Asset Management Plan

Town of Sioux Lookout

2020

This Asset Management Plan was prepared by:

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

Acknowledgements

The Town of Sioux Lookout would like to acknowledge the efforts of the staff across the Town's service areas for their contribution to the development of this Asset Management Plan. Staff have dedicated notable time and effort to provide their expertise and support in developing the Asset Management Plan. In particular, the publication was especially made possible through the guidance and continued support provided by Carly Collins (Treasurer), Ben Hancharuk (Airport Manager), Jody Brinkman (Chief Building Official, Manager of Development Services), Jeff Hawley (Manager of Public Works and Infrastructure), Mat Lelonde (Public Works Operations Manager), as well as numerous other support staff.

Key Statistics

Replacement cost of asset portfolio
$192.5 million

Replacement cost of infrastructure per household
$72,730 (2021)

Percentage of assets in fair or better condition
58%

Percentage of assets with assessed condition data
23%

Annual capital infrastructure deficit
$3.16 million

Recommended timeframe for eliminating annual infrastructure deficit
20 Years

Target reinvestment rate
3.3%

Actual reinvestment rate
1.5%

Table of Contents

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 Sioux Lookout's current infrastructure management practices and strategies and makes recommendations for further advancement. Through the implementation of sound asset management strategies, the Town's public infrastructure is better positioned to support the sustainable delivery of municipal services.

This AMP include the following asset categories:

With the development of this AMP the Town 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 total replacement cost of the assets included in this AMP is $192.5 million. Most (58%) assets analysed in this AMP are in fair or better condition and assessed condition data was available for 23% of assets. For the remaining 77% of assets, assessed condition data was unavailable, and asset age was used to approximate condition – a data gap that persists in most municipalities. Generally, age misstates the true condition of assets, making assessments essential to accurate asset management planning, and a recurring recommendation in this AMP.

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

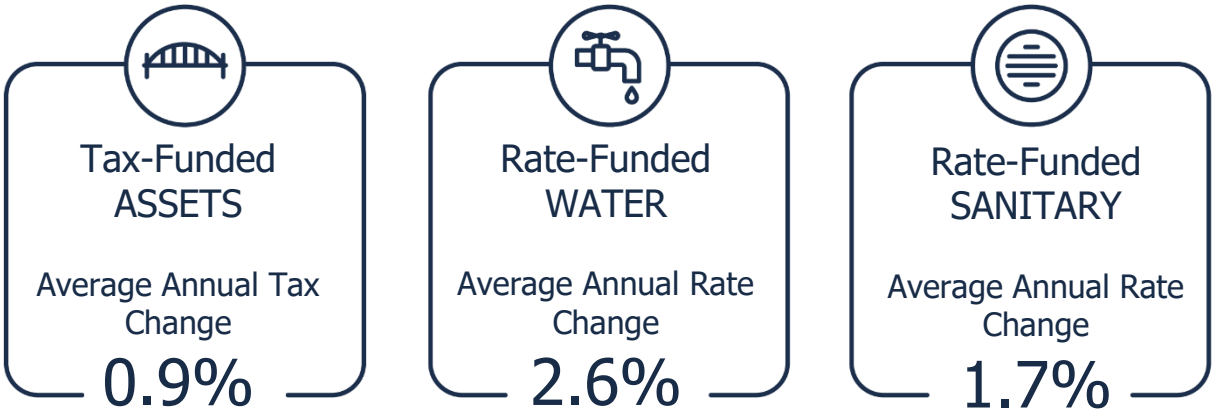
To meet capital replacement and rehabilitation needs for existing infrastructure, prevent infrastructure backlogs, and achieve long-term sustainability, the Town's average annual capital requirement totals $5.7 million[1]. Based on a historical analysis of sustainable capital funding sources, the Town is committing approximately $2.5 million towards capital projects or reserves per year. As a result, there is currently an annual funding gap of $3.2 million.

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

[1] Annual capital requirements and capital funding available excludes Airport assets due to unique AIF funding structure

Recommendations

A financial strategy was developed to address the annual capital funding gap. The following graphics shows annual tax/rate change required to eliminate the Town's infrastructure deficit based on a 10-year plan for tax funded assets, 20-year plan for water services, and a 15-year place for sanitary:



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

- Continuously review and refine asset data; ensure updates to database (including condition assessments) are made so that data is complete and accurate
- Review lifecycle management strategies so that they are accurate. Develop and regularly review short- and long-term plans to meet capital requirements.
- Measure current levels of service and identify sustainable proposed levels of service
- Develop a communication strategy to engage the Public on asset management and obtain feedback to inform development of proposed levels of service and the O.Reg. 588/17 2025 Requirements
- Assess resource capacity in managing asset management program

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 Town's Asset Management Policy provides clear direction to staff on their roles and responsibilities regarding asset management

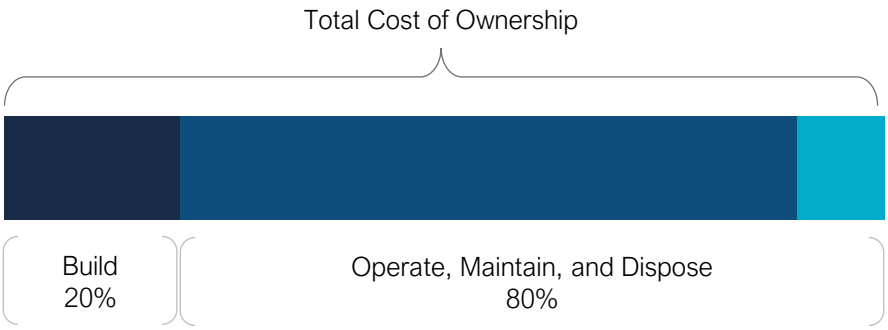
- An Asset Management Plan (AMP) is a living document that requires regular update to best inform long-term planning

- Ontario Regulation 588/17 outlines several key milestones and requirements for asset management plans in Ontario between July 1, 2022, and 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. 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.

Typically, 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 the equitable distribution of their financial costs. An AMP is critical to this capital planning, and an essential element of broader asset management program. The industry-standard approach and sequence to developing a practical asset management program begins with a Strategic Plan, followed by an Asset Management Policy and an Asset Management Strategy, concluding with an Asset Management Plan.

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

Asset Management Policy

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

The Municipality adopted By-law No. 39-19 "A By-law to Adopt the Municipality of Sioux Lookout Policy No.1-17, The Strategic Asset Management Policy" on May 15th, 2019, in accordance with Ontario Regulation 588/17.

The policy outlines the assets that are within scope, defines staff and council roles and responsibility for asset management, and details the principles that the policy seeks to support and advance. These principles are:

- Service Delivery to Customers
- Long-term Sustainability and Resilience
- Fiscal Responsibility & Asset Management Decision Making
- Innovation & Continual Improvement

Asset Management Strategy

An asset management strategy outlines how organizational objectives are translated 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 the planned activities and decision-making criteria to enable the municipality to achieve it asset management objectives.

Several of the recommendations throughout this report highlight specific actions and practices that are expected to improve the Municipality's Asset management practices, internal capacity and cognizance, and resultant decisions. Thus, these recommendations serve informally as an Asset Management Strategy and provide a framework of planned activities to operationalize and support the delivery of the asset management objectives as defined in the policy.

Asset Management Plan

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

- State of Infrastructure
- Asset Management Strategies
- Levels of Service
- Financial Strategies

The AMP is a living document that requires regular updates as additional asset and financial data becomes available. This will allow the municipality to re-evaluate the state of infrastructure and identify how the organization's asset management and financial strategies are progressing.

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 and is affected by a range of factors including an asset's characteristics, location, utilization, maintenance history and environment. Asset deterioration has a negative effect on the ability of an asset to fulfill its intended function, and may be characterized by increased cost, risk and even service disruption.

To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

There are several field intervention activities that are available to extend the life of an asset. These activities can be generally placed into one of three categories: maintenance, rehabilitation, and replacement. The following table provides a description of each type of activity and the general difference in cost.

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

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

The Town'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 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-criticality 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. All assets are assigned a probability 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 Town is providing to the community and the nature and quality of that service. Within each asset category in this AMP, technical metrics and qualitative descriptions that measure both technical and community levels of service have been established and measured as data is available.

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

Community Levels of Service

Community levels of service are a simple, plain language description or measure of the service that the community receives. For core asset categories (Roads, Bridges & Culverts, Water, Wastewater, Stormwater) the Province, through O. Reg. 588/17, has provided qualitative descriptions that are required to be included in this AMP. For non-core asset categories, the Town has determined the qualitative descriptions that will be used to determine the community level of service provided. These descriptions can be found in the Levels of Service subsection within each asset category.

Technical Levels of Service

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

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

Current and Proposed Levels of Service

This AMP focuses on measuring the current level of service provided to the community. Once current levels of service have been measured, the Town 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 Town. They should also be determined with consideration for 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 Town 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

2022

Asset Management Plan for Core Assets with the following components:

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

2024

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

2025

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

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

O. Reg. 588/17 Compliance Review

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

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

Asset Management Roadmap

As part of PSD Citywide's Asset Management Roadmap, the Town of Sioux Lookout committed to taking the necessary steps towards developing a systemic, sustainable, and well-structured AMP. This process involved the collaboration of PSD Citywide's industry-leading asset management team with a cross-discipline of Sioux Lookout municipal staff. The following summarizes key milestones/deliverables achieved throughout this project.

Lifecycle Model Development (Workshop Date: January 17th,2022)

The Town's lifecycle management strategies were reviewed and documented to determine current practices. Lifecycle models were developed for paved road assets. These models demonstrate how asset life can be extended through the application of various lifecycle activities.

Level of Service Framework Development (Workshop Date: February 4th, 2022)

A framework was developed to determine the current level of service provided to the community through municipal infrastructure.

Risk and Criticality Model Development (Workshop Date: February 11th, 2022)

Risk models were developed to determine the relative criticality of assets based on their probability and consequence of failure. These models provide asset specific metrics relevant to Sioux Lookout that enable quantification of asset risk and assist with the prioritization and ranking of infrastructure needs.

Asset Data Review and Refinement (March 2022 & April 4th, 2022)

Asset data was refined through a data project that sought to extract a more relevant data structure and disaggregate pooled assets. These data updates provide more data granularity and specificity that allows for stronger analysis. Additional data review and refinement including costing updates, quantity confirmation, and attribute updates were completed across multiple working sessions in March and April.

AMP & Financial Strategy

This document represents the culminating deliverable of the Asset Management Roadmap.

2 Scope and Methodology

Key Insights

- This Asset Management Plan (AMP) includes 10 asset categories and is divided between tax-funded, rate-funded, and Airport Improvement Fee (AIF) funded asset categories

- The source and recency of replacement costs impacts the accuracy and reliability of asset portfolio valuation

- Accurate and reliable condition data helps to enable timely rehabilitation or replacement investments and ensures that lifecycle activities occur at the right time to maximize asset value and useful life

Asset Categories included in this AMP

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

The AMP summarizes the state of the infrastructure for the Town's asset portfolio, establishes current levels of service and the associated technical and customer oriented key performance indicators (KPIs), outlines lifecycle strategies for optimal asset management and performance, and provides financial strategies to reach sustainability for the asset categories listed below.

Asset Category	Source of Funding
Buildings	Tax Funded
Fleet	
Land Improvements	
Machinery & Equipment	
Road Network	
Storm Water Network	
Landfill	User Rates
Wastewater Network	
Water Network	
Airport	Airport Improvent Fees (AIFs)

Deriving Replacement Costs

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

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

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

Estimated Useful Life and Service Life Remaining

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

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

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

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

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

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

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 Town's asset portfolio. The table below outlines the condition rating system used in this AMP to determine asset condition for all asset categories except roads. This rating system is aligned with the Canadian Core Public Infrastructure Survey which is used to develop the Canadian Infrastructure Report Card. When assessed condition data is not available, service life remaining is used to approximate asset condition.

Condition	Description	Criteria	Service Life Remaining (%)
Very Good	Fit for the future	Well-maintained, good condition, new or recently rehabilitated	80-100
Good	Adequate for now	Acceptable, generally approaching mid-stage of expected service life	60-79
Fair	Requires attention	Signs of deterioration, some elements exhibit significant deficiencies	40-59
Poor	Increasing potential of affecting service	Approaching end of service life, condition below standard, large portion of system exhibits significant deterioration	20-39
Very Poor	Unfit for sustained service	Near or beyond expected service life, widespread signs of advanced deterioration, some assets may be unusable	0-19

The analysis in this AMP is based on assessed condition data only as available. In the absence of assessed condition data, asset age is used as a proxy to determine asset condition. Appendix E includes additional information on the role of asset condition data and provides basic guidelines for the development of a condition assessment program.

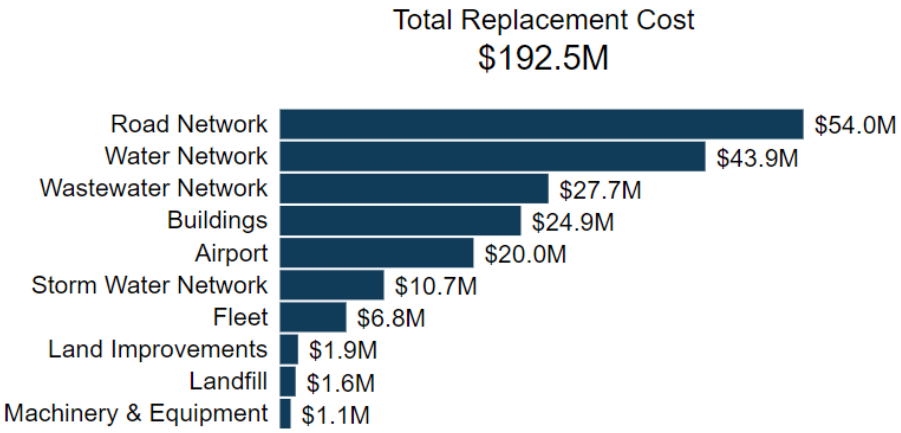
3 Portfolio Overview

Key Insights

- The total replacement cost of the Town's asset portfolio is $192.5 million
- The Town's target re-investment rate is 3.3%, and the actual re-investment rate is 1.5%, contributing to an expanding infrastructure deficit
- 58% of all assets are in fair or better condition
- 40% of assets are projected to require replacement in the next 10 years
- Average annual capital requirements total $6.6 million per year across all assets

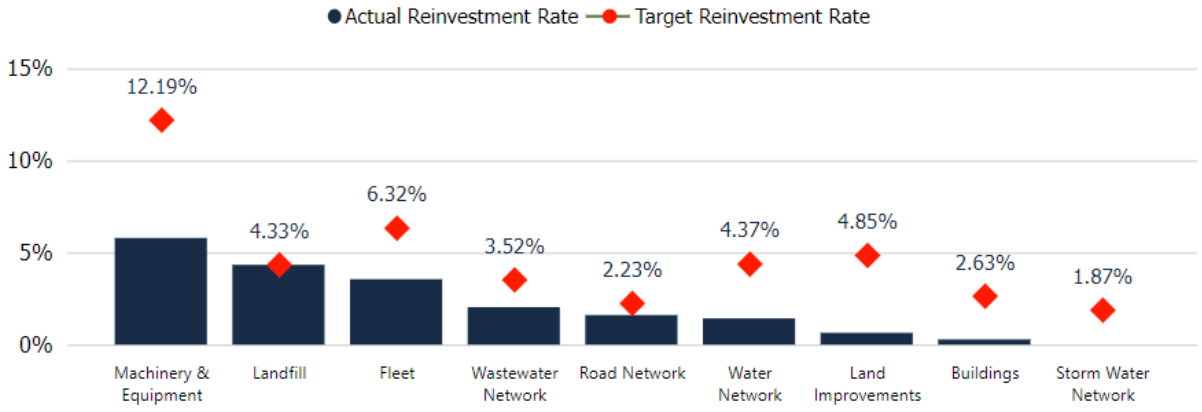
Total Replacement Cost of Asset Portfolio

The asset categories analysed in this AMP have a total replacement cost of $192.5 million based on inventory data from 2020. This total was determined based on a combination of user-defined costs and historical cost inflation. This estimate reflects replacement of historical assets with comparable assets available for procurement today.



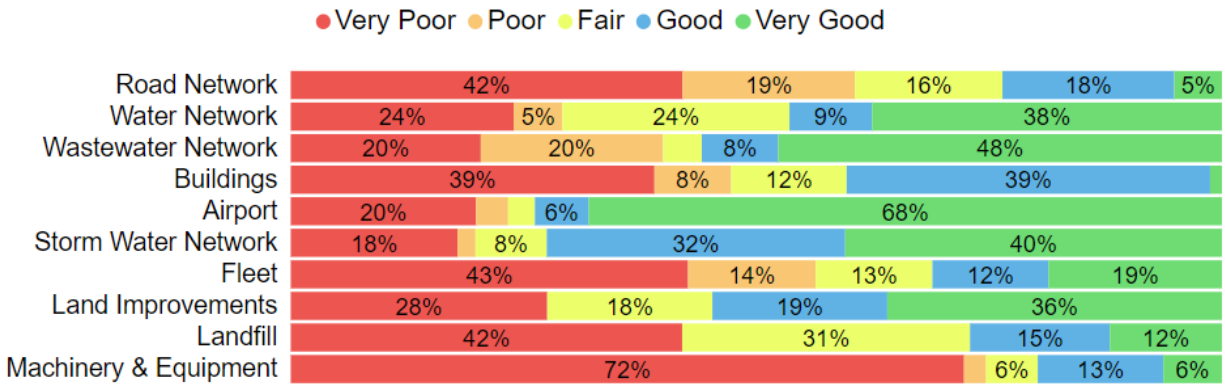
Target vs. Actual Reinvestment Rate

The graph below depicts funding gaps or surpluses by comparing target vs actual reinvestment rate. To meet the long-term replacement needs, the Town should be allocating approximately $5.7 million annually, for a target reinvestment rate of 3.3%. Actual annual spending on infrastructure totals approximately $2.5 million, for an actual reinvestment rate of 1.5%.



Condition of Asset Portfolio

Accurate condition information central to all asset management planning. Collectively, 58% of assets in Sioux Lookout are in fair or better condition. This estimate relies on both age-based and field condition data.



Assessed condition data is available for 23% 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 more accurately reflects the condition of an asset and its ability to perform its functions. The table below identifies the source of condition data used throughout this AMP.

