

# Asset Management Plan

Township of West Lincoln

2021

This Asset Management Program was prepared by:



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

# Key Statistics

Replacement cost of  
asset portfolio  
**\$385.4** million

Replacement cost of  
infrastructure per household  
**\$71,000** (2021 Census)

Percentage of assets in fair or  
better condition  
**90%**

Percentage of assets with  
assessed condition data  
**62%**

Annual capital  
infrastructure deficit  
**\$9.8** million

Recommended timeframe  
for eliminating annual  
infrastructure deficit  
**15-20** Years

Target reinvestment  
rate  
**3.3%**

Actual reinvestment  
rate  
**0.8%**

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# Executive Summary


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

## Scope

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

This AMP includes the following asset categories:

### Asset Category

 Bridges & Culverts	 Rolling Stock
 Facilities	 Storm Network
 Land Improvements	 Water Network
 Machinery & Equipment	 Sanitary Network
 Roads Network	

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

## Findings

The overall replacement cost of the asset categories included in this AMP totals \$385.4 million. 90% of all assets analysed in this AMP are in fair or better condition and assessed condition data was available for 62% of assets. For the remaining assets, assessed condition data was unavailable, and asset age was used to approximate condition – a data gap that persists in most municipalities. Generally, age misstates the true condition of assets, making assessments essential to accurate asset management planning, and a recurring recommendation in this AMP.

The development of a long-term sustainable financial plan requires an analysis of whole lifecycle costs. This AMP uses a combination of proactive lifecycle strategies (paved roads and bridges & culverts) 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 \$12.7 million. Based on a historical analysis of sustainable capital funding sources, the Township is committing approximately \$2.9 million towards capital projects or reserves per year. As a result, there is currently an annual funding deficit of \$9.8 million, translating to \$1,800 per household (2021 Census).

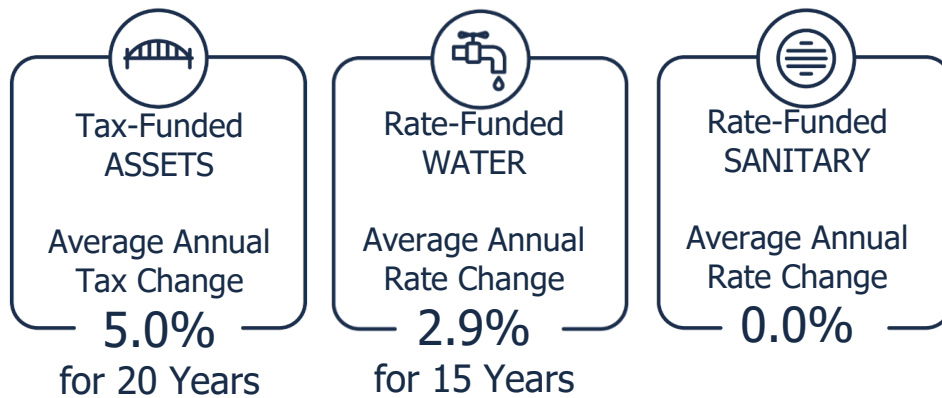
Annual Capital Deficit  
Per Household



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

## Recommendations

A financial strategy was developed to address the annual capital funding gap. The following graphics show the annual tax/rate change required to eliminate the Township's infrastructure deficit:



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

- Develop a data governance framework, complete with a condition assessment strategy
- Regularly review and update data to maintain a complete and accurate inventory
- Incorporate lifecycle strategies, where possible, for more proactive capital planning
- Track current levels of service and identify sustainable proposed levels of service

# 1 Introduction & Context

## Key Insights

- The goal of asset management is to minimize the lifecycle costs of delivering infrastructure services, manage the associated risks while maximizing the value ratepayers receive from the asset portfolio
- The Township's asset management policy provides clear direction to staff on their roles and responsibilities regarding asset management
- An asset management plan is a living document that should be updated regularly to inform long-term planning
- Ontario Regulation 588/17 outlines several key milestones and requirements for asset management plans in Ontario between July 1<sup>st</sup>, 2022, and July 2025

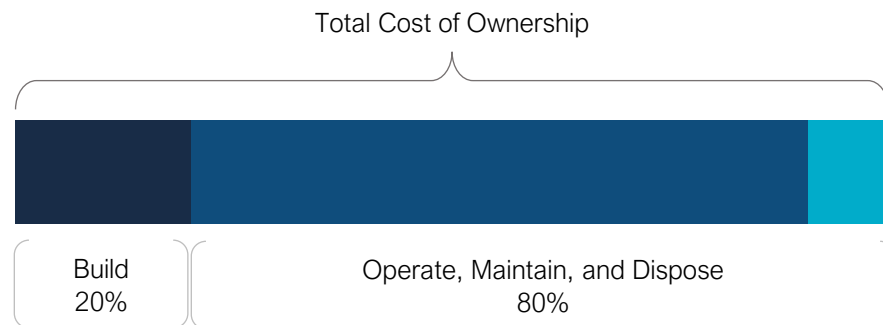


# An Overview of Asset Management

Municipalities are responsible for managing and maintaining a broad portfolio of infrastructure assets to deliver services to the community. This includes roads and bridges, to facilitate movement; water, sewer, and stormwater systems to provide clean drinking water and dispose of waste or excessive rainfall; and buildings, facilities, and parks to provide community and recreational spaces.

Planning for the sustainability of these assets requires a systematic and comprehensive plan for maintaining, rehabilitating, and replacing infrastructure at the lowest cost to the organization and its stakeholders. The goal of asset management is to minimize the lifecycle costs of delivering infrastructure services, manage the associated risks while maximizing the value ratepayers receive from the asset portfolio.

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



These costs can span decades, requiring planning and foresight to ensure financial responsibility is spread equitably across generations. An asset management plan is critical to this planning, and an essential element of the broader asset management program. The industry-standard approach and sequence to developing a practical asset management program begin 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.

## Asset Management Policy

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

In accordance with Ontario Regulation 588/17 the Township's Strategic Asset Management Policy (Policy number POL-ADMIN-02-2019) was approved and effective in late April 2019.

The policy identifies key principles to be followed when making asset management decisions, these include:

- Evidence based priorities & planning
- Financially sustainable planning & investment
- Adaptation of innovative infrastructure technology, services & practices
- Reliable planning & investment
- Environmentally conscious decisions

## 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.

## Asset Management Plan

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

- State of Infrastructure
- Asset Management Strategies
- Levels of Service (LOS)
- Financial Strategies

The AMP is a living document that should be updated regularly as additional assets and financial data become available. This will allow the Township to re-evaluate the state of infrastructure and identify how the organization's asset management and financial strategies are progressing.

# 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.

## 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.

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

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

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

## 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 often fixed first, regardless of their criticality. However, not all assets are created equal. Some are more important than others, and their failure or disrepair poses more risk to the community than that of others. For example, a road with a high volume of traffic that provides access to critical services poses a higher risk than a low volume rural road. These high-value assets should receive funding before others.

By identifying the various impacts of asset failure and the likelihood that it will fail, risk management strategies can identify critical assets, and determine where maintenance efforts, and spending, should be focused.

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

## 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 the core asset categories in this AMP, technical metrics and qualitative descriptions that measure both technical and community levels of service have been established and measured as data is available. For non-core assets, these metrics will be defined in the next iteration of the plan, in time for the 2024 O.Reg. requirements.

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

## Community Levels of Service

Community levels of service are a simple, plain language description or measure of the service that the community receives. For core asset categories (Roads, Bridges & Culverts, Water, Wastewater, Stormwater) the Province, through O. Reg. 588/17, has provided qualitative descriptions that are required to be included in this AMP.

## Technical Levels of Service

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

For core asset categories (Roads, Bridges & Culverts, Water, Wastewater, Stormwater) the Province, through O. Reg. 588/17, has provided technical metrics that are required to be included in this AMP.

## Current and Proposed Levels of Service

This AMP focuses on measuring the current level of service provided to the community. Once current levels of service have been measured, the Township plans to establish proposed levels of service over a 10-year period, in accordance with O. Reg. 588/17.

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

# Ontario Regulation 588/17

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

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

**2019**

Strategic Asset Management Policy

**2024**

Asset Management Plan for Core and Non-Core Assets

**2022**

Asset Management Plan for Core Assets with the following components:

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

**2025**

Asset Management Policy Update and an Asset Management Plan for All Assets with the following additional components:

1. Proposed LOS 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

## O. Reg. 588/17 Compliance Review

The following table identifies the requirements outlined in Ontario Regulation 588/17 for municipalities to meet by July 1, 2022. Next to each requirement a page or section reference is included in addition to any necessary commentary.

<b>Requirement</b>	<b>O. Reg. Section</b>	<b>AMP Section Reference</b>	<b>Status</b>
Summary of assets in each category	S.5(2), 3(i)	4.1.1 - 5.2.1	Complete
Replacement cost of assets in each category	S.5(2), 3(ii)	4.1.1 - 5.2.1	Complete
Average age of assets in each category	S.5(2), 3(iii)	4.1.3 - 5.2.3	Complete
Condition of core assets in each category	S.5(2), 3(iv)	4.1.2 – 5.2.2	Complete
Description of Township’s approach to assessing the condition of assets in each category	S.5(2), 3(v)	4.1.2 – 5.2.2	Complete
Current levels of service in each category	S.5(2), 1(i-ii)	4.1.6 - 5.2.6	Complete for Core Assets
Current performance measures in each category	S.5(2), 2	4.1.6 - 5.2.6	Complete for Core Assets
Lifecycle activities needed to maintain current levels of service for 10 years	S.5(2), 4	4.1.4 - 5.2.4	Complete for Core Assets
Costs of providing lifecycle activities for 10 years	S.5(2), 4	Appendix A	Complete
Growth assumptions	S.5(2), 5(i-ii) S.5(2), 6(i-vi)	6.1-6.2	Complete

# 2 Scope and Methodology

## Key Insights

- This asset management plan includes nine (9) asset categories and is divided between tax-funded and rate-funded categories
- The source of replacement cost values impacts the accuracy and reliability of asset portfolio valuation; Replacement costs in this AMP are based on 2021-year end data, where available.
- Accurate and reliable condition data helps to prevent premature and costly rehabilitation or replacement and ensures that lifecycle activities occur at the right time to maximize asset value and useful life



# 2.1 Included Asset Categories

This asset management plan for West Lincoln Township is produced in compliance with Ontario Regulation 588/17. The July 2022 deadline under the regulation—the first of three AMPs deadlines—requires analysis of only core assets (roads, bridges & culverts, water, wastewater, and stormwater).

The AMP summarizes the state of the infrastructure for the Township’s asset portfolio, establishes current levels of service and the associated technical and customer-oriented key performance metrics, 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
Roads Network	
Bridges & Culverts	
Facilities	
Machinery & Equipment	Tax Levy
Rolling Stock	
Land Improvements	
Storm Network	
Sanitary Network	
Water Network	User Rates

# 2.2 Deriving Replacement Costs

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

- User defined cost and cost/unit method:** costs are provided by municipal staff which could include average costs from recent contracts; data from engineering reports and assessments; and staff estimates based on knowledge and experience.
- Cost Inflation/CPI Tables:** Historical cost of the asset is inflated based on Consumer Price Index or Non-Residential Building Construction Price Index. User-defined costs based on reliable sources are a reasonably accurate and reliable way to determine asset replacement costs.

Cost inflation is typically used in the absence of reliable replacement cost data. It is a reliable method for recently purchased and/or constructed assets where the total cost is reflective of the actual costs that the Township incurred. As assets age and new products and technologies become available, cost inflation becomes a less reliable method.

## 2.3 Estimated Useful Life

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

## 2.4 Reinvestment Rate

As assets age and deteriorate they require additional investment to maintain a state of good repair. The reinvestment of capital funds, through asset renewal or replacement, is necessary to sustain an adequate level of service. The reinvestment rate is a measurement of available or required funding relative to the total replacement cost.

By comparing the actual vs. target reinvestment rate the Township can determine the extent of any existing funding gap. The reinvestment rate is calculated as follows:

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

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

# 2.5 Deriving Asset Condition

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

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

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 the end of service life, condition below standard, a large portion of the system exhibits significant deterioration	20 - 40
Very Poor	Unfit for sustained service	Near or beyond expected service life, widespread signs of advanced deterioration, some assets may be unusable	0 - 20

The analysis in this AMP is based on assessed condition data only as available. In the absence of assessed condition data, asset age is used as a proxy to determine asset condition.

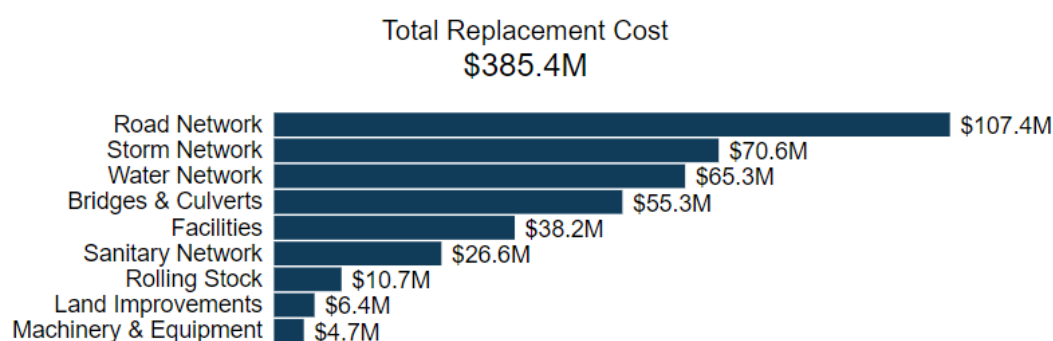
# 3 Portfolio Overview

## Key Insights

- The total replacement cost of the Township's asset portfolio is \$385.4 million
- The Township's target re-investment rate is 3.3%, and the actual re-investment rate is 0.8%, contributing to an expanding infrastructure deficit
- 90% of all assets are in fair or better condition
- The average annual capital requirements total \$12.7 million per year across all asset categories

## 3.1 Total Replacement Cost of Asset Portfolio

The asset categories analysed in this AMP have a total replacement cost of \$385.4 million based on 2021 year-end data. This data is housed in an asset management database called Citywide. This total was determined based on a combination of user-defined costs and inflation of historical cost. This estimate reflects the replacement of historical assets with similar, not necessarily identical, assets available for procurement today. The following graph displays the total 2021 replacement cost per asset category.

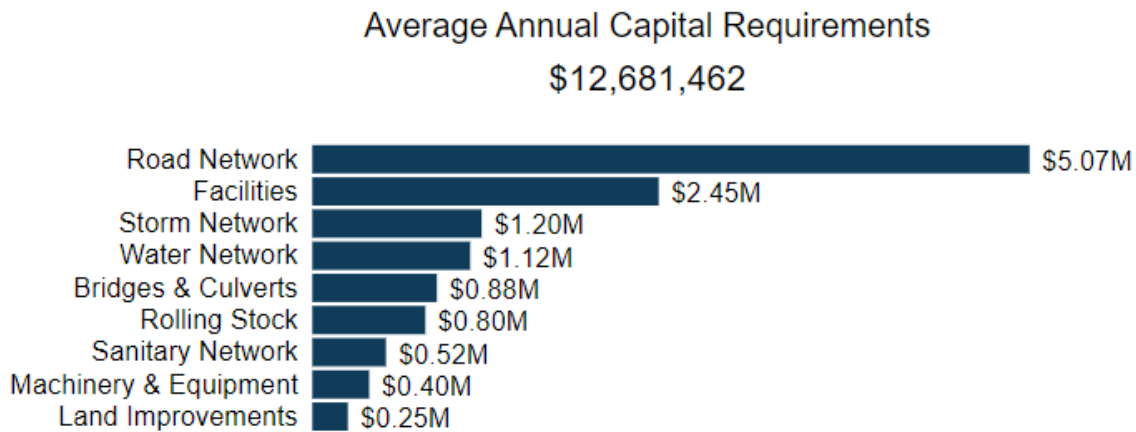


The following table identifies the methods employed to determine replacement costs across each asset category:

Asset Category	Replacement Cost Method		
	User-Defined	Historical Inflation	Notes
Road Network	100%	0%	Unit costs based on 2019 Road Needs Study and latest tender prices for all Road assets
Bridges & Culverts	100%	0%	Unit costs based on 2021 bridge inspections and latest tender prices
Water Network	100%	0%	Unit costs based on staff estimates and latest tender prices
Sanitary Network	98%	2%	
Storm Network	100%	0%	
Facilities	49%	51%	User-Defined Costs provided by Building Condition Inspections
Rolling Stock	90%	10%	Unit Cost based on departmental staff estimates
Machinery & Equipment	0%	100%	Inflation of historical costs
Land Improvements	6%	94%	Inflation of historical costs
<b>Overall</b>	<b>91%</b>	<b>9%</b>	

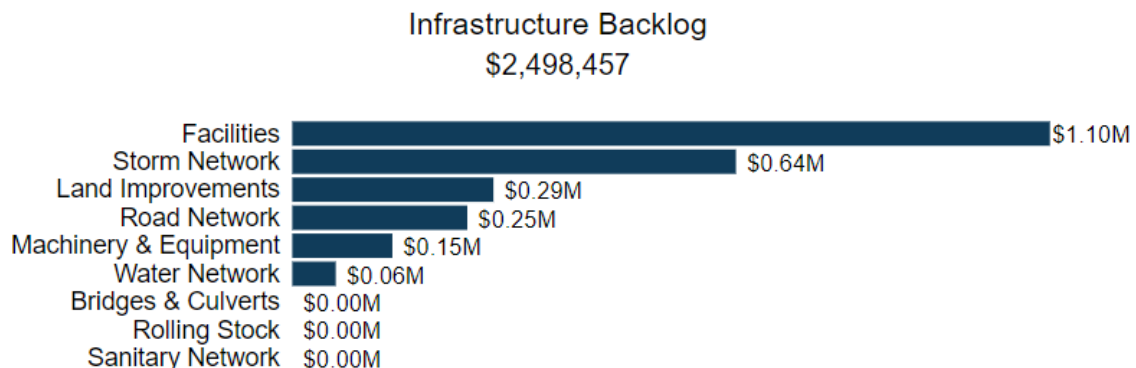
## 3.2 Average Annual Capital Requirements

Annual capital requirements represent the amount the Township should allocate annually to each asset category to meet rehabilitation and/or replacement needs as they arise, prevent infrastructure backlogs, and achieve long-term sustainability. This figure does not factor in costs associated with operations and maintenance.



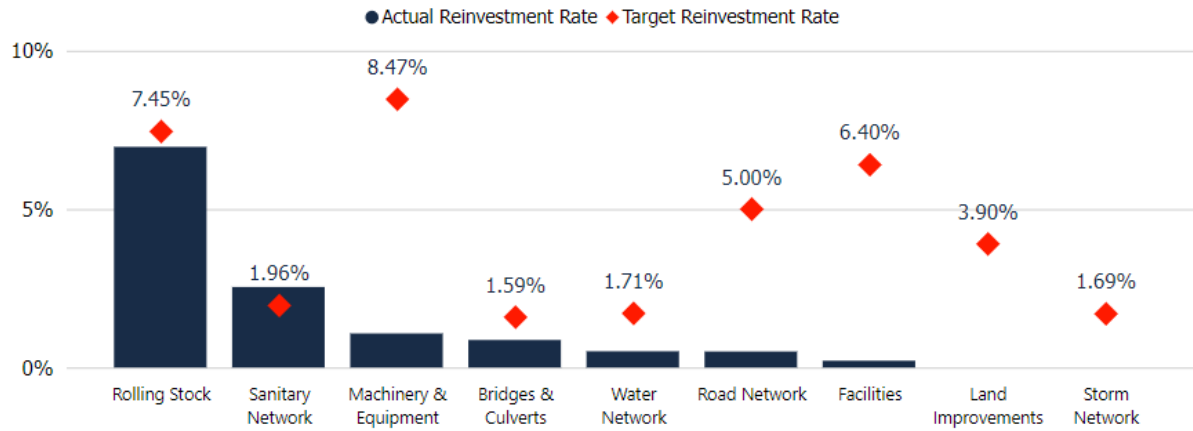
For most asset categories the annual requirement has been calculated based on a “replacement only scenario”, in which capital expenditures are only incurred at the construction and replacement of each asset. However, for paved roads, lifecycle management strategies have been developed, based on staff expertise and road needs study recommendations, to identify capital costs that are realized through strategic rehabilitation and renewal of the Township’s roads.

