



2024

Corporate Asset Management Plan



Executive Summary

Asset Management Plan Overview

The Town of Fort Erie (the Town) is in beautiful Niagara Region and boasts over 45km of shoreline along Lake Erie. The Town has an array of historical sites, natural beauty and beaches, recreational trails, as well as opportunities for fishing and birding. The Town is strategically located with easy access to the border, along a busy economic trade corridor. The Town of Fort Erie infrastructure supports a variety of municipal services that residents and businesses rely on every day. The Town owns approximately \$2.16 billion in infrastructure assets and requires a comprehensive plan for managing these assets to maximize service delivery while balancing costs to the community. An asset management plan (AMP) can help guide the Town in making the best decisions in the management of its infrastructure assets.

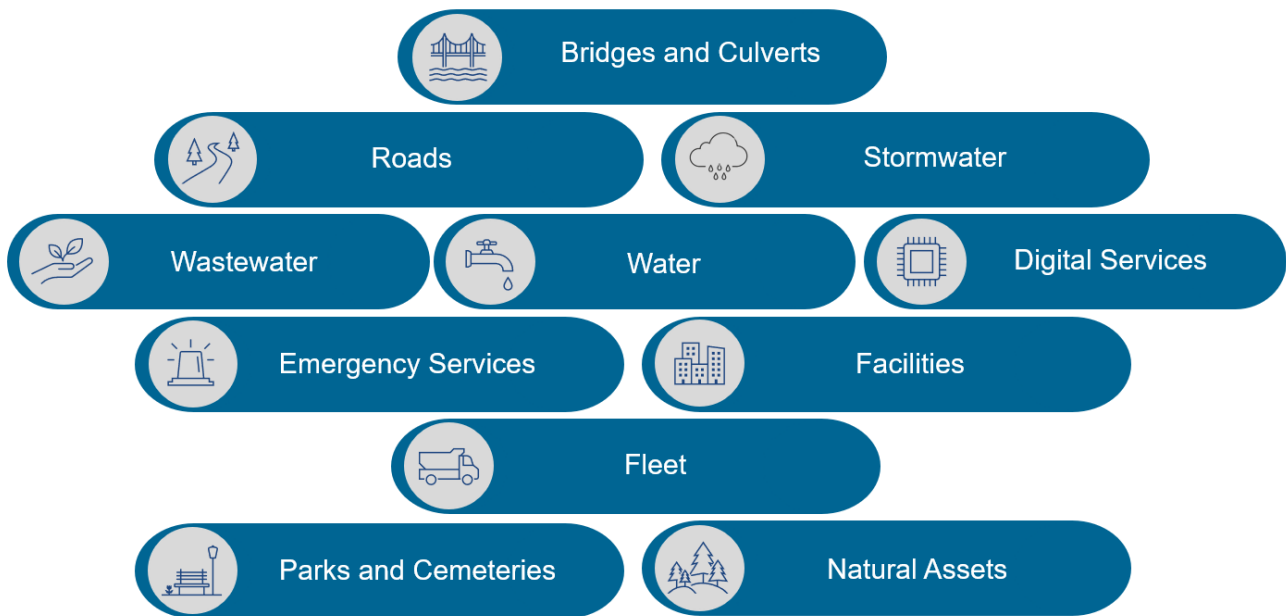
This Asset Management Plan (AMP) has been developed to serve as a guiding document for decision-making related to infrastructure assets. The objective and purpose of this AMP is to maximize benefits, manage risk, and provide satisfactory levels of service to the public in a sustainable manner. Asset Management involves understanding asset characteristics, assessing their condition, and defining current and proposed service levels and measuring performance.

This AMP is a comprehensive document that allows the Town to:

- Meet regulatory requirements.
- Outline the current state of the Town's assets.
- Establish long-term infrastructure goals through master plans and strategic plans.
- Develop sustainable financial plans and the annual budget.
- Describe the Town's current performance for levels of service, as well as set desired (target) levels of service.
- Consistently consider options related to assets, based on the AMP.
- Support funding applications to the federal and provincial levels of government.

Asset Management Plan Scope and Structure

This Asset Management Plan (AMP) is divided into chapters for each asset group owned by the Town:



The Town's natural assets are not included within the main body or analysis of this AMP as a separate AMP was completed to account for the unique nature of the asset class. Information on these assets can be found in Appendix A.

Within each of the included asset category chapters, the plan provides the following information:

State of the Infrastructure

The State of the Local Infrastructure section provides a quantitative assessment of the infrastructure owned by the Town. The primary objective is to provide a high-level inventory and insights on the overall age, condition, replacement value, and key metrics of the assets owned by the Town, as per O.Reg. 588/17. The information is developed based on provided datasets and documents that were assessed for data confidence and discussed with Subject Matter Experts (SMEs) at the Town. This section summarizes the inventory of assets and their replacement values and provides the age and condition for assets in each chapter.

Levels of Service

Levels of service (LOS) are measures for what the Town provides to its customers, residents and visitors. They support the organization's strategic goals and are derived from customer needs and expectations, Council objectives, Town policies, legislative and regulatory requirements, standards, along with the financial capacity of the municipality to deliver those LOS. The LOS sections provide key performance indicators that support the provision of the respective service for each Town asset group. O.Reg. 588/17 has prescribed LOS for core assets only. Remaining asset's LOS were developed by Town staff.



Options for LOS Proposed Performance

As per the 2025 requirements for O.Reg. 588/17, the Town has developed proposed LOS targets for the next 10 years. Various options and factors were considered when setting the proposed (target) performance for the LOS metrics to balance achievability, affordability, risk, and the strategic priorities of the Town. Options included the following:

- Decreasing the LOS
- Maintaining the current LOS (performance)
- Increasing LOS to meet infrastructure needs as per the lifecycle strategies

Lifecycle Management

The Lifecycle Management Strategy defines the set of planned actions that will enable the assets to provide their desired level of service in a sustainable way while mitigating risks and reducing costs throughout their life. The goal of this assessment is to capture the activities that are required to sustain the assets within each asset category. For the purposes of this plan, the lifecycle activity categories are as follows:

- Disposal Activities
- Growth Activities
- Non-Infrastructure Solution
- Operations & Maintenance Activities
- Renewal/Replacement Activities
- Service Improvement

Funding the Lifecycle Activities

Three forecasting scenarios were run to analyze the Town's assets, which provide insight on the Town's ability to continue to provide services into the future. This is achieved by forecasting the total required annual expenditures for the Town to maintain current performance, meet proposed performance, and meet infrastructure needs as per the lifecycle management strategies developed.

Data Confidence and Improvement Plan

Within the asset category chapters, the data confidence and improvement plans provide category specific opportunities for improvements.

The asset category specific chapters are followed by the following sections:

Financial Strategy

The Financial Strategy combines the scenarios for each asset to assess the Town's forecasted expenditures and understand the full cost of maintaining service levels and



meeting infrastructure needs over the 10-year forecast period. Forecasts for expenditures were compared to the capital and operating budget forecasts to determine if an infrastructure gap is present.

Improvement and Monitoring Plan

As the Town matures in their AM journey, the processes for Asset Management Planning will continue to evolve and improve. This final section speaks to the opportunities for increasing AM maturity on a Town-wide or program level.

Town of Fort Erie's Infrastructure Valuation and Condition Distribution

The Town owns approximately \$2.16 billion worth of assets across 10 different asset categories. Each asset category has its own chapter detailing the asset valuation, asset condition, asset age, levels of service, lifecycle management strategy, and data confidence and improvement plan as stated above. Figure 0-1 shows the overall valuation breakdown of each asset category by replacement value.

