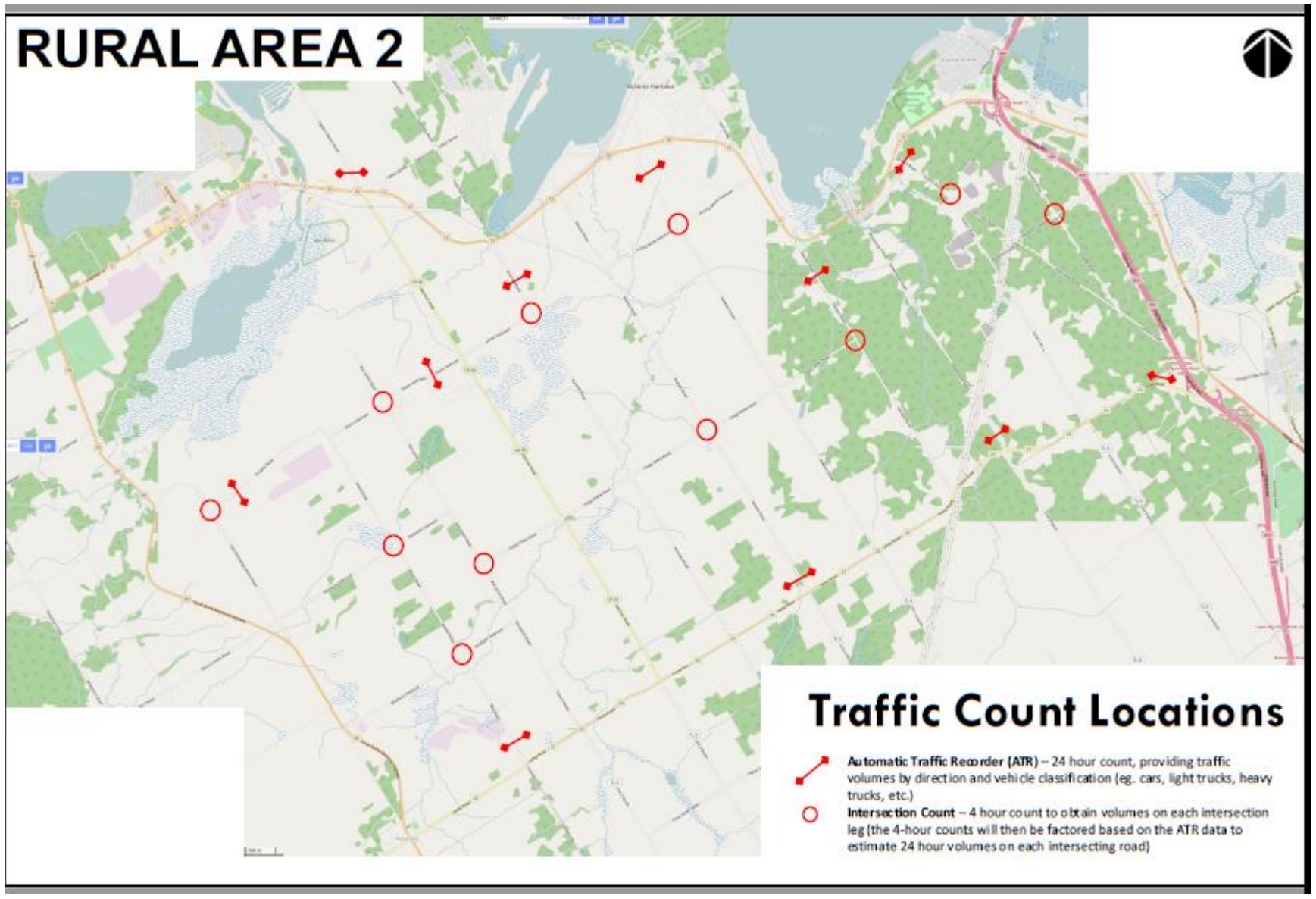
Road Network Map




VICTORIA
HARBOUR
ROBINS POINT ROAD
GEORGINE ST
LOVE JOY ST
KERRITT TRAIL
ANDERSON ACRES
EDIT AVE
LIGHTHOUSE
CRESCENT
JUNEAU
VICTORIA ST
ELLEN ST
WYCLIFFE
INDUSTRIAL RD
PARK STREET
MAPLE STREET
GEORGE STREET
BAY STREET
JOHN DILLINGHAM STREET
ALBERT STREET
WEST ST
TRILLIUM ST
IVY LANE
TOUR LANE
DAVIS DR
BASE BAY RD
CRESCENT INN
WILLIAM STREET
VALUE AVENUE
CABEAU PL
FLORENCE ST
ST MARY CRESCENT
O'LEARY LANE
LIONS COURT
BAYSIDE AVE
LUMBER AVE
ROBERT AVE
BERNARD AVE
HIGHWAY 12


WAUBAUSHENE
BALSAM
HEMLOCK AVE
GOVERNMENT DOCK RD
PINE STREET
ASH ST
HAZEL ST
ELM STREET
WILLOW ST
SPRUCE ST
CHERRY MOUNTAIN
CHESTNUT AVE
WALNUT ST
GOLDWATER RD
OLD COTTAGE LANE PVT
KING ROAD
FOREST LANE PVT
AMANDA STREET
THIFFAULT DRIVE
DODDS ST
DUIDA ST
PERCY ST
PALMER ST
BROWNS LINE
ALBIN ROAD
STURGEON BAY RD
FALLOWFIELD LANE
HWY #12
FRAZER LANE
NEEKAUNIS ROAD
TANNERS RD
LAWSON LANE PVT
TUCKER LANE PVT
SCHOONER LANE PVT
CROSSTOWN LANE PVT
CORN LANE PVT


RURAL AREA 1


RURAL AREA 2
Traffic Count Locations
Automatic Traffic Recorder (ATR) – 24 hour count, providing traffic volumes by direction and vehicle classification (eg. cars, light trucks, heavy trucks, etc.)
Intersection Count – 4 hour count to obtain volumes on each intersection leg (the 4-hour counts will then be factored based on the ATR data to estimate 24 hour volumes on each intersecting road)