The annual requirements, however, do not incorporate the backlog costs of assets, shown in the graph below, that have reached the end of their useful life prior to the 2021 reporting year.



### 3.3 Target vs. Actual Reinvestment Rate

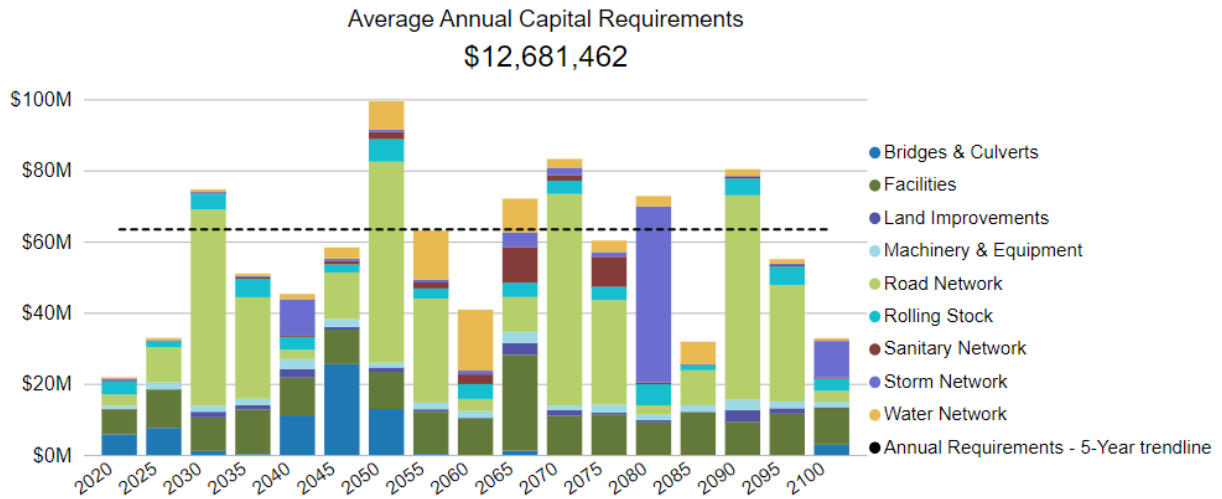
The graph below depicts funding gaps by comparing target vs actual reinvestment rate. To meet the long-term replacement needs, the Township should be allocating approximately \$12.7 million annually, for a target reinvestment rate of 3.3%. Actual annual spending on infrastructure totals approximately \$2.9 million, for an actual reinvestment rate of 0.8%.



# 3.4 Forecasted Capital Requirements

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

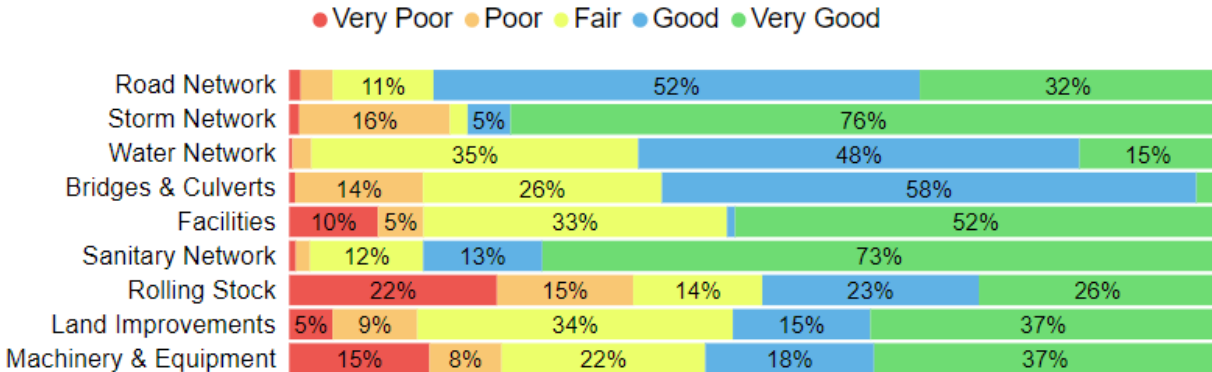
The following graph identifies capital requirements over the next 80 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average 5-year capital requirements.





## 3.5 Condition of Asset Portfolio

The current condition of the assets is central to all asset management planning. Collectively, 90% of assets in West Lincoln are in fair or better condition. This estimate relies on both age-based and assessed condition data. Condition of each asset is weighted by replacement cost.



This AMP relies on assessed condition data for 62% of assets; for the remaining portfolio, age is used as an approximation of condition. Assessed condition data is invaluable in asset management planning as it reflects the true condition of the asset and its ability to perform its functions.

The table below identifies the source of condition data used throughout this AMP.

Asset Category	Asset Segment	% of Assets with Assessed Condition	Source of Condition Data
Road Network	Paved & Unpaved Roads	100%	2019 Roads Needs Study
	Other	20%	Public Works Staff Assessments
Bridges & Culverts	All	100%	2021 bridge inspections
Water Network	All	<1%	Staff Assessments
Storm Network		0%	Age-Based
Sanitary Network	Sanitary Laterals	0%	
	Sanitary Mains	96%	2020 CCTV inspections
	Sanitary Manholes	84%	
Facilities	All	100%	2020 Building Condition Assessments
Machinery & Equipment	All	0%	Age-Based
Rolling Stock	All	96%	Staff Assessments
Land Improvement	All	9%	Staff Assessments

# 4 Analysis of Tax-funded Assets

## Key Insights

- Tax-funded assets have a current replacement value (CRV) of \$293.5 million
- 88% of tax-funded assets are in fair or better condition
- The average annual capital requirement to sustain the current level of service for tax-funded assets is approximately \$11.0 million
- Critical assets should be evaluated to determine appropriate risk mitigation activities and treatment options

## 4.1 Roads Network

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

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

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

Replacement Cost	Condition	Financial Capacity	
\$107.4 million	Good (72%)	Annual Requirement:	\$5,069,000
		Funding Available:	\$513,000
		Annual Deficit:	\$4,556,000

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

Service Attribute	Level of Service Statement
Accessible & Reliable	The road network is reliable and provides reasonable access to properties throughout the municipality
Sustainable	There are long-term plans in place for the renewal and replacement of the road network

## 4.1.1 Asset Inventory & Costs

The table below includes the quantity, replacement cost method, and annual capital requirements of each asset segment in the Township’s Roads Network inventory.

Asset Segment	Quantity	Replacement Cost	Annual Capital Requirement
Paved Roads <sup>1</sup>	260 km	\$89,544,000	\$4,477,000
Roadside Barriers	124	\$4,711,000	\$137,000
Sidewalks	28.9 kms	\$4,531,000	\$136,000
Signs & Posts	Pooled	\$236,000	\$24,000
Streetlights	1,104	\$2,349,000	\$62,000
Unpaved Roads <sup>2</sup>	127 km	\$6,001,000	\$233,000
<b>Total</b>		<b>\$107,369,000</b>	<b>\$5,069,000</b>

Total Replacement Cost  
\$107.4M



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

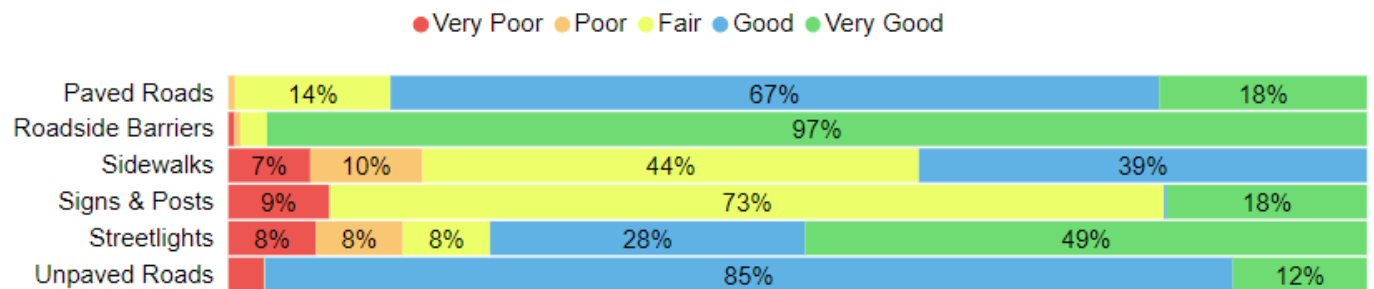
<sup>1</sup> Note: The replacement cost of Paved Roads includes the value of reconstructing the base layers also.

<sup>2</sup> Unpaved roads are typically managed under operating and maintenance (O&M) ; the costs included in this plan are from upgrading the unpaved roads, within the current 10-year capital plan, to hardtop.

## 4.1.2 Data Insights: Useful Life, Age & Condition

The table below identifies the current average condition, the average age, and the estimated useful life for each asset segment. The Average Condition (%) is a weighted value based on replacement cost. For Unpaved roads, the overall condition is Very Good since these assets are in a constant state of repair/maintenance.

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Condition (%)
Paved Roads	15 - 50 Years	21.3	70% (Good)
Roadside Barriers	10 - 25 Years	2	96% (Very Good)
Sidewalks	25 - 40 Years	15.6	74% (Good)
Signs & Posts	5 - 10 Years	5	54% (Fair)
Streetlights	20 - 50 Years	7.1	73% (Good)
Unpaved Roads	N/A	59.2	73% (Good)
		<b>6.9</b>	72% (Good)



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.

## 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 more confidently. The following describes the Township's current approach:

- Every three years, a Road Needs Study is completed for all road segments. For most roads, the last Road Needs Study was completed in 2019.
- A sidewalk condition assessment was completed in 2021 by the Township and is typically performed on an annual basis to track and resolve any sidewalk deficiencies.
- Road signs undergo reflectivity testing and visual inspections in accordance with Minimum Maintenance Standards (MMS)
- Other road appurtenances are visually inspected during road patrols in accordance with MMS guidelines.

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

<b>Condition</b>	<b>Rating</b>
Very Good	75 - 100
Good	61 - 74
Fair	51 - 60
Poor	41 - 50
Very Poor	0 - 40

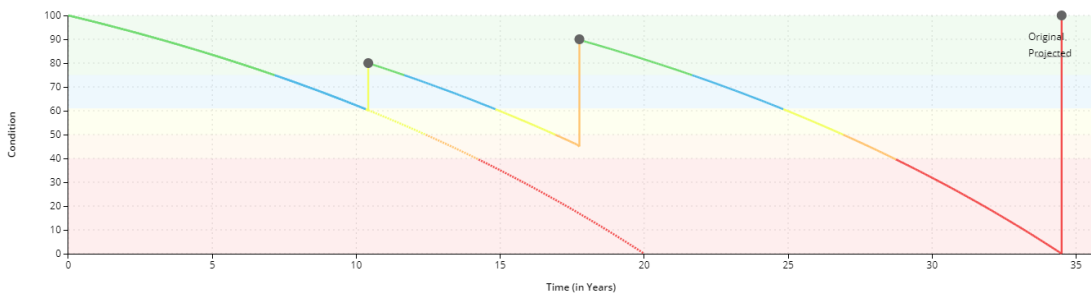
## 4.1.3 Lifecycle Management Strategy

### Lifecycle Models

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.

Staff utilize a road optimization tool, MESH, to manage and develop their lifecycle strategies. The following lifecycle strategies have been developed, in alignment with that tool, as a proactive approach to managing paved roads and extending their service life cost-effectively.

Paved Roads		
Event Name	Event Class	Event Trigger
Resurfacing	Rehabilitation	60% Condition
Major Rehabilitation	Rehabilitation	45%-60% Condition
Full Reconstruction	Replacement	0%-45% Condition



### Lifecycle Strategies

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

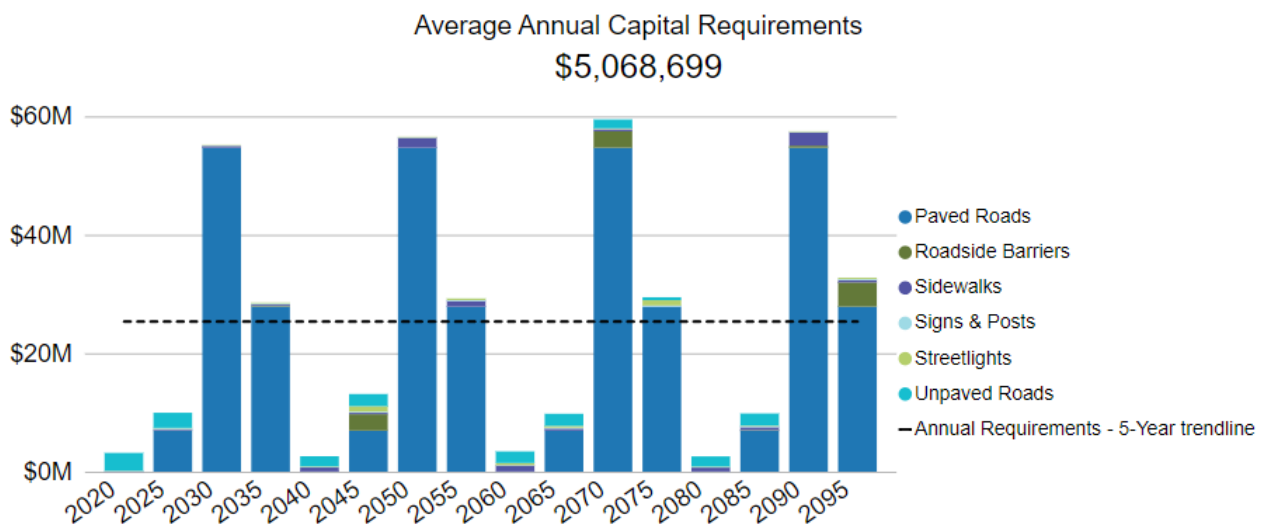
Activity Type	Description of Current Strategy
Maintenance	Annual winter control activities to meet Minimum Maintenance Standards including road and sidewalk plowing, snow removal and sanding.
	Activities such as deep patching, shallow patching and crack sealing are done on an as-needed basis depending on the performance and condition of the road segments and in accordance with MMS guidelines.
	Gravel roads require ongoing maintenance activities including <ul style="list-style-type: none"> <li>• Dust Control Application (annually)</li> <li>• Grading (annually)</li> <li>• Re-gravelling (as needed)</li> </ul>

Rehabilitation	Road rehabilitation activities such as resurfacing, or Mill & Paves are triggered by the pavement condition index and pavement network value as outlined in the Township’s RNS (Road Needs Study). These activities are refined annually.
	Some Gravel roads are determined to be viable options for upgrade to Chip Seal based on economic, social, and environmental factors.
Replacement	Full road reconstruction is coordinated effectively with other Right-of-Way assets, including linear underground assets.

### 4.1.4 Forecasted Capital Requirements

Based on the lifecycle strategies identified previously for Roads, and assuming end-of-life replacement of all other assets in this category, the following graph forecasts capital requirements for the Roads Network. The capital forecast generated from Citywide, however, may vary from the forecast generated by Road Matrix that staff primarily use for their strategic planning. As staff continue to utilize the Citywide database for their asset management purposes, the forecasting will be more keenly reviewed in order to improve the accuracy and reliability of the outcomes.

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



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



## 4.1.5 Risk & Criticality

### Risk Matrix

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure road network assets based on 2021 inventory data. As staff update the Citywide database with more metrics and asset attributes, the risk models will become more comprehensive to align with staff's current prioritization methods.

		50 Assets 79,740.52 m, m2 \$22,453,528.00	100 Assets 117,470.06 m \$41,670,701.00	14 Assets 12,255.98 m \$8,080,288.00	6 Assets 2,318.84 m \$2,536,618.00	0 Assets - \$0.00
5		28 Assets 9,441.55 m \$3,342,702.00	43 Assets 28,378.27 m \$5,141,348.00	6 Assets 3,366.93 m \$777,710.00	1 Asset 96.20 m \$102,857.00	2 Assets 245.62 m \$273,103.00
4		27 Assets 5,564.36 m \$1,925,644.00	27 Assets 11,786.09 m2, m \$1,918,059.36	8 Assets 1,955.51 m, m2 \$452,125.20	6 Assets 2,233.84 m2, m \$477,778.52	4 Assets 696.28 m \$317,974.00
3		18 Assets 2,151.35 unit(s), m \$688,679.00	28 Assets 6,083.81 m2, m \$1,009,776.36	24 Assets 6,920.20 m2, m \$859,220.36	7 Assets 2,181.13 m2, m \$241,759.08	5 Assets 1,339.56 m2 \$153,928.32
2		358 Assets 46,714.66 unit(s), m2, m \$5,946,936.54	518 Assets 138,934.40 m2, unit(s), m \$6,563,322.56	94 Assets 8,989.45 m2, unit(s), m \$1,498,516.88	24 Assets 1,306.91 m2, unit(s), m \$349,239.36	36 Assets 12,244.58 m2, unit(s), m \$586,670.80
1						
		1	2	3	4	5
		Probability				

Within the risk models developed in Citywide, the asset-specific metrics used when calculating risks scores and that staff utilize when prioritizing their road assets can be found below:

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

## Risks to Current Asset Management Strategies

The following section summarizes qualitative risks that the road assets held. This is based on key trends and current and projected future challenges to service:



### Climate Change & Extreme Weather Events

An increase in the frequency and intensity of precipitation events can result in flooding of sections of the road network. Further issues can arise as a result of flooding and poor drainage including accelerated deterioration caused by freeze/thaw cycles. To improve asset resiliency, Staff should continue to identify problem areas and improve drainage through enhanced lifecycle strategies.



### Capital Funding Strategies

Major capital rehabilitation projects for roads are sometimes heavily dependant on the availability of grant funding opportunities. When grants are not available, rehabilitation projects may be deferred. A long-term capital funding strategy can reduce dependency on grant funding and help prevent the deferral of capital works.

## 4.1.6 Levels of Service

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

### Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2021)
Scope	Description, which may include maps, of the roads network in the Township and its level of connectivity	See Appendix B

Quality	Description or images that illustrate the different levels of road class pavement condition	<p>Every road section receives a Pavement Condition Index (PCI) rating (0-100). The rating incorporates pavement roughness measurements and surface distress (type, quantity, severity).</p> <p>Ratings are categorized into 4 general qualitative descriptors as detailed below.</p> <p>Very Good- 75 PCI and greater; Over 20 years of useful life remaining</p> <p>Good- 61 PCI and greater; 15-20 years remaining</p> <p>Fair- 51 PCI and greater; 10-15 years remaining</p> <p>Poor -0-50 PCI; Less than 10 years remaining</p>
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## Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2021)
Accessibility & Reliability	Lane-km of arterial roads (MMS classes 1 and 2) per land area (km/km <sup>2</sup> )	0.45
	Lane-km of collector roads (MMS classes 3 and 4) per land area (km/km <sup>2</sup> )	0.29
	Lane-km of local roads (MMS classes 5 and 6) per land area (km/km <sup>2</sup> )	0.25
Sustainable	Average pavement condition index for paved <b>rural</b> roads in the Township	70 (Good)
	Average pavement condition index for paved <b>urban</b> roads in the Township	70 (Good)
	Average surface condition for unpaved <b>urban</b> roads in the Township (e.g., excellent, good, fair, poor)	Fair-Good
	Average surface condition for unpaved <b>rural</b> roads in the Township (e.g., excellent, good, fair, poor) Capital reinvestment rate	Fair-Good
	Average condition of sidewalks in the Township	74% (Good)

## 4.1.7 Recommendations

### Condition Assessment Strategies

- Both lifecycle strategies and risk analysis are informed, at least in part, by assessed condition. Information collected through Road Needs Studies and/or staff assessments should be regularly updated in Citywide so that decisions are based on the most recent and accurate information.