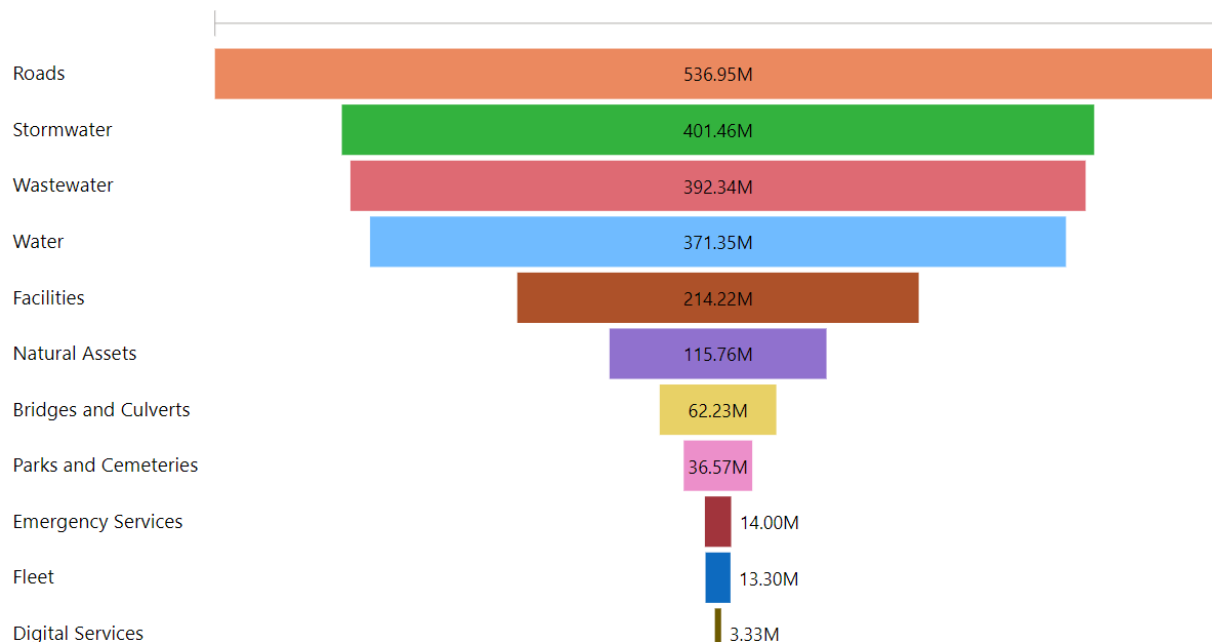


Figure 0-1. Overall Asset Valuation by Replacement Value

Due to the unique nature of Natural Assets, the valuation and analysis for this category was completed separately and not included here. While this AMP does not account for Natural Assets, the completed AMP for this specific asset category, including the valuation and analysis, is provided in Appendix A.

Asset condition is an important piece of asset management. The overall condition by replacement value for all Town owned assets is shown in Figure 0-2.

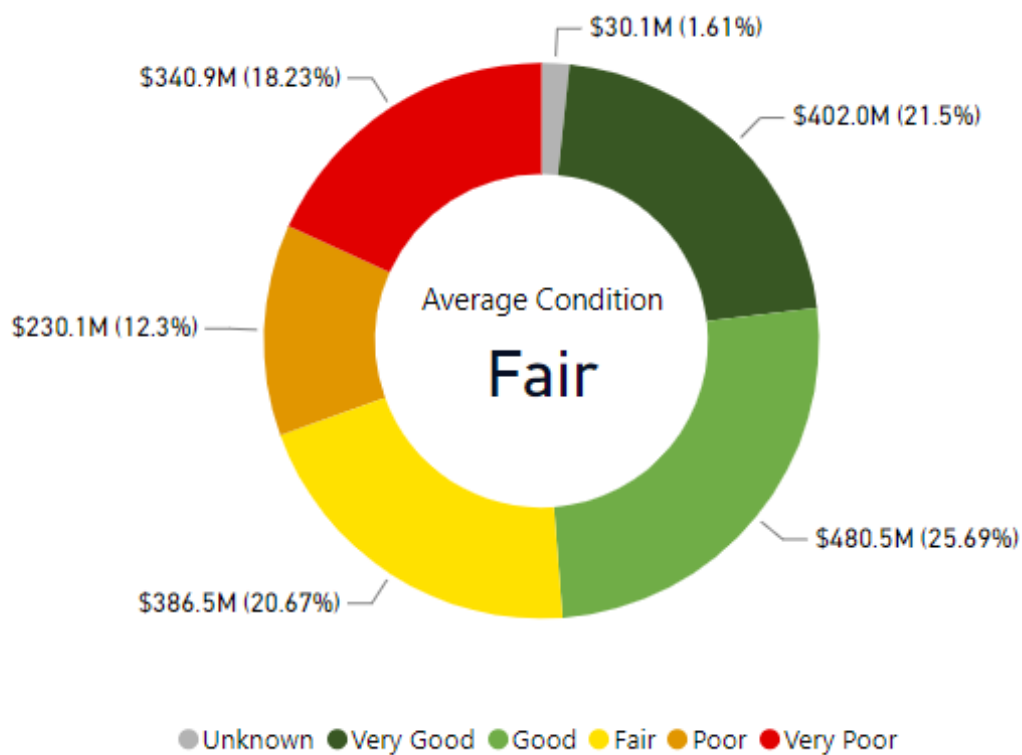


Figure 0-2. Overall Asset Condition by Replacement Value

The Town of Fort Erie's assets are on average in fair condition, with approximately 67% of assets in fair or better condition. Currently, just under 2% of asset have an unknown condition. Asset management is a process of continual improvement, and the need for accurate and complete condition data is highlighted as a recommendation for improvement for those areas that have incomplete condition data.

Figure 0-3 compares the condition profiles of the asset categories, which can be seen in more detail within the asset category chapters within this plan.