OSIM Bridge & Culvert Map

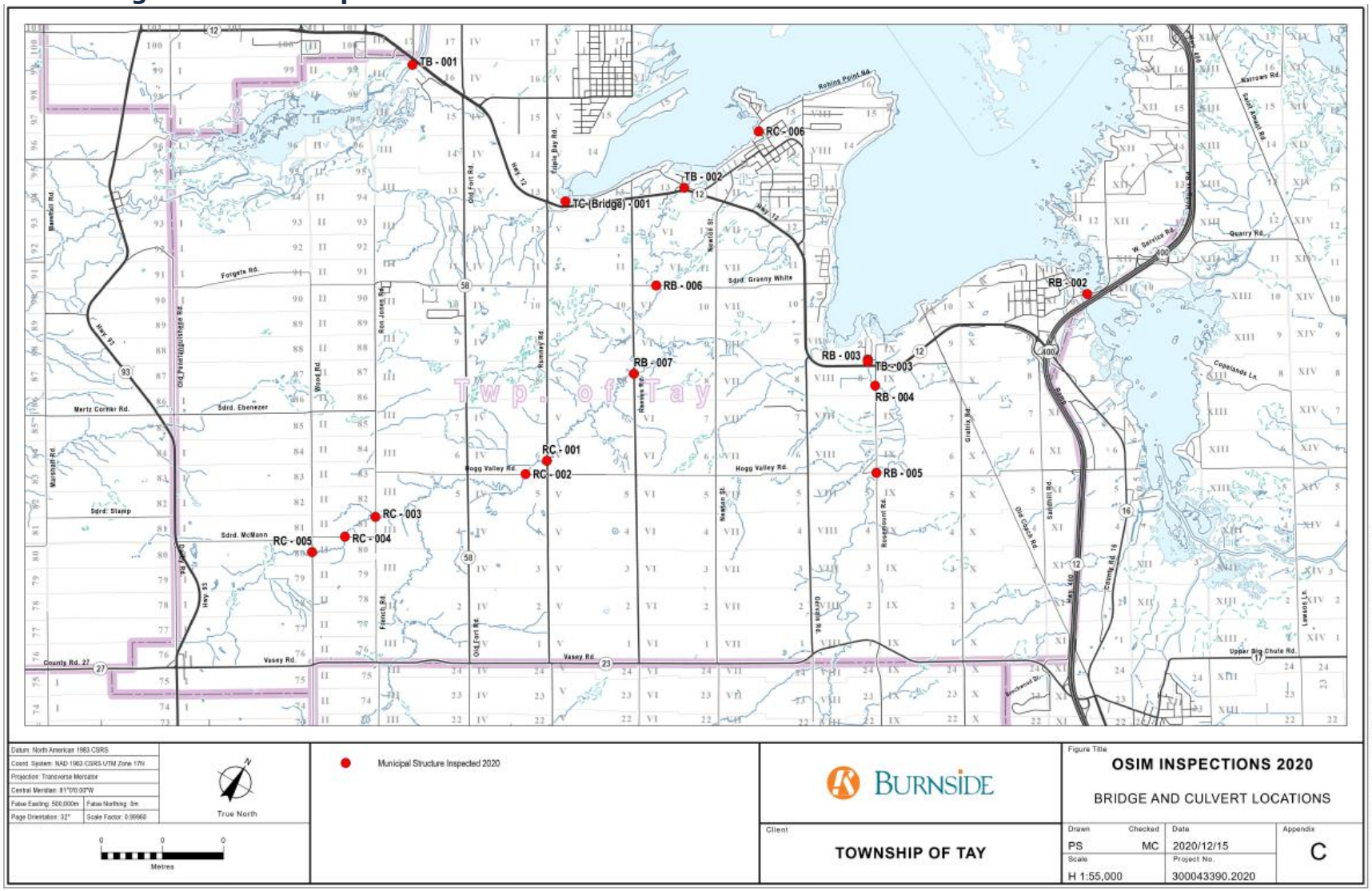
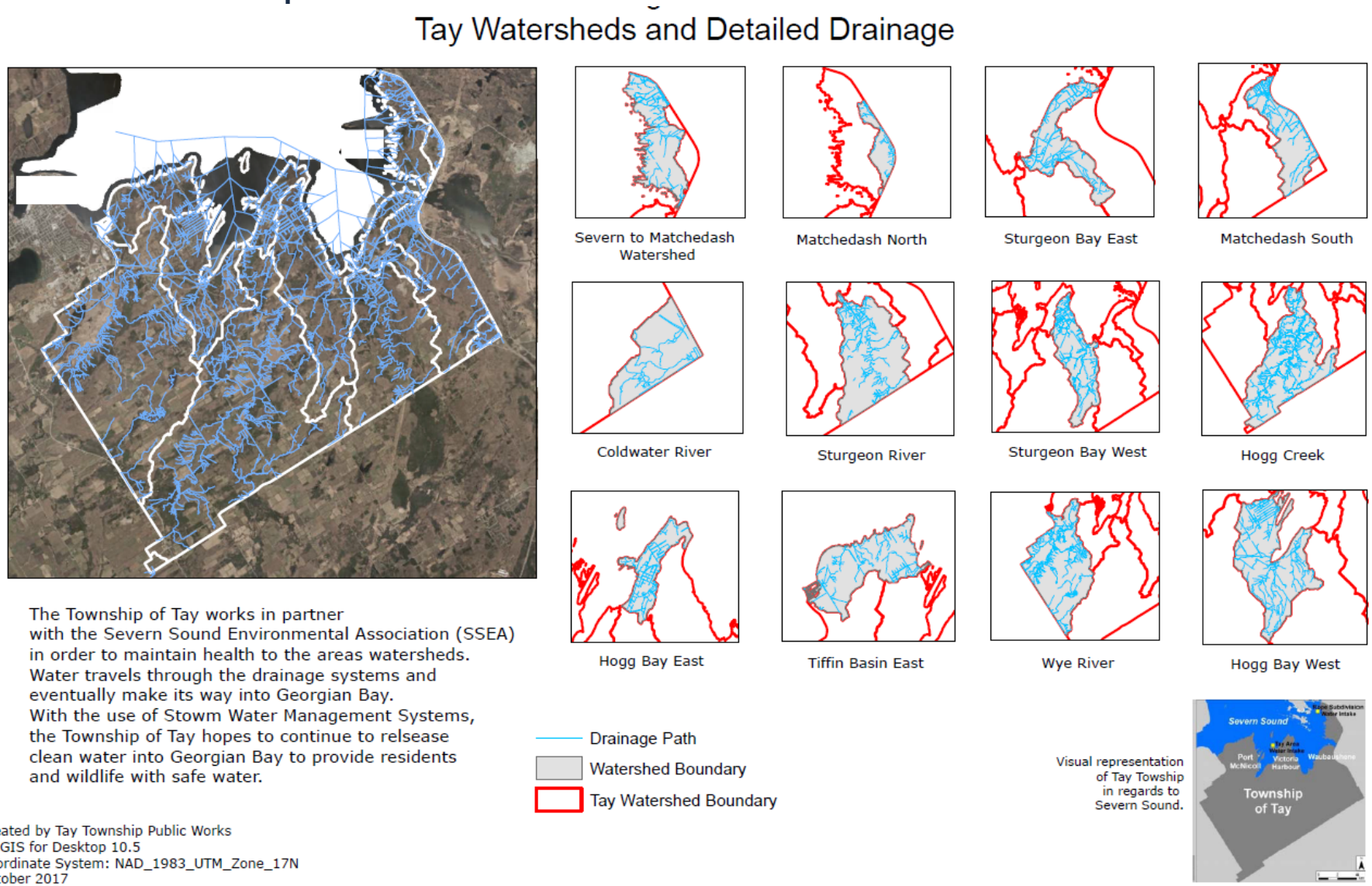