### Lifecycle Management Strategies

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

### Risk Management Strategies

- Implement risk-based decision-making as part of asset management planning and budgeting processes. This should include the regular review of high-risk assets to determine appropriate risk mitigation strategies.
- Review risk models on a regular basis and adjust according to an evolving understanding of the probability and consequences of asset failure. As feasible, collect and update attribute information identified as valuable to the risk models (i.e., daily traffic counts, road maintenance class, drainage adequacy, etc.).

### Levels of Service

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

## 4.2 Bridges & Culverts

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

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

Segment	Replacement Cost	Condition	Financial Capacity	
Bridges & Culverts	\$55.3 million	Good (70%)	Annual Requirement:	\$880,000
			Funding Available:	\$481,000
			Annual Deficit:	\$399,000

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

Service Attribute	Level of Service Statement
Accessible & Reliable	Bridges and culverts provide reliable access to the road network for vehicles and/or pedestrians
Sustainable	There are long-term plans in place for the renewal and replacement of all bridges and culverts

## 4.2.1 Asset Inventory & Costs

The table below includes the quantity, replacement cost method, and annual capital requirements of each asset segment in the Township’s Bridges & Culverts inventory.

Asset Segment	Quantity	Replacement Cost	Annual Capital Requirement
Bridges	37	\$44,203,000	\$717,000
Major Culverts	51	\$11,142,000	\$164,000
<b>Total</b>		\$55,345,000	\$880,000

Total Replacement Cost  
\$55.3M

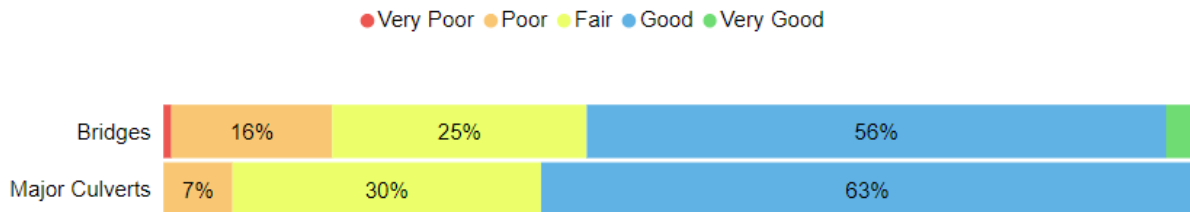


The replacement costs of all assets should be reviewed periodically to determine whether adjustments are needed to more accurately represent realistic capital requirements.

## 4.2.2 Asset Data: Useful Life, Age & Condition

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

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Condition (%)
Bridges	25 - 75 Years	12.7	70% (Good)
Major Culverts	25 - 75 Years	36.1	69% (Fair)
<b>Average</b>		<b>28</b>	<b>70% (Good)</b>



To ensure that the Township’s bridges and culverts 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 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.

# 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 more confidently. The following describes the Township’s current approach:

- Condition assessments of all bridges and structural culverts are completed every 2-4 years in accordance with the Ontario Structure Inspection Manuals (OSIMs).
- Staff visually inspect bridges and culverts on a regular basis, between OSIM inspections, to ensure that the assets are structurally and functionally adequate. These inspections are followed by annual bridge cleaning and erosion clean outs.

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

<b>Condition</b>	<b>Rating</b>
Very Good	80 - 100
Good	70 - 79
Fair	61 - 69
Poor	50 - 60
Very Poor	0 - 49



### 4.2.3 Lifecycle Management Strategy

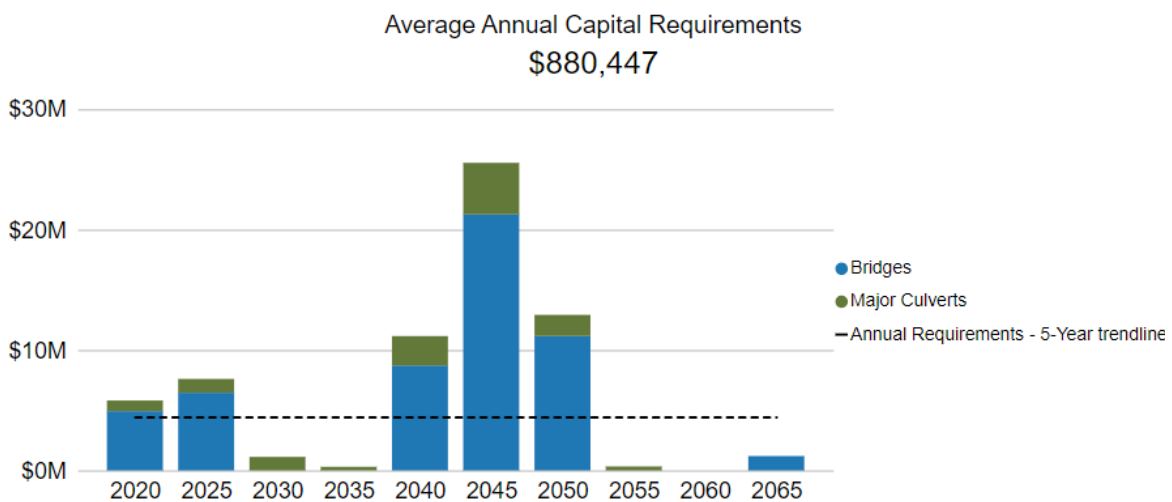
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Maintenance, Rehabilitation & Replacement	<p>All lifecycle activities are driven by the results of mandated structural inspections completed according to the Ontario Structure Inspection Manual (OSIM).</p> <hr/> <p>Staff perform visual inspections regularly Internal annual bridge cleaning and erosion clean-outs are performed</p>

### 4.2.4 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 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 5-year capital requirements.



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

## 4.2.5 Risk & Criticality

### Risk Matrix

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for bridge and structural culvert assets based on 2021 inventory data.



Within the risk models developed in Citywide, the asset-specific metrics that determine the risk scores as shown above and that staff utilize when prioritizing their bridges and structural culvert assets are as follows:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition	Replacement Cost (Financial)
	Priority Rating (Operational)
	Implementation Ranking (Operational)

## Risks to Current Asset Management Strategies

In addition to the quantified risks illustrated above, the Township faces qualitative risks for its bridge and culvert assets.



### Capital Funding

The Township has a large inventory of bridges and structural culverts that require regular and often costly, lifecycle activities. Limited funding may necessitate the deferment of major capital rehabilitation projects. The need to defer due to budget constraints may be challenged by assets that have dire consequences of failure. Identifying the long-term capital funding needs of this asset class and incorporating into the asset management database can enable proactive and effective capital planning to minimize potential risks.

## 4.2.6 Levels of Service

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

### Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2021)
Accessible & Reliable	Description of the traffic that is supported by municipal bridges (e.g. heavy transport vehicles, motor vehicles, emergency vehicles, pedestrians, cyclists)	Most of the Township’s structures do not have loading or dimensional restrictions meaning that most traffic, including heavy transport, motor vehicles, emergency vehicles and cyclists can be supported.
Sustainable	Description or images of the condition of bridges and how this would affect use of the bridges	<p><b>Good (70-100):</b> considered to be in good-excellent condition, and repair work is not required in the short-term.</p> <p><b>Fair (50-70):</b> considered to be in good-fair condition. Repair work is ideally scheduled to be completed within the next 5 years.</p> <p><b>Poor (&lt; 50):</b> considered poor with lower numbers representing structures nearing the end of their service life. The repair of these structures is best scheduled within a year.</p>
	Description or images of the condition of culverts and how this would affect use of the culverts	

## Technical Levels of Service

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

<b>Service Attribute</b>	<b>Technical Metric</b>	<b>Current LOS (2021)</b>
Accessible & Reliable	% of bridges in the Township with loading or dimensional restrictions	1%
Sustainable	Average bridge condition index value for bridges in the Township	70
	Average bridge condition index value for structural culverts in the Township	69

## 4.2.7 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.
- Ensure updated OSIM report information is consistently uploaded into Citywide to enable the most accurate planning and analysis

### Risk Management Strategies

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

### Levels of Service

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

## 4.3 Storm Network

Storm services are provided by the Township and overseen by the Publics Works Department. The Township’s stormwater network includes catch basins, manholes, outfalls, storm mains, and stormwater management ponds. The state of the infrastructure for stormwater is summarized in the following table:

Replacement Cost	Condition	Financial Capacity (rounded)	
\$70.6 million	Very Good (86%) <sup>3</sup>	Annual Requirement:	\$1,196,000
		Funding Available:	\$0
		Annual Deficit:	\$1,196,000

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

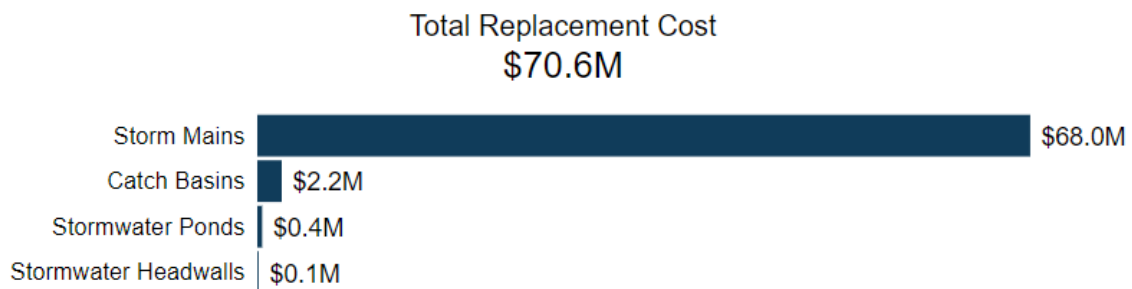
Service Attribute	Level of Service Statement
Safety & regulatory	The stormwater network supports the protection of the Township from impacts of climate change and/or extreme weather events by complying with the necessary regulatory requirements and following best industry practices, where applicable.
Sustainable	There are long-term plans in place for the renewal and/or replacement of stormwater infrastructure, where required, to ensure its resilience and capacity meets requirements.

<sup>3</sup> As staff continue to collect condition information on their storm assets, especially underground mains, a more accurate assessment will be provided.

### 4.3.1 Asset Inventory & Costs

The table below includes the quantity, replacement cost method, and annual capital requirements of each asset segment in the Township’s Storm Network inventory.

<b>Asset Segment</b>	<b>Quantity</b>	<b>Replacement Cost</b>	<b>Annual Capital Requirement</b>
Catchbasins	495 <sup>4</sup>	\$2,151,000	\$38,000
Storm Mains	27 kms	\$67,966,000	\$1,141,000
Stormwaterwater Headwalls	7	\$96,000	\$3,000
Stormwater Ponds	6	\$427,000	\$15,000
<b>Total</b>		<b>\$70,639,000</b>	<b>\$1,196,000</b>



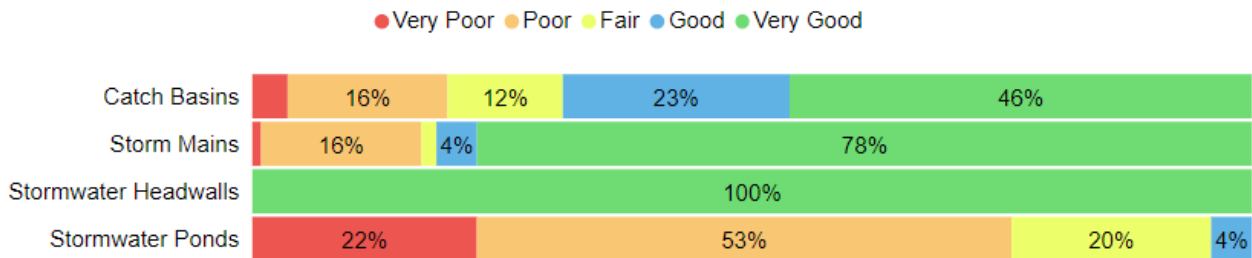
Each asset’s replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurately represent realistic capital requirements.

<sup>4</sup> Staff are currently reviewing and updating their inventory of catchbasins as some of them may be mislabelled as manholes and vice versa.

### 4.3.2 Asset Data: Useful Life, Age & Condition

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

Asset Segment	Estimated Useful Life (Years)	Average Age	Average Condition (%)
Catchbasins	45 - 60 Years	20.8	71% (Good)
Stormwater Mains	60 Years	22	84% (Very Good)
Stormwater Headwalls	50 - 60 Years	5.8	91% (Very Good)
Stormwater Ponds	20 - 30 Years	18.9	30% (Poor)
<b>Average</b>		<b>19.8</b>	<b>84% (Very Good)</b>



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. 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 sewer 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.

## 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 more confidently.

- CCTV inspections are completed on a project-by-project basis for storm mains; however, staff are considering assessing the entire network throughout a 5-year cycle moving forward.
- Manholes and other point assets are visually inspected as needed and/or whenever CCTV inspections are completed.

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

<b>Condition</b>	<b>Rating</b>
Very Good	80 - 100
Good	60 - 79
Fair	40 - 59
Poor	20 - 39
Very Poor	0 - 19

As staff perform network-wide CCTV inspections and upload these assessments to the Citywide database, the Condition Rating scale will change to align with the 5-point scale used by the North American standard - Pipeline Assessment Certification Program (PACP).



### 4.3.3 Lifecycle Management Strategy

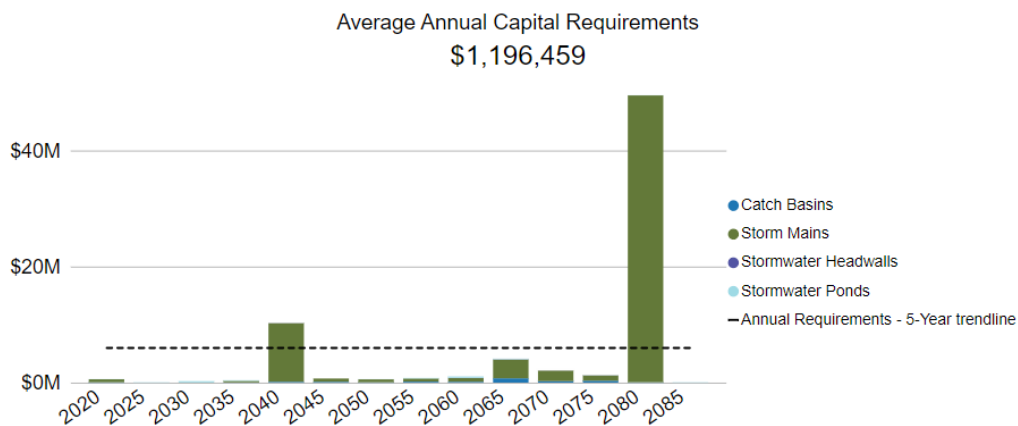
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Maintenance	CCTV camera inspections are performed on an as-needed basis.
	Unique storm mains are cleaned and flushed annually to maintain flow rate and clear obstructions.
	Catch basin cleaning, manhole repairs, and stormwater pond maintenance are performed regularly. Outfalls are inspected regularly in the summer months.
	Oil grit separators are cleaned and inspected on an annual basis.
Rehabilitaiton/ Replacement	Trenchless Relining is performed on an as-needed basis according to CCTV inspection results and inflow and infiltration (I&I) study recommendations.
	Storm infrastructure replacements are coordinated with nearby road and/or underground infrastructure replacements.

### 4.3.4 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 65 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average 5-year capital requirements.



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

## 4.3.5 Risk & Criticality

### Risk Matrix

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for stormwater assets based on 2021 inventory data.



Within the risk models developed in Citywide, the asset-specific metrics that determine the risk scores as shown above and that staff utilize when prioritizing their storm network assets are as follows:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition	Replacement Cost (Financial)
Pipe Material	Pipe Diameter (Operational)

## Risks to Current Asset Management Strategies

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



### **Asset Data & Information**

All Storm Network assets currently utilize age-based condition, which is not always accurate and can lead to limited confidence in the available inventory data for Storm Network assets. However, CCTV camera inspections are planned for completion every five (5) years moving forward. Once completed, there will provide greater confidence in the development of data-driven strategies to address infrastructure needs.

## 4.3.6 Levels of Service

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

### Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2021)
Safe & Regulatory	Description, which may include maps, of the user groups or areas of the Township that are protected from flooding, including the extent of the protection provided by the municipal stormwater management system.	See Appendix B
Sustainable	Description of the current condition of the stormwater network and the plans that are in place to maintain or improve the provided level of service	<p>The Storm Network is in overall fair condition. Staff perform regular visual inspections to ensure that assets are performing optimally to maintain the desired level of service.</p> <p>When necessary, staff employ appropriate lifecycle strategies (i.e., trenchless relining, maintenance, replacement) to assets. In the near future CCTV inspections are planned and are expected to be completed every five years.</p>

## Technical Levels of Service

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

<b>Service Attribute</b>	<b>Technical Metric</b>	<b>Current LOS (2021)</b>
Safe & Regulatory	% of properties in municipality resilient to a 100-year storm	TBD
	% of the municipal stormwater management system resilient to a 5-year storm	100%
Sustainable	% of the Storm Network system that is in good or very good condition	81%
	% of the Storm Network system that is in poor or very poor condition	17%

## 4.3.7 Recommendations

### Condition Assessment Strategies

- Implement a CCTV inspection program for the storm network and regularly update condition assessment information to Citywide for more accurate capital planning.
- Utilize a simple 1-5 condition rating system that can be applied to assets during staff visual inspections and upload this information regularly in the asset management database.

### Risk Management Strategies

- Review risk models on a regular basis and adjust according to an evolving understanding of the probability and consequences of asset failure.
- 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.

### Lifecycle Management Strategies

- Evaluate the efficacy of the Township's lifecycle management strategies at regular intervals to determine the impact cost, condition, and risk.
- Review the performance of mains that have received trenchless re-lining to better understand its value as a rehabilitation strategy.