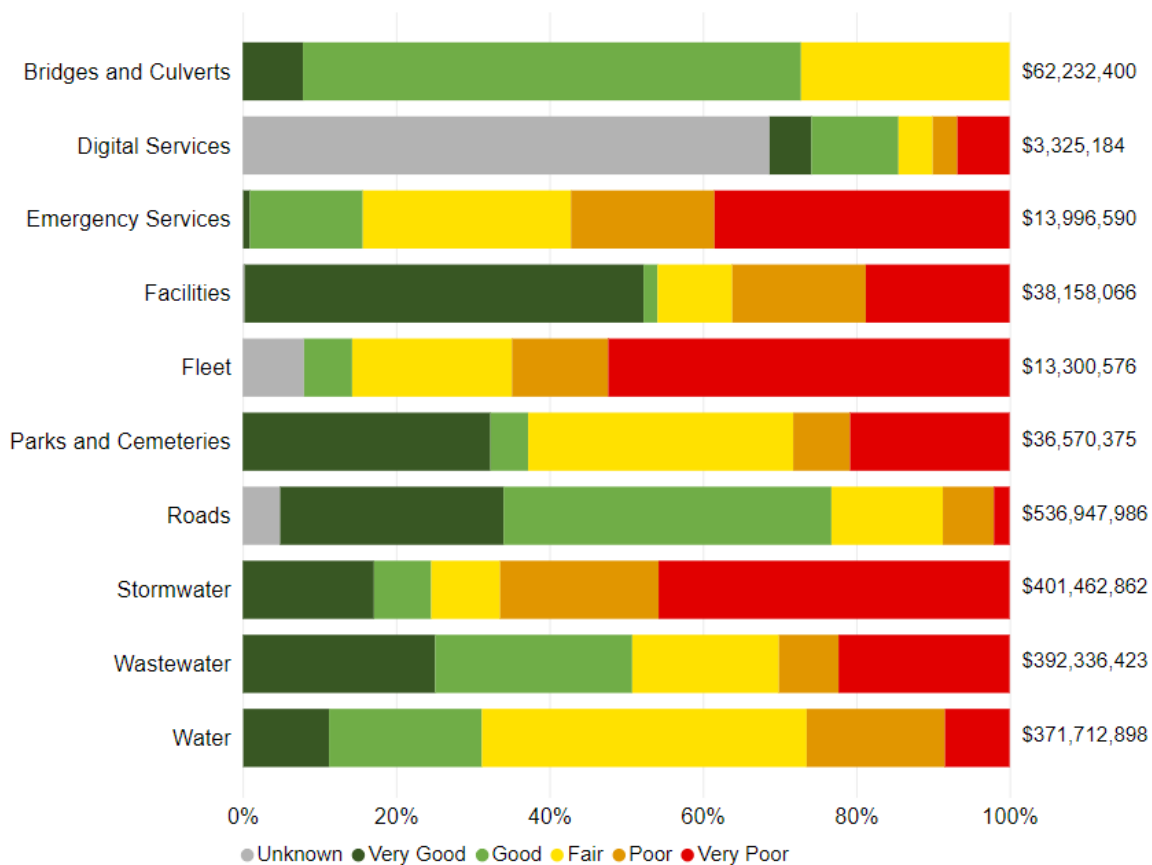


Figure 0-3. Asset Category Condition Overview by Replacement Value

An asset management plan for Natural Assets was completed under a separate engagement, and can be found in Appendix A.

Lifecycle Management Strategy

The results of the lifecycle management strategy have been compiled to provide an overall view of the Town's ability to meet current LOS as well as to meet the target LOS, or infrastructure needs, for the whole organization. Scenarios 1 and 3 determine the infrastructure needs based on the asset data provided by the Town, as well as the impact on the condition of the assets if these scenarios are followed. The information for the average budget (Scenario 2) is used to compare Scenario 1 and 3 to determine the infrastructure gap.

Scenario 1 – Cost to Maintain Current Performance (LOS): Calculates the approximate annual cost of the renewal, rehabilitation and replacement activities required to maintain assets in a similar performance (condition) as their current state. This is used to determine the annual cost to provide the current level of service for each asset category (as mandated by O. Reg. 588/17).



Scenario 2 – Current Funding: Determines the impact of the current 10-year capital budget on the condition (performance) of the assets. The average annual budget is used to compare to Scenario 1 and 3.

Scenario 3 – Proposed LOS Target/Infrastructure Needs Assets: Calculates the average budget needed to achieve the proposed levels of service, which has been determined using infrastructure needs as per lifecycle strategies. The lifecycle strategies were developed in consultation with Town staff, and using industry best practices for the renewal, rehabilitation, and replacement activities.

These forecast scenarios can be found in the asset category chapters of this AMP but have been compiled below to show the overall impact of the scenarios on the condition of all Town assets analyzed within this plan.