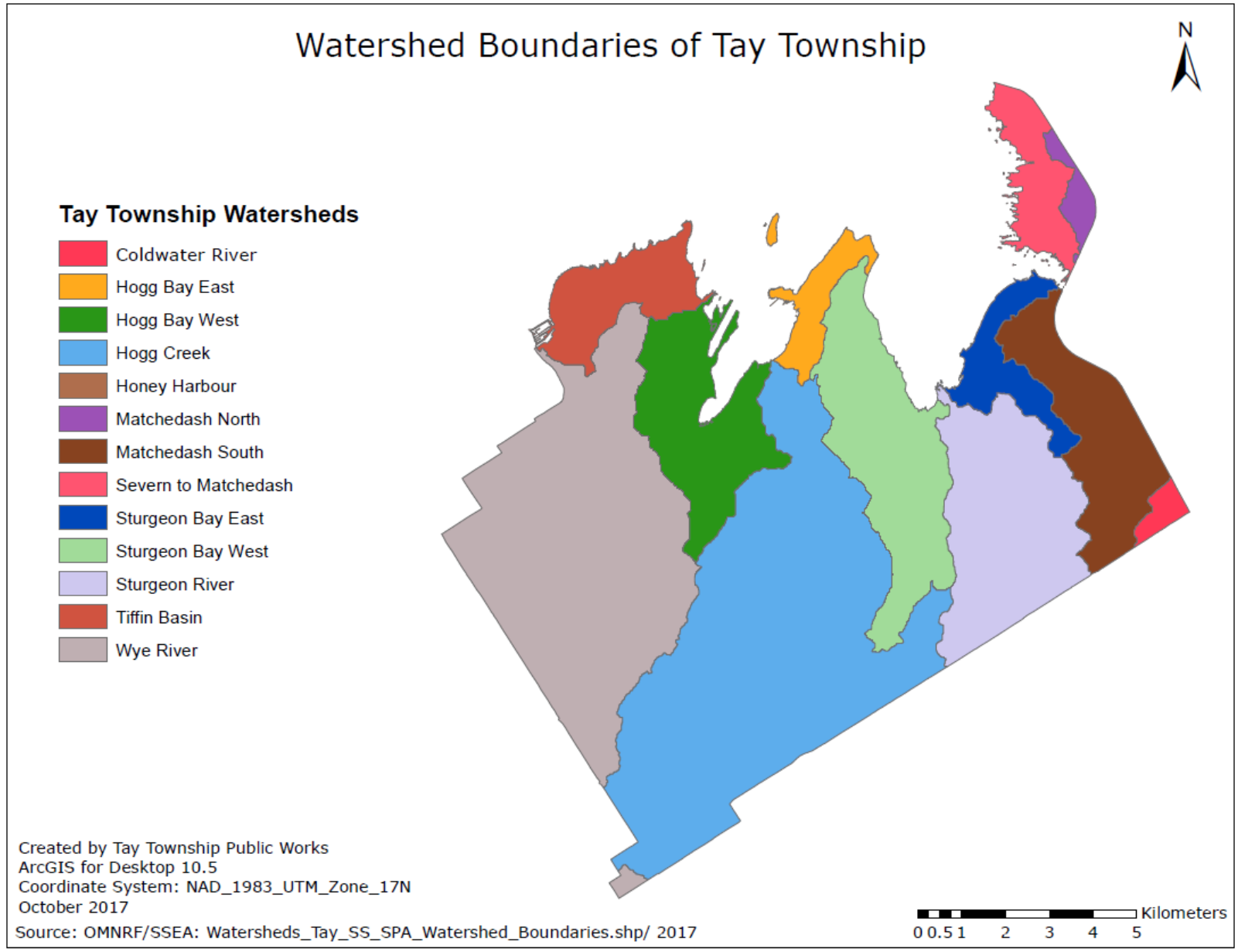
Image of a Bridge in Good Condition

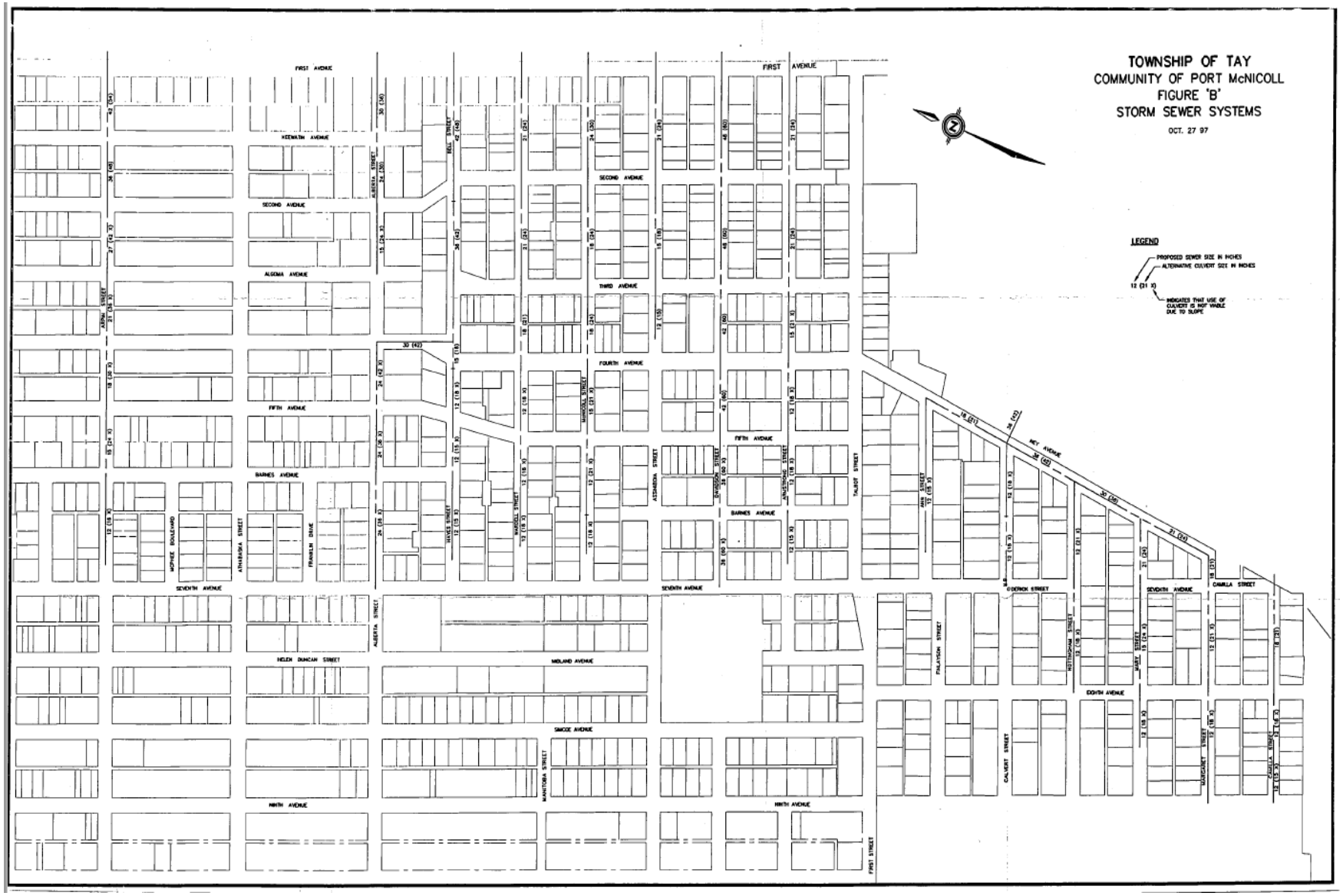
Image of a Culvert in Fair

Stormwater Network Map

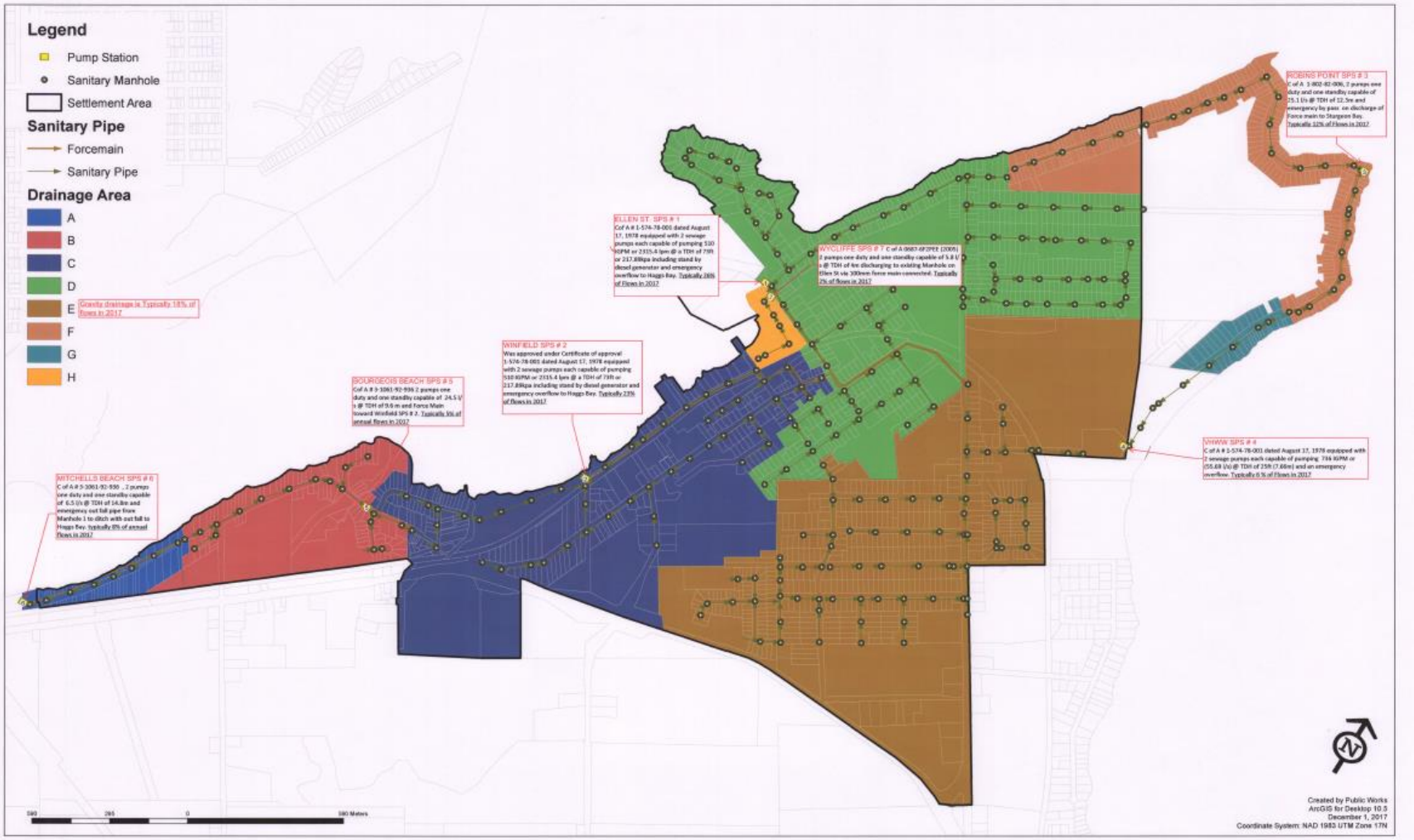


Watershed Boundaries of Tay Township



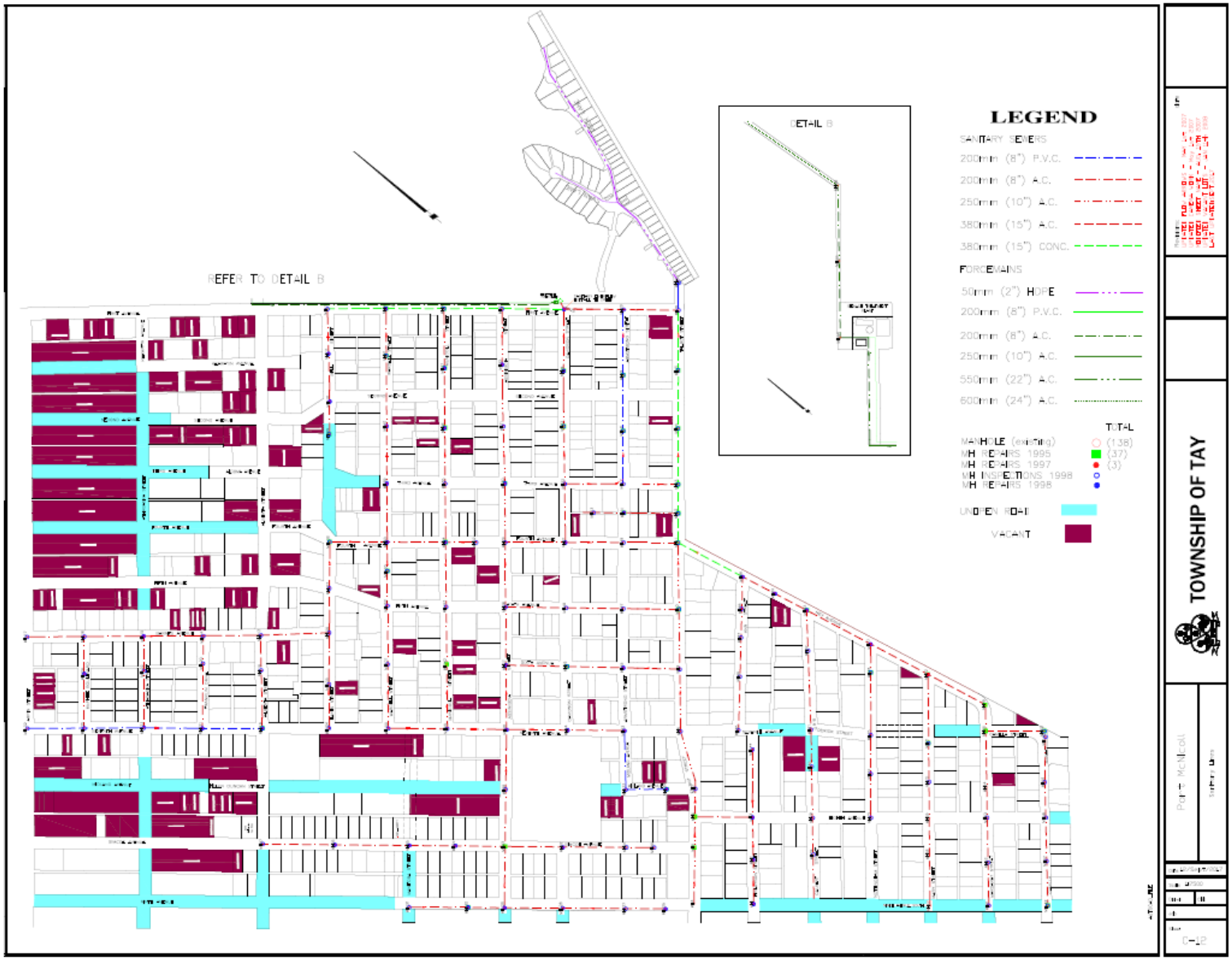

TOWNSHIP OF TAY
COMMUNITY OF PORT McNICOLL
FIGURE 'B'
STORM SEWER SYSTEMS
OCT. 27 97
LEGEND
PROPOSED SEWER SIZE IN INCHES
ALTERNATIVE CULVERT SIZE IN INCHES
INDICATES THAT USE OF CULVERT IS NOT VIABLE DUE TO SLOPE
FIRST AVENUE
SECOND AVENUE