### Levels of Service

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

## 4.4 Facilities

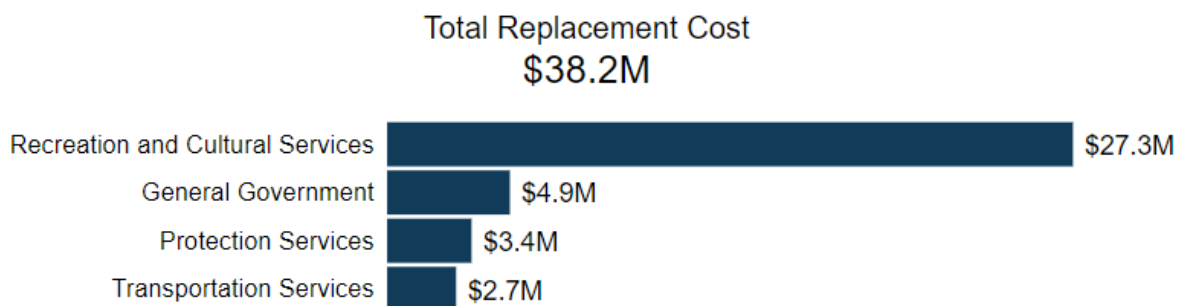
The Township of West Lincoln owns and maintains several facilities that provide key services to the community. These facilities include:

- Two Fire Stations
- Three Community Halls
- West Lincoln Community Center (includes an arena, library branch and gymnasium)
- Two rural library branches
- Administration Building
- Public works garages and storage sheds

### 4.4.1 Asset Inventory & Costs

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

Asset Segment	Quantity (Components)	Replacement Cost	Annual Capital Requirement
General Government	1 (160)	\$4,881,000	\$694,000
Protection Services	3 (212)	\$3,355,000	\$288,000
Recreation & Culture Services	7 (454)	\$27,266,000	\$1,211,000
Transportation Services	2 (100)	\$2,744,000	\$257,000
<b>Total</b>		<b>\$38,245,000</b>	<b>\$2,448,000</b>

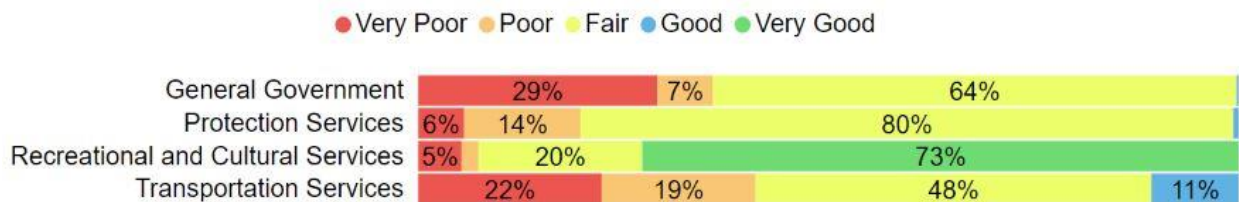


Each asset’s replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurately represent realistic capital requirements.

## 4.4.2 Asset Data: Useful Life, Age & Condition

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

Asset Segment	Estimated Useful Life (Years)	Average Age	Average Condition (%)
General Government	5 - 50 Years	25.3	37% (Poor)
Protection Services	5 - 50 Years	18.6	47% (Fair)
Recreation & Culture Services	5 - 50 Years	22.6	80% (Very Good)
Transportation Services	5 - 50 Years	26.8	40% (Fair)
<b>Average</b>		<b>22.7</b>	<b>69% (Good)</b>



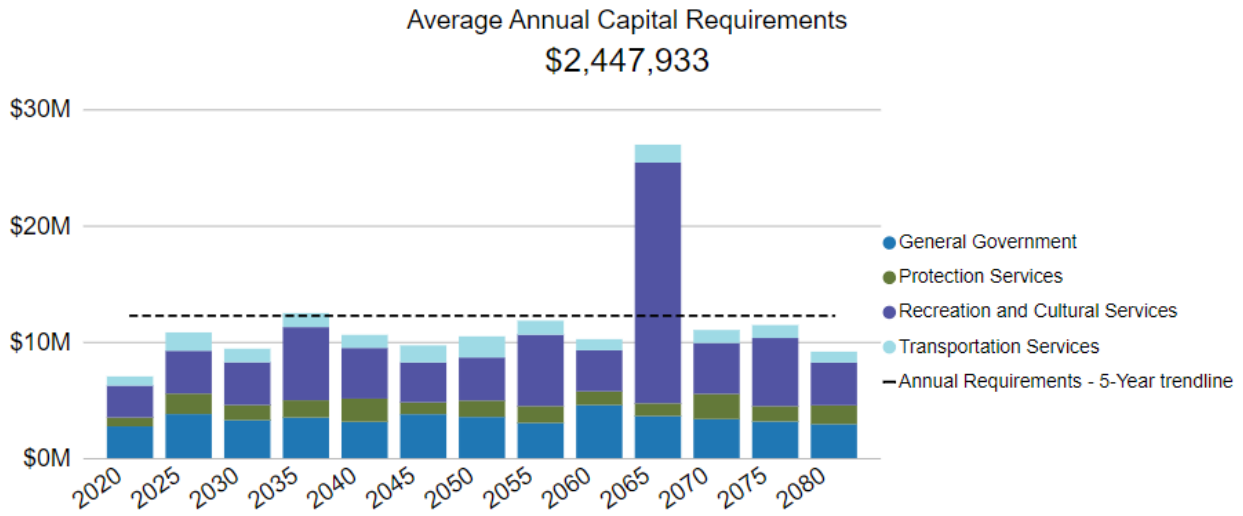
To ensure that the Township's facilities continue to provide an acceptable level of service, their average condition should be monitored. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of maintenance, rehabilitation and replacement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



### 4.4.3 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 60 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average 5-year capital requirements.



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

### 4.4.4 Asset Management Strategies

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

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

## 4.4.5 Recommendations

### Replacement Costs

- Most replacement costs currently in Citywide are user defined based on the 2019 Building Condition Assessment completed by MacIntosh Perry. Assuming replacement costs are predicated on accurate quantity and unit pricing information this is the recommended costing approach. Going forward, replacement costs will require regular review and update to ensure they remain accurate and useful to the Township for capital planning purposes.

### Condition Assessment Strategies

- Staff should continue conducting Building Condition Assessment (BCAs) on all its major critical buildings. What data is collected, and the format should be carefully considered to ensure the collected information can be appropriately populated into Citywide and provide meaningful analysis for asset management purposes.
- As a best practice data should be collected using Building Unifomat coding classification; Level Two is recommended. If feasible, BCAs should be completed on all facilities.

### Risk Management Strategies

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

### Levels of Service

- Begin documenting and measuring current levels of service in preparation of the O.Reg. 588/17 2024 requirements. Additional metrics can be established as they are determined to provide meaningful and reliable inputs into asset management planning.
- Regularly review the LOS metrics to identify any issues or trends and respond through the appropriate lifecycle activity (i.e., increased maintenance, enhanced rehabilitation and/or adjustment to frequency of the above)

## 4.5 Rolling Stock

To maintain the high quality of public infrastructure and support the delivery of core services, Township staff own and employ various types of rolling stock assets. This includes:

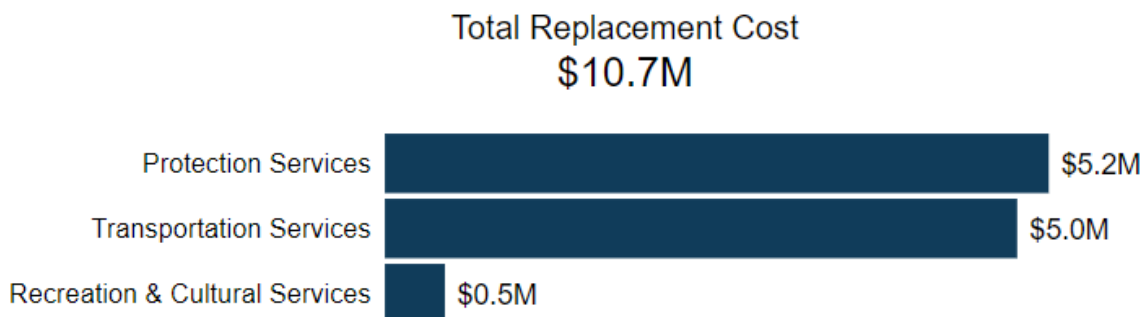
- Fire trucks and associated fire vehicle assets
- Ice resurfacing equipment
- Lawn maintenance assets (i.e., mowers)
- Various utility vehicles like plows, tractors, and trailers

Keeping rolling stock assets in an adequate state of repair is important to maintain a high level of service.

### 4.5.1 Asset Inventory & Costs

The table below includes the quantity, replacement cost method, and annual capital requirements of each asset segment in the Township’s Rolling Stock inventory.

Asset Segment	Quantity	Replacement Cost	Annual Capital Requirement
Protection Services	16	\$5,249,000	\$373,000
Recreation & Cultural Services	13	\$475,000	\$47,000
Transportation Services	36	\$4,999,000	\$380,000
<b>Total</b>		<b>\$10,723,000</b>	<b>\$799,000</b>

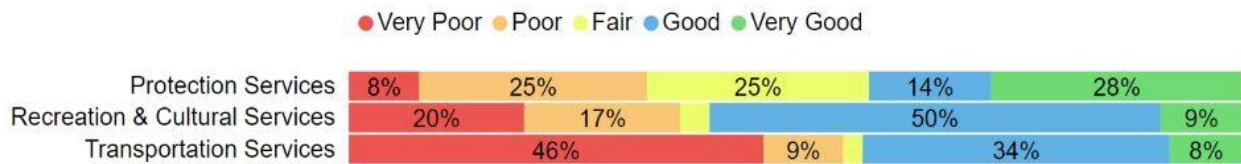


Each asset’s replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurately represent realistic capital requirements.

## 4.5.2 Asset Data: Useful Life, Age & Condition

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

Asset Segment	Estimated Useful Life (Years)	Average Age	Average Condition (%)
Protection Services	5 - 20 Years	9.9	55% (Fair)
Recreation & Cultural Services	7 - 15 Years	6.5	52% (Fair)
Transportation Services	5 - 15 Years	6.8	42% (Fair)
<b>Average</b>		<b>7.4</b>	<b>49% (Fair)</b>

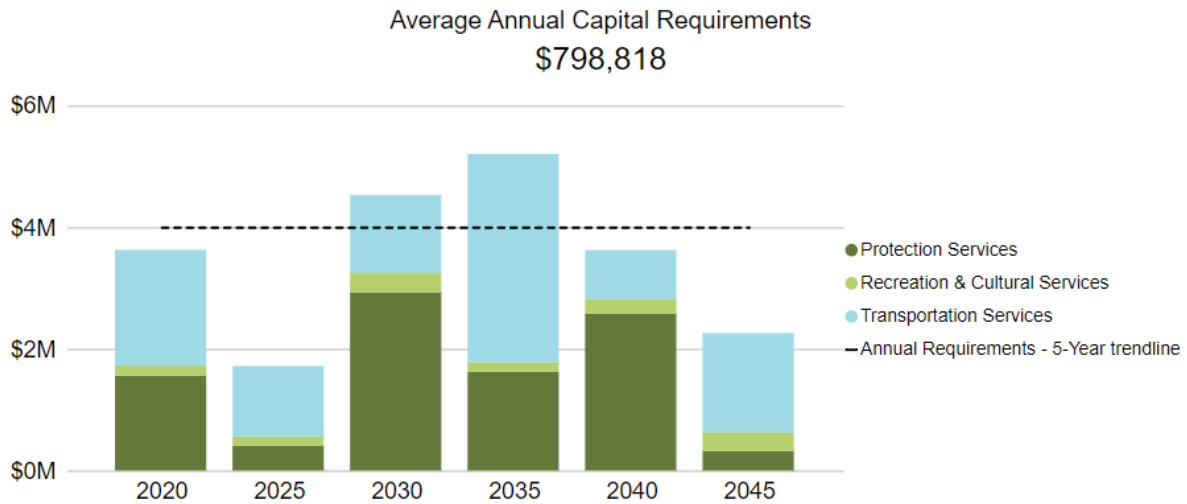


To ensure that the Township's rolling stock continues to provide an acceptable level of service, the Township should monitor the average condition of all assets. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of maintenance,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

### 4.5.3 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 5-year capital requirements.



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

### 4.5.4 Asset Management Strategies

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

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

## 4.5.5 Recommendations

### Replacement Costs

- Ensure that all assets have up-to-date replacement costs that have been evaluated for their accuracy and reliability. Accurate replacement costs are foundational to deriving the most value from asset management practices.

### Condition Assessment Strategies

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

### Risk Management Strategies

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

### Levels of Service

- Document and measure current levels of service in preparation of the O.Reg. 588/17 2024 requirements.
- Regularly review the level of service performance metrics and consider these results when making lifecycle decisions.

## 4.6 Machinery & Equipment

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

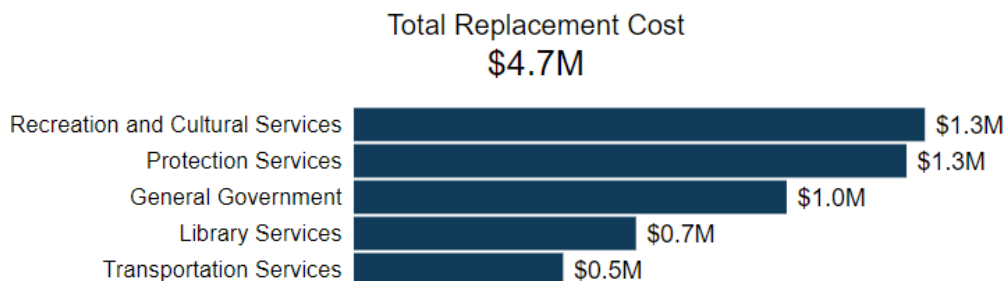
- Pooled library assets (i.e., books)
- Miscellaneous road equipment (e.g., snowploughs)
- Fire Equipment (i.e., hoses, bunker gear)
- Video Equipment (i.e., thermal imaging camera, security cameras etc.)

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

### 4.6.1 Asset Inventory & Costs

The table below includes the replacement cost method and annual capital requirements of each asset segment in the Township’s Machinery & Equipment inventory. Quantity is not defined as many of the assets are of a pooled and dynamic nature.

Asset Segment	Replacement Cost	Annual Capital Requirement
General Government	\$1,003,000	\$122,000
Library Services	\$654,000	\$74,000
Protection Services	\$1,280,000	\$113,000
Recreational & Cultural Services	\$1,323,000	\$62,000
Transportation Services	\$485,000	\$33,000
<b>Total</b>	<b>\$4,742,000</b>	<b>\$402,000</b>

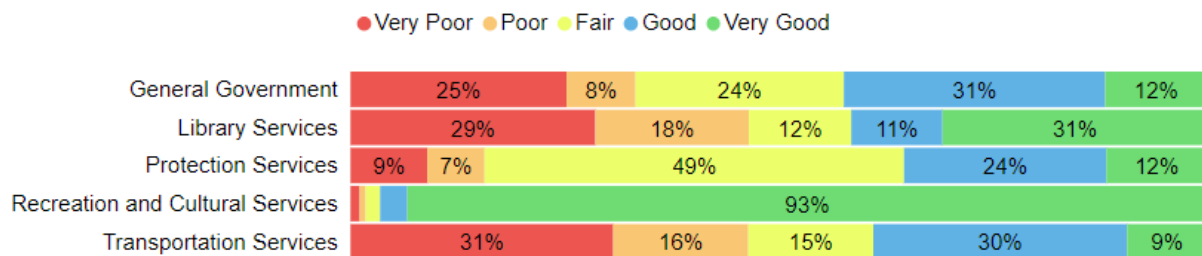


Each asset’s replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurately represent realistic capital requirements.

## 4.6.2 Asset Data: Useful Life, Age & Condition

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

Asset Segment	Estimated Useful Life (Years)	Average Age	Average Condition (%)
General Government	5 - 25 Years	7.3	54% (Fair)
Library Services	5 - 20 Years	8.2	54% (Fair)
Protection Services	3 - 20 Years	5.6	61% (Good)
Recreational & Cultural Services	5 - 30 Years	3.9	89% (Very Good)
Transportation Services	10 - 20 Years	9.9	44% (Fair)
<b>Average</b>		<b>7.2</b>	<b>65% (Good)</b>



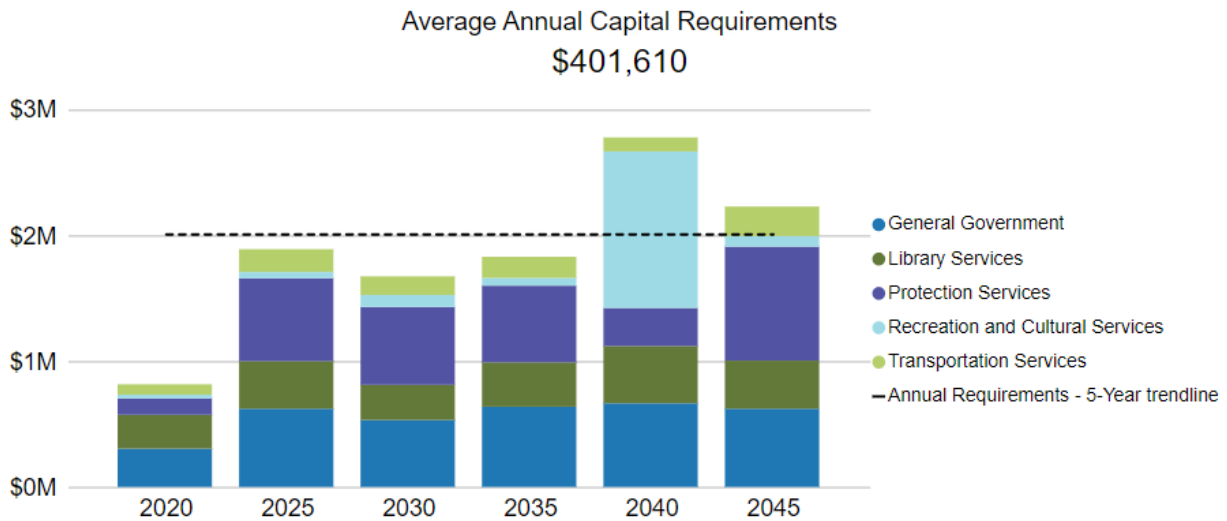
To ensure that the Township's Machinery & Equipment continues to provide an acceptable level of service, the average condition of all assets should be monitored. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of maintenance,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

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



### 4.6.3 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 5-year capital requirements.



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

### 4.6.4 Asset Management Strategies

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

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

## 4.6.5 Recommendations

### Replacement Costs

- Continue to update replacement costs of all assets and review for accuracy and reliability. Accurate replacement costs are foundational to deriving the most value from asset management practices.

### Condition Assessment Strategies

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

### Risk Management Strategies

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

### Levels of Service

- Document and measure current levels of service in preparation of the O.Reg. 588/17 2024 requirements.
- Regularly review the level of service performance metrics and consider these results when making lifecycle decisions.

## 4.7 Land Improvements

West Lincoln Township owns several assets that are considered Land Improvements, including:

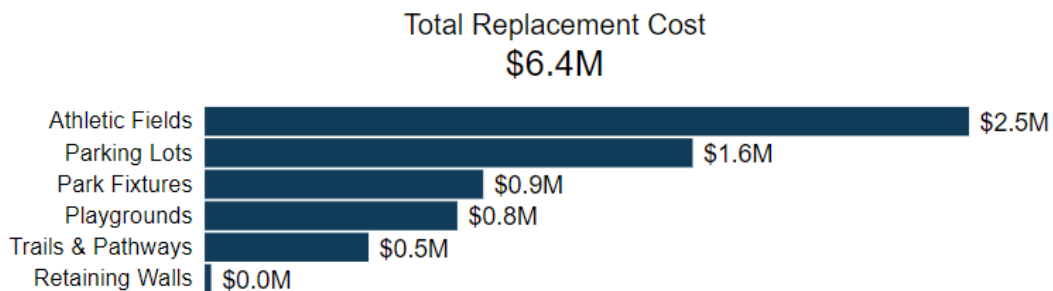
- Parking lots for municipal facilities
- Fencing and gates
- Playground Equipment
- Various athletic fields (e.g., Baseball Diamonds, Soccer fields)

### 4.7.1 Asset Inventory & Costs

The table below includes replacement cost method and annual capital requirements of each asset segment in the Township’s Land Improvements inventory. Quantity is not defined as many of the assets are of a pooled and dynamic nature.