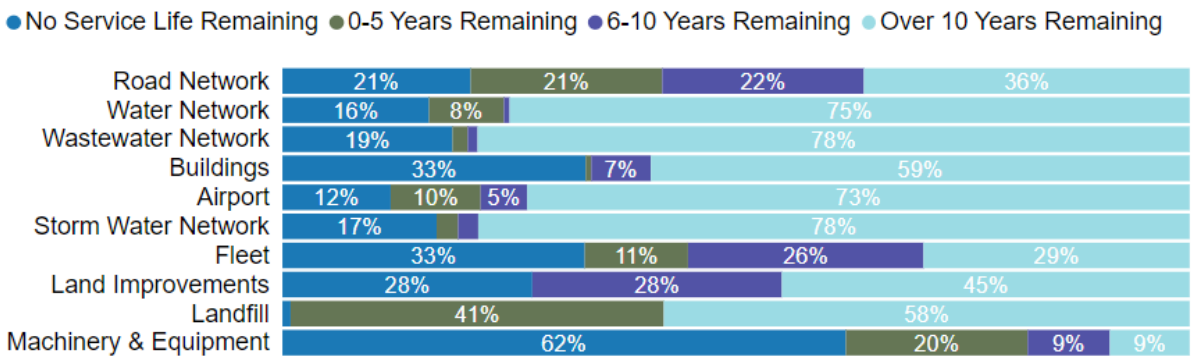
Asset Category	Asset Segment	% of Assets with Assessed Condition	Source of Condition Data
Road Network	Paved Roads	93	Sioux Lookout Internal Assessment
Stormwater Network	All	0[2]	Age-Based
Waste Water Network	All	12	2020 Nadine Consulting Engineers Report
Water Network	All	10	2020 Nadine Consulting Engineers Report
Airport	All	0	Age-Based
Buildings	All	0[3]	Age-Based
Machinery & Equipment	All	0	Age-Based
Fleet	All	0	Age-Based
Land Improvements	All	0	Age-Based
Landfill	All	0	Age-Based

[2] Sioux Lookout recently completed CCTV assessments for many of their storm and wastewater mains. The town is currently working on a data upload strategy.

[3] Building Condition Assessments were recently completed on most of the Town's Buildings. There are active plans to upload these assessments in Q4 of 2022.

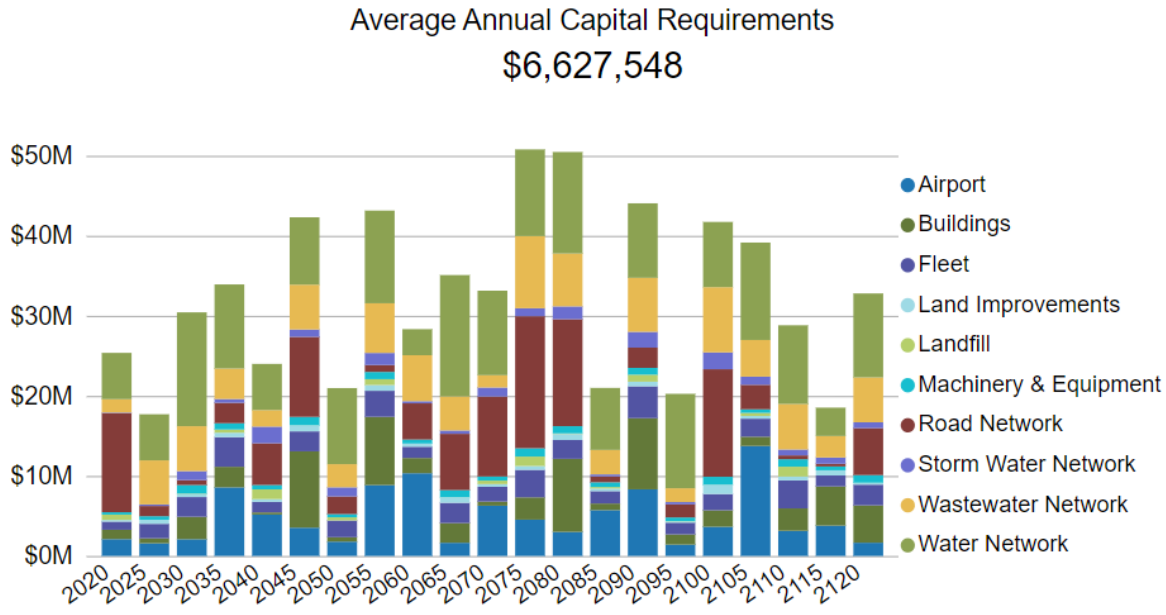
Service Life Remaining

Based on asset age, available assessed condition data and estimated useful life, 40% of the Town's assets will require replacement within the next 10 years. Capital requirements over the next 10 years are identified in Appendix B. A summary of remaining service life by asset category is below:



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 Town can produce an accurate long-term capital forecast. The following graph identifies capital requirements over the next 100 years; based on this the average annual capital requirement is $6.6 million.



4 Analysis of Tax-funded Assets

Key Insights

- Tax-funded assets are valued at $101 million
- 48% 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 $2.8 million
- Critical assets should be evaluated to determine appropriate risk mitigation activities and treatment options

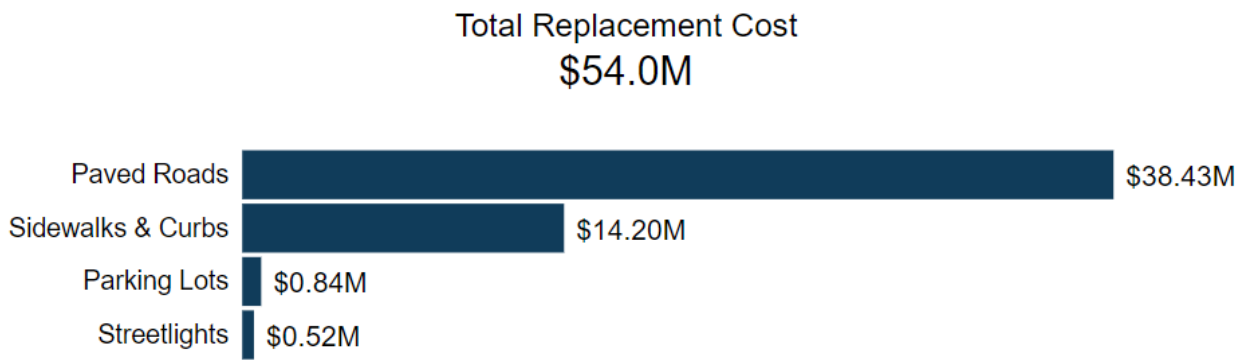
Road Network

The Road Network is a critical component of the provision of safe and efficient transportation services and is the highest value asset category in the Town's asset portfolio. It includes all municipally owned and maintained roadways and roadside infrastructure including sidewalks and streetlights. Road assets are managed and maintained by the Public Works department. The following describes typical assets within each of the below noted asset segments:

Asset Inventory & Replacement Cost

The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the Town's Road Network inventory.

Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Gravel Roads	2,550 m	Not Planned for Replacement[4]	
Parking Lots	4 lots (8,204 m^2)	CPI Tables	$837,000
Paved Roads	50,171 m	80% Cost/Unit 20% CPI Tables	$38,432,000
Sidewalks & Curbs	44,728 m	32% Cost/Unit 68% CPI Tables	$14,195,000
Streetlights	532 units	CPI Tables	$518,000
Total			**$53,981,000**

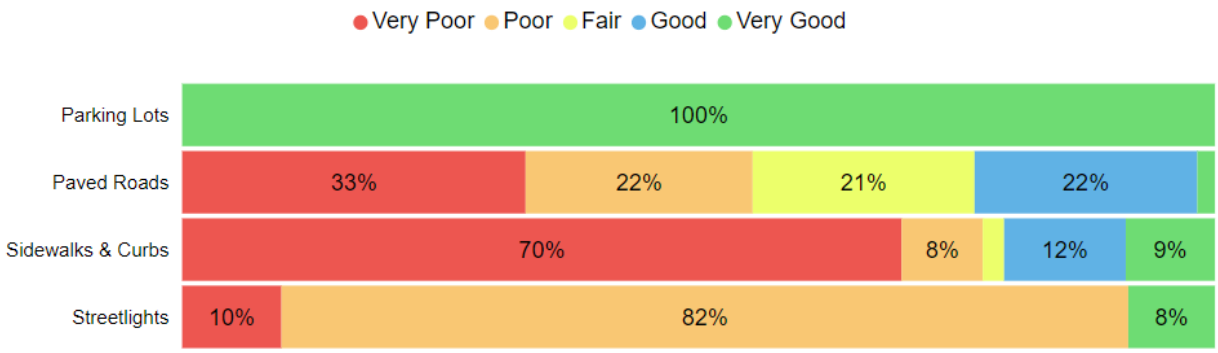


[4] Gravel roads have been included as they comprise a significant portion of the Municipality's road network. However, the lifecycle management strategies for these assets consist of perpetual maintenance activities and do not require capital costs for rehabilitation or replacement. For this reason, the total replacement cost of the road category does not include gravel roads.

Asset Condition

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

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Parking Lots	85	Very Good	Age-Based
Paved Roads	38	Poor	93% Assessed
Sidewalks & Curbs	19	Very Poor	Age-Based
Streetlights	38	Poor	Age-Based
Total	**34**	**Poor**	**66% Assessed**



Current Approach to Condition Assessment

Accurate and reliable condition data allows staff to estimate the remaining service life of assets most accurately and more confidently determine lifecycle strategies. The following describes the municipality's current approach:

- A staff conducted road condition assessment of the entire road network was completed in 2018. The assessment inventoried the following:
    - Road Classification (as per Ministry of Transportation)
    - Surface Type
    - Presence of curbs and gutters
    - Presence of ditches

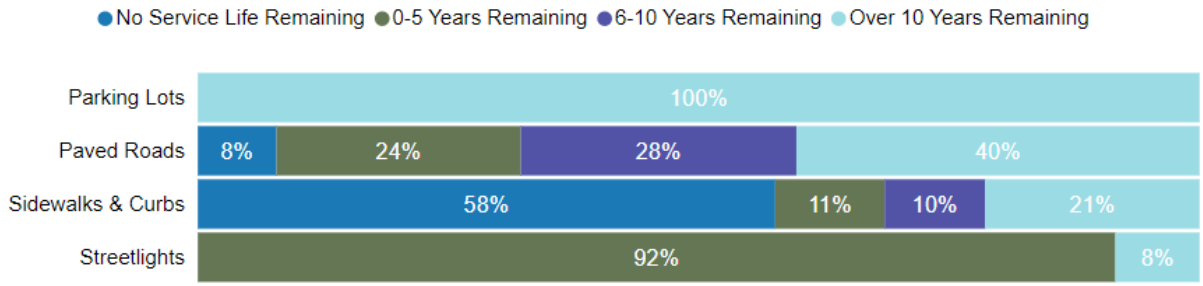
- For each road condition ratings were also assessed for the following attributes:
    - Surface Condition (1-5 scale)
    - Curb and Gutter Condition (1-5 scale)
    - Ditch Condition (1-5 scale)
    - Drainage problems (Yes/No)
    - Base problems (Yes/No)
- Based on an evaluation of the above attributes an overall condition score is calculated for each road asset
- Staff intend to update the condition assessments network wide at least every five (5) years.
- Road appurtenances including sidewalks, signs, and traffic lights are patrolled once per calendar year in accordance with Minimum Maintenance Standards (MMS). In addition, streetlights and traffic signs are also inspected during regular road patrols and in the event of a customer complaint.
- Road Asset Condition is categorized based on the following score ranges and descriptors:

Condition Descriptor	Score Range
Very Good	0-7
Good	8-15
Fair	16-23
Poor	24-31
Very Poor	32-40

Estimated Useful Life & Average Age

The Estimated Useful Life for Road Network assets is based on established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service. The Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

Asset Segment	Estimated Useful Life (Years)[5]	Average Age (Years)	Average Service Life Remaining (Years)
Paved Roads (Asphalt)	30	31.0	9.1
Paved Roads (LCB)	15-20	31.0	9.1
Parking Lots	20-74	4.6	28.8
Sidewalks & Curbs	10-30	33.2	-3.4
Streetlights	10-50	7.0	19.0
		31.8	**2.8**



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

[5] In this table all EUL are based on completing no rehabilitation activities. EUL is extended by rehabilitation activities as discussed in 4.1.4

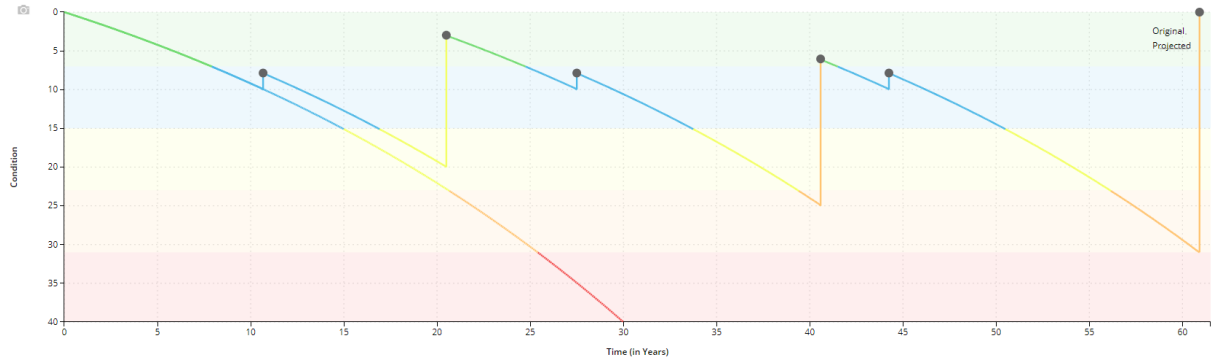
Lifecycle Management Strategy

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

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

Paved Roads (Asphalt)			
Event Name	**Event Class**	**Event Trigger**	**Event Impact**
Crack Sealing	Maintenance	Years 10, 27, & 44[6]	Adds 2 Years
Single Lift Re-surfacing	Rehabilitation	Years 20 & 40	Adds 15 Years
Full Reconstruction	Replacement	Condition	

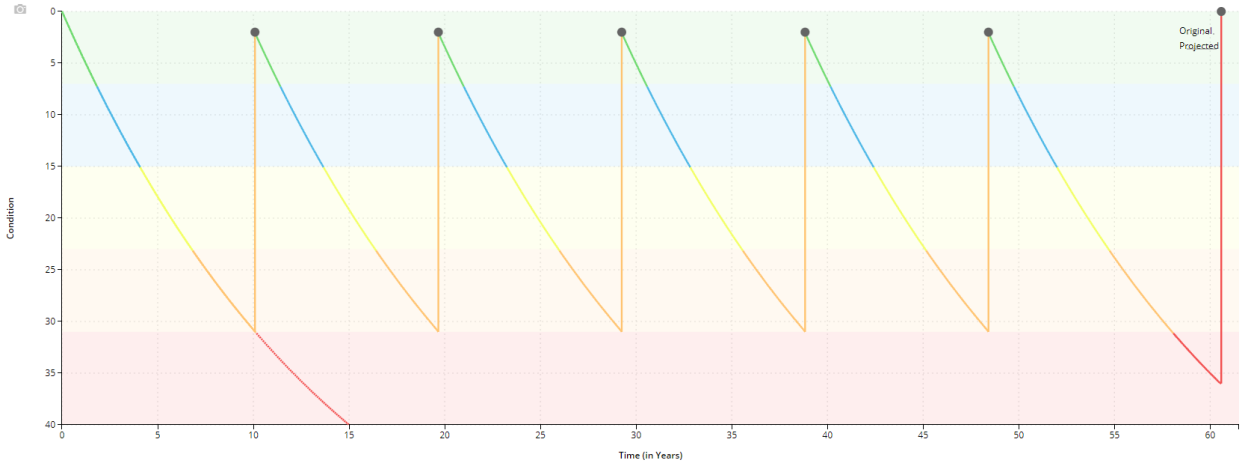
Based on completing the above activities the estimated useful life of asphalt roads is expected to be extended from 30 years to over 60.



[6] Additional treatments may occur as needed but are typically completed in the years noted.

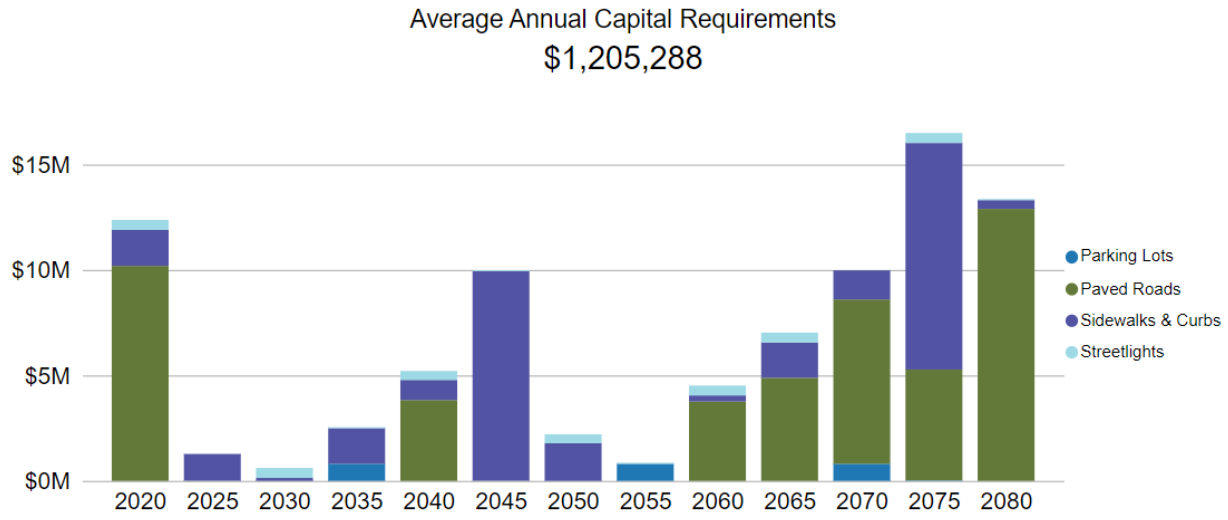
A lifecycle management strategy was also developed for surface treated roads and is based on completing the following activities based on the specified event trigger. Completing these activities significantly extends the assets expected service life.

Surface Treated (LCB)			
Event Name	**Event Class**	**Event Trigger**	**Event Impact**
Coldpatch Repairs	Maintenance	As needed- Condition	None
Surface Treatment	Rehabilitation	25% Condition Remaining	Adds 9.5 years
Full Reconstruction	Replacement	10% Condition Remaining	100% Condition



Forecasted Capital Requirements

Based on the lifecycle strategies identified previously for paved and surface treated roads, and assuming the end-of-life replacement of all other assets in this category, the average annual capital requirements for the road portfolio is $1.2 million. The annual capital requirement represents the average amount per year that the Town should allocate towards funding rehabilitation and replacement needs to meet future capital needs. Total requirements, reported in 5-year buckets, is also documented.



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

Risk & Criticality

Risk Matrix

The asset-specific attributes that municipal staff utilize to define and quantify risk are as listed below; their weighting to the model is listed in bracket.

Probability of Failure (POF)	Consequence of Failure (COF)
Condition (Operational): 60%	Replacement Cost (Financial): 80%
Draining Problems (Operational): 15%	Road Hierarchy (Strategic): 16%
Base Problems (Operational): 15%	Width (Strategic): 4%
Surface Condition (Operational): 10%	

The following risk matrix provides a visual representation of the relationship between the probability and the consequence of failure for the paved road assets based on 2020 inventory data.

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

The quantification of risk at the asset level allows the Town to determine appropriate risk mitigation strategies and treatment options. Risk mitigation may include asset-specific lifecycle strategies, data refinement programs (i.e., condition assessment strategies, attribute data) or asset ownership strategies (i.e., lease vs. own).

Risks to Current Asset Management Strategies

In addition to asset specific risks, as discussed above, the road network is exposed to qualitative risks. These are risks that affect a group of assets rather than specific assets and generally the degree of risk can not be quantified. For the road network the following was identified:

Climate Change & Extreme Weather Events

An increase in freeze/thaw cycles causes road pavement to heave and settle. This can cause the accelerated deterioration of road surfaces which leads to an increased need for maintenance and rehabilitation. For gravel roads, extreme weather events can increase the number of washouts due to storm events like heavy summer rains. The uncertainty surrounding the impact of extreme weather events can make changing conditions difficult to plan for and respond to.