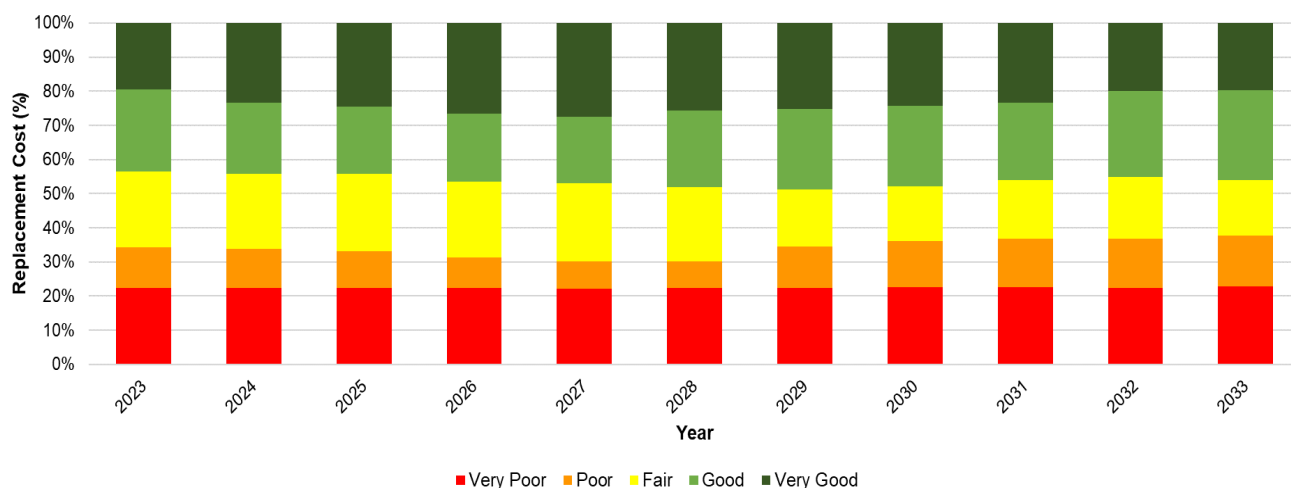


Figure 0-4. Scenario 1: Maintain Current LOS - All Assets

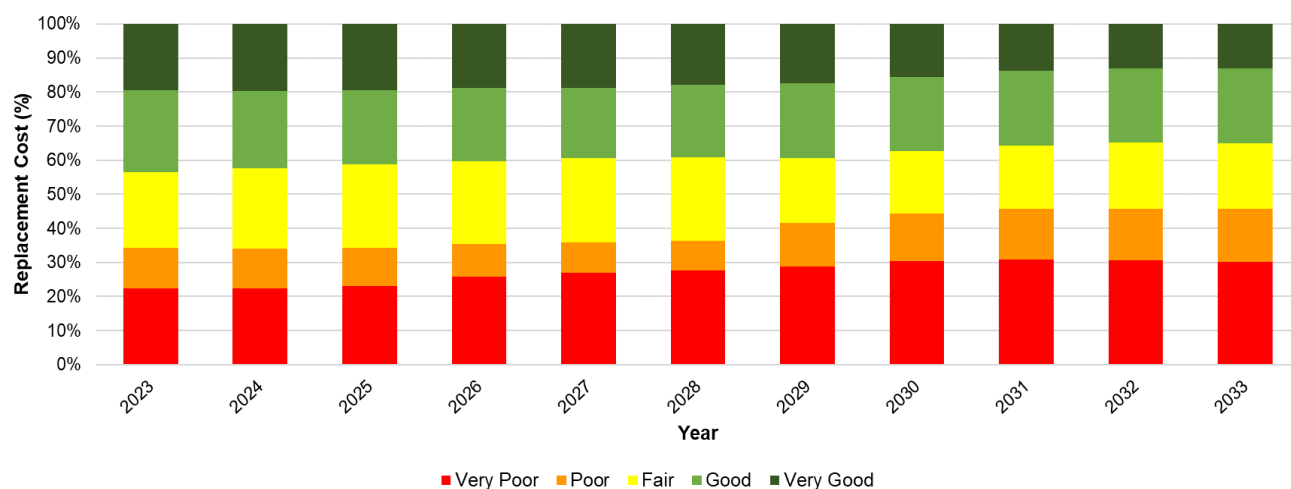


Figure 0-5. Scenario 2: Current Funding – All Assets

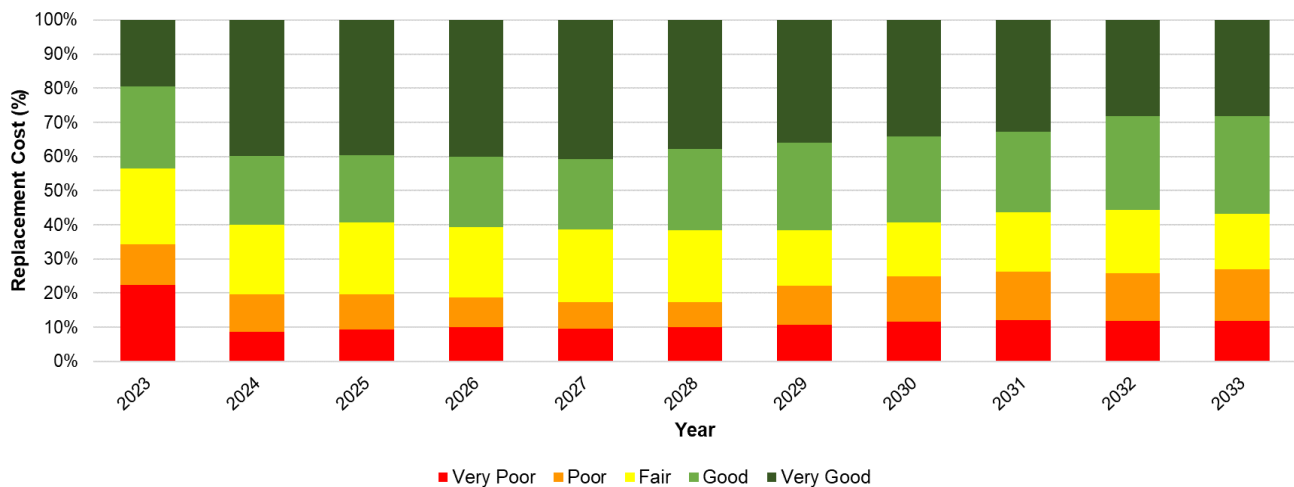


Figure 0-6. Scenario 3: Proposed LOS Target - All Assets

The graphs above show the impact the scenarios developed for this AMP have on the condition of the Town’s assets. Scenario 1 maintains the assets in approximately the same condition they are currently in. Scenario 2 sees a decrease in the overall performance (condition) of the assets by the end of the 10-year forecast period. This analysis is based on the planned spending as per the 10-year capital budget. If the Town follows Scenario 3, to meet proposed LOS targets as per identified lifecycle management strategies, there will be an improvement to the performance of the Town’s assets.

The costs of these scenarios are provided below, with a comparison of their costs to determine the infrastructure gap.

Financial Strategy

This financial strategy provides an analysis of the average annual funding available, the expenditures required to maintain current LOS, as well as the ideal expenditures required to meet the Town’s proposed LOS and infrastructure needs based on the lifecycle strategies identified throughout this plan.

The compiled investment needs under each of the analysis scenarios are presented in Figure 0-7. This figure illustrates the calculated infrastructure needs based on both the Average Annual Cost to Maintain Current LOS (Scenario 1), as well as the Average Annual Cost for the Proposed LOS as Per Infrastructure Needs (Scenario 3). The costs identified as the Infrastructure Needs (Renewal/Rehab/Replacements) identify the lifecycle activity expenditures required for the 10-year forecast to meet proposed LOS, as per O.Reg. 588/17 requirements. These costs represent the Town’s best alternative to provide services at the lowest possible cost, to avoid risk and to meet levels of service.

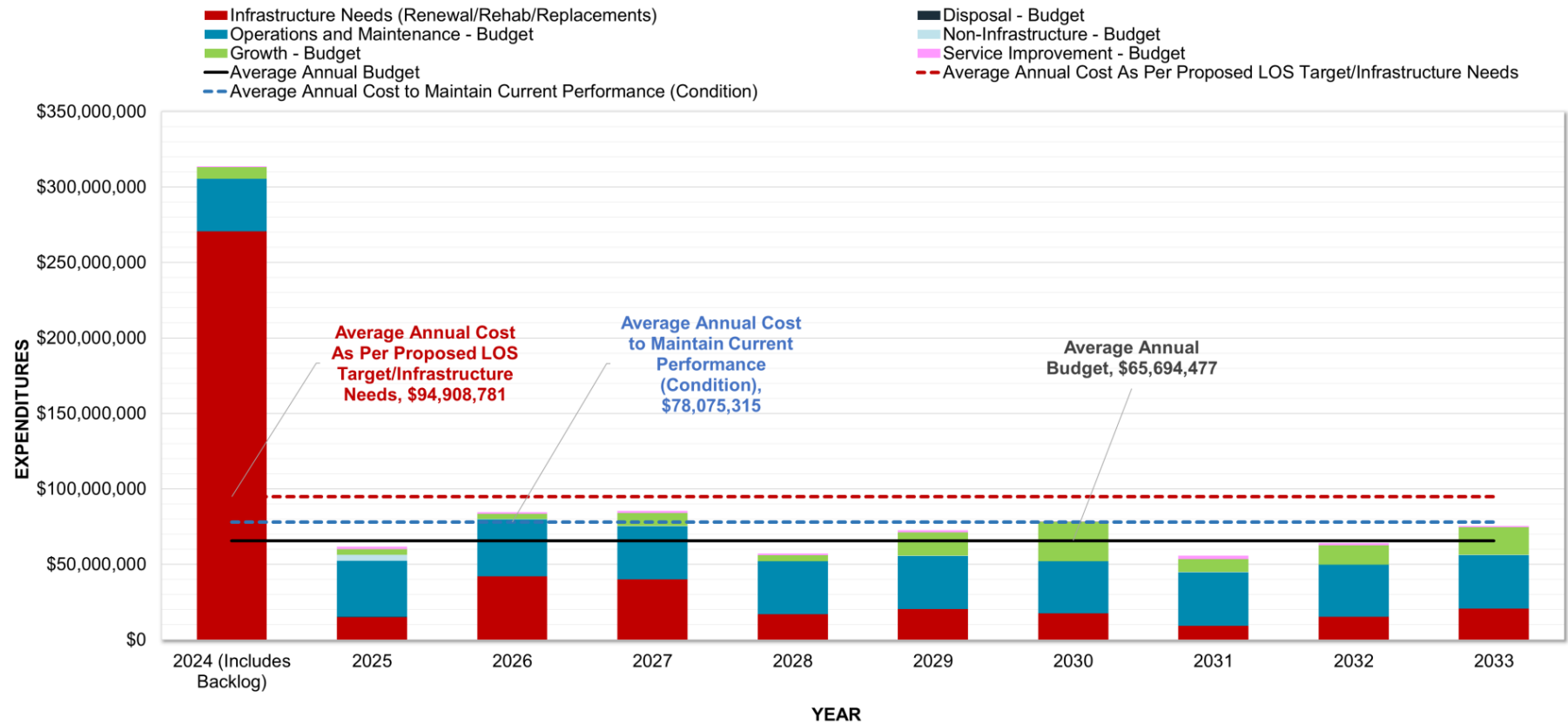


Figure 0-7. Town of Fort Erie Required Expenditures - Scenario Comparison



The infrastructure gap is calculated by comparing the forecasted renewal, rehabilitation, and replacement expenditures under each scenario against the Average Annual Budget attributed to these assets. The AMP has identified an annual funding gap of \$12 million to maintain current LOS, and an annual gap of \$29 M to meet the proposed LOS as per lifecycle strategies that have been documented throughout this plan. An overview of the gap can be found in Table 0-1.