<b>Asset Segment</b>	<b>Total Replacement Cost</b>	<b>Annual Capital Requirement</b>
Athletic Fields	\$2,519,000	\$100,000
Park Fixtures	\$918,000	\$32,000
Parking Lots	\$1,608,000	\$65,000
Playgrounds	\$833,000	\$34,000
Retaining Walls	\$21,000	\$1,000
Trails & Paths	\$540,000	\$22,000
<b>Total</b>	<b>\$6,438,000</b>	<b>\$251,000</b>

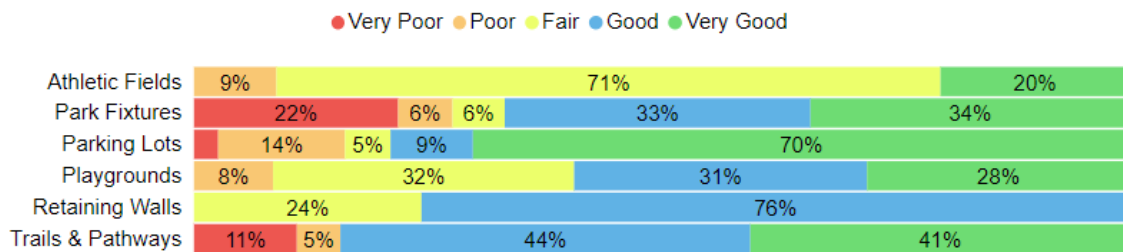
Each asset’s replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurately represent realistic capital requirements.



## 4.7.2 Asset Data: Useful Life, Age & Condition

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

Asset Segment	Estimated Useful Life (Years)	Average Age	Average Condition (%)
Athletic Fields	15 - 40 Years	38.1	56% (Fair)
Park Fixtures	20 - 40 Years	11.9	60% (Good)
Parking Lots	12 - 25 Years	18.6	79% (Good)
Playgrounds	15 - 25 Years	12.7	84% (Very Good)
Retaining Walls	25 - 33 Years	8.6	87% (Very Good)
Trails & Pathways	20 - 40 Years	12.1	68% (Good)
<b>Average</b>		<b>19.1</b>	<b>67% (Good)</b>

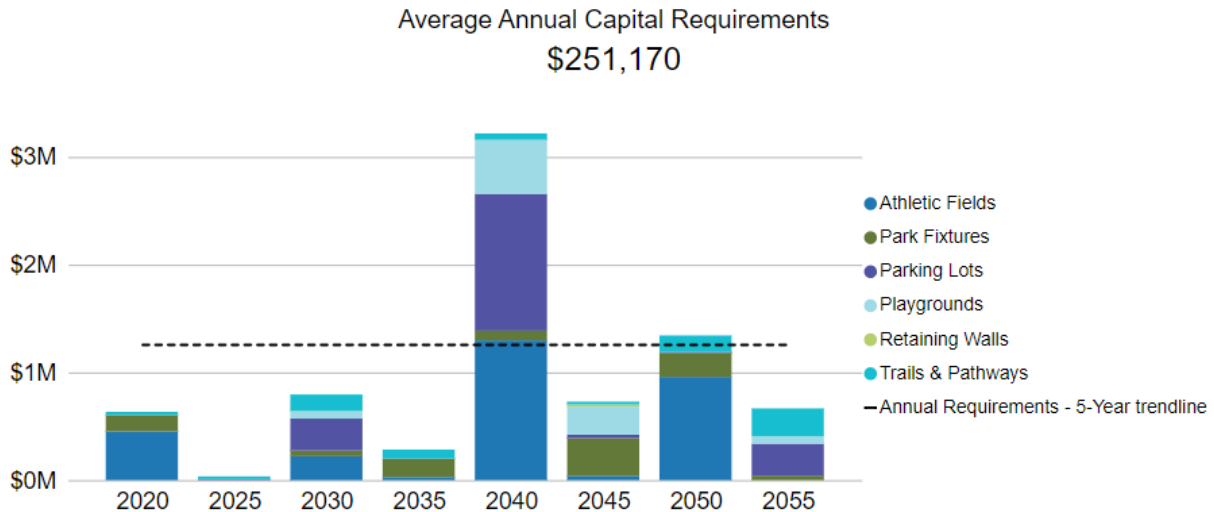


To ensure that the Township's Land Improvements continue to provide an acceptable level of service, the average condition of all assets should be monitored. If the average condition declines, staff should re-evaluate their lifecycle management strategy to determine what combination of maintenance, rehabilitation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

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

### 4.7.3 Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the Township should allocate towards funding rehabilitation and replacement needs. The following graph identifies capital requirements over the next 35 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 5-year capital requirements.



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

### 4.7.4 Asset Management Strategies

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

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

## 4.7.5 Recommendations

### Replacement Costs

- Most replacement costs used in this AMP were based on the inflation of historical costs, with a small portion being user defined. All costs, and especially inflated 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

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

### Risk Management Strategies

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

### Levels of Service

- Begin documenting and measuring current levels of service in preparation of the O.Reg. 588/17 2024 requirements. Additional metrics can be established as they are determined to provide meaningful and reliable inputs into asset management planning.
- Regularly collect levels of service performance metrics and incorporate data into decision feedback; consider sharing with staff to gain engagement, cultivate asset management understanding and interest, and incentive staff to work towards continual improvement.

# 5 Analysis of Rate-funded Assets

## Key Insights

- Rate-funded assets are valued at \$91.9 million
- 98% of rate-funded assets are in fair or better condition
- The average annual capital requirement to sustain the current level of service for rate-funded assets is approximately \$1.6 million
- Critical assets should be evaluated to determine appropriate risk mitigation activities and treatment options

## 5.1 Water Network

The water services provided by the Township are overseen by the Public Works Department and include the following assets:

- Underground water mains and above ground assets such as meters, valves, and hydrants
- Water vehicles and equipment
- Water buildings and stations

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

Replacement Cost	Condition	Financial Capacity	
\$65.3 million	Good (66%)	Annual Requirement:	\$1,116,000
		Funding Available:	\$ 335,000
		Annual Deficit:	\$ 781,000

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

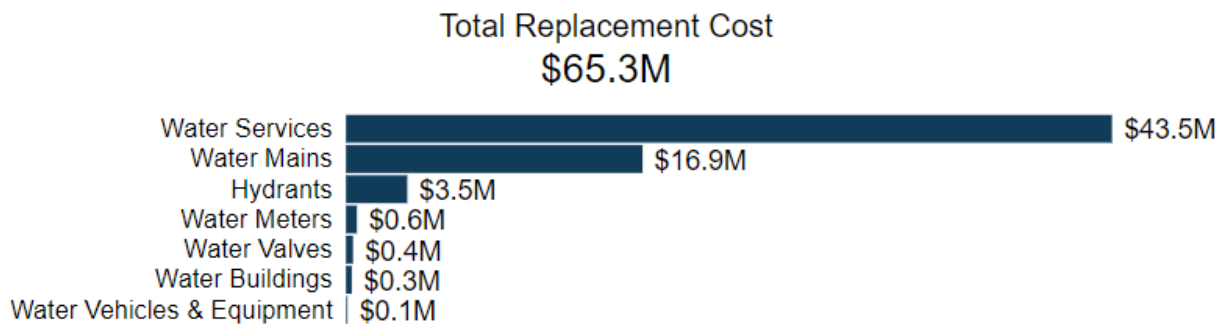
Service Attribute	Level of Service Statement
Accessible & Reliable	A reliable water supply is provided with minimal service disruptions
Safe & Regulatory	Water supply is safe to drink and meets all regulatory requirements
Sustainable	There are long-term plans in place for the renewal and replacement of all water infrastructure



## 5.1.1 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 (components)	Replacement Cost	Annual Capital Requirement
Hydrants	260	\$3,483,000	\$51,000
Water Buildings	2 (59)	\$329,000	\$61,000
Water Mains	35 kms	\$16,857,000	\$216,000
Water Meters	Pooled	\$621,000	\$42,000
Water Services	Pooled <sup>5</sup>	\$43,537,000	\$729,000
Water Valves	317	\$398,000	\$12,000
Water Vehicles & Equipment	5	\$82,000	\$9,000
<b>Total</b>		<b>\$65,304,000</b>	<b>\$1,116,000</b>



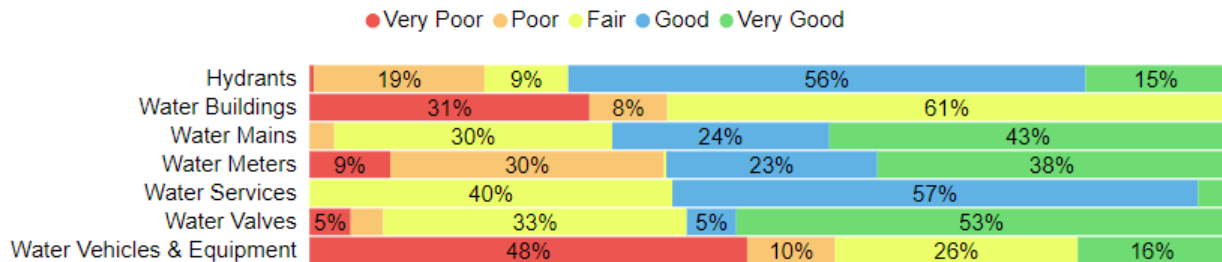
Each asset's replacement cost should be reviewed periodically to determine whether adjustments are needed to more accurately represent realistic capital requirements.

<sup>5</sup> Water services include curb stops and service connections that are replaced on a regular basis. These assets are pooled.

## 5.1.2 Asset Condition

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

Asset Segment	Estimated Useful Life (Years)	Average Age	Average Condition (%)
Hydrants	50 - 70 Years	30.8	68% (Good)
Water Buildings	5 - 50 Years	21.6	35% (Poor)
Water Mains	80 Years	21.3	71% (Good)
Water Meters	15 Years	13.3	63% (Good)
Water Services	45 - 60 Years	22.3	64% (Good)
Water Valves	25 - 40 Years	13.8	72% (Good)
Water Vehicles & Equipment	8 - 20 Years	7.1	37% (Poor)
<b>Average</b>		<b>22.6</b>	<b>66% (Good)</b>



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

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

## 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 more confidently.

- Staff primarily rely on the age, pipe material, and the number of breaks to determine the projected condition of water mains. The Township has recently completed hydraulic modelling to model water flow and capacity.
- Hydrants, valves, and other point assets are visually inspected on a regular basis and repaired/replaced as needed.
- Water buildings are inspected in accordance with Health and Safety standards and the Building Code Act. A recent 2020 Building Condition Assessment was conducted and provided condition ratings for all major components of the buildings.
- Water vehicles are inspected and serviced in accordance with Commercial Vehicle Operators Registration (CVOR) requirements

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

<b>Condition</b>	<b>Rating</b>
Very Good	80 - 100
Good	60 - 79
Fair	40 - 59
Poor	20 - 39
Very Poor	0 - 19

### 5.1.3 Lifecycle Management Strategy

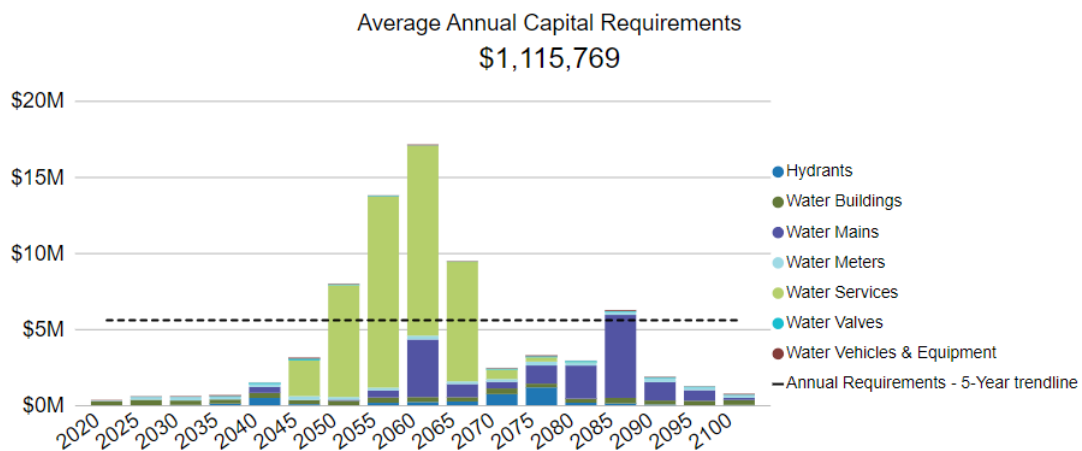
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

The following table outlines the Township’s current lifecycle management strategy for their water assets:

Activity Type	Description of Current Strategy
Maintenance	Annual watermain flushing, hydrant maintenance, and valve exercising is complete.
	Staff have a dedicated water meter replacement program (\$30,000/year).
	A water loss and leak detection program has been developed for regular inspections.
Rehabilitation	The Township has experienced very few main breaks historically and addresses these on a reactive basis as necessary. Many of the Township’s watermains are PVC are in Good-Very Good condition.
Replacement	Prioritization focuses on affordability, coordination with other projects, and health & safety impacts as key indicators.

### 5.1.4 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 80 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average 5-year capital requirements.



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

## 5.1.5 Risk & Criticality

### Risk Matrix

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for water work assets. Risk outputs are based on 2021 inventory data.

Consequence	5	5 Assets 1,562.00 m \$778,580.00	0 Assets - \$0.00	0 Assets - \$0.00	0 Assets - \$0.00	0 Assets - \$0.00
	4	21 Assets 604.74 km, unit(s), m \$1,907,287.00	7 Assets 1.53 km \$952,200.00	12 Assets 2.87 km \$1,748,750.00	0 Assets - \$0.00	0 Assets - \$0.00
	3	58 Assets 109.91 km, m \$3,641,920.00	0 Assets - \$0.00	26 Assets 3,776.50 km, unit(s), sq ft \$422,882.00	7 Assets 14,306.00 sq ft, unit(s) \$21,900.00	12 Assets 1,803.00 unit(s), sq ft, feet \$52,605.00
	2	75 Assets 10.39 km, unit(s) \$3,684,301.00	22 Assets 2.88 km \$1,094,400.00	34 Assets 6.14 km, unit(s) \$1,955,700.00	1 Asset 1.00 unit(s) \$6,000.00	7 Assets 54.00 unit(s), sq ft \$15,150.00
	1	134 Assets 3,029.30 unit(s), m \$3,135,368.50	12,289 Assets 12,287.00 unit(s) \$27,085,735.00	8,154 Assets 9,888.00 unit(s), sq ft \$17,784,873.00	236 Assets 586.00 unit(s) \$854,864.00	122 Assets 122.00 unit(s) \$161,300.00
		1	2	3	4	5
		Probability				

Within the risk models developed in Citywide, the asset-specific metrics that determine the risk scores for water mains assets and that staff utilize when prioritizing replacement are as follows:

Probability of Failure (POF)	Consequence of Failure (COF)
Age	Replacement Cost (Financial)
Breaks per Segment	Pipe Diameter (Operational)
Pipe Material	

## Risks to Current Asset Management Strategies

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



### Asset Data & Information

Staff are actively working towards improving the quality of the available inventory data for the water network. Staff plan to prioritize data refinement efforts to increase confidence in the accuracy and reliability of asset data and information. To improve the inventory and accuracy of condition data, third party building condition assessments were recently completed for the Township’s water buildings. As this data becomes more integrated into asset management decisions it will improve confidence in strategies and decisions.

## 5.1.6 Levels of Service

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

### Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2021)
Accessible & Reliable	A Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal water system	See Appendix B
	Description, which may include maps, of the user groups or areas of the municipality that have fire flow	
Safe & Regulatory	Description of boil water advisories and service interruptions	In 2021, there were no boil water advisories within West Lincoln. Water service interruptions may occur due to main breaks, maintenance work or projects. Staff provide notice for planned interruptions and respond in a timely manner.

Sustainable	Description of the current condition of the water network and the plans that are in place to maintain or improve the provided level of service	Except for buildings, the condition of the water network is age-based and ranges by segment; most segments have an average condition rating of good. Water network assets are replaced in coordination with other projects (i.e., roads) with additional considerations for affordability and health and safety impacts.
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## 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 (2021)
Accessible & Reliable	% of properties connected to the municipal water system	100%
	% of properties where fire flow is available	100% <sup>6</sup>
	# of connection-days per year where a boil water advisory notice is in place compared to the total number of properties connected to the municipal water system	0
Safe & Regulatory	# of connection-days per year where water is not available due to water main breaks compared to the total number of properties connected to the municipal water system	0 <sup>7</sup>
	# of water quality customer complaints received annually related to the water system	3
Sustainable	% of the water system that is in good or very good condition	62%
	% of the water system that is in poor or very poor condition	3%

<sup>6</sup> 100% of properties in urban areas have fire flow.

<sup>7</sup> Most water main breaks are addressed immediately allowing a return to service within the same day.

## 5.1.7 Recommendations

### Asset & Data Information

- Review asset quantities to ensure asset management inventory is comprehensive and accurate. This is particularly relevant for smaller point assets that are generally pooled and replaced as needed.

### Condition Assessment Strategies

- Identify condition assessment strategies for high-value and high-risk water network assets. Update the asset management database with the collected condition information.
- Where possible, collect other relevant asset attribute information (i.e., material, bury depth etc.) alongside the condition assessments.

### 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.
- On a regular basis review the performance of established levels of service and incorporate performance results in lifecycle decisions, risks assessment evaluations, and other asset management practices (i.e., internal information sharing and reporting).



## 5.2 Sanitary Network

The sewer services provided by the Township are overseen by the Publics Work Department. The Sanitary Network includes underground mains, manholes, and laterals.

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

Replacement Cost	Condition	Financial Capacity	
\$26.6 million	Very Good (83%)	Annual Requirement:	\$521,000
		Funding Available:	\$676,000
		Annual Surplus:	\$155,000

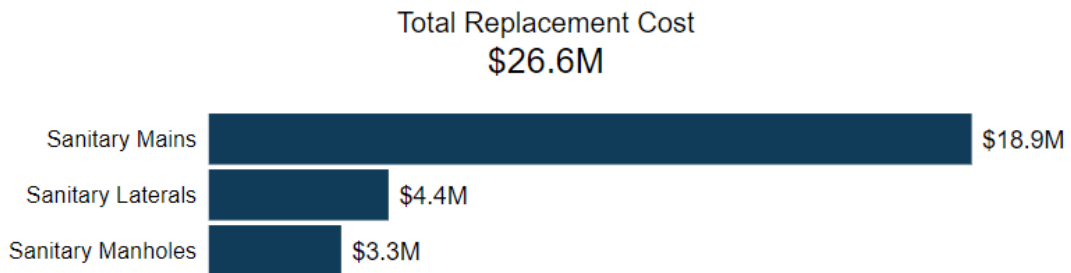
The following core values and level of service statements are a key driving force behind the Township's asset management planning.

Service Attribute	Level of Service Statement
Accessible & Reliable	A reliable wastewater service is provided with minimal service disruptions
Safe & Regulatory	Wastewater services are managed in accordance with regulatory requirements
Sustainable	There are long-term plans in place for the renewal and replacement of wastewater infrastructure

## 5.2.1 Asset Inventory & Costs

The table below includes the quantity, replacement cost method, and annual capital requirements of each asset segment in the Township’s Sanitary Network inventory.