Levels of Service

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

Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2020.)
Scope	Description, which may include maps, of the road network in the municipality and its level of connectivity	The Municipality's road network contains over 50 kilometers of paved and gravel local and collector roads as well as pedestrian infrastructure located in the core settlement areas. The road network is predomintley within the settlement areas of Sioux Lookout and Hudson. For a map of the road network please refer to Appendix C
Quality	Description or images that illustrate the different levels of road class pavement condition	The Town completed an internal road condition assessment in 2018 and rated surface condition on a five (5) point scale which ranged from excellent to critical condition.

Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2021)
Scope	Lane-km of collector roads (MMS classes 3 and 4) per land area (km/km^2)	12.65
	Lane-km of local roads (MMS classes 5 and 6) per land area (km/km^2)	126.77
Quality	Average pavement condition index for paved roads in the municipality	HCB: 34% LCB: 22%
	Average surface condition for unpaved roads in the municipality (e.g., excellent, good, fair, poor)	Poor
Performance	Capital reinvestment rate	1.61%

Recommendations

Asset Inventory

- Compete regular and on-going data updates as assets, including sidewalks, curbs, and streetlights, change.

Condition Assessment Strategies

- Complete the next scheduled road condition assessment. If there is a significant decline in condition, consider increasing the frequency of condition assessments to improve data accuracy and timeliness.
- Ensure road condition assessments follow a standardized, replicable approach. Thoroughly document the approach so that future assessments can be completed in a consistent and uniform manner, especially in the event of staff changes.

Lifecycle Management Strategies

- Implement the identified lifecycle management strategies for asphalt and surface treated roads to realize potential cost avoidance and maintain a high quality of road pavement condition.
- Evaluate the efficacy of the Town's lifecycle management strategies at regular intervals to better understand the appropriate event trigger, and the resultant impact and cost.

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. Where the Town identifies additional information that would be especially relevant and valuable to quantifying risk, consider if such data is available and if not, methods for regular and reliable collection.

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 Town 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 strategies to close any gaps between current and proposed levels of service.

Stormwater Network

The Town owns and maintains a stormwater network which contains storm sewer mains, catch basins and manholes.

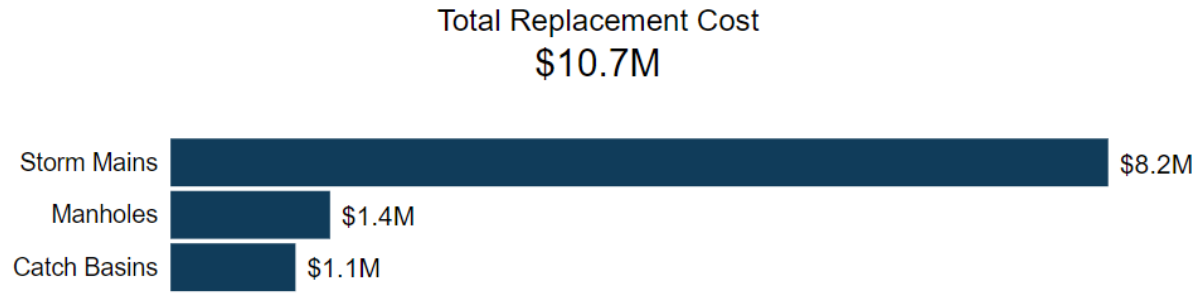
Stormwater assets enable the collection and distribution of stormwater in developed areas with less natural capacity to absorb runoff. In this AMP, stormwater segments can be generally described as follows:

Catch Basins: Collect stormwater and provide pre-treatment through removal of sediment and large debris.
Manholes: Provide access to the storm mains and catch basins.
Storm Mains: Used to distribute stormwater collected from roads and streets to the discharge area (i.e., river).

Asset Inventory & Replacement Cost

The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the Town's Stormwater Network inventory.

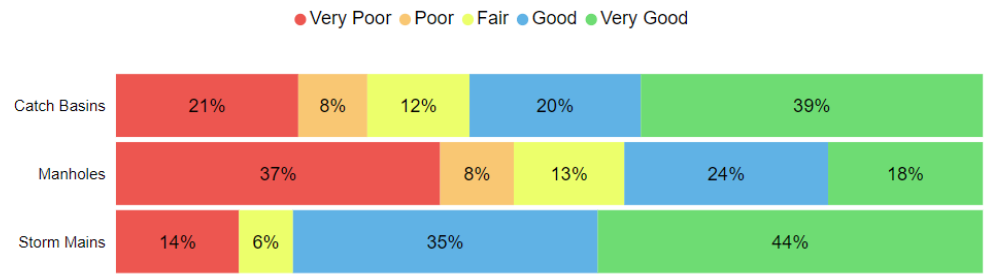
Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Catch Basins	243 units	77% Cost/Unit 23% CPI Tables	$1,097,000
Manholes	117 units	93% Cost/Unit 7% CPI Tables	$1,400,000
Storm Mains	13,632 m	82% Cost/Unit 15% CPI Tables 3% User-Defined	$8,231,000
Total			**$10,728,000**



Asset Condition

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

	Average Condition (%)	Average Condition Rating	Condition Source
Catch Basins	59	Fair	Age-Based
Manholes	41	Fair	Age-Based
Storm Mains	70	Good	Age-Based[7]
	65	**Good**	**Age-Based**



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

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 municipality's current approach:

- Staff completed CCTV inspections of the entire storm main network in 2021. The Town is currently working to review and compile the collected data and then complete uploads to Citywide, their asset management software system.

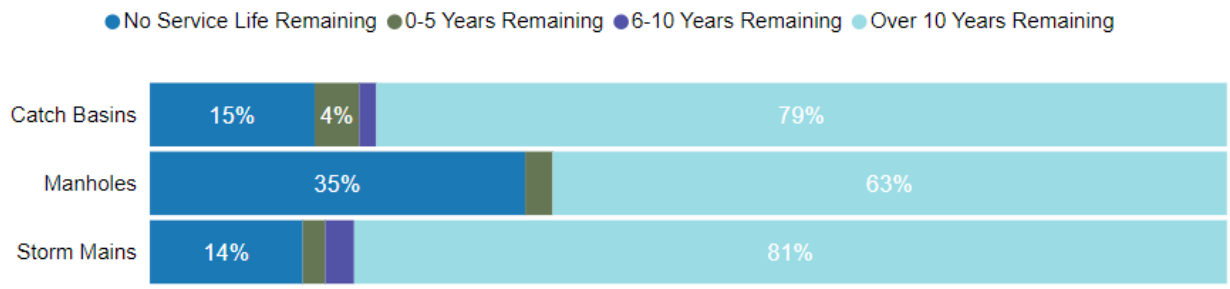
[7] Sioux Lookout recently completed CCTV assessments for many of their storm and wastewater mains. The town is currently working on a data upload strategy.

- Going forward, the Town intends to complete network wide inspections every 8-10 years, however depending on the outcome of the 2021 inspections the timeline may be accelerated

Estimated Useful Life & Average Age

The Estimated Useful Life for Stormwater Network assets are assigned according to a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service. The Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Catch Basins	40	21.1	18.9
Manholes	40	21.7	18.3
Storm Mains	40-100	34.8	25.9
		29.6	**23.1**



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

Lifecycle Management Strategy

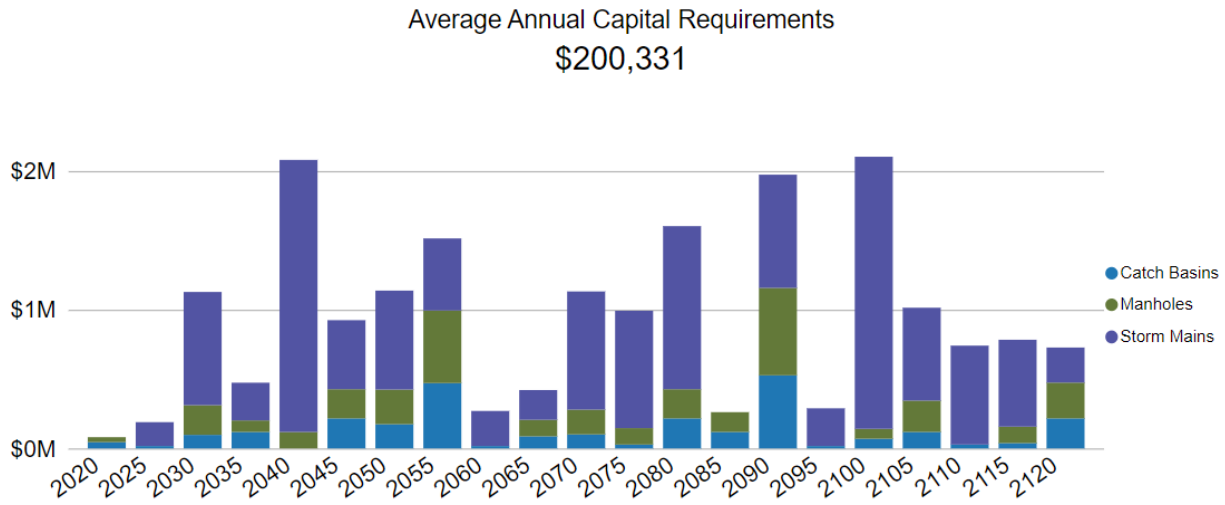
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Maintenance & Inspection	All catch basins and manholes are inspected annually.
	All catch basins and manholes receive annual vacuming.
	Based on findings from annual manhole and catch basin inspections and as otherwise needed, Storm mains are flushed.
	In 2021 CCTV inspections were completed for the entire network. This information will be used to drive forward rehabilitation and replacement plans
Replacement	Storm replacement considers the assets condition, and potential for coordinated replacement with other assets (i.e., replacement of related road).

Forecasted Capital Requirements

The average annual capital requirement for stormwater assets is $200, 231. This figure represents the average amount per year that the Town should allocate towards funding rehabilitation and replacement needs. Forecasted capital requirements are forecasted in 5-year buckets for the next 100 years.



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

Risk & Criticality

Risk Matrix

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

Probability of Failure (POF)	Consequence of Failure (COF)
Condition (Operational): 64%	Replacement Cost (Financial): 75%
Pipe Material (Operational): 16%	Diameter (Operational): 25%
Service Life Remaining (Economic): 20%	

The following risk matrix provides a visual representation of the relationship between the probability and the consequence of failure for the stormwater main assets based on 2020 inventory data.

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

The identification of critical assets allows the Town to determine appropriate risk mitigation strategies and treatment options. Risk mitigation may include asset-specific lifecycle strategies (i.e., replacement or rehabilitation), or broader asset data projects like collecting condition assessment information.

Risks to Current Asset Management Strategies

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

Capital Funding Strategies
Limited tax-based capital funding is a challenge for stormwater assets. While external (i.e., federal, or provincial) funding programs are sometimes available the Town finds it can be difficult to access. Specifically, accessing funding requires extensive applications and pre-planning which the Town may not have the staff capacity and/or funding to complete. Further, when funding is received it often must be spent within a defined timeline which may be impractical (i.e., seasonal interferences).

Levels of Service

The following tables identify the Town's current level of service for 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 Town 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 Stormwater Network.

Service Attribute	Qualitative Description	Current LOS (2020)
Scope	Description, which may include map, of the user groups or areas of the municipality that are protected from flooding, including the extent of protection provided by the municipal stormwater system	At this time, the Town does not have flood mapping to determine its flood resilience, including the number of properties protected. The Town has identified the need for more information of storm resilience and is working on a strategy to develop and collect such information.

Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2020)
Scope	% of properties in municipality resilient to a 100-year storm	TBD[8]
	% of the municipal stormwater management system resilient to a 5-year storm	100%[9]
Performance	Current capital reinvestment rate	0%

[8] The Town does not currently have data available to determine this technical metric. The rate of properties that are expected to be resilient to a 100-year storm is expected to be low.
[9] This is based on the observations of municipal staff.

Recommendations

Asset Inventory

- Ensure regular review of asset inventory to ensure it remains accurate, relevant, and of utility to staff and their asset management decisions.
- Ensure inventory updates occur as assets change or replaced.

Condition Assessment Strategies

- Upload the CCTV assessments findings to the Citywide database to ensure that lifecycle strategies, including replacement decisions, are based on the most up to date condition information.
- Consider more frequent CCTV inspections on assets identified in fair or worse condition and assets that are particularly critical to the system. Promptly update completed assessments into Citywide.

Risk Management Strategies

- Implement risk-based decision-making as part of asset management planning and budgeting processes. This should include the regular review of the risk models themselves alongside the review of high-risk assets to determine appropriate risk response and mitigation strategies.
- Review available asset attribute information to determine its suitability for assessing risk. If additional attribute data may be of value, consider information reliability and means of regular collection and update.

Lifecycle Management Strategies

- Document and review lifecycle management strategies for the Stormwater Network on a regular basis to achieve the lowest total cost of ownership while maintaining adequate service levels.

Levels of Service

- Begin to procure flood analysis and mapping, specifically as it relates to 5 and 100-year storm events so that O. Reg 588/17 mandated LOS can be collected and reported on. In the event of future storms, this information may also provide practical benefits to the Town.
- Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify strategies to close any gaps between current and proposed levels of service.

Non-Core Asset Categories

Sioux Lookout's non-core assets as defined by O. Reg. 588/17 are as follows:

- Airport[10]
- Buildings
- Fleet
- Land Improvements
- Landfill
- Machinery & Equipment

The following describes typical assets within each of the above noted asset categories. Please note Airport assets are discussed in section 6 of the AMP:

Buildings: Various buildings used to support municipal operations and provide recreational services. Includes fire halls, museums, library, recreation centres, medical centre, municipal offices, and operational buildings.

Fleet: A variety of licenced and unlicensed assets (i.e., tractors) and related attachments (i.e., plow). Includes zamboni, snow ploughs and attachments, fire services vehicles, various public work utility trucks and street sweepers.

Land Improvements: A variety of assets, in most cases constructed outdoors, that support recreational activities. Assets include sports fields and courts, playgrounds, park shelters and concession stand and walkways.

Machinery & Equipment: A wide variety of assets used to support the operations of the municipality across a variety of departments. Typical assets include fire equipment, such as breathing apparatus, fire suits, and pumps, technology and communications equipment including computers, servers, and telephones and public works equipment such as line painting machine and an air compressor.

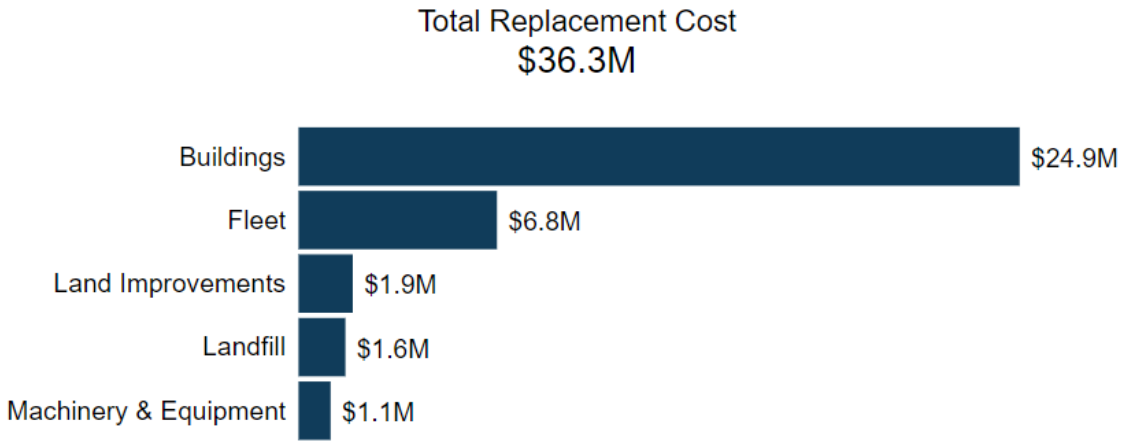
Landfill: Building and fleet and fleet equipment assets used to operate the landfill. Includes landfill office and garage and compactor, loader, and packer.

[10] Airport assets uniquely funded through Airport Improvement Fees are discussed in more detail in section 6.

Asset Inventory & Replacement Cost

The table below includes the quantity, replacement cost method and total replacement cost of each non-core asset category in the Town's inventory. Please note as per footnote below, airport assets are detailed in section 5, rate-funded assets.

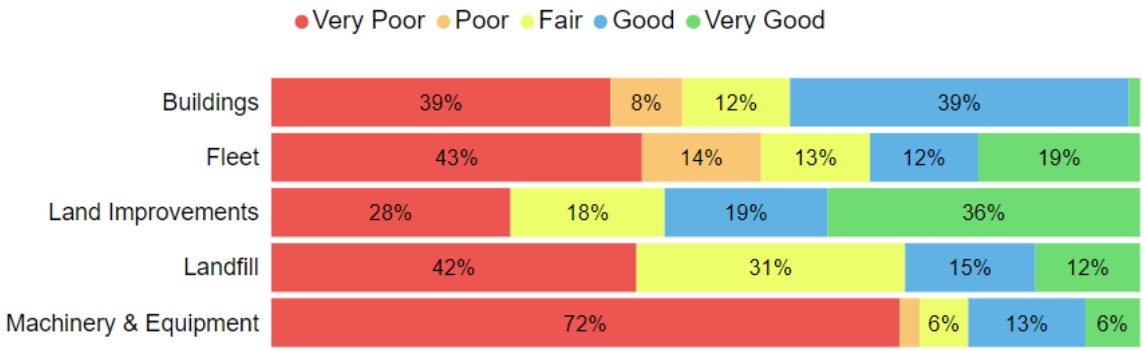
Asset Category	Quantity	Replacement Cost Method	Total Replacement Cost
Buildings	21 (109 components)	CPI Tables	$24,852,000
Fleet	55	48% CPI Tables 52% User-Defined	$6,839,000
Land Improvements	35	CPI Tables	$1,869,000
Landfill	12	CPI Tables	$1,615,000
Machinery & Equipment	142	CPI Tables	$1,105,000
Total			**$36,280,000**



Asset Condition

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

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Buildings	40	Fair	Age-Based[11]
Fleet	36	Poor	Age-Based
Land Improvements	53	Fair	Age-Based
Landfill	43	Fair	Age-Based
Machinery & Equipment	19	Very Poor	Age-Based

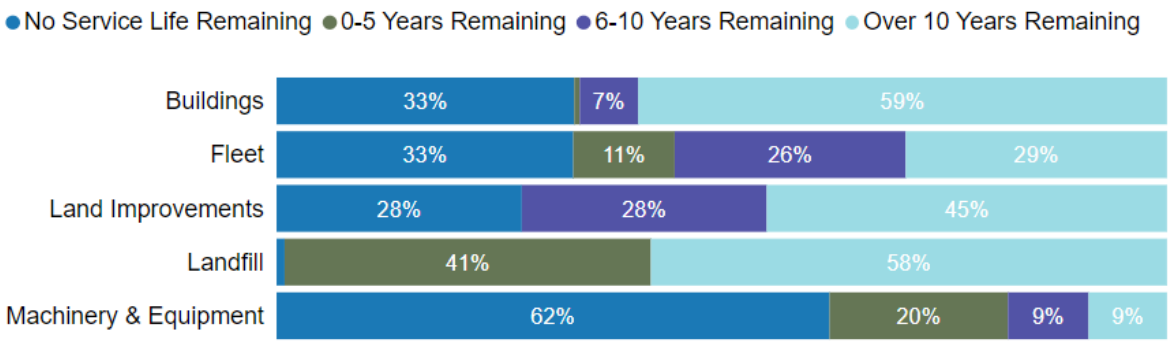


[11] Building Condition Assessments were recently completed on most of the Town's Buildings. There are active plans to upload these assessments in Q4 of 2022.