Table 0-1. Average Annual Expenditures and Infrastructure Gap

Lifecycle Activity	Average Annual Budget	Average Annual Cost to Maintain Current LOS	Average Annual Cost As Per Proposed LOS Target/ Infrastructure Needs
Disposal	\$15,000	\$15,000	\$15,000
Growth	\$10,907,595	\$10,907,595	\$10,907,595
Non-Infrastructure	\$521,100	\$521,100	\$521,100
Operations & Maintenance	\$35,443,628	\$35,443,628	\$35,443,628
Renewal, Rehabilitation & Replacement	\$17,577,181	\$29,958,019	\$46,791,485
Service Improvement	\$1,229,973	\$1,229,973	\$1,229,973
Total	\$65,694,477	\$78,075,315	\$94,908,781
Average Annual Spending Gap		\$12,380,838	\$29,214,304
Percentage Increase Required to Address Gap		19%	44%

The cumulative results of these scenarios demonstrate that significant investment, along with the adoption of strategic asset management practices and policies will be required to meet expected spending requirements to meet current LOS, and an additional gap to meet proposed LOS. Left unaddressed, the impact of not developing strategies to close the gap can be seen in Figure 0-8, which shows the infrastructure gap at the end of the 10-year period, including the impact of inflation (this assumes a 2.5% rate of inflation).

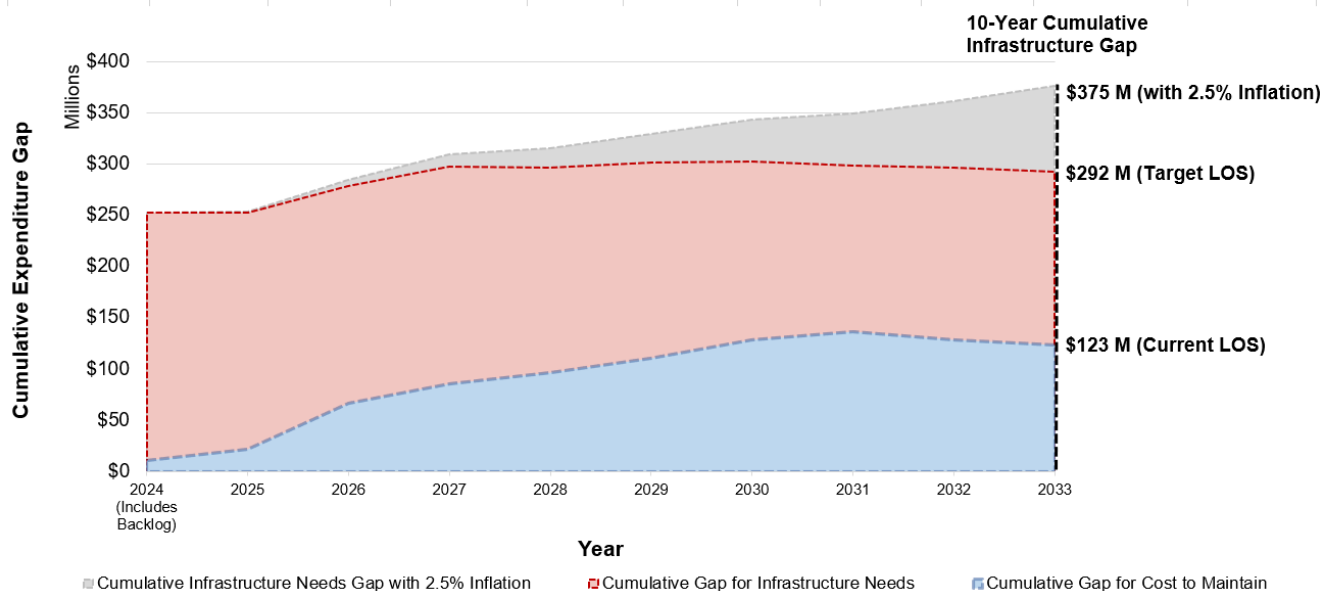


Figure 0-8. Cumulative 10-Year Infrastructure Gap and Impact of Inflation

Without strategies in place to close the infrastructure gap, the Town faces a total gap of \$375 million at the end of the 10-year period, factoring in inflation. Further detail on the infrastructure gaps have been provided to review the gap based on the tax supported and rate supported assets.

Breakdown of Infrastructure Gap by Rate and Tax Supported Assets

The infrastructure needs and gap are further described below, broken down by rate supported and tax supported assets to reflect the main source of revenue for these asset categories to further understand how revenues need to be increased to meet the needs and close the overall infrastructure gap to meet the proposed LOS targets outlined within this AMP.

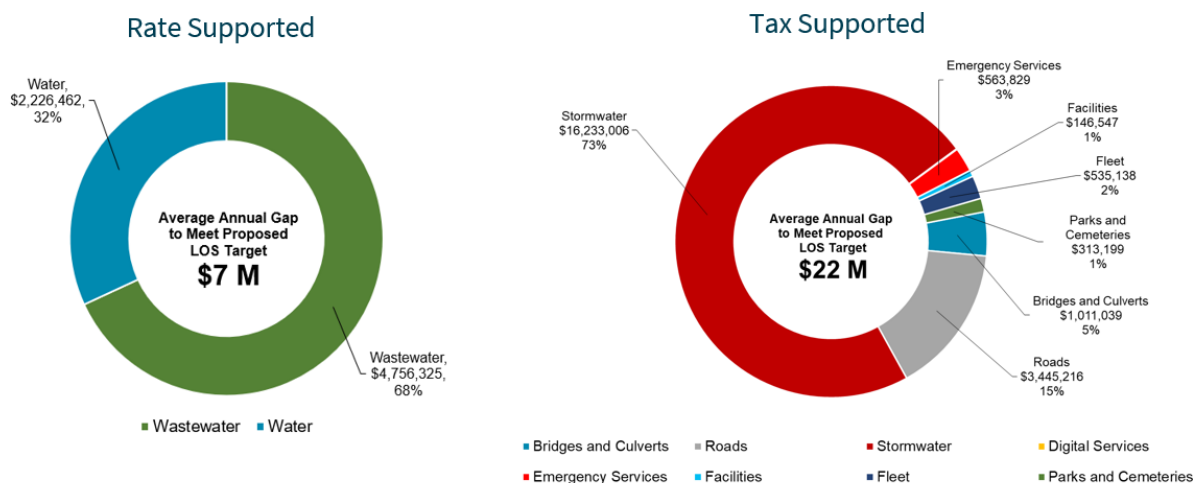


Figure 0-9. Breakdown of Infrastructure Gap to Meet Proposed LOS by Rate and tax Supported Assets



Closing the infrastructure gap is critical for ensuring the long-term sustainability and optimal performance of the Town's assets. To address this gap, the Town will need to explore options to increase funding, reduce the projected infrastructure costs or a combination of the two. Addressing the gap will require careful consideration and a combination of strategies, including non-financial and financial.

By adopting a combination of strategies, the Town can better address the infrastructure gap, improve service delivery, and enhance the quality of life for residents while ensuring fiscal sustainability and responsible stewardship of public resources.