<b>Asset Segment</b>	<b>Quantity</b>	<b>Replacement Cost</b>	<b>Annual Capital Requirement</b>
Sanitary Laterals	18 kms	\$4,448,000	\$77,000
Sanitary Mains	32 kms	\$18,872,000	\$375,000
Sanitary Manholes	440	\$3,276,000	\$70,000
<b>Total</b>		<b>\$26,595,000</b>	<b>\$521,000</b>

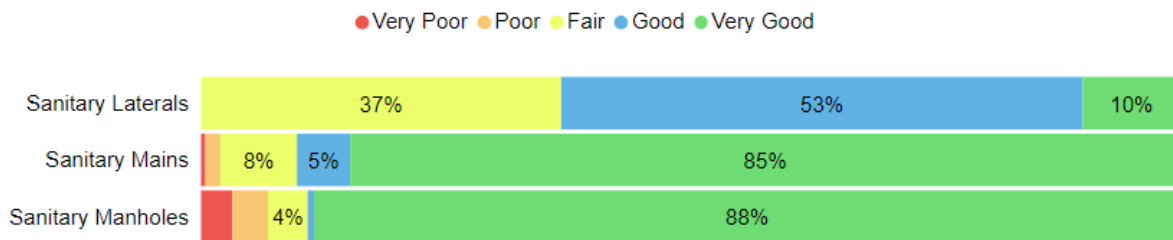


All replacement cost should be reviewed periodically to determine whether adjustments are needed to deliver more accurate capital requirements forecasts.

## 5.2.2 Asset Data: Useful Life, Age & Condition

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

Asset Segment	Estimated Useful Life (Years)	Average Age	Average Condition (%)
Sanitary Laterals	60 Years	16.3	66% (Good)
Sanitary Mains	60 Years	34.7	87% (Very Good)
Sewer Manholes	60 Years	33.9	88% (Very Good)
<b>Average</b>		<b>35.8</b>	<b>83% (Good)</b>



To ensure that the Township’s sanitary network continues to provide an acceptable level of service, the average condition of all assets should be monitored. 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 sewer 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.

## 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 more confidently. The following describes the Township's current approach:

- CCTV inspections are completed every 3-5 years on sanitary mains to document their condition. Manholes are inspected and rated alongside the mains, when possible.
- Other sanitary assets are inspected on an as-needed visual basis.

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

<b>Condition</b>	<b>Rating</b>
Very Good	80 - 100
Good	60 - 79
Fair	40 - 59
Poor	20 - 39
Very Poor	0 - 19

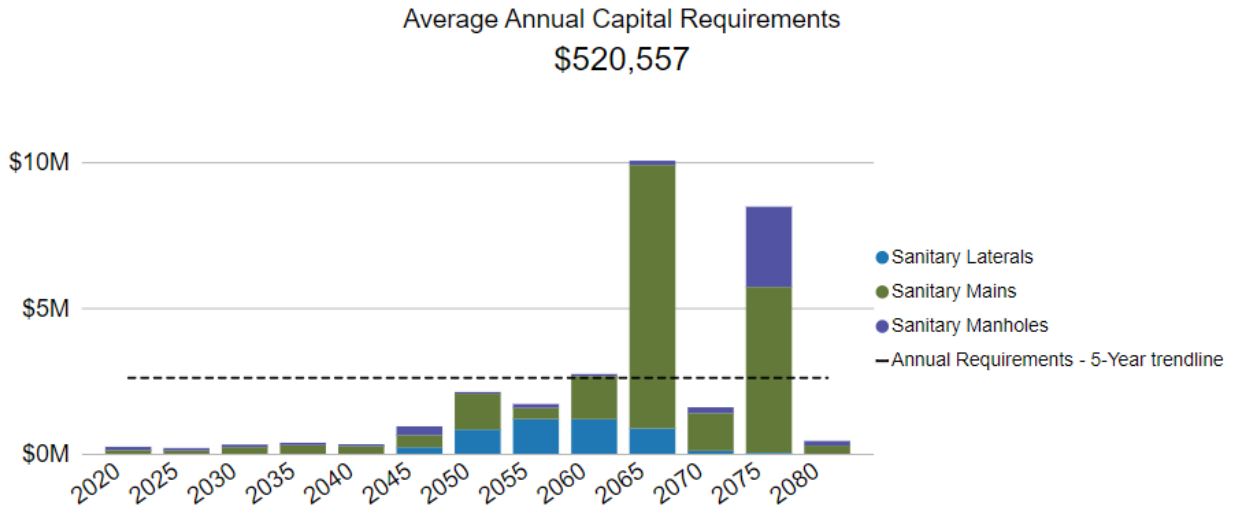
## 5.2.3 Lifecycle Management Strategy

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

Activity Type	Description of Current Strategy
Maintenance	Annual sanitary sewer flushing, and inspection activities are completed regularly
	Sanitary manhole repairs and inspections are performed as needed
	CCTV camera inspections are completed every 3 years
Rehabilitation	Inflow & Infiltration (I&I) studies are performed, when needed, to identify trouble areas in both the sanitary and storm networks (\$250,000)
	After inspections, smoke testing and/or rodding & boring is performed as needed.
Replacement	At this time trenchless re-lining activities are performed on an as-needed basis based after an evaluation of potential cost savings, bury depth, pipe size, and condition/performance of above ground assets.
	Replacements are prioritized based on the sewer mains’ condition ratings from the CCTV inspections, and areas that have capacity or infiltration issues

## 5.2.4 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 60 years. This projection is used as it ensures that every asset has gone through one full iteration of replacement. The forecasted requirements are aggregated into 5-year bins and the trend line represents the average 5-year capital requirements.



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

## 5.2.5 Risk & Criticality

### Risk Matrix

The following risk matrix provides a visual representation of the relationship between the probability of failure and the consequence of failure for sanitary network assets based on 2021 inventory data.

Consequence	5	3 Assets 16.00 km \$8,020,000.00	4 Assets 0.36 km \$216,000.00	1 Asset 0.04 km \$24,000.00	0 Assets - \$0.00	0 Assets - \$0.00
	4	11 Assets 1.26 km \$633,000.00	10 Assets 1.17 km \$587,000.00	0 Assets - \$0.00	0 Assets - \$0.00	0 Assets - \$0.00
	3	80 Assets 2,078.81 km, m \$1,886,192.00	31 Assets 7,502.00 km, m \$2,347,420.00	8 Assets 0.65 km \$250,500.00	0 Assets - \$0.00	0 Assets - \$0.00
	2	110 Assets 543.05 km, m \$2,318,179.50	100 Assets 3,187.42 km, m \$3,027,935.00	46 Assets 5,303.24 km, m \$2,183,722.50	3 Assets 0.20 km \$60,180.00	0 Assets - \$0.00
	1	461 Assets 2,748.73 unit(s), m, km \$4,102,993.50	4 Assets 80.60 unit(s), m \$59,800.00	28 Assets 2,117.43 m, unit(s) \$614,779.00	19 Assets 139.10 unit(s), m \$155,630.00	16 Assets 22.50 unit(s), m \$107,250.00
		1	2	3	4	5
		Probability				

Within the risk models developed in Citywide, the asset-specific metrics that determine the risk scores for sanitary mains and that staff utilize when prioritizing replacement are as follows:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition	Replacement Cost (Financial)
Pipe Material	Pipe Diameter (Operational)
	Inflow & Infiltration (Operational)

## 5.2.6 Levels of Service

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

### Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2021)
Accessible & Reliable	Description, which may include maps, of the user groups or areas of the Township that are connected to the municipal wastewater system	See Appendix B
	Description of how combined sewers in the municipal wastewater system are designed with overflow structures in place which allow overflow during storm events to prevent backups into homes	Not Applicable. There are no combined sewers in the Township
Safe & Regulatory	Description of the frequency and volume of overflows in combined sewers in the municipal wastewater system that occur in habitable areas or beaches  Description of how stormwater can get into sewers in the municipal wastewater system, causing sewage to overflow into streets or backup into homes	Stormwater can enter the sanitary sewers due to cracks in sanitary mains or through indirect connections (e.g., weeping tiles). In the case of heavy rainfall events, sanitary sewers may experience a volume of water and sewage that exceeds its designed capacity. In some cases, this can cause water and/or sewage to overflow backup into homes. The disconnection of weeping tiles from sanitary mains and the use of sump pumps and pits directing storm water to the storm drain system can help to reduce the chance of this occurring.



<b>Service Attribute</b>	<b>Qualitative Description</b>	<b>Current LOS (2021)</b>
	Description of how sanitary sewers in the municipal wastewater system are designed to be resilient to stormwater infiltration	The municipality follows a series of design standards that integrate servicing requirements and land use considerations when constructing or replacing sanitary sewers. These standards have been determined with consideration of the minimization of sewage overflows and backups.
	Description of the effluent that is discharged from sewage treatment plants in the municipal wastewater system	Effluent refers to water pollution that is discharged from a wastewater treatment plant, and may include suspended solids, total phosphorous and biological oxygen demand. The Environmental Compliance Approval (ECA) identifies the effluent criteria for municipal wastewater treatment plants
Sustainable	Description of the current condition of the wastewater network and the plans that are in place to maintain or improve the provided level of service	The condition of the sanitary network is in overall good condition. Where possible, trenchless relining is performed, and assets are replaced as required to maintain the quality and performance of the system.

## Technical Levels of Service

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

<b>Service Attribute</b>	<b>Technical Metric</b>	<b>Current LOS (2021)</b>
Accessibility & Reliable	% of properties connected to the municipal wastewater system	100%
	# of events per year where combined sewer flow in the municipal wastewater system exceeds system capacity compared to the total number of properties connected to the municipal wastewater system	N/A
Safety & Regulatory	# of connection-days per year having wastewater backups compared to the total number of properties connected to the municipal wastewater system	0 (managed by Region)
	# of connection-days per year due to sanitary service backups compared to the total number of properties connected to the municipal wastewater system	2 : 2,800
	# of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system	4 : 2,800
Sustainable	% of the wastewater system that is in good or very good condition	86%
	% of the wastewater system that is in poor or very poor condition	2%

## 5.2.7 Recommendations

### Asset & Data Information

- Review asset quantities to ensure asset management inventory is comprehensive and accurate. The quantities for sanitary laterals and sanitary mains should be reviewed in order to align them with the records staff have in their GIS inventory.

### Condition Assessment Strategies

- Continue completing CCTV inspections of the sanitary network. Regularly update collected information into Citywide to ensure that analysis and resultant decisions are based on the best available information.

### Risk Management Strategies

- Review risk models on a regular basis and adjust according to an evolving understanding of the probability and consequences of asset failure.
- 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.

### Lifecycle Management Strategies

- Evaluate the efficacy of the Township's lifecycle management strategies at regular intervals to determine the impact cost, condition, and risk.
- As the trenchless re-lining strategy is utilized, continue to monitor its performance, cost, and other project benefits and risks of the approach to better understand the value of the rehabilitation approach.

### 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.
- Review and consider LOS performance metrics to better understand asset performance and trends and utilize this information in conjunction with risk and other Township considerations when making asset lifecycle decisions.

# 6 Impacts of Growth

## Key Insights

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

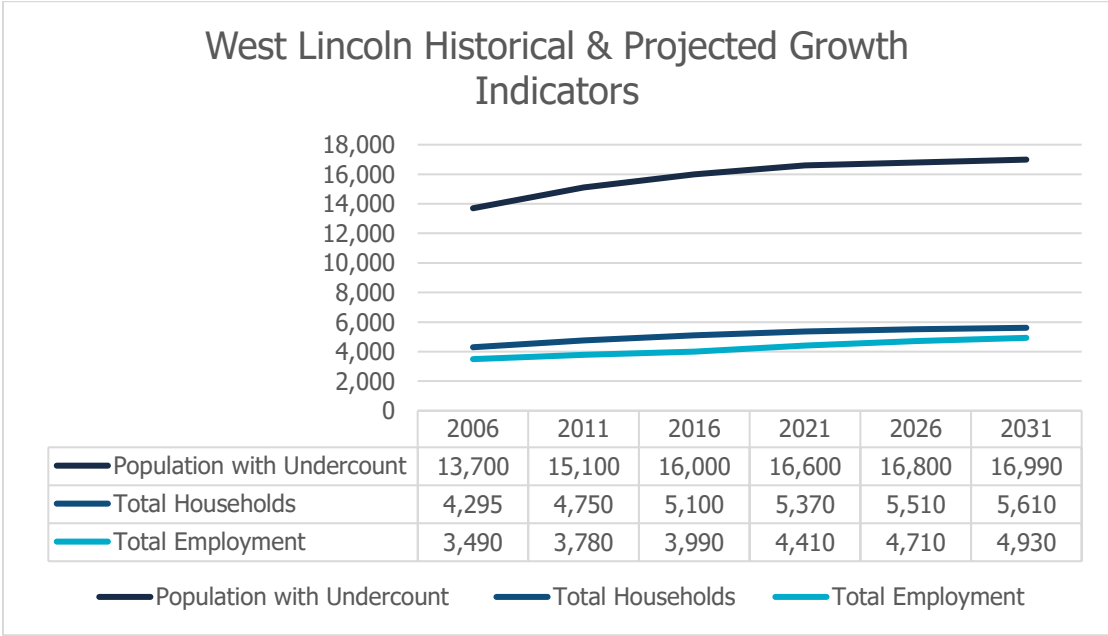
# 6.1 Description of Growth Assumptions

The demand for infrastructure and services will change over time based on a combination of internal and external factors. Understanding the key drivers of growth and demand will allow the Township to plan for new infrastructure more effectively, and the upgrade or disposal of existing infrastructure. Increases or decreases in demand can affect what assets are needed and what level of service meets the needs of the community.

## 6.1.1 West Lincoln Township: Strategic Plan

The Township of West Lincoln’s Official Plan was adopted by the Ontario Municipal Board in 2015 with the latest amendment dated, November of 2019. The plan’s objective is to provide general guidance for growth and development until 2031.

As illustrated in the figure below, West Lincoln’s population is projected to grow by 19.36% from 2006 to 2031. Total households and employment indicators are projected to grow at a similar rate, with the former growing by 23.44%, and the latter, by 29.21%.



It is noteworthy that while there will be considerable growth across the mentioned indicators, the Township’s rate of growth between 2026 and 2031 is projected to decrease from previous years. This is evidenced in the table below:

Years	% Change in Population	% Change in Households	% Change in Employment
2006-2011	9.27	9.58	7.67
2011-2016	5.63	6.86	5.26
2016-2021	3.61	5.03	9.52
2021-2026	1.19	2.54	6.37
2026-2031	1.12	1.78	4.46

## 6.1.2. Niagara Region Official Plan (June 2014)

West Lincoln is one of 12 lower tier municipalities in Niagara Region. By virtue of the municipal tier system Niagara Region implements Provincial Policy over all the regional municipalities. Niagara Region's existing Official Plan was written in 1970 and most recently amended in 2014. Niagara Region is currently in the final stages of releasing a brand-new Official Plan which will include the following related Provincial and local plans:

1. Niagara Escarpment Plan (2017)
2. A Place to Grow: Growth plan for the Greater Golden Horseshoe (2019)
3. Greenbelt Plan (2017)
4. Provincial Policy Statement (2020)

The 2014 Niagara Region Official Plan identifies both *Intensification* and *Greenfield Growth* as two approaches to expanding Niagara Region's growth. Niagara Region's intensification target rate is 40% for a minimum of 10 years, starting in 2015. The Township of West Lincoln's minimum residential intensification target is 15%.

The *Greenfield Density* target for Niagara Region is 50 people per hectare across all Designated Greenfield Areas. To achieve this, municipalities within Niagara Region will:

1. Accommodate a range of land uses including residential, commercial, institutional, recreational, employment, and other uses.
2. Contribute to the growth of the respective *Urban Areas*.
3. Provide opportunities for integrated, mixed land uses.
4. Create street patterns that are fine grain and in grid pattern, with supporting active transit within the area; and
5. Ensuring the Greenfield development is sequential and orderly with existing built-up areas.

## 6.2 Impact of Growth on Lifecycle Activities

Future versions of the Township's asset management plan must include assumptions regarding projected changes in population and economic activity informing the preparation of lifecycle management and financial strategies.

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 AMP. While the addition of residential units will add to the existing assessment base and offset some of the costs associated with growth, the Township will need to review the lifecycle costs of growth-related infrastructure. These costs should be considered in long-term funding strategies that are designed to, at a minimum, maintain the current level of service.

The Township has developed and adopted numerous documents and policies to guide population and economic growth. This includes the West Lincoln Official Plan (specifically Section 5), the Community Strategic Plan, the Economic Development Plan (2020), Trails and Corridors Master Plan, and the Urban Settlement Area Expansion Analysis Report. In addition to these documents, the Township plans to invest in an updated Development Charge Background study at least by 2024. Existing and future Development Charge Studies will provide the basis for expected population growth, the associated infrastructure costs, and the required development charges to cover the costs of growth to infrastructure.

These future studies and reports are expected to assist the Township as they begin to gather data to support future O. Reg. requirements including developing proposed levels of service and identifying risks associated with their asset management program.

# 7 Financial Strategy

## Key Insights

- The Township is committing approximately \$2.9 million towards capital projects per year from sustainable revenue sources
- Given the annual capital funding investment of \$12.7 million, there is currently a funding gap of \$9.8 million annually
- For tax-funded assets, we recommend increasing tax revenues by 5.0% each year for the next 20 years to achieve a sustainable level of funding
- For the Water Network, we recommend increasing rate revenues by 2.9% annually for the next 15 years to achieve a sustainable level of funding
- For the Sanitary Network, we recommend maintaining the current rate revenues annually to achieve a sustainable level of funding



# 7.1 Financial Strategy Overview

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

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

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

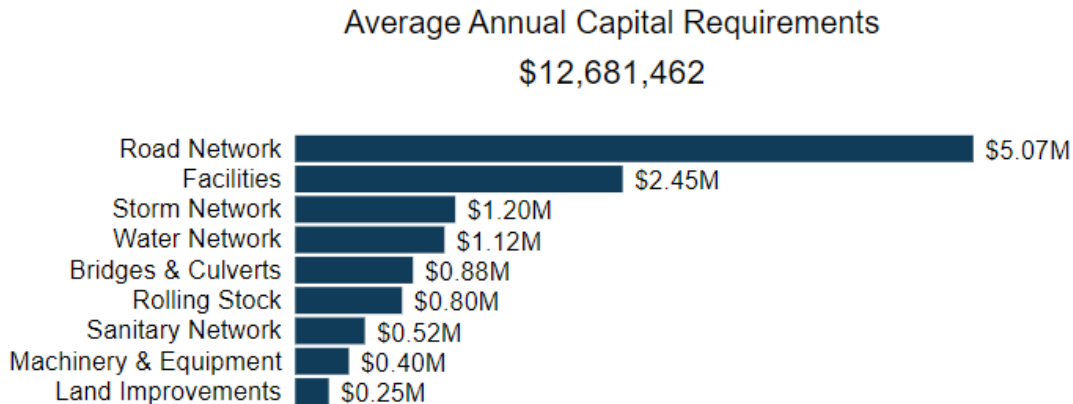
Note: Periodic grants are normally not included due to Provincial requirements for firm commitments. However, if moving a specific project forward is wholly dependent on receiving a one-time grant, the replacement cost included in the financial strategy is the net of such grant being received. If the financial plan component results in a funding shortfall, the Province requires the inclusion of a specific plan as to how the impact of the shortfall will be managed. In determining the legitimacy of a funding shortfall, the Province may evaluate a Township 's approach to the following:

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

## 7.1.1 Annual Requirements & Capital Funding

### Annual Requirements

The annual requirements represent the amount the Township should allocate annually to each asset category to meet replacement needs as they arise, prevent infrastructure backlogs, and achieve long-term sustainability. In total, the Township must allocate approximately \$12.7 million annually to address capital requirements for the assets included in this AMP.