Estimated Useful Life & Average Age

The Estimated Useful Life for non-core assets has is assigned based on both established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service. The Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

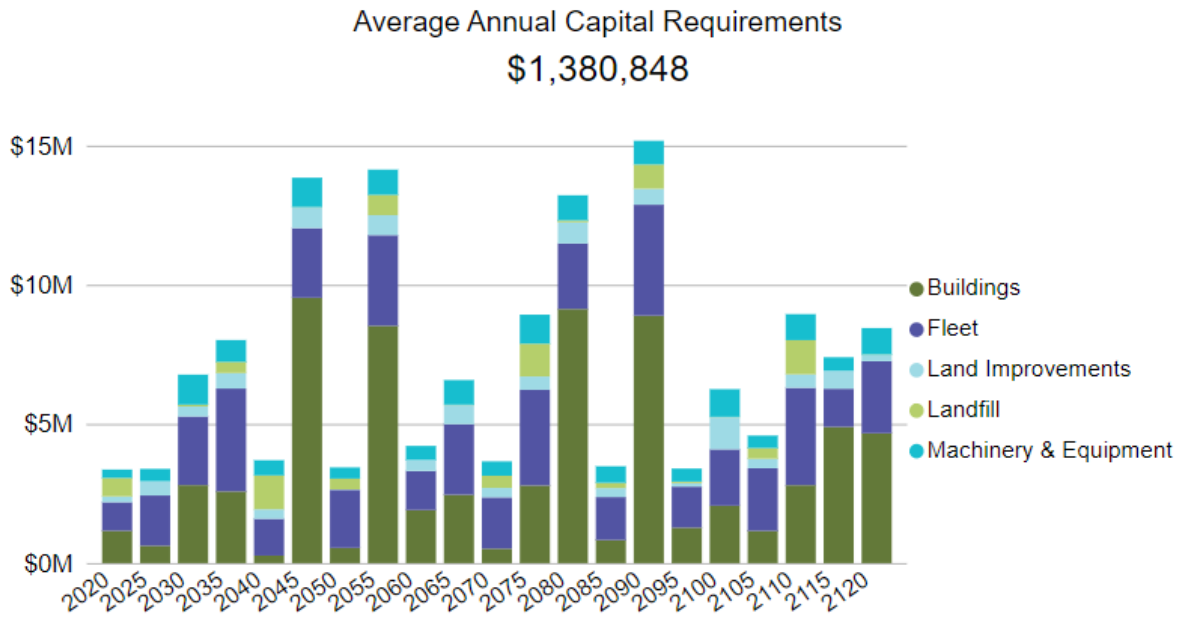
Asset Category	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Buildings	15-40	23.6	6.0
Fleet	10-20	14.1	0.7
Land Improvements	10-100	13.9	22.3
Landfill	10-40	12.4	12.6
Machinery & Equipment	3-25	11.0	-1.7



Regular review of an asset's Estimated Useful Life is helpful to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

Forecasted Capital Requirements

The following graph forecasts long-term capital requirements for the period of 2020 to 2120. Total forecasted capital requirements vary by the 5-year period reported. The average annual capital requirement for all non-core assets is $1.3 million. The annual capital requirement represents the average amount per year that the Town should allocate towards funding rehabilitation and replacement needs.



Please refer to Appendix B for the projected cost of lifecycle activities identified for completion over the next 10 years to maintain the current level of service.

Recommendations

Asset Inventory

- Complete a regular review of asset to ensure that all fields, especially estimated useful life, are appropriate.
- Review componentized assets to determine if they may be best suited as a primary asset or not.

Condition Assessment Strategies

- Work to upload Building Condition Information into the database so that information is more accurate and comprehensive.
- Consider collecting assessed condition information for other non-core assets, especially high value and/or high criticality assets (e.g., fire fleet).

Risk Management Strategies

- Review available asset attribute information to determine its suitability for assessing risk. If additional attribute data may be of value, consider information reliability and means of collection and update.
- Begin implementing risk models for non-core assets; start with most critical asset categories and/or categories with readily available data.

Levels of Service

- Begin identifying any potential key performance indicators which may be suitable Level of Service metrics to meet O. Reg. 588/17 2024 requirements.
- Start measuring proposed LOS metrics in advance of the O. Reg. 588/17 deadline to assess metrics suitability, accuracy, and data availability. This will assist the municipality in selecting appropriate metrics upon O. Reg. 588/17 deadline.

.

5 Analysis of Rate-funded Assets

Key Insights

- The 2020 replacement value of all rate-funded assets is $92 million
- Most (69%) 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 $3.8 million
- Assets deemed of high risk should be evaluated to determine appropriate risk mitigation activities and treatment options

Water Network

The water services provided by the Town are administered by the Public Works Department in conjunction with Northern Waterworks Incorporated (NWI). NWI primarily oversees the operations, reporting, and rehabilitation of the water treatment plant and lift stations. NWI completes all required ministerial reporting for any unplanned maintenance events. Typically, the Town completes unplanned maintenance tasks for the distribution system.

The water network is comprised of a variety of asset segments used to treat, distribute, and support the operations of the water network. These asset segments can be described as follows:

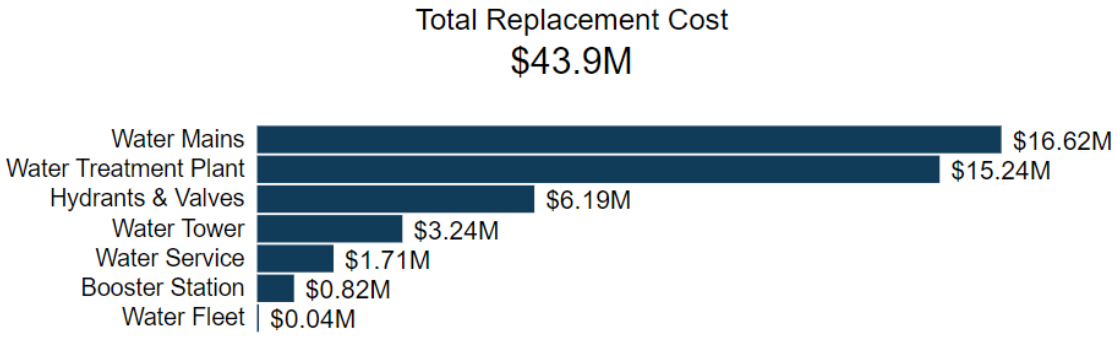
- Booster Stations: support the distribution of water at adequate pressures and flow throughout the distribution system, and especially across different land elevations.
- Hydrants & Valves: Hydrants provide water for fire protection services; valves enable water mains to be temporarily shut off often for maintenance purposes.
- Water Fleet: Cube van to support water operations.
- Water Mains: Distribute water from the water treatment plant throughout the Town
- Water Services: small distribution pipes collected to the water mains. Water Services distribute water directly to properties.
- Water Tower: Elevated structure supporting a water tank to enable the delivery of water at a sufficient pressure.
- Water Treatment Plant: A building comprised of various machinery and equipment to enable the treatment of water such that is safe for drinking.

Asset Inventory & Replacement Cost

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

Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Booster Stations	11	39% CPI Tables 61% User-Defined	$824,000
Hydrants & Valves	552	68% Cost/Unit 1% CPI Tables 31% User-Defined	$6,192,000
Water Fleet	1	CPI Tables	$40,000
Water Mains	32,343 m	70% Cost/Unit 17% CPI Tables 13% User-Defined	$16,620,000

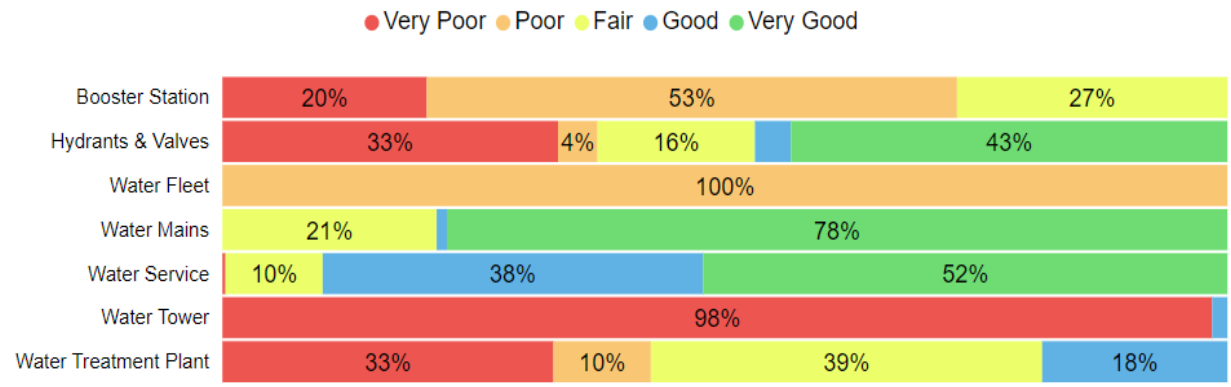
Water Service	3,673 m	9% CPI Tables 91% Cost/Unit	$1,707,000
Water Tower	2	CPI Tables	$3,245,000
Water Treatment Plant	2 (118 components)	75% CPI Tables 25% User-Defined	$15,242,000
Total			**$43,870,000**



Asset Condition

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

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Booster Stations	30	Poor	61% Assessed
Hydrants & Valves	52	Fair	Age-Based
Water Fleet	38	Poor	Age-Based
Water Mains	86	Very Good	Age-Based
Water Service	79	Good	Age-Based
Water Tower	8	Very Poor	Age-Based
Water Treatment Plant	34	Poor	25% Assessed
	56	**Fair**	**10% Assessed**



To ensure that the Town'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, the lifecycle management strategy should be revaluated to determine what combination of maintenance, rehabilitation and replacement activities is required to increase the overall condition of the Water Network.

Current Approach to Condition Assessment

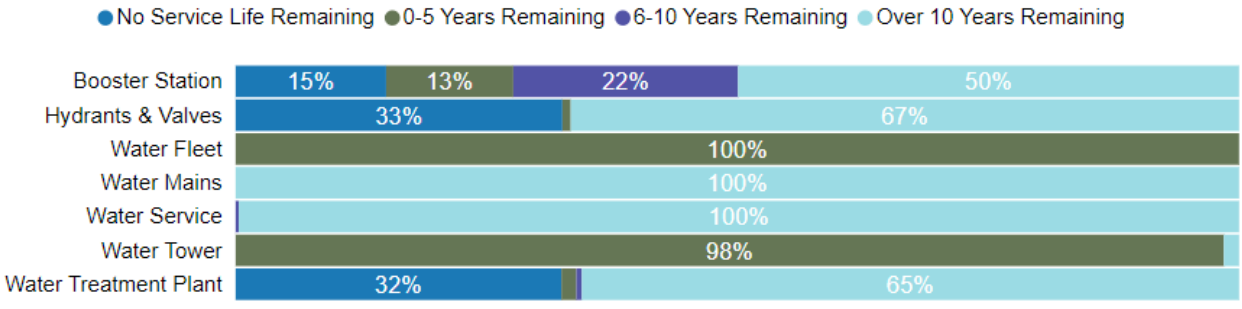
Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets more confidently. The following describes the municipality's current approach:

- Staff primarily rely on the age and material of water mains to determine the projected condition of water mains
- Where a pipe is excavated, staff informally collect and document condition information
- Currently, there are no formal condition assessment programs in place for linear water assets
- NWI inspects booster stations bi-annually and the water treatment plan annually. Specific components are inspected, tested, and serviced as follows:
    - Annually: Flow meter verifications, hoist inspections, fire extinguisher inspections
    - Bi- annual: Backflow prevention device testing
    - Every three year: Thermal imaging inspections, emergency generator servicing, generator battery replacement
    - Every Five years: UPS battery replacement, reservoir cleaning and inspections\
    - Every 10 years: Intake Structures and standpipes
- In late 2020 third-party conducted Building Condition Assessments were completed on the Water facilities (excluding equipment). Based on Uniformat II, buildings were componentized and assigned assessed condition ratings based on a 1-5 scale.

Estimated Useful Life & Average Age

The Estimated Useful Life for Water Network assets is based on both established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service. Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Booster Stations	10-75	33.9	11.5
Hydrants & Valves	30-60	20.2	27.9
Water Fleet	10	6.1	3.9
Water Mains	90	36.9	53.1
Water Service	25-90	11.9	50.9
Water Tower	20-40	20.9	9.1
Water Treatment Plant	3-75	17.9	12.9
		23.9	**39.2**



A period review of each asset's Estimated Useful Life is helpful to determine whether adjustments may be needed to better align with the observed length of service life for each asset type.

Lifecycle Management Strategy

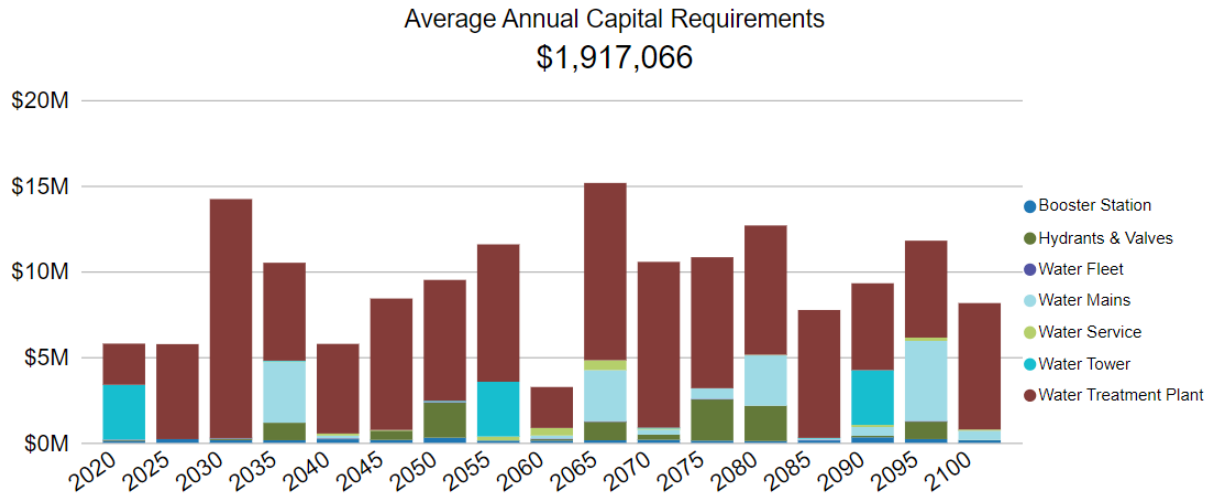
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Maintenance	NWI conducts distribution system flushing and routine hydrant maintenance on a semi-annual to annual basis. At this time, any major deficiencies are identified.
	On an annual basis valve turning is completed for the entire network.
	In an effort to prepare for and mitigate unplanned maintenance events at the Water Treatment plant the following measures are in place: equipment interchangeability and redundancy, spare parts inventories, and the availability of relevant operations and maintenance manuals.
	After a watermain break, NWI monitors flow rates to ensure the issue has been fully resolved.
Rehabilitation	Rehabilitation of distribution network assets does not occur currently.
	NWI's annual review of booster stations and water treatment plants may result in recommendations for asset rehabilitation. NWI provides these recommendations to the Town for their review and approval.
Replacement	In the absence of mid-lifecycle rehabilitative events, water mains are maintained with the goal of full replacement once it reaches its end-of-life
	Replacement activities for the distribution network are identified based on an analysis of condition, as well as the assets' location and coordination with the replacement of other asset systems.
	Annually, NWI evaluates overall infrastructure adequacy and provision which includes the identification of deficiencies and the application of recommendations to address those deficiencies. This review is the main input to the annual capital budgets prepared by NWI for consideration and approval by the Municipality of Sioux Lookout

Forecasted Capital Requirements

The following graph forecasts capital requirements in 5-year cumulative bins from 2020 to 2100. Also reported is the average annual capital requirement which is $1.9 million and represents the average amount per year that the Town should allocate towards funding rehabilitation and replacement needs.



The projected cost of lifecycle activities identified for completion over the next 10 years to maintain the current level of service can be found in Appendix B.

Risk & Criticality

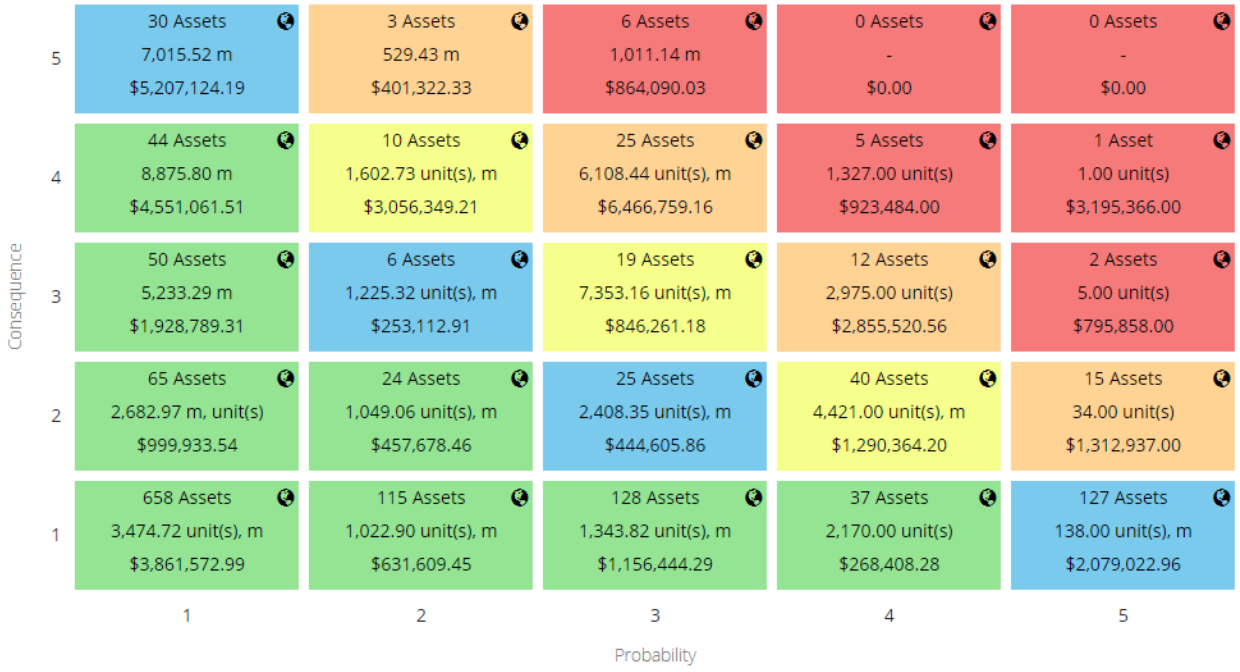
Risk Matrix

The asset-specific attributes and their weighting as noted in brackets that municipal staff utilize to define and prioritize the criticality of the water network mains are as follows:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition (Operational): 80%	Replacement Cost (Financial): 80%
Pipe Material (Operational): 20%	Diameter (Strategic): 20%

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

Based on these parameters, the following risk matrix provides a visual representation of the relationship between the probability and the consequence of failure for water network main assets based on 2020 inventory data.