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List of Acronyms

Acronym	Definition
AM	Asset Management
AMP	Asset Management Plan
BCA	Building Condition Assessment
BCI	Bridge Condition Assessment
CCTV	Closed Circuit Television Camera
ESL	Estimated Service Life
LOS	Level of Service
OSIM	Ontario Structure Inspection Manual
PACP	Pipeline Assessment and Certification Program
PCI	Pavement Condition Index
SAAS	Software-as-a-Service



1.0 Introduction



1 Introduction

The Town of Fort Erie (the Town)'s infrastructure supports a variety of municipal services that residents and businesses rely on everyday. The Town owns approximately \$2.16 billion in core and non-core infrastructure assets and requires a comprehensive plan for managing these assets to maximize service delivery while balancing costs to the community. An asset management plan (AMP) can help guide the Town in making the best decisions in the management of its infrastructure assets. Upon endorsement of this plan by the Town's executive lead, and upon approval by resolution passed by Council, this plan will be made available to the public on the Town's website. Any background information and reports upon which the information in this plan have been used to inform the state of the infrastructure, which are not already accessible on the Town's website, may be requested through the Town's Municipal Freedom of Information and Protection Privacy Act (MFIPPA) request form on the website.

1.1 Purpose and Regulation

1.1.1 Asset Management Plan Purpose

The Town of Fort Erie recognizes the importance of managing its infrastructure effectively. To this end, this Asset Management Plan (AMP) has been developed to serve as a guiding document for decision-making related to infrastructure assets. The objective and purpose of this AMP is to maximize benefits, manage risk, and provide satisfactory levels of service to the public in a sustainable manner. Asset Management involves understanding asset characteristics, assessing their condition, and defining expected service levels and measuring performance.

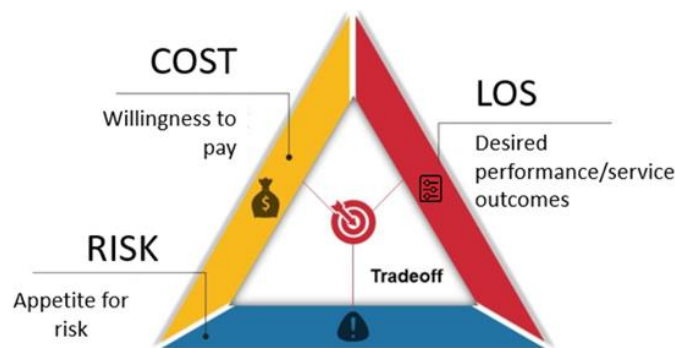


Figure 1-1. Asset Management Balance Between Cost, LOS and Risk

This AMP is a comprehensive document that allows the Town to:

- Meet regulatory requirements.

- Outline the current state of the Town's assets.
- Establish long-term infrastructure master plans and strategic plans.
- Develop sustainable financial plans and the annual budget.
- Describe the Town's current performance for levels of service, as well as set desired (target) levels of service.
- Consistently consider options related to assets, based on the AMP.
- Support funding applications to federal and provincial levels of government.

1.1.2 O.Reg. 588/17 Overview

Ontario Regulation 588/17: Asset Management Planning for Municipal Infrastructure requires municipalities to develop a Strategic Asset Management Policy outlining how asset management practices will be incorporated into the municipal framework. The AMP Policy must also consider actions that may be required to address vulnerabilities caused by climate change. The regulation also requires municipalities to develop and implement an Asset Management Plan and provide supporting policies for municipal infrastructure. After 2025, annual review of AM processes and formal 5-year asset management plan updates will be required as part of compliance to the O.Reg. A summary of O.Reg. 588/17 timelines and requirements is shown in Figure 1-2 below.

The Town developed their Strategic Asset Management Policy as per O.Reg. 588/17 requirements in 2019. This Policy is due to be updated this year, which will be included in Section 13 Improvement and Monitoring Plan of this plan.

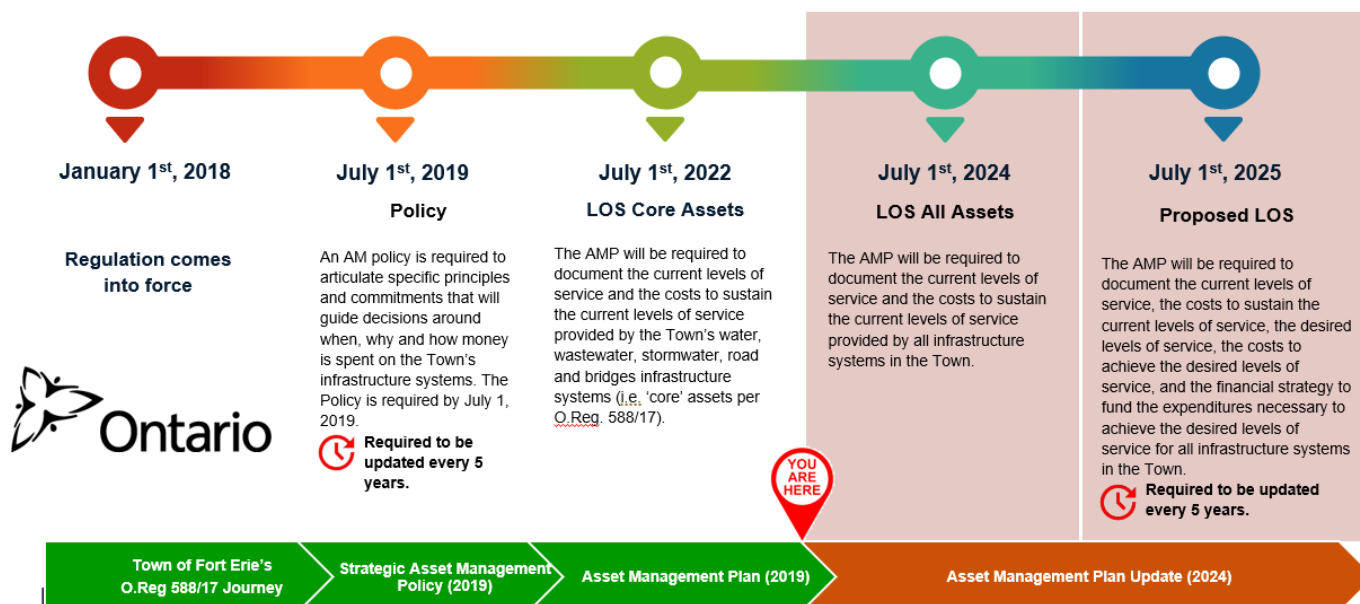


Figure 1-2. O.Reg. 588/17 Milestones



This AMP meets the regulatory requirements for 2024 and 2025, allowing the Town to meet the regulation well in advance of the 2025 deadline.

1.2 Asset Management Program in Fort Erie

1.2.1 Asset Management Governance

The Town of Fort Erie developed an Asset Management Policy in 2019, which outlined roles and responsibilities for asset management within the organization. The policy can be found in Appendix B. Since then, the Town has evolved to a governance structure as demonstrated below.