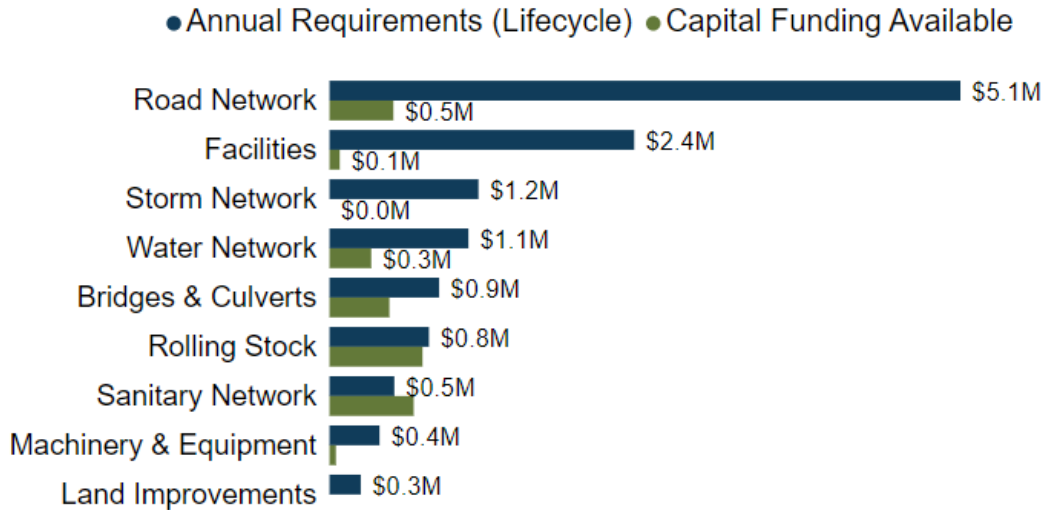
For most asset categories the annual requirement has been calculated based on a “replacement only” scenario, in which capital costs are only incurred at the construction and replacement of each asset. However, for the Road Network and Bridges & Culverts, lifecycle management strategies have been developed to identify capital costs that are realized through strategic rehabilitation and renewal of the Township’s roads, bridges and culverts. The development of these strategies allows for a comparison of potential cost avoidance if the strategies were to be implemented.

- **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

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

## Annual Funding Available

Based on a historical analysis of sustainable capital funding sources, the Township is committing approximately \$2.9 million towards capital projects per year. Given the annual capital requirement of \$12.7 million, there is currently a funding gap of \$9.8 million annually.



## 7.2 Funding Objective

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

1. **Tax Funded Assets:** Road Network, Bridges & Culverts, Storm Network, Facilities, Machinery & Equipment, Land Improvements, Rolling Stock
2. **Rate-Funded Assets:** Water Network, Sanitary Network

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

## 7.3 Financial Profile: Tax Funded Assets

### 7.3.1 Current Funding Position

The following tables show, by asset category, West Lincoln Township 's average annual capital expenditure requirements, current funding positions, and funding increases required to achieve full funding on tax-funded assets.

Asset Category	Avg. Annual Requirement	Annual Funding Available				Annual Deficit
		To Capital Reserves	Gas Tax	OCIF	Total Available	
Road Network	5,069,000	148,000	220,000	145,000	513,000	4,556,000
Storm Network	1,196,000				0	1,196,000
Bridges & Culverts	880,000	133,000	220,000	128,000	481,000	399,000
Facilities	2,448,000	82,000			82,000	2,366,000
Machinery & Equipment	402,000	51,000			51,000	351,000
Land Improvements	251,000				0	251,000
Rolling Stock	799,000	747,000			747,000	52,000
<b>Total</b>	<b>11,045,000</b>	<b>1,161,000</b>	<b>440,000</b>	<b>273,000</b>	<b>1,874,000</b>	<b>9,171,000</b>

The average annual capital expenditure requirement for the above categories is \$11 million. Annual revenue currently allocated to these assets for capital purposes is \$1.9 million leaving an annual deficit of \$9.2 million. Put differently, these infrastructure categories are currently funded at 17% of their long-term requirements.

## 7.3.2 Full Funding Requirements

In 2021, West Lincoln had annual tax revenues of \$8.8 million. As illustrated in the following table, without consideration of any other sources of revenue or cost containment strategies, full funding would require the following tax change over time:

Asset Category	Tax Change Required for Full Funding
Road Network	51.6%
Storm Network	13.5%
Bridges & Culverts	4.5%
Facilities	26.8%
Machinery & Equipment	4.0%
Land Improvements	2.8%
Rolling Stock	0.6%
<b>Total</b>	<b>103.8%</b>

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

- West Lincoln's formula based OCIF grant is scheduled to remain at \$272,786 in 2020 and \$272,786 in 2021.
- West Lincoln's debt payments for these asset categories will be decreasing by \$105,000 over the next 5 years and by \$236,000 over the next 10 years. Although not shown in the table, debt payment decreases will be \$335,000 and \$433,000 over the next 15 and 20 years respectively.

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

	Without Capturing Changes				With Capturing Changes			
	5 Years	10 Years	15 Years	20 Years	5 Years	10 Years	15 Years	20 Years
Infrastructure Deficit	9,171,000	9,171,000	9,171,000	9,171,000	9,171,000	9,171,000	9,171,000	9,171,000
Change in Debt Costs	N/A	N/A	N/A	N/A	-105,000	-236,000	-335,000	-433,000
Change in OCIF Grants	N/A	N/A	N/A	N/A	0	0	0	0
<b>Resulting Infrastructure Deficit</b>	9,171,000	9,171,000	9,171,000	9,171,000	9,066,000	8,935,000	8,836,000	8,738,000
Tax Increase Required	103.9%	103.9%	103.9%	103.9%	102.7%	101.2%	100.1%	99.0%
<b>Annually</b>	<b>20.8%</b>	<b>10.4%</b>	<b>6.9%</b>	<b>5.2%</b>	<b>20.5%</b>	<b>10.1%</b>	<b>6.7%</b>	<b>5.0%</b>

### 7.3.3 Financial Strategy Recommendations

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

- a) when realized, reallocating the debt cost reductions to the infrastructure deficit as outlined above.
- b) increasing tax revenue by 5.0% each year for the next 20 years solely for the purpose of phasing in full funding to the asset categories covered in this section of the AMP.
- c) adjusting tax revenue increases in future year(s) when allocations to CapEx exceed or fail to meet budgeted amounts.
- d) allocating the current gas tax and OCIF revenue as outlined previously.
- e) allocating the scheduled OCIF grant increases to the infrastructure deficit as they occur.
- f) reallocating appropriate revenue from categories in a surplus position to those in a deficit position.
- g) increasing existing and future infrastructure budgets by the applicable inflation index on an annual basis in addition to the deficit phase-in.

#### Notes:

1. As in the past, periodic senior government infrastructure funding will most likely be available during the phase-in period. By Provincial AMP rules, this periodic funding cannot be incorporated into an AMP unless there are firm commitments in place. We have included any applicable OCIF formula-based funding since this funding is a multi-year commitment<sup>8</sup>.
2. We realize that raising tax revenues by the amounts recommended above for infrastructure purposes will be very difficult to do. However, considering a longer phase-in window may have even greater consequences in terms of infrastructure failure.

Although this option achieves full CapEx funding on an annual basis in 20 years and provides financial sustainability over the period modeled, the recommendations do require prioritizing capital projects to fit the resulting annual funding available. Current data shows a pent-up investment demand of \$254,000 for the Road Network, \$0 for Bridges & Culverts, 644,000 for the Storm Network, \$1,100,000 for the Facilities, \$145,000 for Machinery & Equipment, \$292,000 for Land Improvements, and \$0 for Rolling Stock.

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.

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<sup>8</sup> The Township should take advantage of all available grant funding programs and transfers from other levels of government. While OCIF has historically been considered a sustainable source of funding, the program is currently undergoing review by the provincial government. This review may impact its availability.

## 7.4 Financial Profile: Rate Funded Assets

### 7.5 Current Funding Position

The following tables show, by asset category, West Lincoln's average annual capital expenditures (CapEx) requirements, current funding positions, and funding increases required to achieve full funding on rate-funded assets.

Asset Category	Avg. Annual Requirement	Annual Funding Available			Annual Deficit
		Rates	To Operations	Total Available	
Water Network	1,116,000	1,820,000	(1,485,000)	335,000	781,000
Sanitary Network	521,000	2,173,000	(1,497,000)	676,000	(156,000)
<b>Total</b>	<b>1,636,000</b>	<b>3,993,000</b>	<b>(2,982,000)</b>	<b>1,011,000</b>	<b>625,000</b>

The average annual investment requirement for the above categories is \$1.6 million. Annual revenue currently allocated to these assets for capital purposes is \$1.0 million leaving an annual deficit of \$625,000. Put differently, these infrastructure categories are currently funded at 62% of their long-term requirements.

### 7.6 Full Funding Requirements

In 2021, West Lincoln had annual sanitary revenues of \$2.2 million and annual water revenues of \$1.8 million. As illustrated in the table below, without consideration of any other sources of revenue, full funding would require the following changes over time:

Asset Category	Rate Change Required for Full Funding
Water Network	42.9%
Sanitary Network	N/A%
<b>Total</b>	<b>15.7%</b>

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

	Water Network				Sanitary Network			
	5 Years	10 Years	15 Years	20 Years	5 Years	10 Years	15 Years	20 Years
Infrastructure Deficit	781,000	781,000	781,000	781,000	-156,000	-156,000	-156,000	-156,000
Rate Increase Required	42.9%	42.9%	42.9%	42.9%	N/A	N/A	N/A	N/A
<b>Annually:</b>	<b>8.6%</b>	<b>4.3%</b>	<b>2.9%</b>	<b>2.1%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>

## 7.7 Financial Strategy Recommendations

Considering the above information, we recommend the 15-year option for the Water Network and maintaining status quo for the Sanitary Network. This involves full CapEx funding being achieved over 15 years by:

- a) increasing rate revenues by 2.9% for the Water Network each year for the next 15 years & maintaining status quo for Sanitary Network revenues.
- b) these rate revenue increases are solely for the purpose of phasing in full funding to the respective asset categories covered in this AMP.
- c) increasing existing and future infrastructure budgets by the applicable inflation index on an annual basis in addition to the deficit phase-in.

### Notes:

1. As in the past, periodic senior government infrastructure funding will most likely be available during the phase-in period. This periodic funding should not be incorporated into an AMP unless there are firm commitments in place.
2. We realize that raising rate revenues for infrastructure purposes will be very difficult to do. However, considering a longer phase-in window may have even greater consequences in terms of infrastructure failure.
3. Any increase in rates required for operations would be in addition to the above recommendations.

Although this strategy achieves full CapEx funding for rate-funded assets over 15 years, the recommendation does require prioritizing capital projects to fit the annual funding available. Current data shows a pent-up investment demand of \$63,000 for the Water Network and \$0 for the Sanitary Network.

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

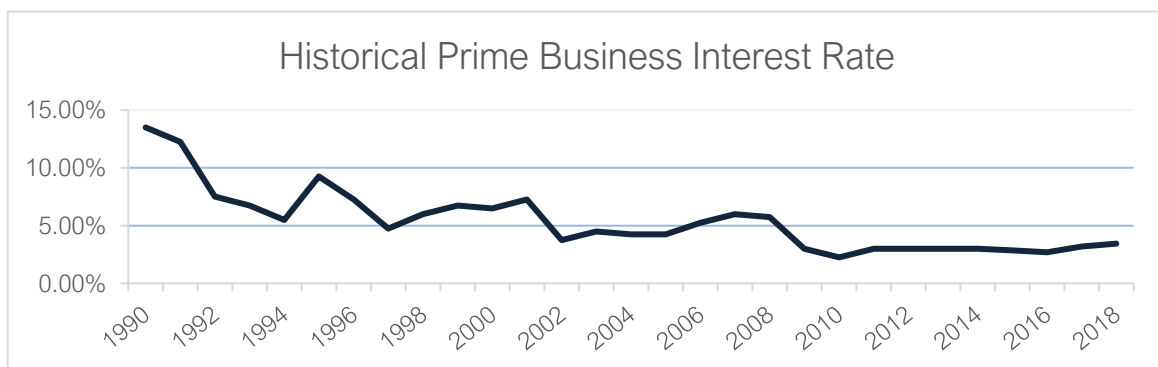


## 7.5 Use of Debt

For reference purposes, the following table outlines the premium paid on a project if financed by debt. For example, a \$1 million project financed at 3.0%<sup>9</sup> 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
<b>7.0%</b>	22%	42%	65%	89%	115%	142%
<b>6.5%</b>	20%	39%	60%	82%	105%	130%
<b>6.0%</b>	19%	36%	54%	74%	96%	118%
<b>5.5%</b>	17%	33%	49%	67%	86%	106%
<b>5.0%</b>	15%	30%	45%	60%	77%	95%
<b>4.5%</b>	14%	26%	40%	54%	69%	84%
<b>4.0%</b>	12%	23%	35%	47%	60%	73%
<b>3.5%</b>	11%	20%	30%	41%	52%	63%
<b>3.0%</b>	9%	17%	26%	34%	44%	53%
<b>2.5%</b>	8%	14%	21%	28%	36%	43%
<b>2.0%</b>	6%	11%	17%	22%	28%	34%
<b>1.5%</b>	5%	8%	12%	16%	21%	25%
<b>1.0%</b>	3%	6%	8%	11%	14%	16%
<b>0.5%</b>	2%	3%	4%	5%	7%	8%
<b>0.0%</b>	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:



<sup>9</sup> 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 West Lincoln has historically used debt for investing in the asset categories as listed. There is currently \$16,514,000 of debt outstanding for the assets covered by this AMP with corresponding principal and interest payments of \$1,188,000, well within its provincially prescribed maximum of \$5,366,000.

Asset Category	Current Debt Outstanding	Use of Debt in the Last Five Years				
		2016	2017	2018	2019	2020
Road Network						
Storm Network						
Bridges & Culverts	217,000			275,000		
Facilities	16,297,000			13,645,000	3,700,000	
Machinery & Equipment						
Land Improvements						
Rolling Stock						
<b>Total Tax Funded:</b>	<b>16,514,000</b>	<b>0</b>	<b>0</b>	<b>13,920,000</b>	<b>3,700,000</b>	<b>0</b>
Water Network						
Sanitary Network						
<b>Total Rate Funded:</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

Asset Category	Principal & Interest Payments in the Next Ten Years						
	2020	2021	2022	2023	2024	2025	2030
Road Network							
Storm Network							
Bridges & Culverts	37,000	36,000	35,000	34,000	33,000	32,000	
Facilities	1,151,000	1,130,000	1,110,000	1,091,000	1,072,000	1,051,000	952,000
Machinery & Equipment							
Land Improvements							
Rolling Stock							
<b>Total Tax Funded:</b>	<b>1,188,000</b>	<b>1,166,000</b>	<b>1,145,000</b>	<b>1,125,000</b>	<b>1,105,000</b>	<b>1,083,000</b>	<b>952,000</b>
Water Network							
Sanitary Network							
<b>Total Rate Funded:</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

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

## 7.6 Use of Reserves

### 7.6.1 Available Reserves

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

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

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

Asset Category	Balance at December 31, 2020
Road Network	495,000
Storm Network	-
Bridges & Culverts	236,000
Facilities	1,424,000
Machinery & Equipment	981,000
Land Improvements	1,667,000
Rolling Stock	1,405,000
<b>Total Tax Funded:</b>	<b>6,208,000</b>
Water Network	995,000
Sanitary Network	1,485,000
<b>Total Rate Funded:</b>	<b>2,480,000</b>

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

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

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

## 7.6.2 Recommendation

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

# 8 Appendices

## Key Insights

- Appendix A identifies projected 10-year capital requirements for each asset category
- Appendix B includes several maps and images that have been used to visualize the current level of service

# Appendix A: 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.

Facilities											
Segment	Backlog	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
General Government	\$539,000	\$617,000	\$449,000	\$578,000	\$439,000	\$975,000	\$433,000	\$647,000	\$501,000	\$1,295,000	\$355,000
Protection Services	\$157,000	\$17,000	\$148,000	\$154,000	\$164,000	\$161,000	\$362,000	\$325,000	\$163,000	\$756,000	\$171,000
Recreation & Culture Services	\$366,000	\$301,000	\$752,000	\$538,000	\$568,000	\$495,000	\$597,000	\$1,044,000	\$442,000	\$1,189,000	\$421,000
Transportation Services	\$40,000	\$526,000	\$34,000	\$105,000	\$56,000	\$595,000	\$59,000	\$85,000	\$235,000	\$608,000	\$141,000
<b>Total</b>	<b>\$1,100,000</b>	<b>\$1,459,000</b>	<b>\$1,382,000</b>	<b>\$1,374,000</b>	<b>\$1,226,000</b>	<b>\$2,225,000</b>	<b>\$1,449,000</b>	<b>\$2,099,000</b>	<b>\$1,340,000</b>	<b>\$3,846,000</b>	<b>\$1,086,000</b>

Machinery & Equipment											
Segment	Backlog	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
General Government	\$91,000	\$0	\$90,000	\$53,000	\$163,000	\$82,000	\$207,000	\$108,000	\$87,000	\$141,000	\$56,000
Library Services	\$0	\$0	\$82,000	\$82,000	\$106,000	\$91,000	\$87,000	\$82,000	\$54,000	\$66,000	\$61,000
Protection Services	\$11,000	\$16,000	\$37,000	\$39,000	\$29,000	\$41,000	\$82,000	\$468,000	\$48,000	\$22,000	\$61,000
Recreation & Culture Services	\$0	\$8,000	\$8,000	\$10,000	\$7,000	\$6,000	\$5,000	\$8,000	\$23,000	\$11,000	\$6,000
Transportation Services	\$45,000	\$0	\$38,000	\$22,000	\$23,000	\$41,000	\$41,000	\$28,000	\$68,000	\$5,000	\$2,000
<b>Total</b>	<b>\$146,000</b>	<b>\$23,000</b>	<b>\$253,000</b>	<b>\$204,000</b>	<b>\$327,000</b>	<b>\$260,000</b>	<b>\$420,000</b>	<b>\$692,000</b>	<b>\$277,000</b>	<b>\$244,000</b>	<b>\$185,000</b>

Rolling Stock											
Segment	Backlog	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Protection Services	\$0	\$0	\$440,000	\$0	\$1,117,000	\$214,000	\$0	\$53,000	\$36,000	\$107,000	\$10,000
Recreation & Culture Services	\$0	\$0	\$0	\$90,000	\$80,000	\$0	\$50,000	\$19,000	\$59,000	\$23,000	\$0
Transportation Services	\$0	\$0	\$82,000	\$1,028,000	\$795,000	\$77,000	\$412,000	\$171,000	\$260,000	\$241,000	\$49,000
<b>Total</b>	<b>\$0</b>	<b>\$0</b>	<b>\$522,000</b>	<b>\$1,118,000</b>	<b>\$1,992,000</b>	<b>\$291,000</b>	<b>\$462,000</b>	<b>\$243,000</b>	<b>\$355,000</b>	<b>\$371,000</b>	<b>\$59,000</b>

Land Improvements											
Segment	Backlog	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Athletic Fields	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$28,000	\$222,000
Park Fixtures	\$201,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$33,000
Parking Lots	\$32,000	\$0	\$0	\$0	\$0	\$10,000	\$0	\$0	\$0	\$0	\$34,000
Playgrounds	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Retaining Walls	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Trails & Pathways	\$59,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$25,000	\$0
<b>Total</b>	<b>\$292,000</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$10,000</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$53,000</b>	<b>\$289,000</b>