Risks to Current Asset Management Strategies

In addition to the quantified risks measured above, the water network is exposed to qualitative risks. These are general risks that threaten the service delivery and affect multiple assets to varying extents:

Aging Infrastructure

As the Town's water assets continue to age, more significant capital investments are anticipated. Currently, annual funding amounts are not sufficient, and the funding shortfall is expected to increase as the inventory's average age increased.

Demographic Changes

As discussed in Section 6: Impacts of Growth, Sioux Lookout has experienced population growth in the last several years which is placing increased demand on their infrastructure. This population growth has necessitated upgrades to water infrastructure assets like booster stations. The resultant demand for capital funding to meet growth needs are a potential risk to funding the capital needs of existing assets.

Levels of Service

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

Community Levels of Service

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

Service Attribute	Qualitative Description	Current LOS (2020)
Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal water system	The Municipal water system services the settlement areas of Sioux Lookout and Hudson and provides water to a variety of users including residential, commercial, and light industrial. See Appendix C
	Description, which may include maps, of the user groups or areas of the municipality that have fire flow	At this time, it is assumed that where there are water services there is sufficient fire flow. Please refer to Appendix C for a map of watermains.
Reliability	Description of boil water advisories and service interruptions	The Municipality experienced no boil water advisories in 2020. However, water service interruptions may occur due to main breaks, maintenance activities or reconstruction projects. Staff attend to these interruptions in a timely manner, when possible.

Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2020)
Scope	% of properties connected to the municipal water system	62%
	% of properties where fire flow is available	62%[12]
Reliability	# of connection-days per year where a boil water advisory notice is in place compared to the total number of properties connected to the municipal water system	0
	# of connection-days per year where water is not available due to water main breaks compared to the total number of properties connected to the municipal water system	0
Performance	Capital re-investment rate	1.42%

[12] Figure assumes that any properties connected to municipal water have adequate fire flow. Currently, there are no fire flow studies.

Recommendations

Asset Inventory

- Regularly review and update inventory information so it is most accurate and best informs asset management decisions
- Review asset attributes to determine their suitability; consider removing attributes that are no longer relevant or useful. Identify any additional attributes that may be valuable to collect.

Condition Assessment Strategies

- Consider completing condition assessment for the distribution network. Consider prioritizing mains of high replacement value, system criticality, and/or high-risk.

Risk Management Strategies

- Work to assess the Town's risk tolerance and work to develop risk mitigation strategies suitable for all asset categories, including water.
- Implement risk-based decision-making as part of asset management planning and budgeting processes. This should include the regular review of both the risk model itself and high-risk assets.
- Review data available to calculate risk, ensure it remains accurate, updated, and relevant. If additional attribute data points are deemed of significant value review feasibility to collect and manage data going forward.

Levels of Service

- Continue to measure current levels of service in accordance with the metrics that the Town has established in this AMP. Consider refining the Town's understanding of fire flow sufficiency.
- 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.

Wastewater Network

Wastewater services provided by the Town are overseen by the Public Works department in conjunction with NWI. Together, the Town and NWI manage and operate wastewater treatment (including one communal septic field) and collection assets.

The wastewater network is comprised of sanitary collection (force mains, sewers, pumping stations) and treatment assets alongside assets that support the maintenance and operation of the system (chambers, manholes). These can be described as follows:

- Chambers: Used to inspect the collection system. Typically, smaller than manholes.
- Manholes: vertical access shaft from the ground surface used to inspect, clean, and repair the sewer.
- Force mains and Valves: Pressurized sewer pipe used to convey wastewater.
- Sewers: convey wastewater from properties to the treatment plant through gravity conveyance.
- Fleet: Vacuum truck, sewer flusher, and dump trailer used for wastewater purposes.
- Wastewater Treatment Plant: A building containing a variety of machinery and equipment used to treat wastewater through preliminary, primary, secondary, and tertiary treatment.

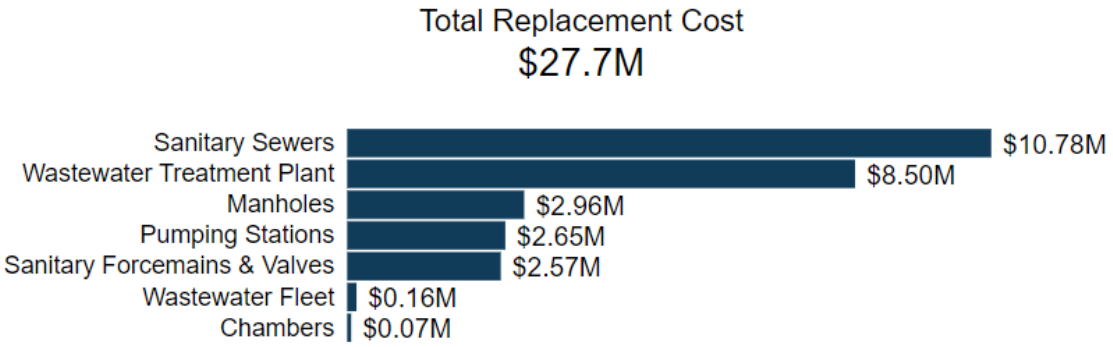
Asset Inventory & Replacement Cost

The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the Town's Sanitary Sewer Network inventory.

Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Chambers[13]	4 units	CPI Tables	$67,000
Manholes	246 units	Cost/Unit	$2,963,000
Pumping Stations	10	84% CPI Tables 16% User-Defined	$2,647,000
Sanitary Forcemains & Valves	6,610 m	80% CPI Tables 20% User-Defined	$2,571,000
Sanitary Sewers	22,730 m	77% CPI Tables 23% User-Defined	$10,781,000
Wastewater Fleet	3	CPI Tables	$157,000

[13] Chambers are used to access

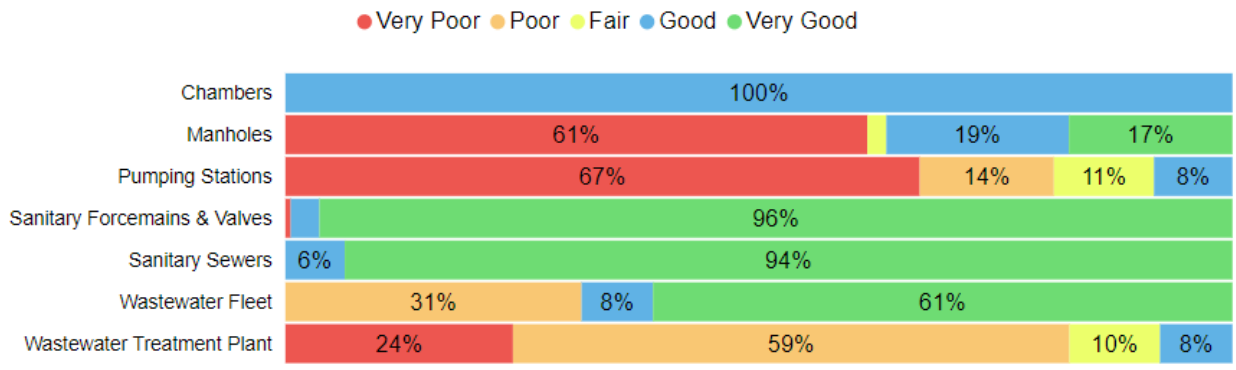
Wastewater Treatment Plant	1 (21,556 components)	66% CPI Tables 34% User-Defined	$8,503,000
Total			**$27,689,000**



Asset Condition

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

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Chambers	78	Good	Age-Based
Manholes	32	Poor	Age-Based
Pumping Stations	18	Poor	15% Assessed
Sanitary Forcemains & Valves	97	Very Good	Age-Based
Sanitary Sewers	92	Very Good	Age-Based
Wastewater Fleet	70	Good	Age-Based
Wastewater Treatment Plan	29	Poor	34% Assessed
	59	**Fair**	**12% Assessed**



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

Current Approach to Condition Assessment

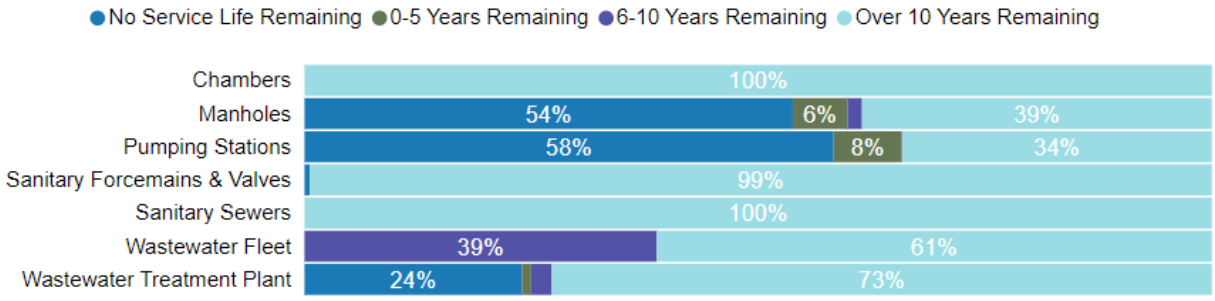
Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets more confidently. The following describes the municipality's current approach:

- Between 2013 and 2020 CCTV inspections were completed for the entire distribution network. The Town is actively working to upload these assessments to Citywide.
- Going forward, the Town plans to complete updated CCTV inspections only where there are identified issues.
- Like the water network, the wastewater treatment plant and pumping stations operations are overseen by NWI who complete regular inspections of equipment.
- Third-party conducted Building Condition Assessments were completed on the wastewater facilities (excluding equipment) in 2021. Based on Uniformat II, buildings were componentized and assigned assessed condition ratings on a 1-5 scale. The Town has active plans to upload these assessments to Citywide in Q4 of 2022.

Estimated Useful Life & Average Age

The Estimated Useful Life for Sanitary Sewer Network assets is based on established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service. Finally, the Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Chambers	5-55	13.1	46.9
Manholes	40-55	31.2	8.8
Pumping Stations	10-75	29.4	3.9
Sanitary Forcemains & Valves	55-100	14.7	72.8
Sanitary Sewers	100	34.7	65.2
Wastewater Fleet	15-20	7.0	1.3
Wastewater Treatment Plan	3-75	27.0	11.6
		30.5	**37.9**



Regular review of each asset's Estimated Useful Life (EUL) will help inform whether adjustments are needed to be made to better align the EUL with the observed length of service life for each asset type.

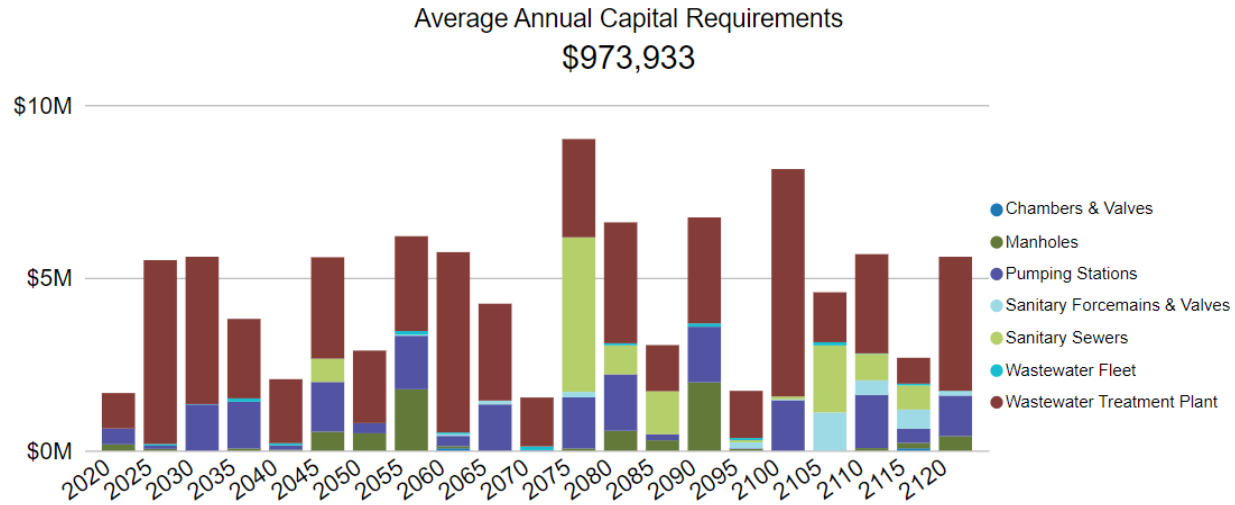
Lifecycle Management Strategy

The condition or performance of most assets will deteriorate over time. Such changes in asset condition are affected by a range of factors including an asset's characteristics, location, utilization, maintenance history and environment. The table below outlines the Town's current maintenance, rehabilitation, and replacement strategies for the wastewater network.

Activity Type	Description of Current Strategy
Maintenance & Inspection	Annually, the entire network is flushed. Problematic areas are flushed quarterly.
	CCTV inspections were complete between 2013 and 2020. Going forward there are tentative plans to conduct subsequent inspections where issues have been previously identified.
Rehabilitation	Staff are investigating trenchless relining as a rehabilitation strategy for select wastewater linear assets that are in unique locations (i.e., extend underneath rail lines) which would pose significant challenges for full replacement.
Replacement	Apart from uniquely located mains, most mains maintained with the goal of full replacement once it reaches its end-of-life.
	Replacement activities for the distribution network assets consider the assets condition, number of backups, location, and coordination with other infrastructure projects (i.e., water main replacements).
	Annually, NWI evaluates overall infrastructure adequacy and provision which includes the identification of deficiencies and the application of recommendations to address those deficiencies. This review is the main input to the annual capital budgets prepared by NWI for consideration and approval by the Municipality of Sioux Lookout

Forecasted Capital Requirements

The average annual capital requirement for the wastewater network is $973,933. This represents the average amount per year that the Town should allocate towards funding rehabilitation and replacement needs. Capital requirements for the period of 2020 to 2120 reported in 5-year cumulative bins are indicated below. These totals vary by period and asset category.



The projected cost of lifecycle activities expected over the next 10 years can be found in Appendix B.

Risk & Criticality

Risk Matrix

The asset-specific attributes that are used to measure asset risk are listed below, alongside their weighting listed in brackets, are as follows:

Probability of Failure (POF)	Consequence of Failure (COF)
Condition (Operational): 64%	Replacement Cost (Financial): 56%
Pipe Material (Operational): 16%	Segment (Economic): 24%
Service Life Remaining (Economic): 20%	Diameter (Strategic): 20%

Please refer to Appendix D for a more detailed breakdown of the risk model.

Based on the above parameters and their weightings the following risk matrix provides a visual representation of resultant probability and the consequence of failure scores for the wastewater mains based on 2020 inventory data.

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

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

Risks to Current Asset Management Strategies

In addition to the quantified risks described above the Town is exposed to other more general and qualitative risks that tend to affect a group of assets and could compromise the Town's ability to deliver service. The following risks were deemed particularly relevant to wastewater assets:

Organizational Change & Capacity

Asset management is an information intensive discipline that requires accurate data and information to support decisions. Managing data alongside other municipal operations, reporting, and project requirements is a resource challenge. Staff changes and turnover, which have been particularly prevalent for wastewater staff, further exacerbates the existing resourcing challenges.

Levels of Service

The following tables identify the Town's current level of service for Sanitary 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 Town 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 Sanitary Sewer Network.

Service Attribute	Qualitative Description	Current LOS (2020)
Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal wastewater system	The Municipal wastewater system services the settlement area of Sioux Lookout. A variety of users, including residential, commercial, and light industrial, are connected to the wastewater network. See Appendix C
Reliability	Description of how combined sewers in the municipal wastewater system are designed with overflow structures in place which allow overflow during storm events to prevent backups into homes	The Town does not own any combined sewers
	Description of the frequency and volume of overflows in combined sewers in the municipal wastewater system that occur in habitable areas or beaches	The Town does not own any combined sewers
	Description of how stormwater can get into sanitary sewers in the municipal wastewater system, causing sewage to overflow into streets or backup into homes	Storm water can get into sanitary sewers because of illegal drains connected to the sanitary system, and infiltration related to aging and damaged infrastructure. In the case of heavy rainfall events, sanitary sewers may experience a volume of water that exceeds its designed capacity. The use of sump pumps and pits directing storm water to the storm drain system can help to reduce the chance of backups occurring.

Service Attribute	Qualitative Description	Current LOS (2020)
Reliablity	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. Approximately 795,000 m3 of influent was treated in 2020; the resultant effluent was within all compliance limit parameters except for pH.

Technical Levels of Service

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

Service Attribute	Technical Metric	Current LOS (2020)
Scope	% of properties connected to the municipal wastewater system	57%
Reliability	# of events per year where combined sewer flow in the municipal wastewater system exceeds system capacity compared to the total number of properties connected to the municipal wastewater system	N/A
	# of connection-days per year having wastewater backups compared to the total number of properties connected to the municipal wastewater system	0
	# of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system	0.002
Performance	Capital re-investment rate	2.04%

Recommendations

Asset Inventory

- Review asset attributes to determine their suitability; consider removing attributes that are no longer relevant or useful. Identify any additional attributes that may be valuable to collect.

Condition Assessment Strategies

- Update asset attributes to include available CCTV assessment information as well as Building Condition Assessments (BCA). Use these assessments to further refine lifecycle strategies.
- Ensure resources are in place for future BCA, and CCTV inspections, reporting, and data update.
- Continue to work with NWI to assess and understand the condition of machinery and equipment assets within wastewater facilities.

Risk Management Strategies

- Implement risk-based decision-making as part of asset management planning and budgeting processes. This should include the determination of risk tolerance for wastewater assets and identification of risk mitigation measures.
- Review risk models on a regular basis Revise the model as appropriate and feasible based on available data.

Lifecycle Management Strategies

- Continue exploring rehabilitation options such as trenchless re-lining. If implemented, evaluate lifecycle costs and asset performance to begin assessing the viability and suitability of trenchless re-lining for other wastewater mains.
- Evaluate the efficacy of the Town's lifecycle management strategies at regular intervals to determine their impact cost, condition, and risk.

Levels of Service

- Continue to measure current levels of service in accordance with the metrics that the Town has established in this AMP.
- Where LOS information deficits are identified, begin working to collect, store, and report on the required data.

Work towards identifying proposed levels of service as per O. Reg. 588/17 and identify the strategies that are required to close any gaps between current and proposed levels of service.

6 Airports – Airport Improvement Fee Funded

Key Insights

- Airport Improvement Fees (AIFs) are costs chargeable to passengers using the airport. Collected fees are remitted to the airport and used as revenue to fund existing capital debts and capital projects. Please refer to sections 6 and 8 for further details on AIFs.

- The 2020 replacement value of all AIF-funded assets is $19.9 million

- Most (68%) AIF funded assets are in good condition

- The average annual capital requirement to sustain the current level of service for rate-funded assets is approximately $950,000

Airport

As Northern Ontario's busiest airport, the Sioux Lookout Municipal Airport serves to provide essential service to the community. In the 2020 Strategic Plan it is identified as a critical enabler of the Municipality's innovation and development. This non-core asset category contains a diverse array of assets. Information on airport specific funding and the assets included are detailed in the following sections.