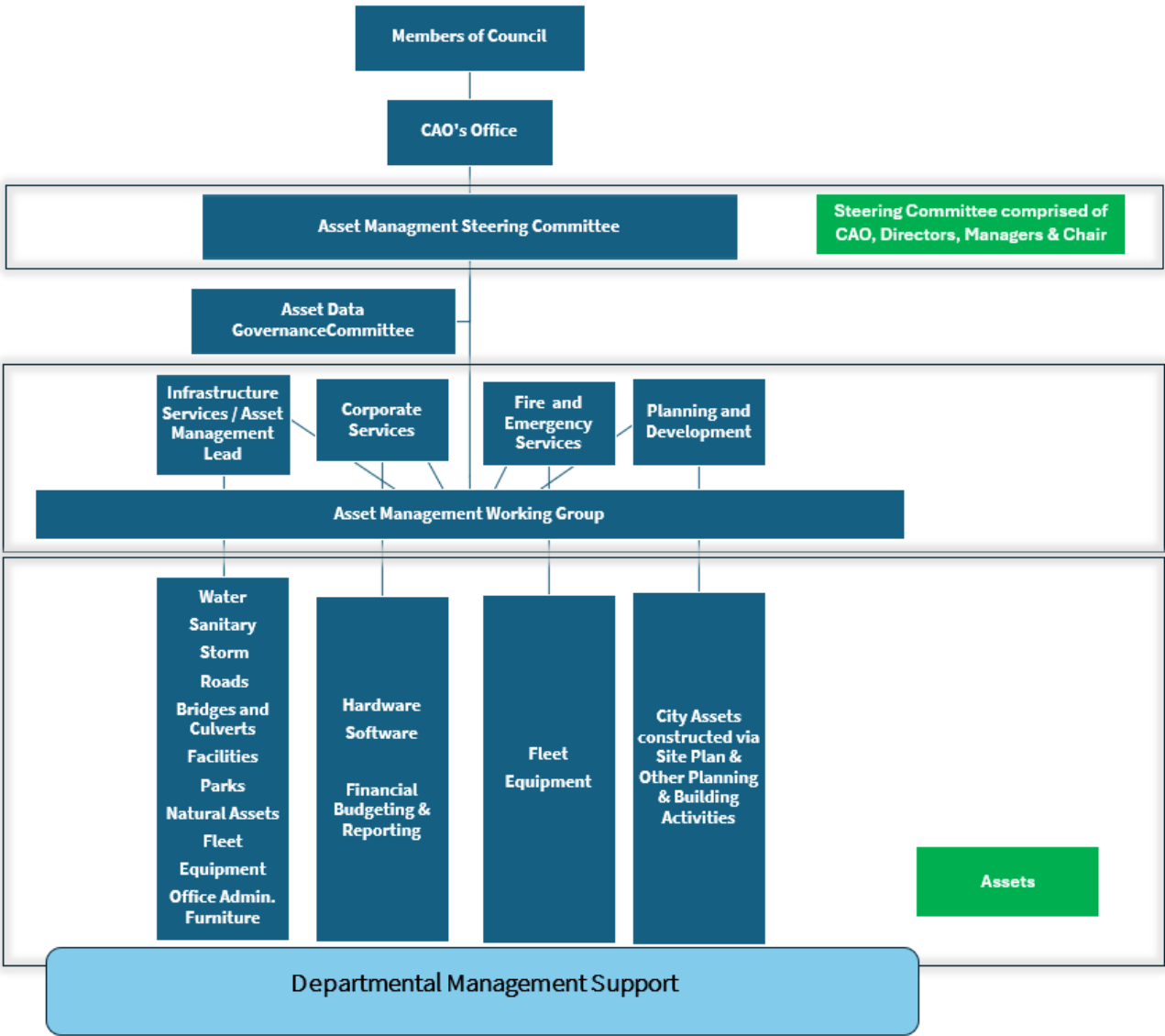


Figure 1-3. Overall Governance Structure for Asset Management at the Town of Fort Erie (Strategic Asset Management Policy, 2019)



1.2.2 Asset Management Stakeholders Roles & Responsibilities

Descriptions of the roles and responsibilities in Figure 1-3 are as follows:

Members of Council are responsible for ensuring resources are provided to staff to ensure the Asset Management Policy and Plan are established and maintained. Council has the authority to approve this policy and municipal budgets. Council also has the authority to make or override asset management decisions, in adherence with this policy.

CAO's Office has overall responsibility for implementing the Asset Management Policy and Plan. The CAO is responsible for endorsing the Asset Management Policy, assigning authorities and resources in administrative staff to ensure the Asset Management Plan is in place and the Asset Management Policy is executed. The CAO has the authority to execute the duties defined above and has the authority to make or override asset management decisions or recommendations from Senior Management or from the Asset Management Lead, in adherence with this policy.

Asset Management Steering Committee have the authority to recommend policy, budgets and the Asset Management Plan and Policy to Council. The Asset Management Steering Committee is comprised of the CAO, Directors and Managers. is required to drive asset management activities and to ensure that there is corporate responsibility. Asset Management is not a singular responsibility and requires acceptance and involvement of the whole organization to be accomplished. The AMSC is responsible for ensuring the Town's assets are managed in a systematic, efficient and coordinated manner now and into the future. The role of this group will be to implement, monitor, guide and report on the Town's approach to asset management. The AM steering committee must provide leadership and strategy and must focus on the "big picture. AMSC must avoid making managerial decisions and getting involved in the day-to-day implementation of the AM strategy.

The Data Governance Steering Committee (DGSC) has been established by the CAO to ensure that the Town's Data Governance practices support its strategic plan objectives and are consistent with best practices and are supporting asset management requirements.

Executive Lead at the Town of Fort Erie is the **Asset Management Lead**, a role filled by the **Director of Infrastructure Services**. The Asset Management Lead is responsible for ensuring Asset Management Policy and Plan is relevant, suitable, adequate, reviewed and updated as required. The Asset Management Lead also has the authority to make or override asset management decisions made by Managers within Infrastructure Services, in adherence with this policy.

Corporate Services, Fire and Emergency Services, and Planning and Development Services are responsible for working with the Asset Management Lead and AMP outcomes,



to ensure the financial budgets and long-term financial plan is aligned with the asset forecasts and Levels of Service. The Director's are also responsible for financial reporting on assets and maintaining the financing and revenue strategy in alignment with the Asset Management Plan, Budget and Reserve Policies. In collaboration, the Director's, CAO and Director of Infrastructure Services have the authority to make asset management decisions in adherence with this policy, particularly when meeting financial policy, in accordance with the capital process flow chart, is challenged.

Managers are responsible for making asset recommendations related to the assigned portfolio, in adherence with this policy, and executing plans once approved and reporting on results once executed.

Members of the Public can stay informed, access information, and provide feedback related to the AMP. The public may access information that provides a basis to decision making in the AMP under privacy and disclosure legislation.

Since the creation of the AM Policy, there is a new role of **Project Manager for Asset Management** to help drive asset management in the organization and oversee important projects, such as the development of this plan, and the implementation of the Town's maintenance management software and decision support tool which will support future asset management forecasting and reporting for the Town. In addition, this position is responsible for leading various asset management initiatives as required by the Town.

1.3 Alignment to the Town's Strategic Goals

The Town's 2023-2026 Corporate Strategic plan outlines the following Pillars and Strategic Objectives. This AMP supports the strategic objectives of the Town of Fort Erie by connecting levels of service developed in this AMP to the strategic objectives of the Town. This plan supports several of the objectives laid out in the Strategic Plan and provides a strategic plan to meet the goals and objectives of the Town through effective and efficient management of Town assets, which provide services to residents and businesses.



Table 1-1. The Town of Fort Erie's Strategic Objectives

Pillar/Focus Area	Strategic Objective
Sustainable, reliable access to local Health Care	A community where all residents have equitable access to comprehensive, community-based, innovative health care and social services
Quality of Life and Community Well-being	A community that is welcoming, engaged and inclusive and provides opportunities for everyone.
Sustainable and Managed Growth	A community that manages growth responsibly and recognizes existing neighborhoods by implementing effective planning and policies.
Economic Prosperity & Diversification	A community that creates opportunities for economic growth and job creation by maximizing our strategic location and tourism potential.
Environmental and Climate Change Resiliency	A community that addresses climate change and the impacts to the natural environment by proactive planning and action.
Comprehensive Housing Options	A community where all residents have access to safe, stable and appropriate housing that is affordable for all ages, abilities and income levels.