**Water Network**

<b>Segment</b>	<b>Backlog</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>
Hydrants	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Water Buildings	\$64,000	\$10,000	\$55,000	\$46,000	\$54,000	\$59,000	\$32,000	\$94,000	\$39,000	\$119,000	\$60,000
Water Mains	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Water Meters	\$0	\$0	\$55,000	\$0	\$0	\$51,000	\$68,000	\$68,000	\$1,000	\$1,000	\$1,000
Water Services	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Water Valves	\$0	\$0	\$0	\$0	\$0	\$4,000	\$0	\$0	\$15,000	\$0	\$0
Water Vehicles & Equipment	\$0	\$0	\$39,000	\$0	\$0	\$0	\$22,000	\$8,000	\$0	\$0	\$39,000
<b>Total</b>	<b>\$64,000</b>	<b>\$10,000</b>	<b>\$148,000</b>	<b>\$46,000</b>	<b>\$54,000</b>	<b>\$113,000</b>	<b>\$121,000</b>	<b>\$169,000</b>	<b>\$54,000</b>	<b>\$119,000</b>	<b>\$99,000</b>

**Storm Network**

<b>Segment</b>	<b>Backlog</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>	<b>2029</b>	<b>2030</b>
Catch Basins	\$72,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$4,000
Storm Mains	\$572,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$22,000
Stormwater Headwalls	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Stormwater Ponds	\$0	\$0	\$0	\$27,000	\$0	\$0	\$0	\$70,000	\$0	\$0	\$0
<b>Total</b>	<b>\$644,000</b>	<b>\$0</b>	<b>\$0</b>	<b>\$27,000</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$70,000</b>	<b>\$0</b>	<b>\$0</b>	<b>\$26,000</b>



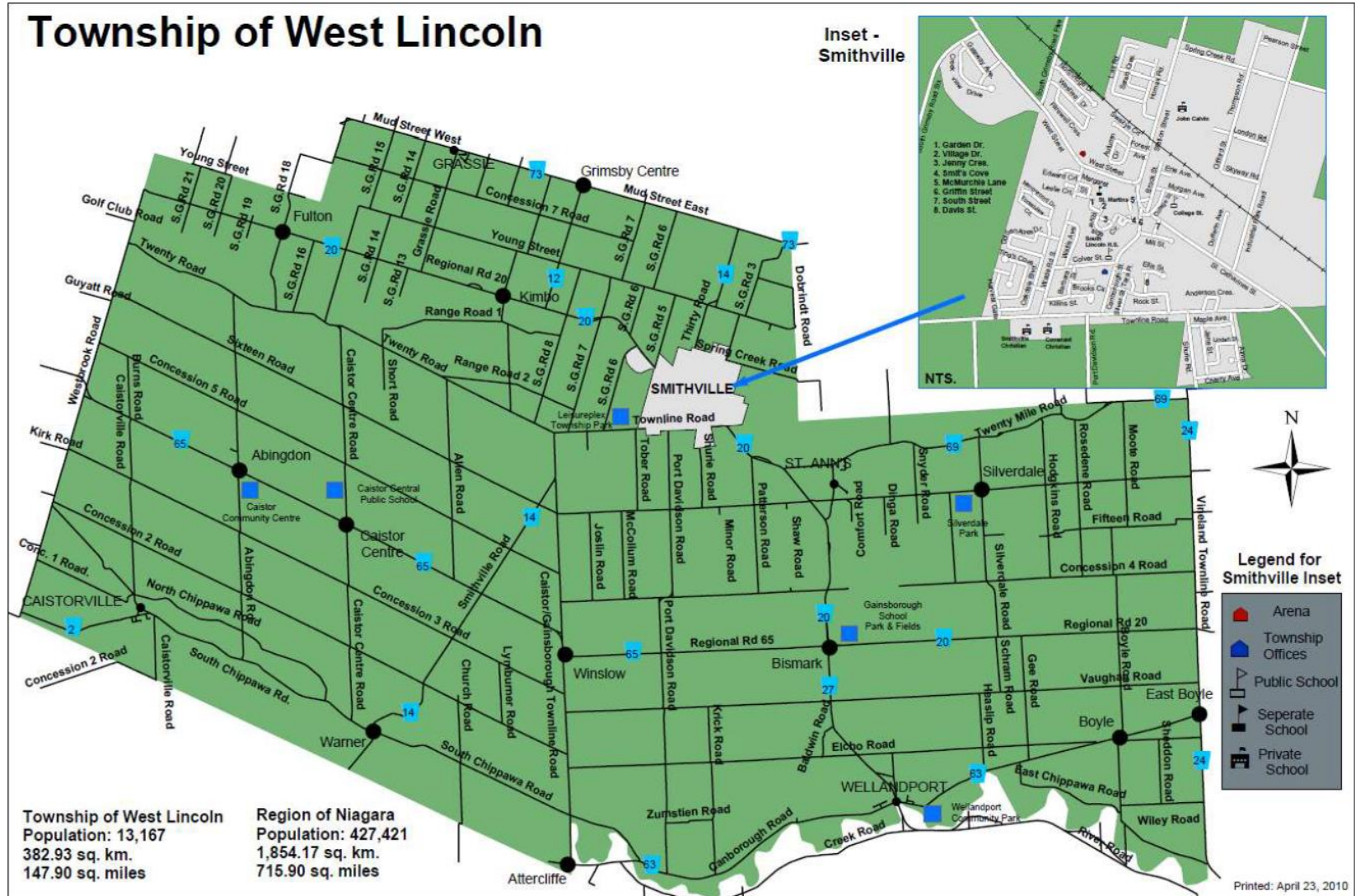
Sanitary Network											
Segment	Backlog	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Sanitary Laterals	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Sanitary Mains	\$0	\$0	\$73,000	\$3,000	\$52,000	\$3,000	\$52,000	\$3,000	\$52,000	\$3,000	\$105,000
Sanitary Manholes	\$0	\$0	\$84,000	\$28,000	\$0	\$28,000	\$0	\$28,000	\$0	\$28,000	\$0
<b>Total</b>	\$0	\$0	\$157,000	\$31,000	\$52,000	\$31,000	\$52,000	\$31,000	\$52,000	\$31,000	\$105,000

Bridges & Culverts											
Segment	Backlog	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Bridges	\$0	\$1,253,000	\$1,398,000	\$982,000	\$1,303,000	\$663,000	\$965,000	\$2,005,000	\$1,760,000	\$1,065,000	\$0
Major Culverts	\$0	\$807,000	\$23,000	\$35,000	\$15,000	\$334,000	\$10,000	\$0	\$345,000	\$460,000	\$610,000
<b>Total</b>	\$0	\$2,059,000	\$1,421,000	\$1,016,000	\$1,318,000	\$996,000	\$975,000	\$2,005,000	\$2,105,000	\$1,525,000	\$610,000

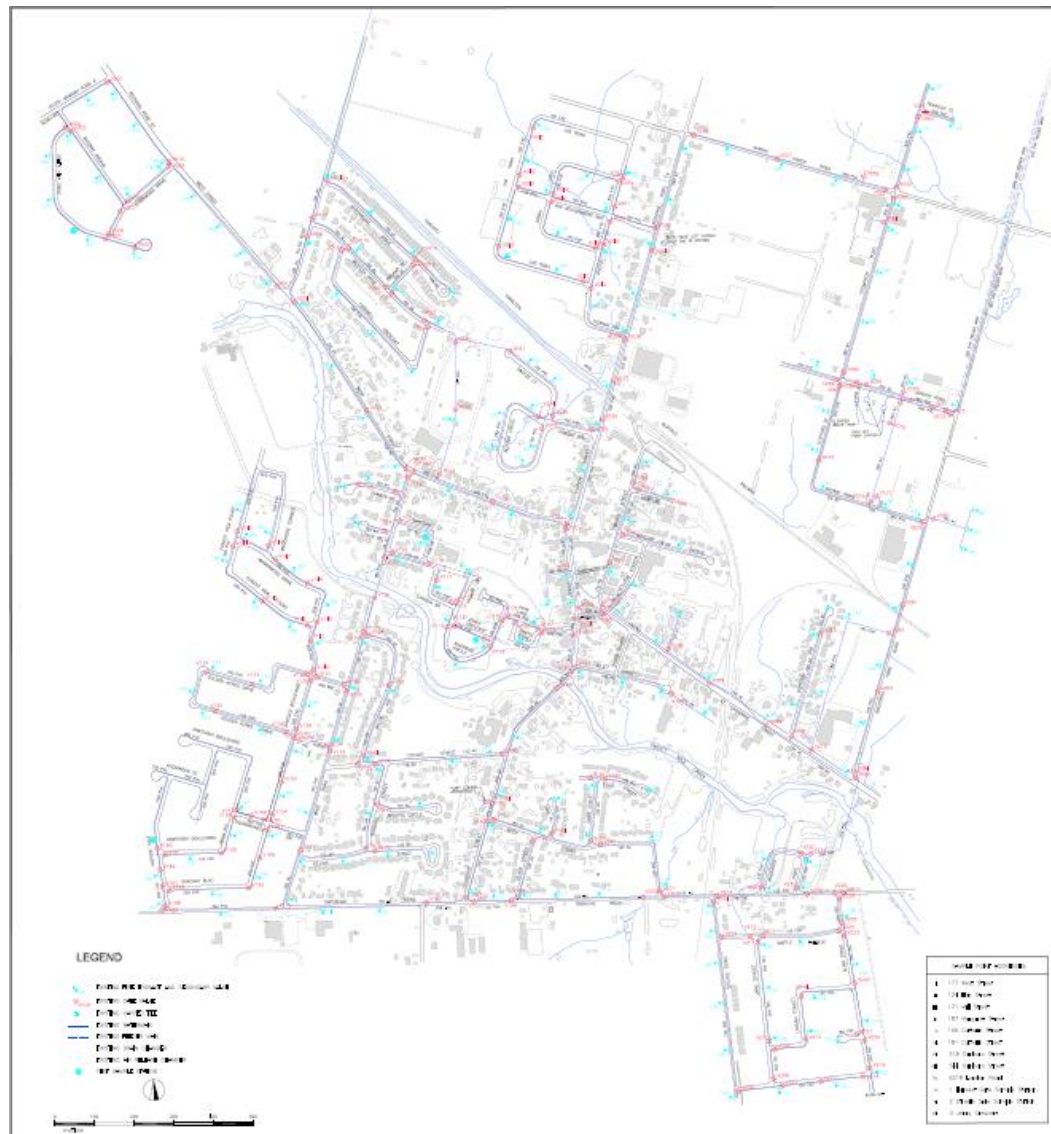
Road Network											
Segment	Backlog	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Paved Roads	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$653,000	\$1,729,000	\$4,554,000	\$4,915,000
Roadside Barriers	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$26,000	\$0
Sidewalks	\$66,000	\$0	\$0	\$39,000	\$0	\$20,000	\$87,000	\$0	\$52,000	\$23,000	\$173,000
Signs & Posts	\$0	\$0	\$21,000	\$1,000	\$1,000	\$1,000	\$175,000	\$0	\$0	\$0	\$19,000
Streetlights	\$0	\$0	\$18,000	\$18,000	\$18,000	\$18,000	\$18,000	\$18,000	\$18,000	\$18,000	\$18,000
Unpaved Roads	\$189,000	\$0	\$1,300,000	\$1,100,000	\$625,000	\$1,200,000	\$1,350,000	\$0	\$0	\$0	\$0
<b>Total</b>	\$255,000	\$0	\$1,339,000	\$1,157,000	\$644,000	\$1,238,000	\$1,629,000	\$671,000	\$1,799,000	\$4,620,000	\$5,124,000

# Appendix B: Level of Service Metrics

## Roads Network Map

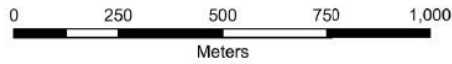


# Water Network Map



Sanitary Network

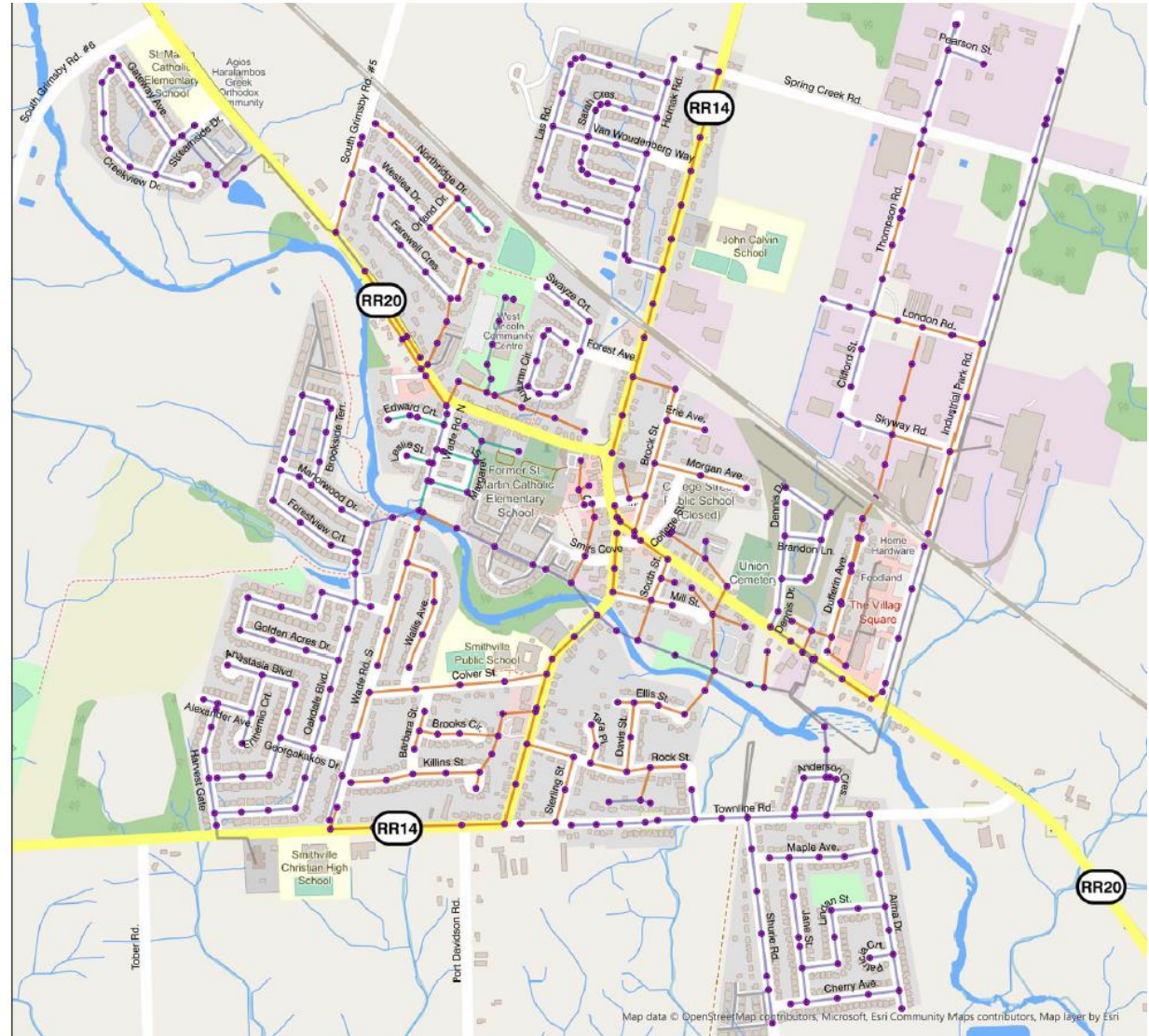
**Township of West Lincoln - Sanitary Network**



Sanitary Manholes

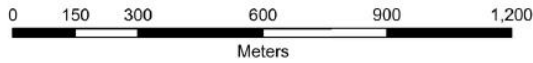
Sanitary Mains

- AC-Asbestos Cement
- CON-Concrete
- PVC-Polyvinyl Chloride
- Non-Township Mains

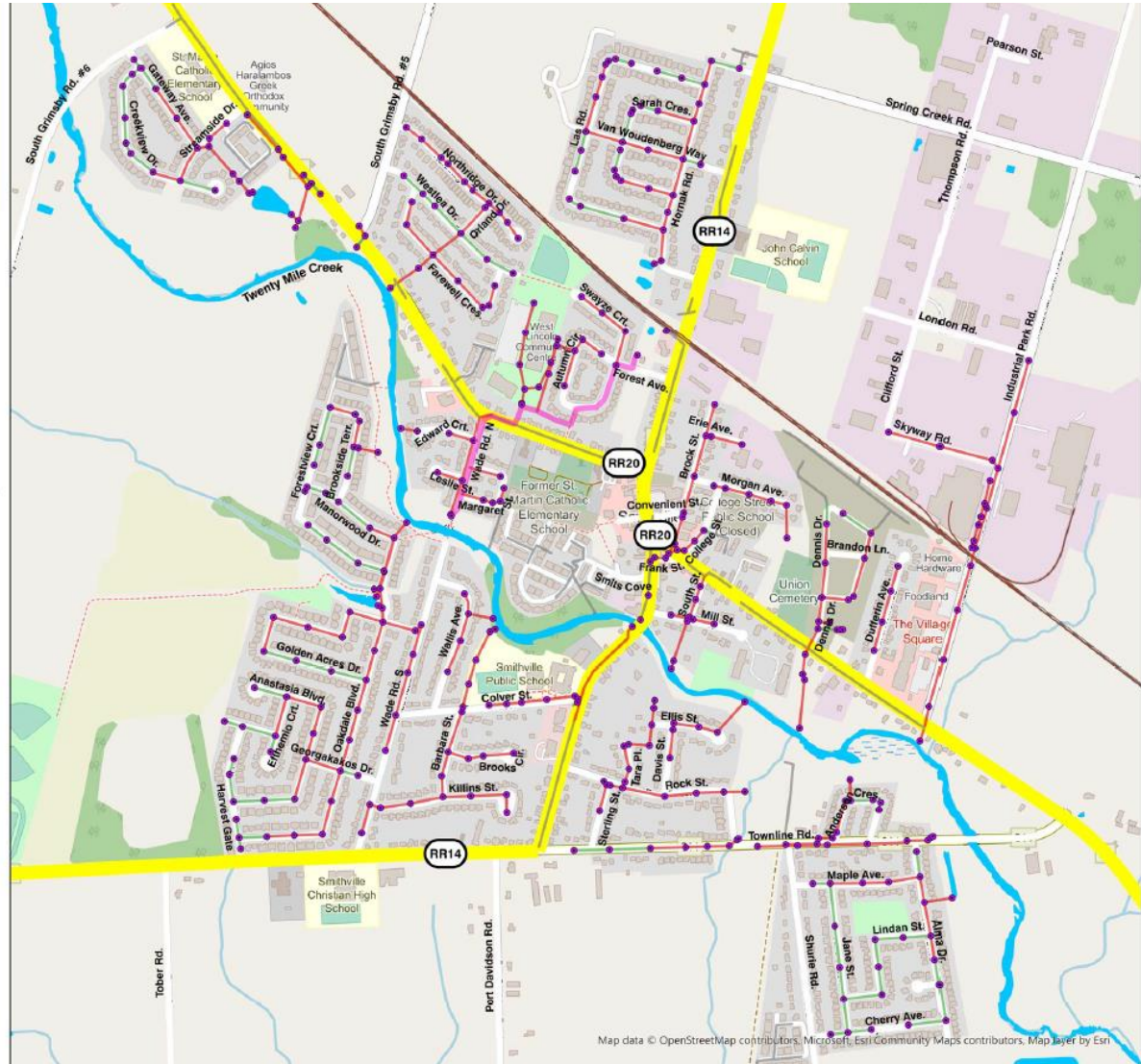


**Storm Network - Urban**

**Township of West Lincoln - Stormwater Network**



- Stormwater Manholes
- Stormwater Mains
  - CON-Concrete
  - HDPE-High Density Polyethylene
  - PVC-Polyvinyl Chloride
  - Non-Township Mains
  - Grassie Estates Box Culvert



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# Storm Network – Rural