The airport contains a wide variety of assets which serve various functions. The following summarizes typical assets found within each of the airport segments listed in the tables below:

Airfield Lighting: Various airfield lighting assets located on runways, taxiways, and aprons.

Airport Buildings: The buildings located at the airport including the components (i.e., doors, flooring) within. Main assets include the airport garage, administration building, and fuel service building.

Airport Machinery & Equipment: Assets used to support the operations and administration of the airport. Assets include computers, security cameras and airstrip maintenance equipment.

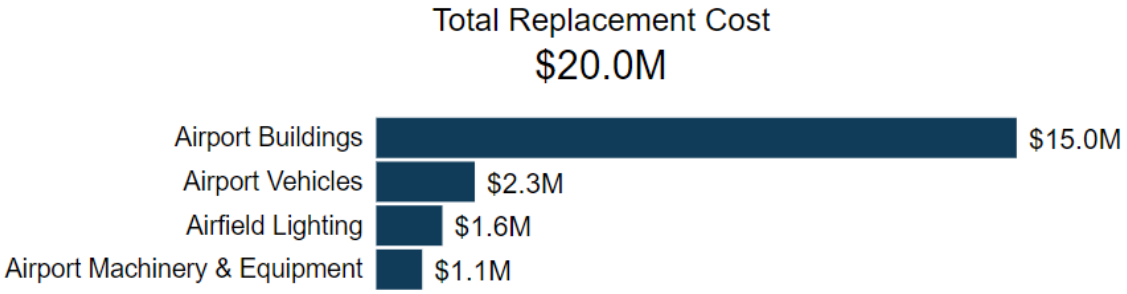
Airport Vehicles: Licensed and unlicensed vehicles used to support the summer and winter maintenance of the airport parking lots, runways, and taxiway. Assets include trucks, plows, sweepers, tractors, and attachments.

Asset Inventory & Replacement Cost

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

Asset Segment	Quantity (components)	Replacement Cost Method	Total Replacement Cost
Airfield Lighting	16[14]	CPI Tables	$1,552,000
Ariport Buildings	3 (26)	CPI Tables	$15,025,000
Ariport Machinery & Equipment	14	93% CPI Tables 7% User-Defined	$1,078,000
Ariport Vehicles	20	CPI Tables	$2,313,000
Total			**$19,968,000**

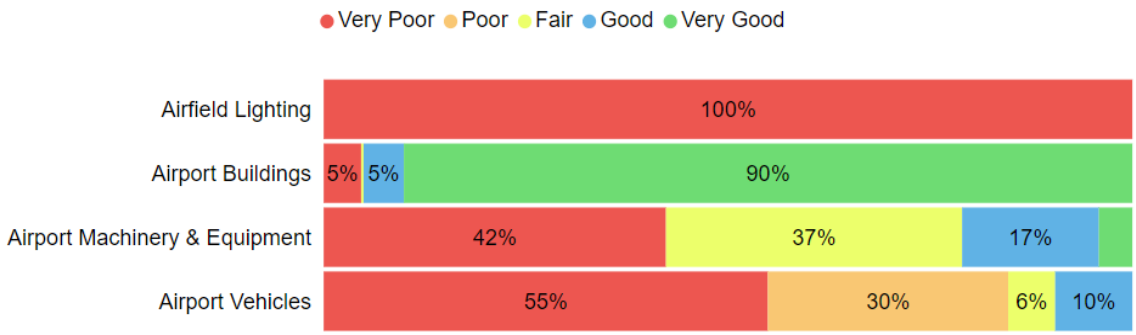
[14] Comprised of 13 airfield flood lighting poles and 3 (runway, taxiway, apron) electrical infrastructure systems


Total Replacement Cost
$20.0M
Airport Buildings
$15.0M
Airport Vehicles
$2.3M
Airfield Lighting
$1.6M
Airport Machinery & Equipment
$1.1M

Asset Condition

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

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Airfield Lighting	7	Very Poor	Age-Based
Ariport Buildings (components)	83	Very Good	Age-Based
Ariport Machinery & Equipment	30	Poor	Age-Based
Ariport Vehicles	22	Poor	Age-Based
	68	**Good**	**Age-Based**

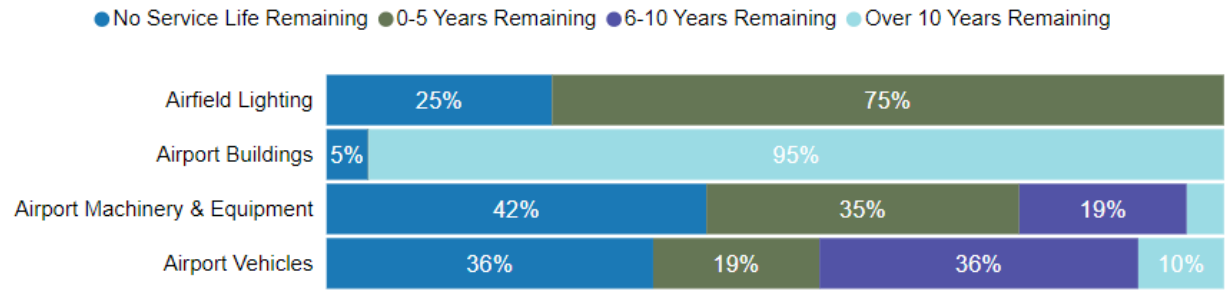


To ensure that the Town's Airport continues to provide an acceptable level of service, the average condition of all assets should be regularly monitored. If the average condition declines, it is best to re-evaluate the lifecycle management strategy to determine what combination of maintenance, rehabilitation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

Estimated Useful Life & Average Age

The Estimated Useful Life for Airport assets is based on a combination of established industry standards and staff knowledge. The Average Age of each asset is based on the number of years each asset has been in-service. The Average Service Life Remaining represents the difference between the Estimated Useful Life and the Average Age, except when an asset has an assessed condition rating. Assessed condition may increase or decrease the average service life remaining.

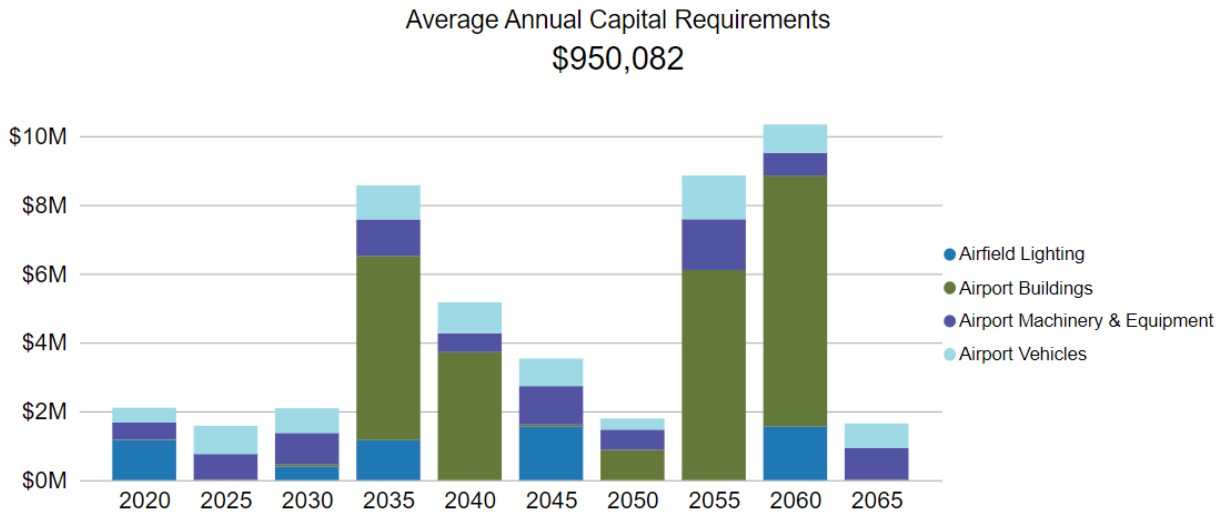
Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Airfield Lighting	15	14.7	0.3
Ariport Buildings (components)	5-50	13.6	14.1
Ariport Machinery & Equipment	3-20	10.1	-2.1
Ariport Vehicles	10-20	14.2	1.6
		13.1	**5.9**



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

Forecasted Capital Requirements

The average annual capital requirements for airport assets is $950,082. This represents the average amount per year that the Town should allocate towards funding rehabilitation and replacement needs. The 5-year cumulative capital requirements for the period of 2020-2065 is also reported and as indicated below, total requirements vary significantly by reporting period and by asset category.



Please refer to Appendix B for the projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service.

Recommendations

Asset Inventory

- Upload Building Condition Assessments for the Airport buildings
- Review existing attributes for airport fleet, machinery, and equipment to ensure they remain relevant, accurate, and comprehensive.

Lifecycle Strategies

- Begin developing lifecycle strategies for airport roads, and runways with airport specific considerations applied
- Use the recommendation asset interventions and schedules as the basis for the lifecycle strategy for airport building assets

Levels of Service

- Begin to identify potential LOS for airport assets. Review any existing KPIs to determine their suitability as a LOS and considering the feasibility of collecting and reporting on LOS when selecting them.

7 Impacts of Growth

Key Insights

- Population and employment growth is expected in the Town until at least 2030.

- While the Town has identified strategies to accommodate population growth, any additional costs of growth (i.e., additional services) should be considered in long-term funding strategies that maintain the current level of service.

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 Town to plan for new infrastructure and the upgrade or disposal of existing infrastructure more effectively. Changes in demand can affect the required assets and level of service.

Sioux Lookout Official Plan (July 2019)

On November 21st, 2018, Sioux Lookout adopted a new Official Plan which became effective on July 11th, 2019. The Official Plan serves as a formal mechanism to establish a vision, guiding principles, objectives, and policies for the Town and its future development. It is also an integral document to guide the physical development and the effect of change on the social, cultural, economic, and natural environment over 20 years.

There are two Settlement Area defined in the official plan: Urban Sioux Lookout (primary settlement area) and Hudson (secondary settlement area). The Settlement Areas, particularly Urban Sioux Lookout, are areas for planned growth where existing public services and infrastructure can be used optimally, and outward sprawl of development into areas of natural resources and natural heritage is minimized.

The Official Plan outlines areas for growth specific to the land-use type. For example, commercial growth is intended to occur in the commercial core so that residents are provided services close to home while protecting the vitality of the area. Other commercial uses (i.e., gas stations, large format retail) that cater to the travelling public and require larger areas for development are identified for Highway Commercial Areas.

Population & Economic Growth Projections

While Sioux lookout's population was in decline until 2011 it has since seen growth which is projected to continue until at least 2030. The rate of growth is slightly behind growth rates for the province of Ontario.

The demographic makeup of Sioux- Lookout has changed too, with the share of economically active young persons (ages 25 to 44) declining most since 2001. However, despite this Sioux Lookout still has a larger share of economically active young persons when compared to Ontario as a whole.

The following table outlines historic and forecasted population figures for Sioux Lookout. Actual Projection figures are sourced from Statistics Canada, projected population figures are sourced from McSweeney & Associates from Manifold Data Mining Inc. Super Demographics 2017.

Actual or Projected Population (*)					
2006	**2011**	**2016**	**2021**	**2024**	**2029**
5,183	5,037	5,272	5,839	5,861*	6,359*

Impact of Growth on Lifecycle Activities

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

Sioux Lookout's Official Plan has accounted for growth and its potential impacts on infrastructure availability and capacity. Based on the latest population projections the Town is positioned to provide water and wastewater until 2037. Development principles that focus on the settlement areas with existing services, allow the Town's population to expand while utilizing existing infrastructure like roads and underground utilities. Where municipal services require expansion because of growth (i.e., outside of the settlement Areas) financial mechanisms like development charges are identified as a cost recovery strategy.

If growth-related assets are constructed or acquired, they should be integrated into the Town's AMP. While the addition of residential units will add to the existing assessment base and offset some of the costs associated with growth, the Town may need to review the lifecycle costs of growth-related infrastructure to ensure that any cost recovery mechanisms (i.e., Development charges) fulsomely recover the lifecycle costs of any additional infrastructure requirements. These costs should be considered in long-term funding strategies that are designed to, at a minimum, maintain the current level of service.

8 Financial Strategy

Key Insights

- The Town is committing approximately $2,515,000 towards capital projects per year from sustainable revenue sources
- Given the annual capital requirement of $5,677,000, there is currently a funding gap of $3,162,000 annually
- For tax-funded assets, we recommend increasing tax revenues by 0.9% each year for the next 10 years to achieve a sustainable level of funding
- For the Sanitary Sewer Network, we recommend increasing rate revenues by 1.7% annually for the next 15 years to achieve a sustainable level of funding
- For the Water Network, we recommend increasing rate revenues by 2.6% annually for the next 20 years to achieve a sustainable level of funding
- For the Airport, we recommend review the adequacy of the AIF rate at the end of the current 15-year term

Financial Strategy Overview

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

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

1. The financial requirements for:
    a. Existing assets
    b. Existing service levels
    c. Requirements of contemplated changes in service levels (none identified for this plan)
    d. Requirements of anticipated growth (none identified for this plan)
2. Use of traditional sources of municipal funds:
    a. Tax levies
    b. User fees
    c. Reserves
    d. Debt
3. Use of non-traditional sources of municipal funds:
    a. Reallocated budgets
    b. Partnerships
    c. Procurement methods
4. Use of Senior Government Funds:
    a. Canada Community Building Fund (CCBF), formerly known as Gas tax
    b. Annual grants
    c. Airports Capital Assistance Program (ACAP)
5. Use of traditional sources of airport funds:
    a. Airport Improvement Fee

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.

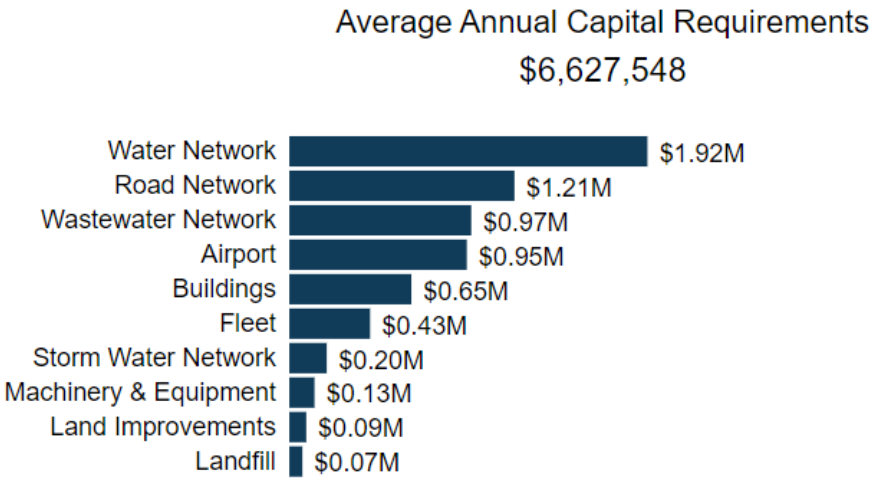
If the financial plan component results in a funding shortfall, the Province requires the inclusion of a specific plan as to how the impact of the shortfall will be managed. In determining the legitimacy of a funding shortfall, the Province may evaluate a Town's approach to the following:

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

Annual Requirements & Capital Funding

Annual Requirements

The annual requirements represent the amount the Town 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 Town must allocate approximately $6.6 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 wastewater and water network, lifecycle management strategies have been developed to identify capital costs that are realized through strategic rehabilitation and renewal of the Town's roads and water and wastewater assets respectively. For the water and wastewater network the lifecycle strategy is based on the completion of

replacement and repairs as per recommendations from Building Condition Assessment s(BCA) completed by Nadine Engineering Consultants. The development of these strategies allows for a comparison of potential cost avoidance if the strategies were to be implemented. The following table compares replacement and lifecycle strategy scenarios:

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

Asset Category	Annual Requirements (Replacement Only)	Annual Requirements (Lifecycle Strategy)	Difference
Road Network	$2,422,944	$1,205,288	$1,217,656
Water Network	$1,831,694	$1,917,066	($85,372)
Wastewater Network	$899,589	$973,932	($74,343)

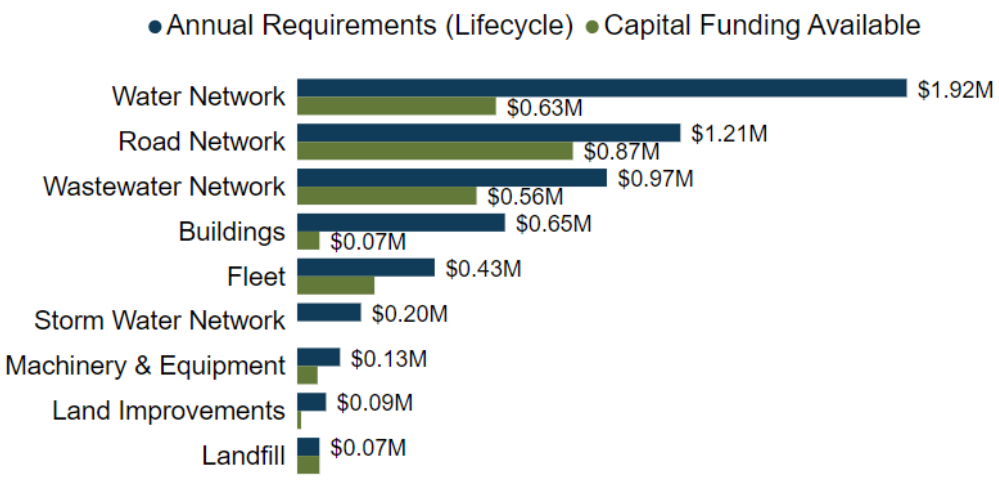
The implementation of a proactive lifecycle strategy for roads leads to a potential annual cost avoidance of $1,217,656 for the Road Network. This represents an overall reduction of the annual requirements for the road network of over 50%.

For water and wastewater categories the annual requirements under the lifecycle strategy are higher than for the replacement only strategy. This is based on a series of recommendations for repairs and replacement of water and wastewater treatment and pump assets based on the findings of the Building Condition Assessments. These recommendations better reflect the assets actual needs based on expert assessment of asset condition, typical deterioration, and recommended interventions.

As the lifecycle strategy scenario represents the lowest cost or most well researched option available to the Town, we have used these annual requirements in the development of the financial strategy.

Annual Funding Available

Based on a historical analysis of sustainable capital funding sources, the Town is committing approximately $2,445,000 towards capital projects per year from sustainable revenue sources. Given the annual capital requirement of $5,677,000 there is currently a funding gap of $3,232,000 annually.



Funding Objective

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

- **Tax Funded Assets:** Road Network, Stormwater Network, Buildings, Machinery & Equipment, Land Improvements, Fleet
- **Rate-Funded Assets:** Water Network, Wastewater Network
- Airport Improvement Fee (AIF): Airport

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

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

Financial Profile: Tax Funded Assets

Current Funding Position

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

Asset Category	Avg. Annual Requirement	Annual Funding Available				Annual Deficit
		Taxes [15]	Gas Tax	OCIF	Total Available	
Road Network	1,205,000	450,000	305,000	112,000	867,000	338,000
Stormwater Network	200,000					200,000
Buildings	653,000	70,000			70,000	583,000
Machinery & Equipment	135,000	64,000			64,000	71,000
Land Improvements	91,000	12,000			12,000	79,000
Fleet	432,000	243,000			243,000	189,000
Total	**2,716,000**	**839,000**	**305,000**	**112,000**	**1,256,000**	**1,460,000**

The average annual investment requirement for the above categories is $2,716,000 (rounded). Annual revenue currently allocated to these assets for capital purposes is $1,256,000 leaving an annual deficit of $1,460,000. Put differently, these infrastructure categories are currently funded at 48% of their long-term requirements.