THIRD AVENUE
FOURTH AVENUE
FIFTH AVENUE
SEVENTH AVENUE
EIGHTH AVENUE
NINTH AVENUE
KEEWATIN AVENUE
ALGOMA AVENUE
BARNES AVENUE
HELEN DUNCAN STREET
MIDLAND AVENUE
SIMCOE AVENUE
KEY AVENUE
GODERICH STREET
CAMILLA STREET
FIRST STREET
ALBERTA STREET
MANITOBA STREET
MARKDALE STREET
ATHABASKA STREET
FRANKLIN DRIVE
MOFFATT BOULEVARD
TALBOT STREET
CALVERT STREET
FINLAYSON STREET
MARGARET STREET

Victoria Harbour Drainage Network



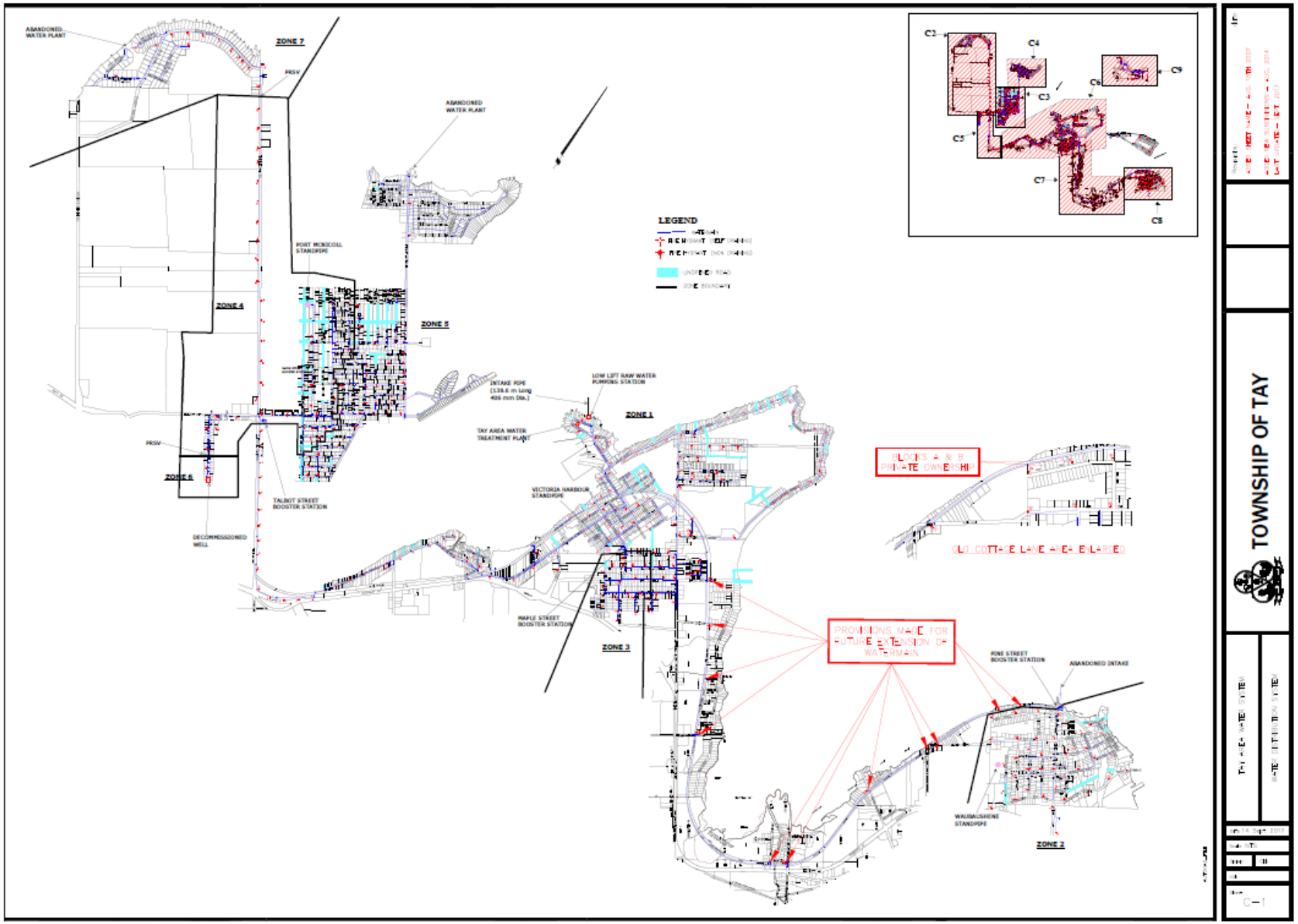
Data Source: Simcoe County: Assessment Parcel (TAY)(20