[15] Includes taxes allocated to reserve funds.

Full Funding Requirements

In 2020, Town of Sioux Lookout has annual tax revenues of $11,395,000. 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	3
Stormwater Network	1.8
Buildings	5.1
Machinery & Equipment	0.6
Land Improvements	0.7
Fleet	1.7
Total	**12.9**

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

- Sioux Lookout's debt payments for these asset categories will be decreasing by
- $95,000 over the next 5 years and by $507,000 over the next 10 years. Debt
- payment decreases will be $582,000 and $936,000 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	1,460,000	1,460,000	1,460,000	1,460,000	1,460,000	1,460,000	1,460,000	1,460,000
Change in Debt Costs	N/A	N/A	N/A	N/A	-95,000	-507,000	-582,000	-936,000
Resulting Infrastructure Deficit	1,460,000	1,460,000	1,460,000	1,460,000	1,365,000	953,000	-878,000	524,000
Total Tax Increase Required	12.8%	12.8%	12.8%	12.8%	12%	8.4%	7.7%	4.6%
Annually	**2.5%**	**1.3%**	**0.9%**	**0.7%**	**2.3%**	**0.9%**	**0.5%**	**0.3%**

Financial Strategy Recommendations

Considering all the above information, we recommend the 10-year option. This involves full funding being achieved over 10 years by:

a) when realized, reallocating the debt cost reductions to the infrastructure deficit as outlined above.
b) increasing tax revenues by 0.9% each year for the next 10 years solely for the purpose of phasing in full funding to the asset categories covered in this section of the AMP.
c) allocating the current CCBF and OCIF revenue as outlined previously.
d) Should the scheduled OCIF grant increase, the Township should reduce the annual tax increase by an amount equal to the grant increase as it occurs
e) increasing existing and future infrastructure budgets by the applicable inflation index on an annual basis in addition to the deficit phase-in.

Notes:

1. As in the past, periodic senior government infrastructure funding will most likely be available during the phase-in period. By Provincial AMP rules, this periodic funding cannot be incorporated into an AMP unless there are firm commitments in place. We have included OCIF formula-based funding, if applicable since this funding is a multi-year commitment[16].
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 10 years and provides financial sustainability over the period modeled, the recommendations do require prioritizing capital projects to fit the resulting annual funding available.

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

[16] The Town 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 which may impact its future availability.

Financial Profile: Rate Funded Assets

Current Funding Position

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

Asset Category	Avg. Annual Requirement	Annual Funding Available				Annual Deficit
		Rates	To Operations	OCIF	Total Available	
Water Network	$1,917,000	1,623,000	1,054,000	56,000	625,000	1,292,000
Wastewater Network	$974,000	1,302,000	794,000	56,000	564,000	410,000
Landfill	70,000				70,000[17]	0
Total	**2,961,000**				**1,259,000**	**1,702,000**

The average annual investment requirement for the above categories is $2,961,000. Annual revenue currently allocated to these assets for capital purposes is $1,259,000 leaving an annual deficit of $1,702,000. Put differently, these infrastructure categories are currently funded at 41% of their long-term requirements.

Full Funding Requirements

In 2020, Sioux Lookout had annual wastewater capital revenues of $564,000 and annual water revenues of $625,000. As illustrated in the table below, without consideration of any other sources of revenue, full funding would require the following changes over time:

Asset Category	Rate Change Required for Full Funding
Water Network	79.6%
Wastewater Network	31.5%

Landfill assets are fully funded and therefore require no change to funding. 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:

[17] Figure based on the average surplus allocation over the past six (6) years. The annual surplus is calculated as the sum of all tipping and curbside collection fees less all annual expenses.

	Water Network				Wastewater Network			
	5 Years	**10 Years**	**15 Years**	**20 Years**	**5 Years**	**10 Years**	**15 Years**	**20 Years**
Deficit	1,292,000	1,292,000	1,292,000	1,292,000	410,000	410,000	410,000	410,000
Change in Debt Costs	n/a	-50,000	-65,000	-209,000	0	-38,000	-38,000	-38,000
Net Deficit	1,292,000	1,242,000	1,227,000	1,083,000	410,000	372,000	372,000	372,000
Rate % Increase Required	79.6	76.5	75.6	66.7	31.5	28.6	28.6	28.6
Annually (%):	**12.5**	**5.9**	**3.9**	**2.6**	**5.7**	**2.6**	**1.7**	**1.3**

Financial Strategy Recommendations

Considering the above information, we recommend the 20-year option for the water network & the 15-year option for the wastewater network. This involves full CapEx funding being achieved over the phase in period:

a) When realized, reallocating the debt cost reductions to the infrastructure deficit as outlined above.
b) Increasing rate revenues by 2.6% for the water network each year for the next 20 years.
c) Increasing rate revenues by 1.7% for the wastewater network each year for the next 15 years.
d) These rate revenue increases are solely for the purpose of phasing in full funding to the respective asset categories covered in this
e) Increasing existing and future infrastructure budgets by the applicable inflation index on an annual basis in addition to the deficit phase-in.
f) Allocating the current OCIF revenue as outlined previously.

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 the phase-in period, the recommendation does require prioritizing capital projects to fit the annual funding available. Prioritizing future projects will require the current data to be replaced by condition-based data. Although our recommendations include no further use of debt, the results of the condition-based analysis may require otherwise

Financial Profile: Airport Rate Funded Assets

Airport Improvement Fees (AIFs) Background

Airport capital expenditures (CapEx) are funded through AIF fees which are charged at each airport to each landing passenger. These fees may only be used to fund CapEx and can not be used to fund operational expenses. AIF revenues are based on an established rate per passenger net of handling fees. The rate is determined and committed to in a Memorandum of Understanding (MOA) between the Sioux Lookout Airport and all signatory air carriers. Sioux Lookout most recently executed an AIF MOU in 2021 with a 15-year term which expires in December 2035. The nominal established rate per passenger remains a direct contractual obligation between Sioux Lookout Airport and each respective signatory Air Carrier. Therefore, annual revenues are not expected to change drastically except in the event of changes in airline traffic.

Since AIFs are charged on a per landed passenger basis, annual revenues fluctuate year-over-year based on airline traffic. For the purposes of analysis, the average annual capital revenue is based on the average revenue collected in years 2016 to 2019. This intentionally excludes years 2020 and 2021 which are considered outliners as the airline traffic were impacted of the Covid-19 pandemic.

Other Relevant Funding Sources

In addition to AIFs, municipal airports are eligible to apply for various grant funding programs including Airport Capital Assistance Program (ACAP) and Northern Ontario Heritage Fund Corporation (NOHFC). For successful applicants, these programs historically have funded the replacement of airport machinery and equipment (ACAP) and funding shortfalls due to the covid-19 pandemic (NOHFC). These funds are applied to by the Municipality based on program eligibility: in some instances, a municipality may not be eligible (i.e., none of their assets meet program requirements). While such funds do provide significant benefit when available, they are not guaranteed and received funding tends to fluctuate year-over-year. For these reasons, such potential funding sources are not included in the financial analysis discussed herein.

Current Funding Position

The following table below shows the Airport's assets average annual asset investment requirements, current funding positions, and funding increases required to achieve full funding on assets funded by rates.

Asset Category	Avg. Annual Requirement	Annual Funding Available				Annual Surplus
		AIF	OCIF	Other	Total Available	
Airport	950,082	1,150,000	0	0	1,150,000	200,000

The average annual investment requirement for the above categories is $950,000. Annual revenue currently available to these assets for capital purposes is $1,150,000 leaving an annual surplus of $200,000.

Full Funding Requirements

From 2016-2019, Sioux Lookout Airport averaged AIF fees of $1,150,000. As illustrated in the table above, the AIF fees are sufficiently funding the average annual requirements of the Airport assets.

The AIF is legislated and bound by agreements with airlines. As mentioned previously there was a recent MOU agreed to which locked in the AIF fees until December 31, 2035. Given the nature of this agreement, CapEx funding available to the Airport assets will fluctuate annually based on many factors outside the direct control of the municipality such as the economy at large and public health.

Financial Strategy Recommendations

Considering all the above information, we recommend the following to ensure adequate long-term funding of Airport assets:

- Review the adequacy of the AIF rate after the 15-year term
- Leverage one-time grant funding (e.g., ACAP) when possible

Notes:

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.

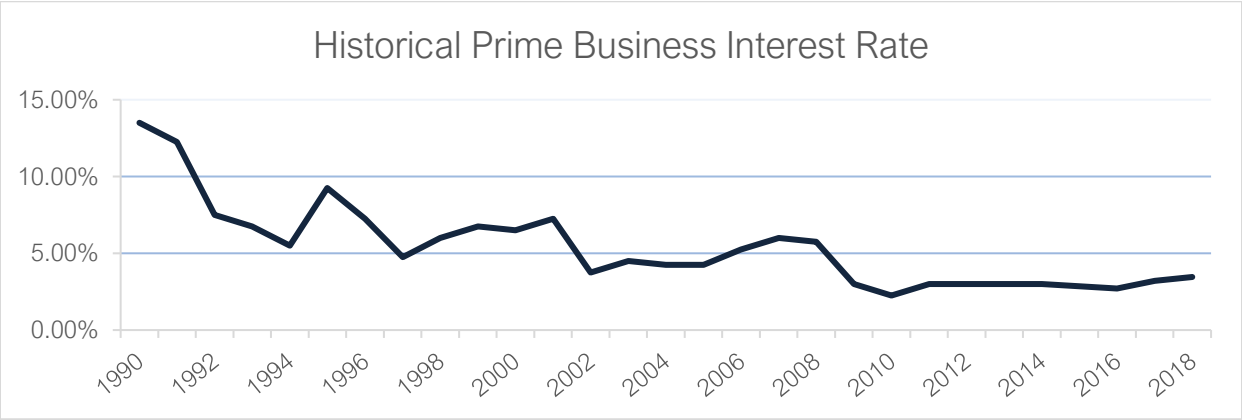
Prioritizing future projects will require the current data to be replaced by condition-based data. Although our recommendations include no further use of debt, the results of the condition-based analysis may require otherwise.

Use of Debt

For reference purposes, the following table outlines the premium paid on a project if financed by debt. For example, a $1,000,000 project financed at 3.0%[18] over 15 years would result in a 26% premium or $260,000 of increased costs due to interest payments. For simplicity, the table does not consider the time value of money or the effect of inflation on delayed projects.

Interest Rate	Number of Years Financed					
	5	10	15	20	25	30
7.0%	22%	42%	65%	89%	115%	142%
6.5%	20%	39%	60%	82%	105%	130%
6.0%	19%	36%	54%	74%	96%	118%
5.5%	17%	33%	49%	67%	86%	106%
5.0%	15%	30%	45%	60%	77%	95%
4.5%	14%	26%	40%	54%	69%	84%
4.0%	12%	23%	35%	47%	60%	73%
3.5%	11%	20%	30%	41%	52%	63%
3.0%	9%	17%	26%	34%	44%	53%
2.5%	8%	14%	21%	28%	36%	43%
2.0%	6%	11%	17%	22%	28%	34%
1.5%	5%	8%	12%	16%	21%	25%
1.0%	3%	6%	8%	11%	14%	16%
0.5%	2%	3%	4%	5%	7%	8%
0.0%	0%	0%	0%	0%	0%	0%

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



[18] 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 Sioux Lookout has historically used debt for investing in the asset categories as listed. As of December 31, 2020, total debt outstanding for assets covered in this AMP totalled $17,280,000 with corresponding principal and interest payments of $1,522,000 well within its provincially prescribed maximum of $3,098,000.

Asset Category	December 2020 Debt Outstanding	Use of Debt in the Last Five Years				
		2016	2017	2018	2019	2020
Road Network	2,755,000	0	1,610,000	0	394,000	0
Buildings	11,197,000	0	34,000	216,000	5,932,000	0
Machinery & Equipment	137,000	160,000	0	68,000	0	0
Land Improvements	228,000	384,000	0	0	0	0
Fleet	545,000	60,000	30,000	120,000	379,000	0
Total Tax Funded[19]:	14,862,000	604,000	1,674,000	404,000	6,705,000	0
Water Network	2,229,000	896,000	0	0	0	0
Wastewater Network	190,000	0	0	0	0	0
Total Rate Funded:	2,418,000	896,000	0	0	0	0
Grand Total	**17,280,000**	**1,500,000**	**1,674,000**	**404,000**	**6,705,000**	**0**

[19] The Stormwater network, airport, and the landfill asset categories did not hold any debt as of December 31st, 2020.

Asset Category	Principal & Interest Payments in the Next Ten Years						
	2020	2021	2023	2024	2025	2030	
Road Network	280,000	279,000	277,000	209,000	209,000	209,000	194,000
Buildings	840,000	840,000	840,000	840,000	840,000	840,000	574,000
Machinery & Equipment	34,000	34,000	33,000	33,000	17,000	16,000	0
Land Improvements	45,000	44,000	43,000	42,000	41,000	40,000	0
Fleet	76,000	76,000	75,000	75,000	75,000	75,000	0
Total Tax Funded:	1,275,000	1,273,000	1,268,000	1,199,000	1,182,000	1,180,000	768,000
Water Network	209,000	209,000	209,000	209,000	209,000	209,000	159,000
Wastewater Network	38,000	38,000	38,000	38,000	38,000	38,000	0
Total Rate Funded:	247,000	247,000	247,000	247,000	247,000	247,000	159,000

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

Use of Reserves

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 Sioux Lookout.

Asset Category[20]	Balance on December 31, 2020
Road Network	1,276,000
Buildings	1,090,000
Machinery & Equipment	164,000
Land Improvements	1,492,000
Fleet	657,000
Total Tax Funded:	4,679,000
Water Network	2,169,000
Wastewater Network	929,000
Landfill	344,000
Total Rate Funded:	3,442,000
Airport	2,349,000
Grand Total	**10,470,000**

There is considerable debate in the municipal sector as to the appropriate level of reserves that a Town 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

[20] The Stormwater network currently uses funds from the road network reserve, however in 2022 a motion to create a stormwater specific reserve fund is expected to be passed.

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 Sioux Lookout'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.

Recommendation

In 2024, Ontario Regulation 588/17 will require Sioux Lookout 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.

9 Appendices

Key Insights

- Appendix A includes a one-page report card with an overview of key data from each asset category
- Appendix B identifies projected 10-year capital requirements for each asset category
- Appendix C includes several maps that have been used to visualize the current level of service
- Appendix D identifies the criteria used to calculate risk for each asset category

Appendix A: Infrastructure Report Card

Asset Category	Replacement Cost (millions)	Asset Condition	Financial Capacity	
Road Network	$54.0	Poor	Annual Requirement:	$1,205,000
			Funding Available:	$867,000
			Annual Deficit:	**$338,000**
Airport	$20.0	Good	Annual Requirement:	$950,000
			Funding Available:	$1,150,000
			Annual Surplus:	**$200,000**
Storm Water Network	$10.7	Good	Annual Requirement:	$200,000
			Funding Available:	$0
			Annual Deficit:	**$200,000**
Buildings	$24.9	Fair	Annual Requirement:	$653,000
			Funding Available:	$70,000
			Annual Deficit:	**$583,000**
Machinery & Equipment	$1.1	Very Poor	Annual Requirement:	$135,000
			Funding Available:	$64,000
			Annual Deficit:	**$71,000**
Fleet	$6.8	Poor	Annual Requirement:	$432,000
			Funding Available:	$243,000
			Annual Deficit:	**$189,000**
Land Improvements	$1.9	Fair	Annual Requirement:	$91,000
			Funding Available:	$12,000
			Annual Deficit:	**$79,000**
Landfill	$1.6	Fair	Annual Requirement:	$70,000
			Funding Available:	$70,000
			Annual Deficit:	**$0**
Water Network	$43.9	Fair	Annual Requirement:	$1,917,000
			Funding Available:	$625,000
			Annual Deficit:	**$1,292,000**

Wastewater Network	$27.7	Fair	Annual Requirement:	$974,000
			Funding Available:	$564,000
			Annual Deficit:	**$410,000**
Overall	$192.5	Fair	Annual Requirement:	$6,628,000
			Funding Available:	$3,665,000
			Annual Deficit:	**$2,963,000**[21]

[21] Since AIF funding can only be used for Airport assets funding figures were excluded from the summary statistics amount as reported on the Key Statistics page. This is the reason for the $200,000 difference in the annual deficit reported in Appendix A compared with the annual deficit as reported on the summary page.