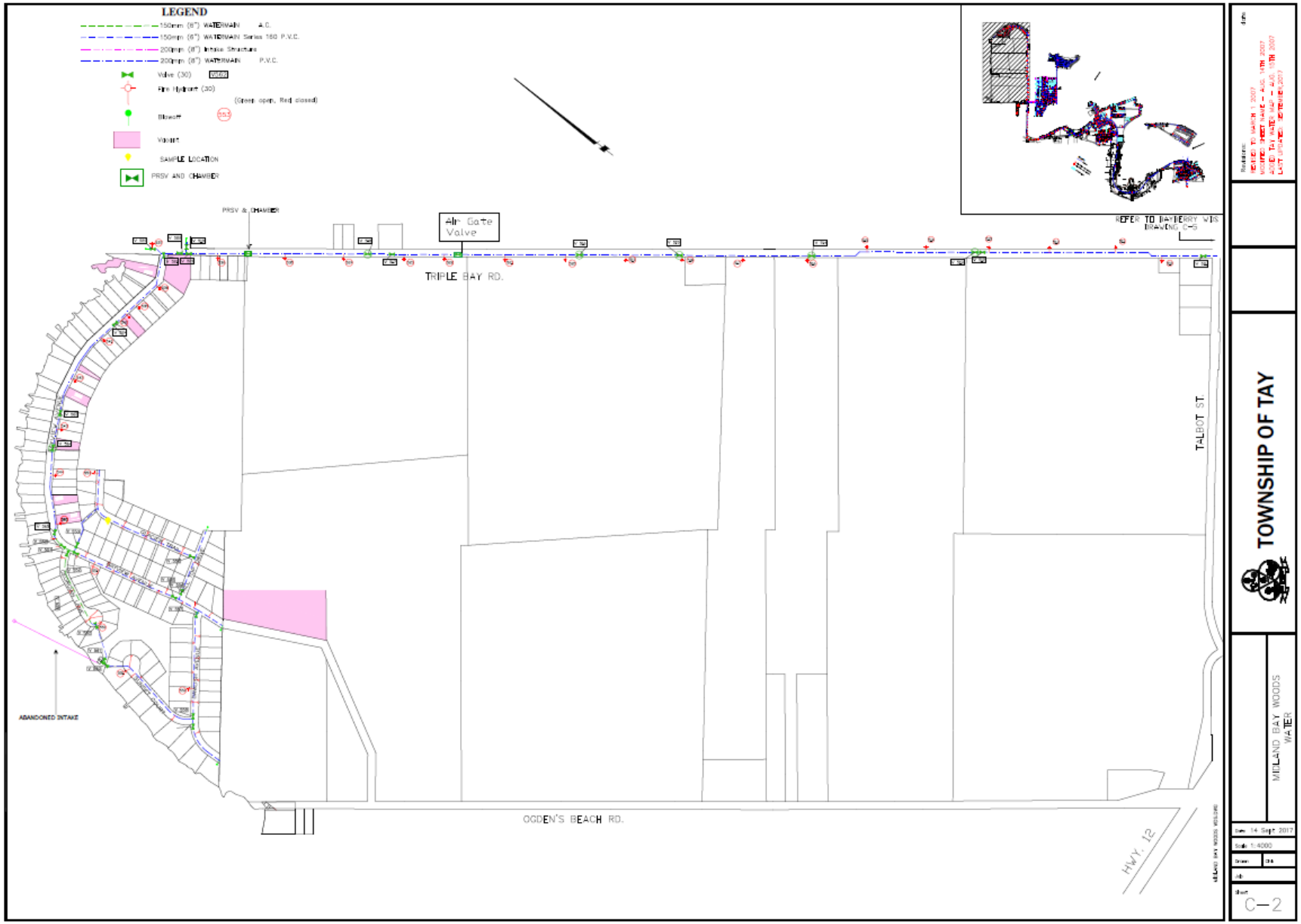
Wastewater Network Map

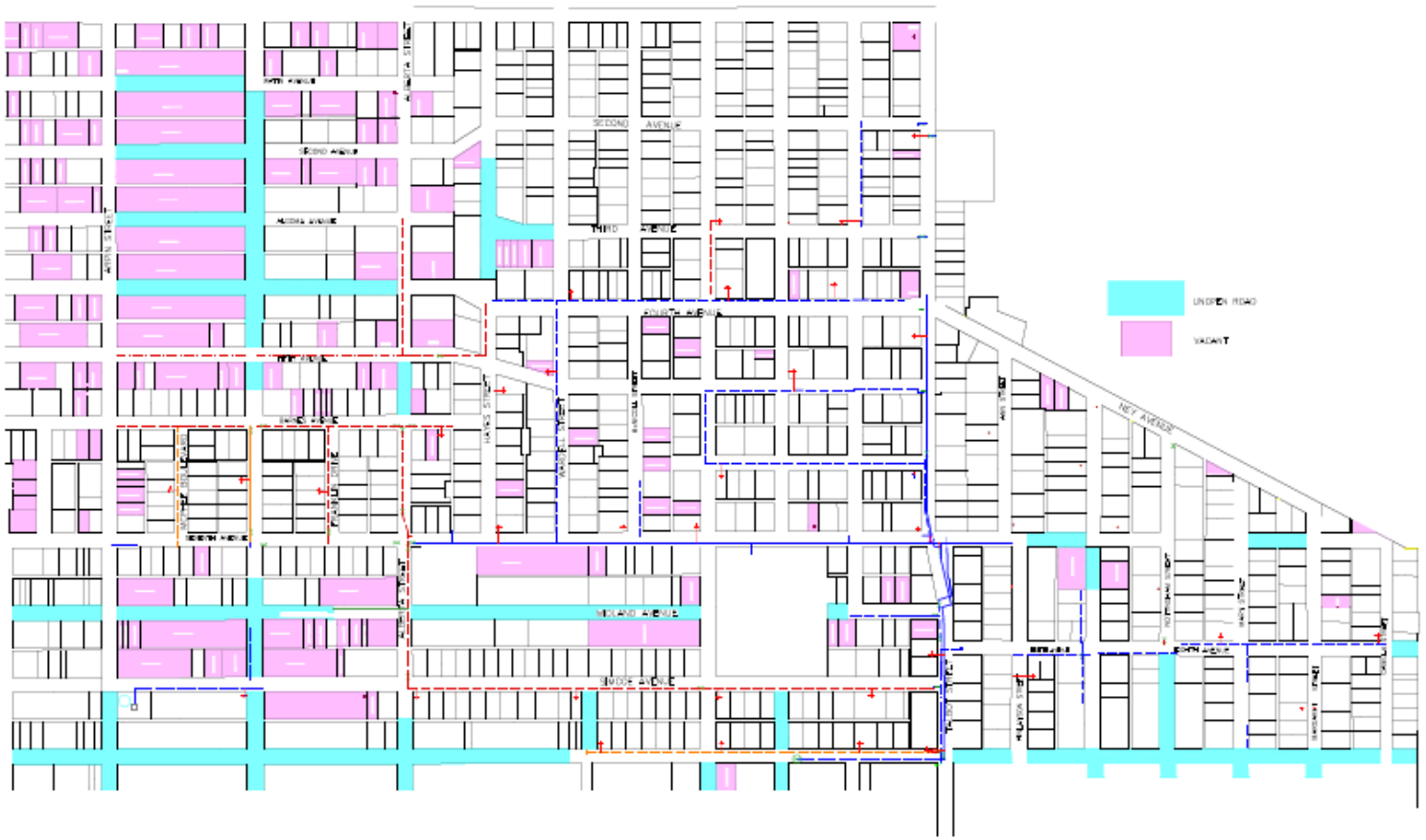


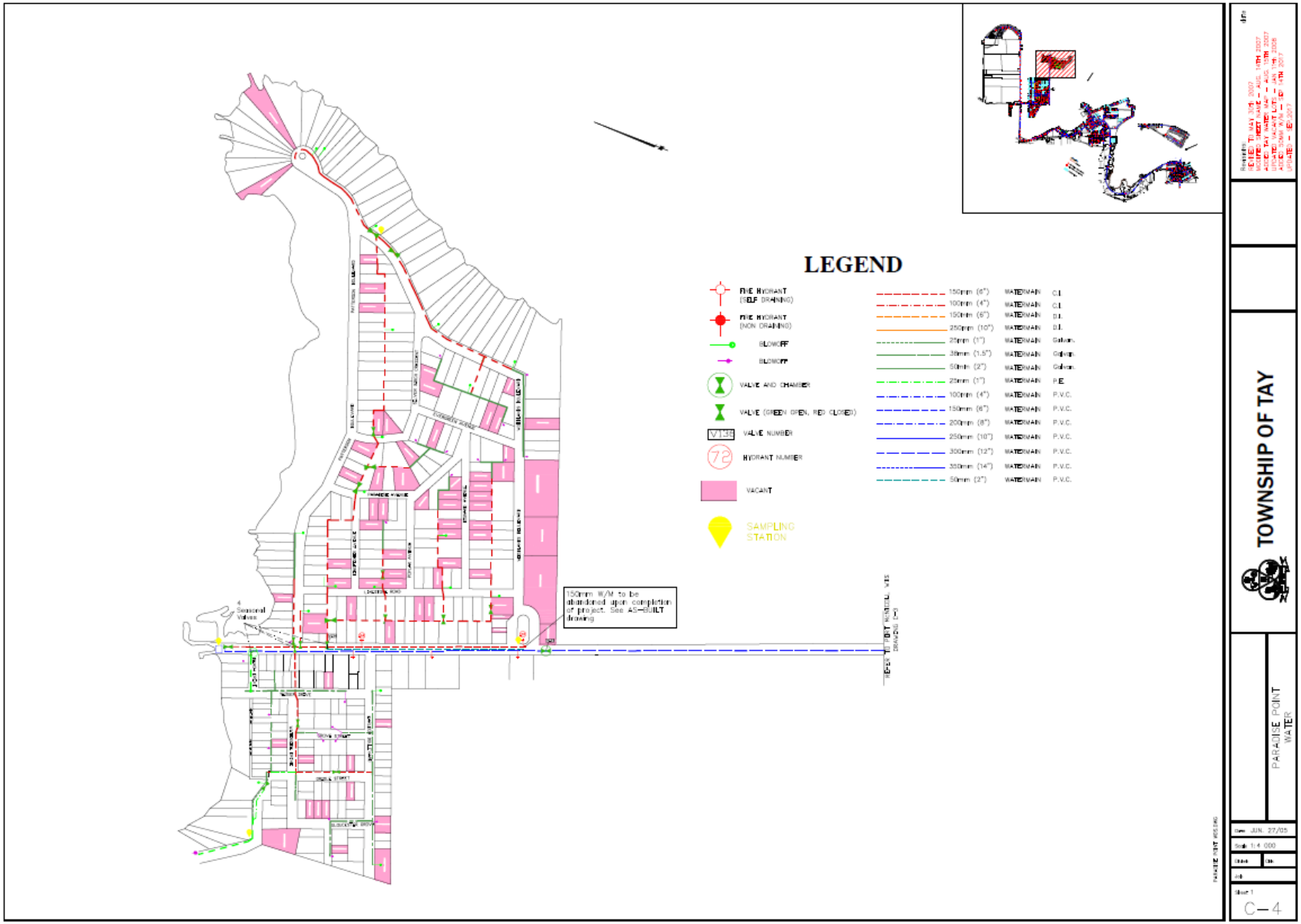

LEGEND
SANITARY SEWERS
200mm (8") P.V.C.
250mm (10") P.V.C.
300mm (12") P.V.C.
350mm (14") P.V.C.
375mm (15") P.V.C.
400mm (16") P.V.C.
450mm (18") P.V.C.
600mm (24") P.V.C.
750mm (30") P.V.C.
900mm (36") P.V.C.
FORCEMAINS
100mm (4") P.V.C.
200mm (8") P.V.C.
250mm (10") P.V.C.
300mm (12") P.V.C.
MANHOLE INSPECTED 1997
MANHOLE REPAIRED 1997
MANHOLE INSPECTED 1998
MANHOLE REPAIRED 1998
MANHOLE (324) 1998
MANHOLE INSPECTED 1999
MANHOLE REPAIRED 1999
STURGEON POINT
SUNSET BEACH
ROBINS POINT
BERGIE POINT
GEORGIAN BAY
McKENZIE BEACH
OLD VILLAGE BOUNDARY
STURGEON BAY
S.T.P.
HOGG BAY
VILLAGE BOUNDARY
DAVIS BLVD
HOWARD ST
TOWNSHIP OF TAY
VICTORIA HARBOUR SANITARY
C—13

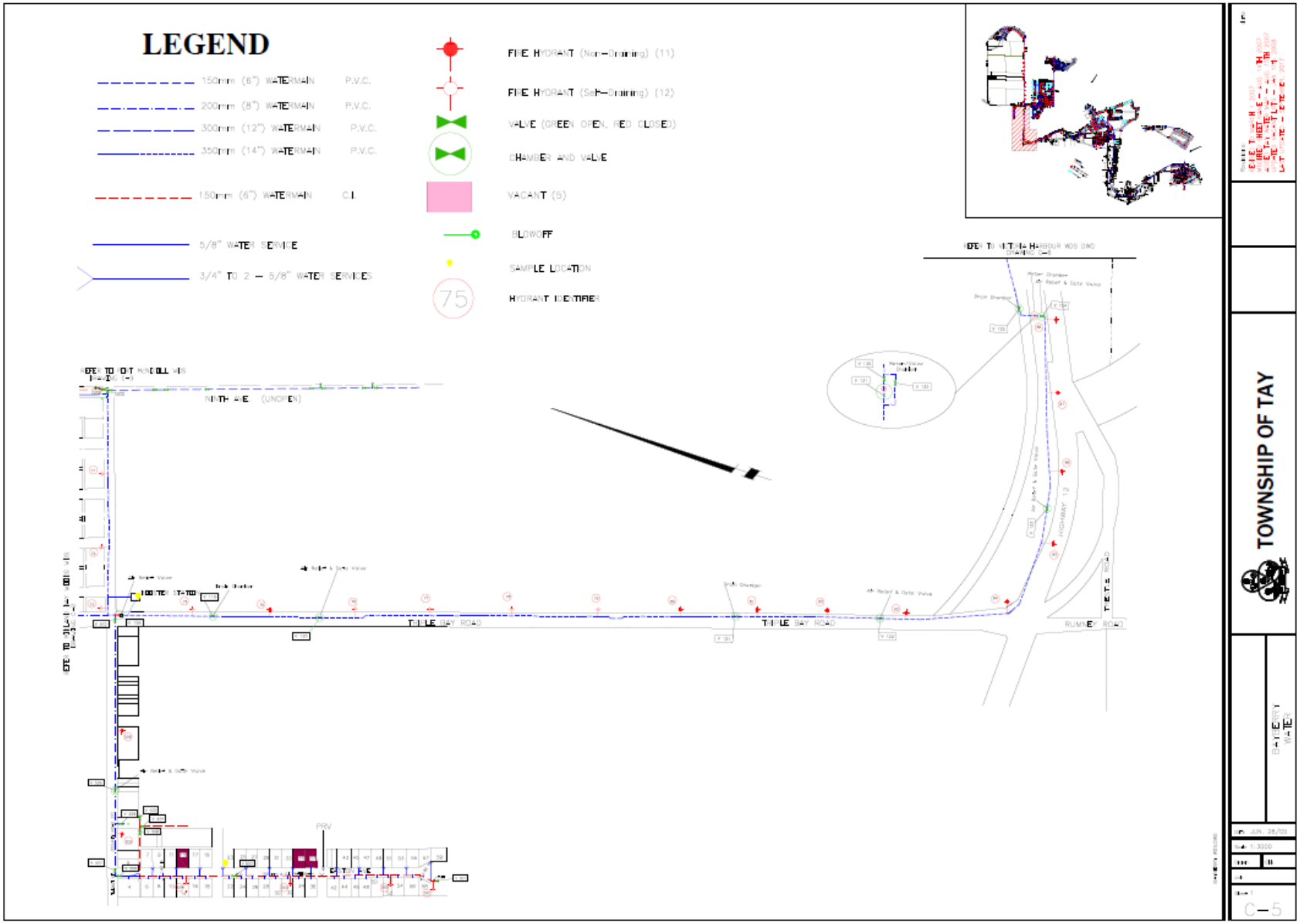
Water Network Map

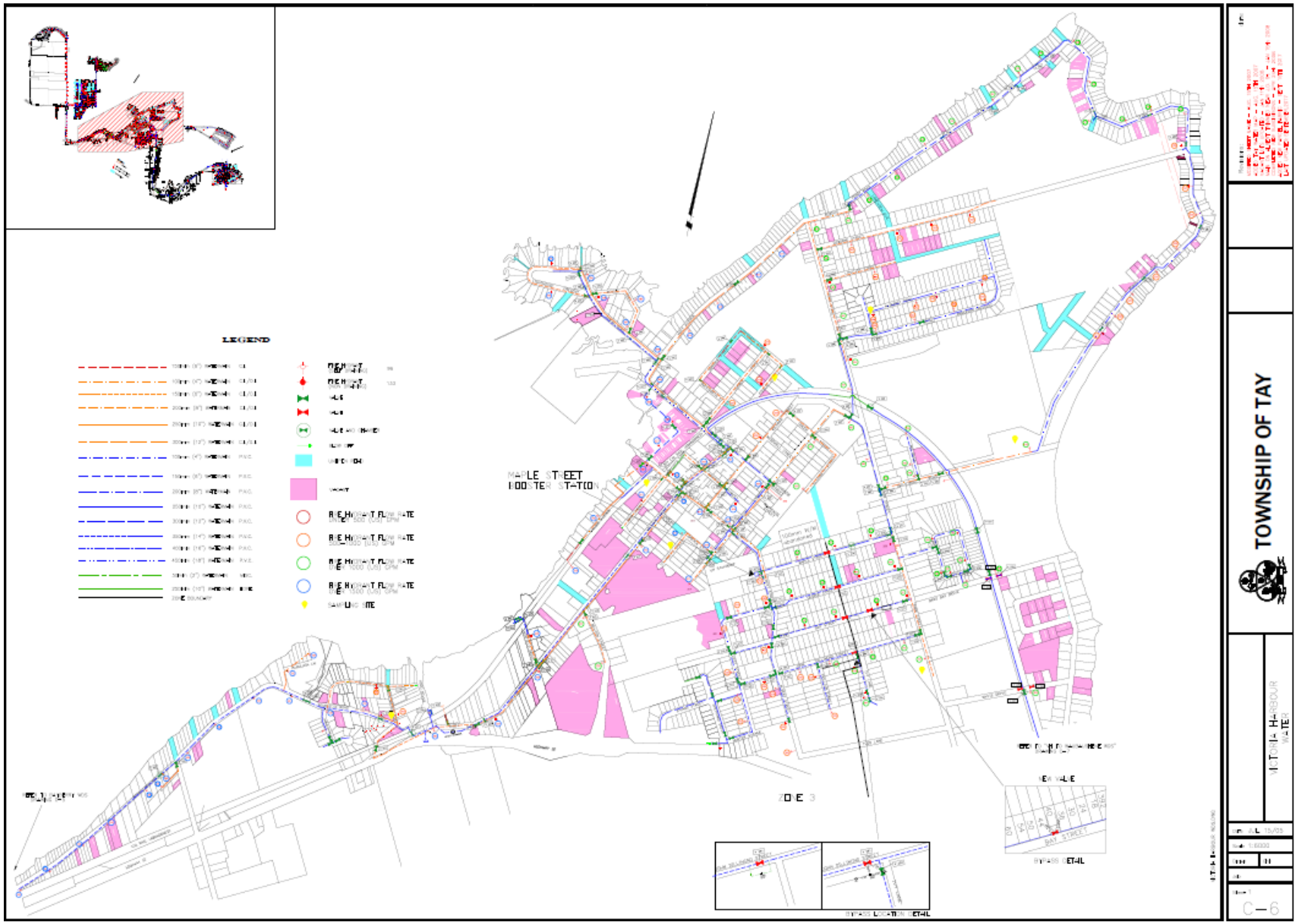


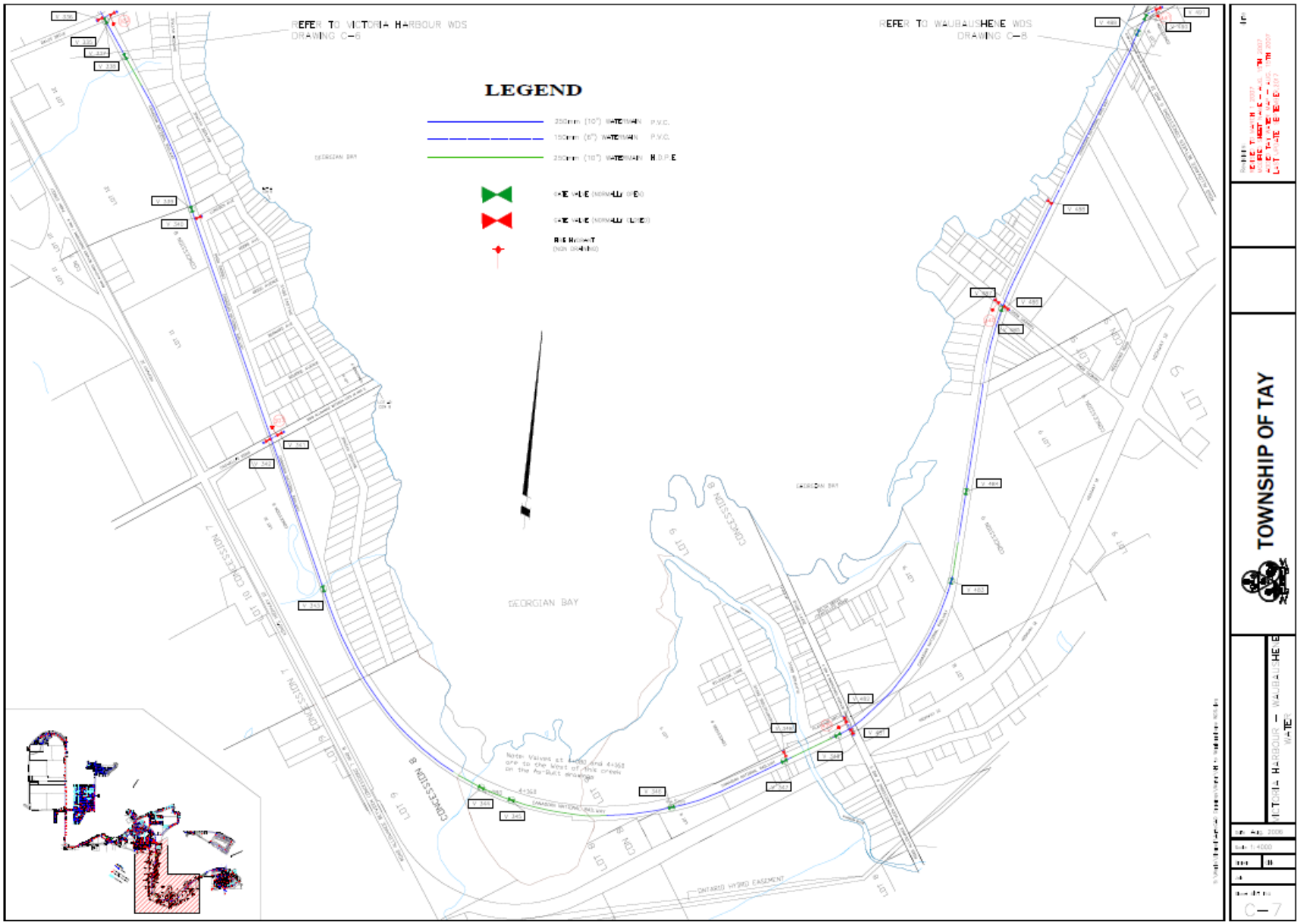

LEGEND
150mm (6") WATERMAIN A.C.
150mm (6") WATERMAIN Series 160 P.V.C.
200mm (8") Intake Structure
200mm (8") WATERMAIN P.V.C.
Valve (30)
Fire Hydrant (30)
(Green: open, Red: closed)
Blowoff
Valve
SAMPLE LOCATION
PRSV AND CHAMBER
PRSV & CHAMBER
Air Gate Valve
TRIPLE BAY RD.
REFER TO BAYBERRY WTR DRAWING C-5
TALBOT ST
ABANDONED INTAKE
OGDEN'S BEACH RD.
HWY. 12
TOWNSHIP OF TAY
MIDLAND BAY WOODS WATER
Date: 14 Sept 2017
Scale: 1:4000
C-2