Appendix B: 10-Year Capital Requirements

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

Road Network

Asset Segment	Backlog	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Parking Lots	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Paved Roads	$2,702,667	$4,754,599	$4,894,547	$548,482	$0	$7,791	$0	$0	$0	$0	$0
Sidewalks & Curbs	$8,182,627	$1,190,706	$0	$205,840	$308,264	$854,560	$153,976	$261,108	$0	$0	$0
Streetlights	$0	$49,804	$0	$0	$424,521	$0	$0	$0	$0	$0	$49,804
	$10,885,295	**$5,995,109**	**$4,894,547**	**$754,322**	**$732,785**	**$862,351**	**$153,976**	**$261,108**	**$0**	**$0**	**$49,804**

Storm Water Network

Asset Segment	Backlog	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Catch Basins	$167,760	$0	$45,435	$0	$0	$0	$17,475	$0	$0	$0	$69,900
Manholes	$487,900	$35,700	$0	$0	$0	$0	$0	$0	$0	$0	$71,400
Storm Mains	$1,168,129	$0	$0	$0	$0	$0	$172,072	$0	$0	$0	$220,952
	$1,823,789	**$35,700**	**$45,435**	**$0**	**$0**	**$0**	**$189,547**	**$0**	**$0**	**$0**	**$362,252**

Wastewater Network											
Asset Segment	Backlog	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Chambers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Manholes	$1,594,600	$47,600	$130,900	$0	$0	$47,600	$0	$0	$0	$0	$0
Pumping Stations	$1,537,904	$76,534	$350,686	$32,186	$0	$0	$0	$17,368	$73,308	$2,008	$1,171,034
Sanitary Forcemains & Valves	$14,500	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sanitary Sewers	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Wastewater Fleet	$0	$0	$0	$0	$0	$0	$48,962	$0	$0	$0	$11,807
Wastewater Treatment Plant	$2,038,660	$13,110	$0	$1,013,907	$0	$63,411	$1,049,531	$0	$3,565,511	$644,870	$1,850,730
	$5,185,664	**$137,244**	**$481,586**	**$1,046,093**	**$0**	**$111,011**	**$1,098,493**	**$17,368**	**$3,638,819**	**$646,878**	**$3,033,571**

Water Network											
Asset Segment	Backlog	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Booster Station	$123,664	$77,090	$1,561	$1,592	$12,204	$13,216	$28,186	$1,723	$31,446	$138,693	$48,824
Hydrants & Valves	$2,016,552	$0	$0	$0	$51,300	$0	$0	$0	$0	$0	$0
Water Fleet	$0	$0	$0	$0	$39,844	$0	$0	$0	$0	$0	$0
Water Mains	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Service	$0	$0	$0	$5,309	$0	$0	$0	$0	$0	$0	$0
Water Tower	$0	$3,195,366	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment Plant	$4,948,498	$28,680	$0	$2,239,691	$134,526	$122,560	$2,204,035	$44,115	$0	$3,174,554	$2,889,763
	$7,088,714	**$3,301,136**	**$1,561**	**$2,246,592**	**$237,874**	**$135,776**	**$2,232,221**	**$45,838**	**$31,446**	**$3,313,247**	**$2,938,587**

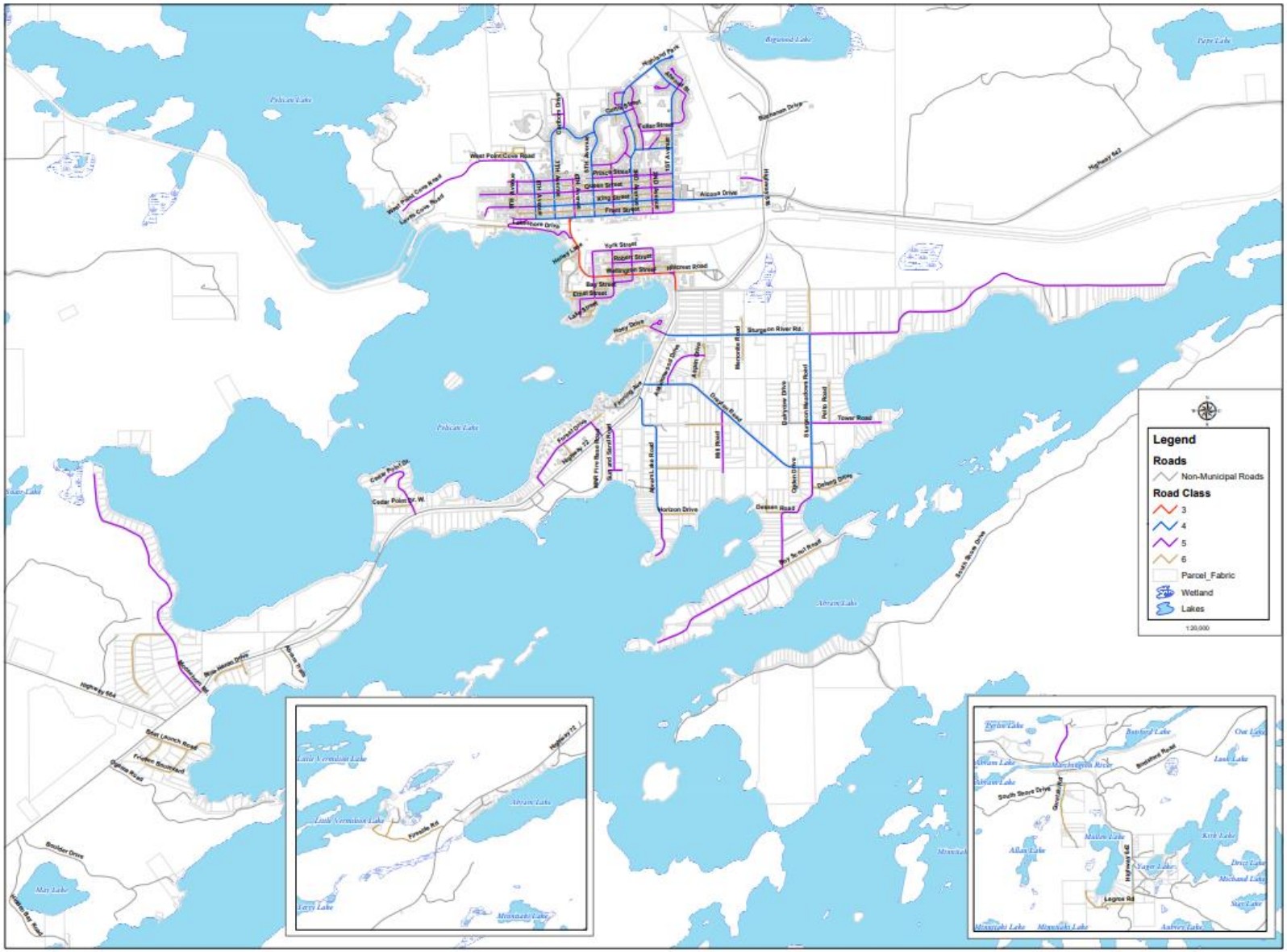
Airport											
Asset Segment	Backlog	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Airfield Lighting	$1,552,129	$1,162,230	$0	$0	$0	$0	$0	$0	$0	$0	$0
Ariport Buildings	$720,747	$0	$0	$12,605	$0	$0	$0	$0	$12,605	$0	$0
Airport Machinery & Equipment	$2,034,310	$39,839	$0	$460,453	$0	$0	$84,618	$0	$576,953	$84,618	$371,525
Airport Vehicles	$2,275,401	$45,771	$315,575	$67,093	$0	$0	$521,776	$269,274	$30,844	$0	$183,092
	$6,582,587	**$1,247,840**	**$315,575**	**$540,151**	**$0**	**$0**	**$606,394**	**$269,274**	**$620,402**	**$84,618**	**$554,617**

Non-Core Assets											
Asset Segment	Backlog	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Buildings	$10,092,351	$153,604	$0	$0	$1,008,144	$238,734	$0	$0	$1,885	$382,806	$0
Fleet	$5,787,052	$594,426	$322,463	$0	$107,487	$410,236	$48,449	$808,489	$165,058	$374,158	$954,786
Land Improvements	$1,279,797	$209,191	$0	$0	$0	$0	$0	$0	$234,120	$279,989	$250,724
Landfill	$745,354	$0	$664,250	$0	$0	$0	$0	$0	$0	$0	$66,437
Machinery & Equipment	$1,934,111	$80,593	$94,184	$69,689	$55,984	$96,679	$99,320	$80,921	$0	$163,704	$559,406
	$19,838,665	**$1,037,814**	**$1,080,897**	**$69,689**	**$1,171,615**	**$745,649**	**$147,769**	**$889,410**	**$401,063**	**$1,200,657**	**$1,831,353**

Appendix C: Level of Service Maps

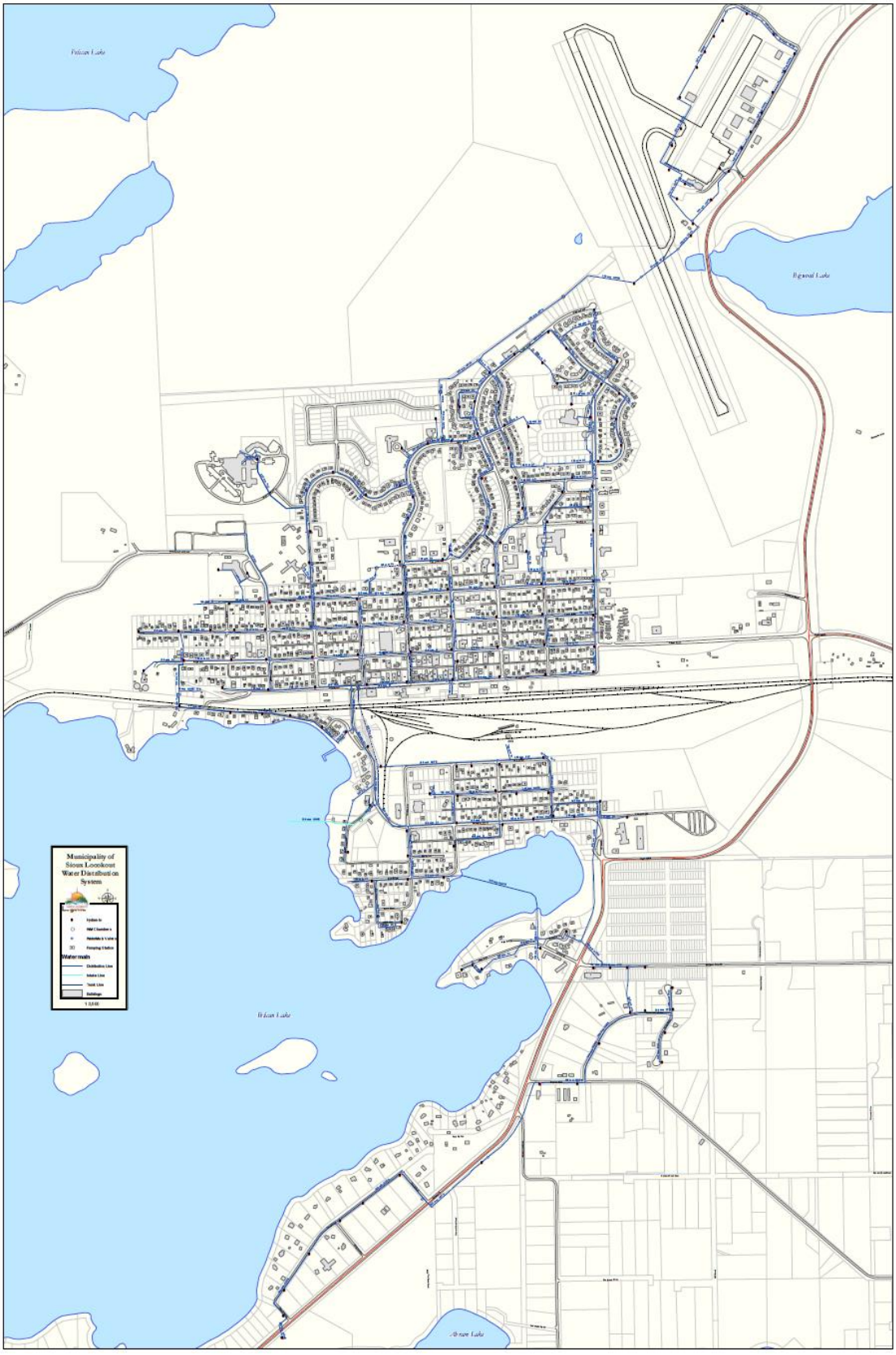
Road Network Map - Hudson

Road Network Map – Sioux Lookout

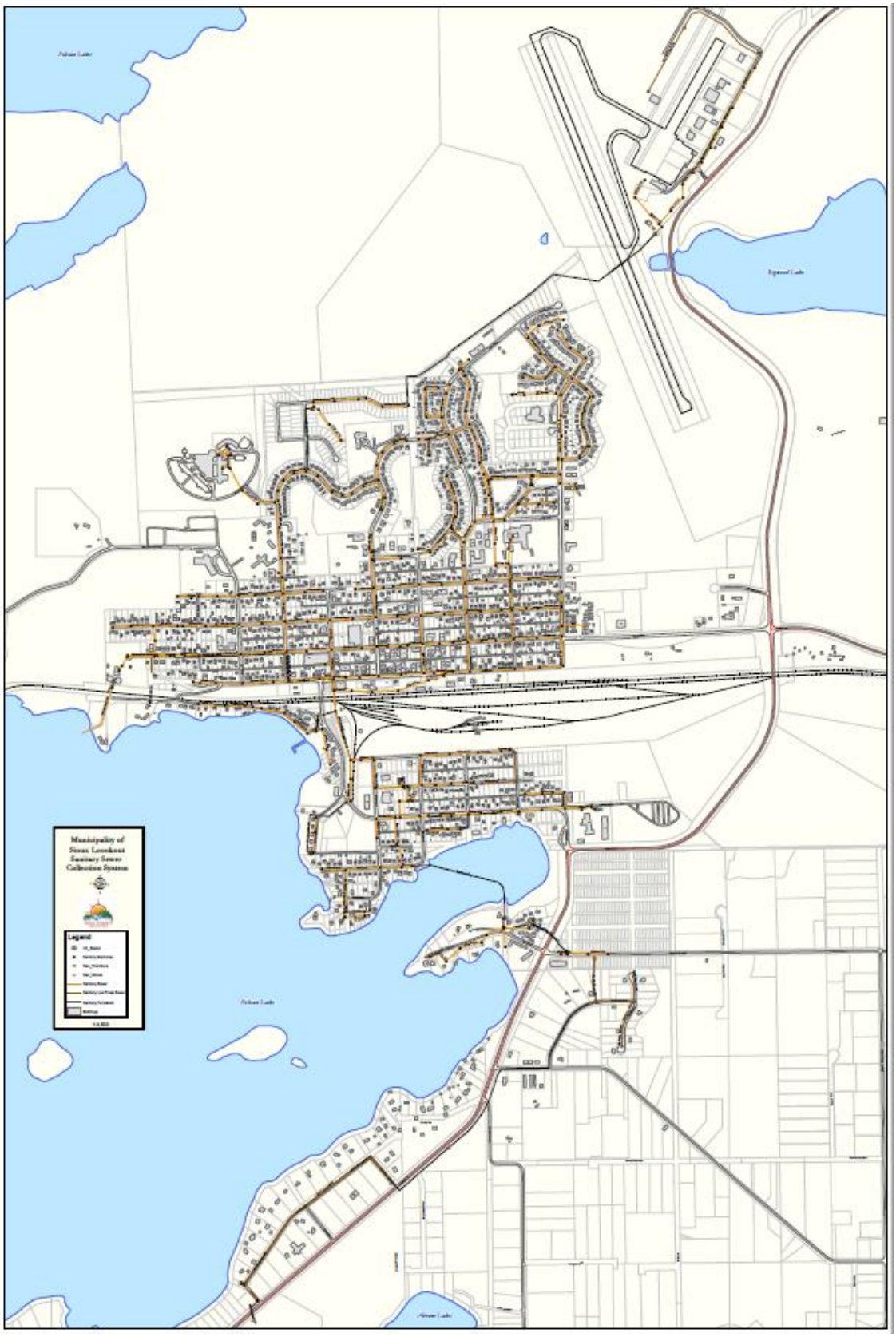


Water Distribution System- Hudson

Water Distribution System- Sioux Lookout



Sanitary Collection System- Sioux Lookout



Appendix D: Risk Rating Criteria

Probability of Failure

Asset Category	Risk Criteria	Criteria Weighting (%)	Value/Range	Probability of Failure Score
Asphalt & LCB Roads	Condition	60	7 and below	1 - Rare
			15 and below	2 - Unlikely
			23 and below	3 - Possible
			31 and below	4 – Likely
			40 and below	5 – Almost Certain
	Surface Condition	10	5 - Good	2 - Unlikely
			10 - Fair	3 - Possible
			15 - Poor	4 – Likely
			20 - Critical	5 – Almost Certain
	Road Base Problems	15	No	2 - Unlikely
			Yes	4 – Likely
	Drainage Problems Observed	15	No	2 - Unlikely
			Yes	4 – Likely
Water and Wastewater Facilities	Condition	100	0 and above	1 - Rare
			1.1 and above	2 - Unlikely
			2.1 and above	3 - Possible
			3.1 and above	4 – Likely
			4.1 and above	5 – Almost Certain
Stormwater and Wastewater Linear (Mains)	Condition	64	80-100	1 - Rare
			60-79	2 - Unlikely
			40-59	3 - Possible
			20-39	4 – Likely
			0-19	5 – Almost Certain
	Pipe Material	16	HDPE	2 - Unlikely
			PVC/PVC SDR 35	2 - Unlikely

Asset Category	Risk Criteria	Criteria Weighting (%)	Value/Range	Probability of Failure Score
			Ductile Iron	3 - Possible
			Concrete	4 – Likely
	Service Life Remaining	20	80-100	1 - Rare
			60-79	2 - Unlikely
			40-59	3 - Possible
			20-39	4 – Likely
			0-19	5 – Almost Certain
Water Network (Mains)	Condition	80	80-100	1 - Rare
			60-79	2 - Unlikely
			40-59	3 - Possible
			20-39	4 – Likely
			0-19	5 – Almost Certain
	Pipe Material	20	Perforated Polytubing	2 - Unlikely
			HDPE	2 - Unlikely
			PVC/PVC SDR 28,35	2 - Unlikely
			Copper	4 – Likely

Consequence of Failure

Asset Category	Risk Classification (weighting)	Risk Criteria (weighting)	Value/Range	Consequence of Failure Score
Surface Treated (LCB) Roads	Economic (80%)	Replacement Cost (100%)	$5,000 and below	1 - Insignificant
			$25,000 and below	2 - Minor
			$50,000 and below	3 - Moderate
			$100,000 and below	4 – Major
			$200,000 and below	5 – Severe
Asphalt & LCB Roads	Strategic	Road Hierarchy (80%)	Local	2 - Minor
			Collector	3 - Moderate
			Arterial	4 – Major
Asphalt	Economic (80%)	Replacement Cost (100%)	$5,000 and below	2 - Minor
			$25,000 and below	2 - Minor
			$100,000 and below	3 - Moderate
			$200,000 and below	4 – Major
			$250,000	5 – Severe
		Width (m) (20%)	4 and below	2 - Minor
			8 and below	3 - Moderate
			10 and below	4 – Major
			15 and below	5 – Severe
Water Mains	Economic (80%)	Replacement Cost (100%)	$5,000 and below	1 - Insignificant
			$25,000 and below	2 - Minor
			$50,000 and below	3 - Moderate
			$75,000 and below	4 – Major
			$100,000 and below	5 – Severe
	Strategic (20%)	Diameter (mm) (100%)	50 and below	1 - Insignificant
			150 and below	2 - Minor
			250 and below	3 - Moderate
			400 and below	4 – Major
			1,000 and below	5 – Severe
Storm Mains	Economic (75%)	Replacement Cost	$5,000 and below	1 - Insignificant
			$25,000 and below	2 - Minor

Asset Category	Risk Classification (weighting)	Risk Criteria (weighting)	Value/Range	Consequence of Failure Score
		(100%)	$50,000 and below	3 - Moderate
			$75,000 and below	4 – Major
			$100,000 and below	5 – Severe
	Strategic (25%)	Diameter (mm) (100%)	50 and below	1 - Insignificant
			150 and below	2 - Minor
			250 and below	3 - Moderate
			400 and below	4 – Major
			1,000 and below	5 – Severe
Wastewater Mains	Economic (80%)	Replacement Cost (80%)	$5,000 and below	1 - Insignificant
			$25,000 and below	2 - Minor
			$50,000 and below	3 - Moderate
			$75,000 and below	4 – Major
			$100,000 and below	5 – Severe
		Segment (20%)	Service Line	2 - Minor
			Sewer	4 – Major
			Forcemain	5 – Severe
	Strategic (25%)	Diameter (mm) (100%)	150 and below	1 - Insignificant
			300 and below	2 - Minor
			600 and below	3 - Moderate
			900 and below	4 – Major
			1,200 and below	5 – Severe
Water & Wastewater Facilities	Economic (80%)	Replacement Cost (80%)	$5,000 and below	1 - Insignificant
			$25,000 and below	2 - Minor
			$75,000 and below	3 - Moderate
			$100,000 and below	4 – Major
			$300,000 and below	5 – Severe
	Operational (20%)	Level 2 Component (20%)	Interior Finishes, Equipment, Furnishing	1 - Insignificant
			Interior Construction , Site Improvements	2 - Minor

Asset Category	Risk Classification (weighting)	Risk Criteria (weighting)	Value/Range	Consequence of Failure Score
			Special Construction, Site Mechanical Utilities, Site Electric Utilities	3 - Moderate
			Foundations, Basement Construction	4 – Major
			Superstructure, Exterior Enclosures, Roofing, Plumbing, HVAC, Electrical, Electronic safety & security, Stairs	4 – Major
			Conveying, Fire Protection	5 – Severe