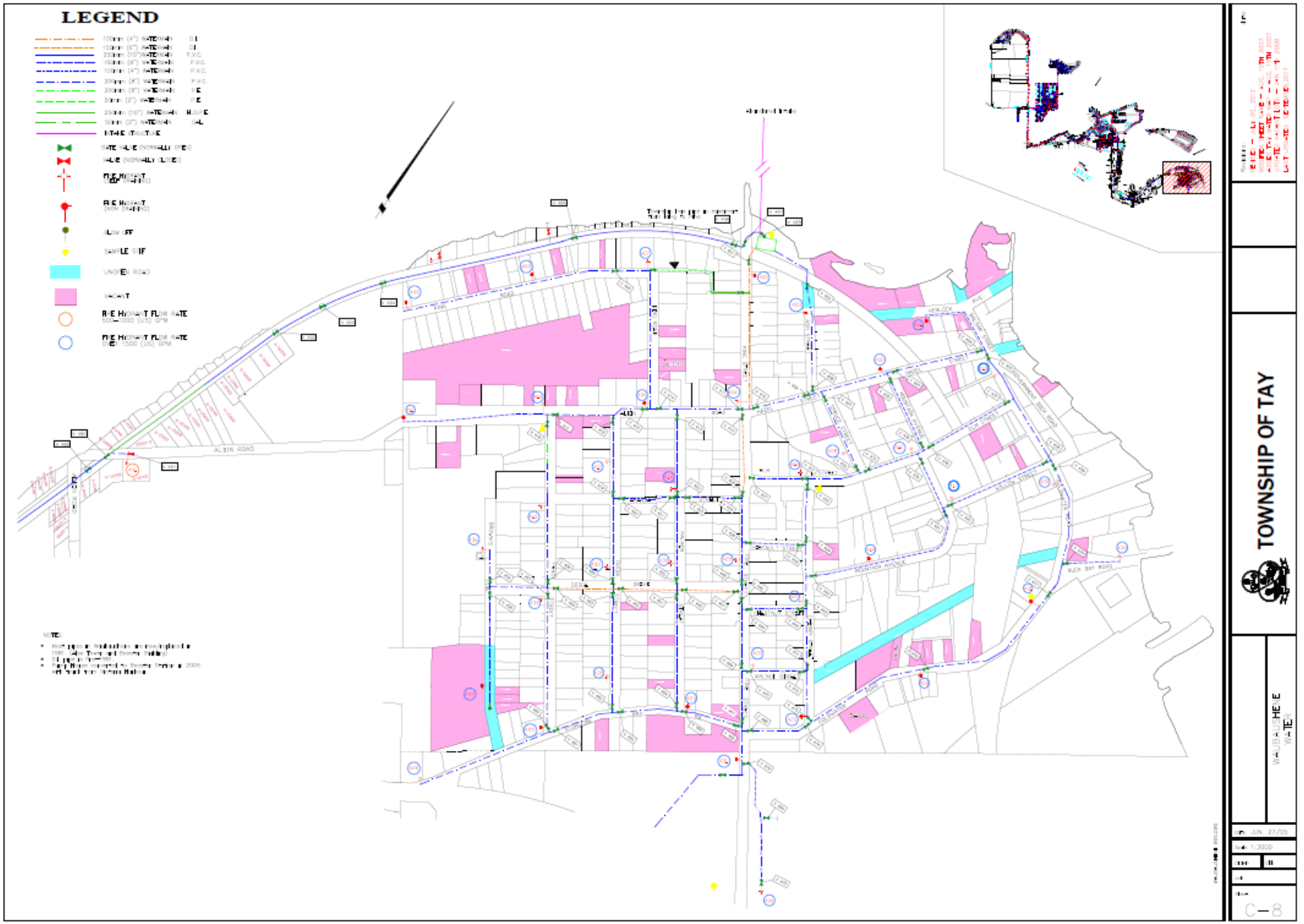

UNOPEN ROAD
VACANT
SECOND AVENUE
THIRD AVENUE
FOURTH AVENUE
KEY AVENUE
HOLLAND AVENUE
SMOOT AVENUE

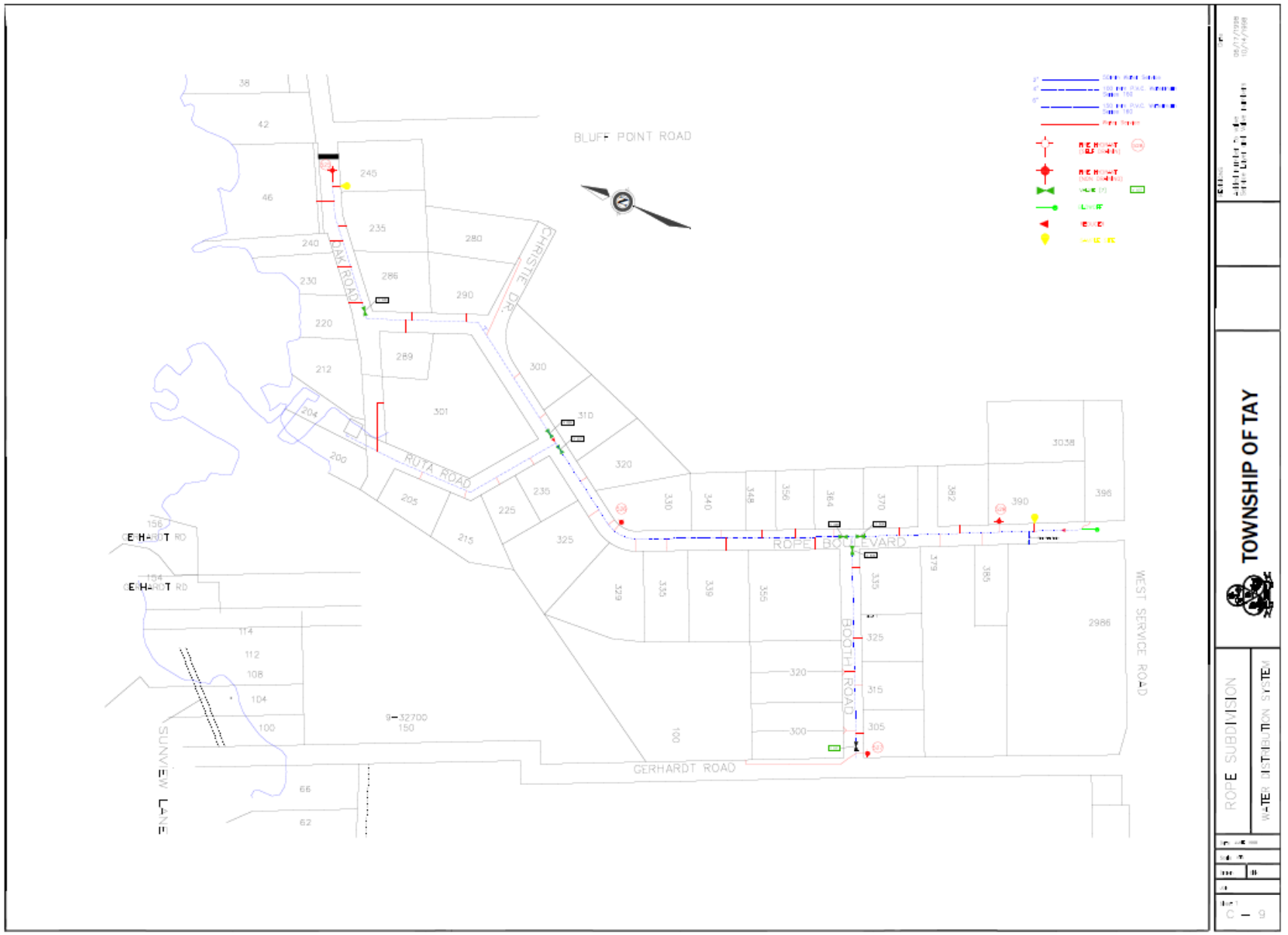

LEGEND
FIRE HYDRANT (SELF DRAINING)
FIRE HYDRANT (NON DRAINING)
BLOWOFF
BLOWOFF
VALVE AND CHAMBER
VALVE (GREEN OPEN, RED CLOSED)
V138
VALVE NUMBER
72
HYDRANT NUMBER
VACANT
SAMPLING STATION
150mm (6") WATERMAIN C.I.
100mm (4") WATERMAIN C.I.
150mm (6") WATERMAIN D.I.
250mm (10") WATERMAIN D.I.
25mm (1") WATERMAIN Galvan.
38mm (1.5") WATERMAIN Galvan.
50mm (2") WATERMAIN Galvan.
25mm (1") WATERMAIN P.E.
100mm (4") WATERMAIN P.V.C.
150mm (6") WATERMAIN P.V.C.
200mm (8") WATERMAIN P.V.C.
250mm (10") WATERMAIN P.V.C.
300mm (12") WATERMAIN P.V.C.
350mm (14") WATERMAIN P.V.C.
50mm (2") WATERMAIN P.V.C.
150mm W/M to be abandoned upon completion of project. See AS-BUILT drawing
4 Seasonal Valves
TOWNSHIP OF TAY
PARADISE POINT
WATER
JUN. 27/05
C-4


LEGEND
150mm (6") WATERMAIN P.V.C.
200mm (8") WATERMAIN P.V.C.
300mm (12") WATERMAIN P.V.C.
350mm (14") WATERMAIN P.V.C.
150mm (6") WATERMAIN C.I.
5/8" WATER SERVICE
3/4" TO 2 – 5/8" WATER SERVICES
FIRE HYDRANT (Non-Draining) (11)
FIRE HYDRANT (Self-Draining) (12)
VALVE (GREEN OPEN, RED CLOSED)
CHAMBER AND VALVE
VACANT (5)
BLOWOFF
SAMPLE LOCATION
75
HYDRANT IDENTIFIER
NINTH AVE (UNOPEN)
TRIPLE BAY ROAD
TRIPLE BAY ROAD
RUMLEY ROAD
HIGHWAY 12
PRV
TOWNSHIP OF TAY
C-5


LEGEND
MAPLE STREET
BOOSTER STATION
ZONE 3
TOWNSHIP OF TAY
VICTORIA HARBOUR
WATER
C-6


REFER TO VICTORIA HARBOUR WDS
DRAWING C-8
REFER TO WAUBAUSHENE WDS
DRAWING C-8
LEGEND
GEORGIAN BAY
CONCESSION 8
CONCESSION 7
LOT 9
LOT 8
ONTARIO HYDRO EASEMENT
TOWNSHIP OF TAY
C-7


LEGEND
TOWNSHIP OF TAY
ALBIN ROAD
C-8


BLUFF POINT ROAD
OAK ROAD
CHRISTIE DR.
ROTA ROAD
ROPE BOULEVARD
SOUTH ROAD
WEST SERVICE ROAD
GERHARDT ROAD
SUNVIEW LANE
TOWNSHIP OF TAY
ROPE SUBDIVISION
WATER DISTRIBUTION SYSTEM

Appendix D: Risk Rating Criteria

General Risk Definitions

Risk	Integrating a risk management framework into your asset management program requires the translation of risk potential into a quantifiable format. This will allow you to compare and analyze individual assets across your entire asset portfolio. Asset risk is typically defined using the following formula: Risk = Probability of Failure (POF) x Consequence of Failure (COF)

Probability of Failure (POF)	The probability of failure relates to the likelihood that an asset will fail at a given time. The current physical condition and service life remaining are two commonly used risk parameters in determining this likelihood.
POF - Structural	The likelihood of asset failure due to aspects of an asset such as load carrying capacity, condition or breaks
POF - Functional	The likelihood of asset failure due to its performance
POF - Range	1 - Rare 2 - Unlikely 3 - Possible 4 - Likely 5 - Almost Certain

Consequences of Failure (COF)	The consequence of failure describes the overall effect that an asset's failure will have on an organization's asset management goals. Consequences of failure can range from non-eventful to impactful: a small diameter water main break in a subdivision may cause several rate payers to be without water service for a short time. However, a larger trunk water main may break outside a hospital, leading to significantly higher consequences.
COF - Economic	The monetary consequences of asset failure for the organization and its customers
COF - Social	The consequences of asset failure on the social dimensions of the community
COF - Environmental	The consequence of asset failure on an asset's surrounding environment
COF - Operational	The consequence of asset failure on the Town's day-to-day operations
COF - Health & safety	The consequence of asset failure on the health and well-being of the community
COF - Strategic	The consequence of asset failure on strategic planning
COF - Range	1 - Insignificant 2 - Minor 3 - Moderate 4 - Major 5 - Severe

Framework

Asset Category	Asset Segment	Risk Criteria	Criteria	Weighting (%)	Sub-Criteria	Weighting (%)	Value/Range	Score
General / Corporate		COF	Economic	100%	Replacement Cost	100%	0 - 25,000 25,000 - 50,000 50,000 - 100,000 100,000 - 250,000 >250,000	1 - Insignificant 2 - Minor 3 - Moderate 4 - Major 5 - Severe
		POF	Structural	60%	Age Based Condition	100%	80 - 100 60 - 79 40 - 59 20 - 39 0 - 19	1 - Rare 2 - Unlikely 3 - Possible 4 - Likely 5 - Almost Certain
			Functional	40%	Service Life Remaining	100%	> 40% 30 – 40% 20 – 30% 10 – 20% < 10%	1 - Rare 2 - Unlikely 3 - Possible 4 - Likely 5 - Almost Certain

Asset Category	Asset Segment	Risk Criteria	Criteria	Weighting (%)	Sub-Criteria	Weighting (%)	Value/Range	Score
Stormwater Network / Water Network / Wastewater Network	Mains / Pipes	COF	Economic	50%	Replacement Cost	100%	0 - 25,000 25,000 - 50,000 50,000 - 100,000 100,000 - 250,000 >250,000	1 - Insignificant 2 - Minor 3 - Moderate 4 - Major 5 - Severe
			Operational	50%	Diameter	100%	<=100 >100 - < 300 >=300 - <400 >=400 - <700 >700	1 - Insignificant 2 - Minor 3 - Moderate 4 - Major 5 - Severe
		POF	Structural	60%	Assessed Condition	100%	80 - 100 60 - 79 40 - 59 20 - 39 0 - 19	1 - Rare 2 - Unlikely 3 - Possible 4 - Likely 5 - Almost Certain
			Functional	40%	Service Life Remaining	100%	> 40% 30 – 40% 20 – 30% 10 – 20% < 10%	1 - Rare 2 - Unlikely 3 - Possible 4 - Likely 5 - Almost Certain

Appendix E: Condition Assessment Guidelines

The foundation of good asset management practice is accurate and reliable data on the current condition of infrastructure. Assessing the condition of an asset at a single point in time allows staff to have a better understanding of the probability of asset failure due to deteriorating condition.

Condition data is vital to the development of data-driven asset management strategies. Without accurate and reliable asset data, there may be little confidence in asset management decision-making which can lead to premature asset failure, service disruption and suboptimal investment strategies. To prevent these outcomes, the Township's condition assessment strategy should outline several key considerations, including:

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

Role of Asset Condition Data

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

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

Guidelines for Condition Assessment

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

Condition assessments must include a quantitative or qualitative assessment of the current condition of the asset, collected according to specified condition rating

criteria, in a format that can be used for asset management decision-making. As a result, it is important that staff adequately define the condition rating criteria that should be used and the assets that require a discrete condition rating. When engaging with external consultants to complete condition assessments, it is critical that these details are communicated as part of the contractual terms of the project. There are many options available to the Township to complete condition assessments. In some cases, external consultants may need to be engaged to complete detailed technical assessments of infrastructure. In other cases, internal staff may have sufficient expertise or training to complete condition assessments.

Developing a Condition Assessment Schedule

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

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