1.4 Development & Methodology of the Asset Management Plan

1.4.1 Asset Management Plan Scope

This Asset Management Plan (AMP) includes the following services:



Figure 1-4. AMP Scope

The Town's natural assets are not included within the main body or analysis of this AMP as a separate AMP was completed to account for the unique nature of the asset class. Information on these assets can be found in Appendix A.

1.4.2 Asset Management Plan Structure & Methodology

The AMP is divided into chapters for each asset group listed above. Each chapter outlines the State of the Infrastructure, Levels of Service, Lifecycle Management, and Data Confidence and Improvement Plan. The chapters are followed by the Financial Strategy and Improvement and Monitoring Plan for the Town. The methodology for each section is described below.

1.4.2.1 State of the Infrastructure

The State of the Local Infrastructure section provides a quantitative assessment of the infrastructure owned by the Town. The primary objective is to provide a high-level inventory and insights on the overall age, condition, replacement value, and key metrics of the assets owned by the Town, as per O.Reg. 588/17. The information is developed based on provided datasets and documents that were assessed for data confidence and discussed with Subject



Matter Experts (SMEs). This section summarizes the inventory of assets and their replacement values and provides the age and condition for assets in each chapter.

Asset Register

The asset register was developed by Town staff, pulling information from multiple sources of information to compile the required information for asset management planning. Required information includes:

- Unique Asset Identifier
- Install Date
- Current Replacement Value
- Estimated Useful Life
- Condition
- Asset type specific information

The resulting register, or inventory, provides the basis for the analysis completed for the asset management plan, including State of the Infrastructure, Levels of Service, and Lifecycle Management Strategies.

Current Replacement Value

Current Replacement Value (CRV) of an asset refers to the cost that would be incurred to replace the asset with a similar one. It represents the current market value of the asset, considering factors such as inflation and changes in market conditions. Determining the current replacement value is important for asset management purposes, as it helps the Town assess the financial implications of asset replacement, and plan for future capital expenditures. It is best practice to include all costs required to replace and construct an asset with a comparable asset. Where required, these costs may include engineering and design, project management, materials, and labour.

Town staff have undergone a lengthy process to review, assess and update CRVs across all asset categories for the purposes of this AMP. To update these values, several strategies have been leveraged, including market assessment, analyzing recent contracts of similar assets (based on average of 3 years of contracts), staff expertise, engineering estimates and professional appraisals. This is an on-going effort, which will be continually improved upon for asset management purposes.

CRVs used in this AMP represent the best available information for the development of this document and will continue to be evaluated and updated as required prior to the 2025 AMP. Current market conditions have been reflected in this AMP, and in some cases are



dramatically different than those provided in the previous AMP. There is no growth, technology change, or enhancement assumptions included in those costs (unless identified).

Estimated Service Life

Estimated Service Life in asset management planning refers to the anticipated duration over which an asset is expected to remain operational and provide its intended function. This estimate may be based on various factors such as design specifications, historical performance data, maintenance practices, environmental condition, and technological advancements. The purpose of estimating service life for asset management planning is to enable organizations to allocate resources for maintenance, repairs, replacements, and new acquisitions over the asset's lifecycle. It allows for budgeting long-term capital expenditures through replacement planning, risk management, optimizing maintenance and performance evaluation.

For the purposes of this AMP, staff reviewed and assessed estimated service lives to ensure appropriate values were used to ensure accurate forecasting for infrastructure spending needs.

Asset Condition

Assigning condition ratings to assets across each asset category using a consistent rating scale is a crucial step in asset management. By using industry standards, the Town of Fort Erie can facilitate benchmarking with other Canadian municipalities and gain insights into the overall condition of its assets, regardless of asset category. Condition ratings scale consists of a numerical or categorical value that represents the condition of the assets.

Within this AMP, condition ratings were assigned based on numerous methods, and then standardized into condition rating scale of Very Poor to Very Good. Where condition assessment data was available, these condition values were used and input into the condition rating scale, which are described in the category chapters.

Where assessed condition was not available, condition of an asset was assessed based on its remaining life compared to its age and estimated service life. This assessment involves categorizing the percentage of remaining life into different condition categories, as outlined in Table 1-2.

**Table 1-2. Condition Rating Scale**

Condition	Age/ESL	Description
Very Good	>80% life remaining	The asset is fit for the future. It is well maintained, in good condition, new or recently rehabilitated.
Good	60-80% life remaining	The asset is adequate. It is acceptable and generally within the mid-stage of its expected service life.
Fair	40-60% life remaining	The asset requires attention. The asset shows signs of deterioration, and some elements exhibit deficiencies.
Poor	20-40% life remaining	There is an increasing potential for its condition to affect the service it provides. The asset is approaching the end of its service life, the condition is below the standard and a large portion of the system exhibits significant deterioration.
Very Poor	0-20% life remaining	The asset is unfit for sustained service. It is near or beyond its expected service life and shows widespread signs of advanced deterioration. Some assets may be unusable.
Unknown		Not enough data exists to determine condition.

1.4.2.2 Levels of Service

Levels of service (LOS) are measures for what the Town provides to its customers, residents and visitors. They support the organization's strategic goals and are derived from customer needs and expectations, Council objectives, Town polities, legislative and regulatory requirements, standards, along with the financial capacity of the municipality to deliver those LOS.

The Levels of Service (LOS) section provides key performance indicators that support the provision of the respective service for each Town asset group. O.Reg. 588/17 has prescribed LOS for core assets only. Remaining assets LOS were developed by Town staff. In general, LOS provide the following information:

- **Level of Service Statement:** A brief description presented in plain language for public understanding of the service provided by each asset category to residents based upon the Town's core values and mission.
- **Key Service Attribute:** Categorizes the LOS metrics to specific areas of customer interest which are recognizable to the customer/public. These attributes are tied to the strategic objectives of the Town. See Figure 1-5 for the Town's Key Service Attributes and the related Strategic Pillars.



Figure 1-5. Strategic Objectives in Relation to Levels of Service



Sustainable and Managed Growth

- **Cost Efficient:** Providing services in an efficient manner
- **Operational:** Providing assets that are operational for all residents and visitors



Quality of Life and Community Well-Being

- **Accessible:** Providing accessible services
- **Safety & Regulatory:** Providing safe services that comply with regulations and have minimal environmental impacts
- **Reliable:** Providing quality services to residents
- **Quality:** Providing reliable services with minimal interruptions and minimal impact to the community



Environmental and Climate Change Resiliency

- **Environmental Stewardship:** Providing services that are energy efficient, environmentally conscious, and protect the environment
- **Safety & Regulatory:** Providing safe services that comply with regulations and have minimal environmental impacts

- **Levels of Service Metric:** A statement that describes quantifiable metrics of the service delivery outcomes from the perspective of the customer and service provider, expressed in terms that can be easily understood by customer. O.Reg. 588/17 requires specific metrics for core assets, while non-core assets the municipality determines the metrics to be used. These metrics are then filled out to determine the current performance (based on data from the previous calendar year), and the Town's proposed performance (target) for the 10-year period of the plan.

Difference in Level of Service between Current and Proposed: Each level of service has an arrow describing whether the difference between the current and proposed level of service is increasing, decreasing or maintained. A description of these arrow is in Table 1-3.



Table 1-3. Arrow Description for Difference in Current and Proposed Level of Service

Arrow Type	Description
	Maintain level of service
	Increase in level of service (increase in metric)
	Increase in level of service (decrease in metric)
	Decrease in level of service (increase in metric)
	Decrease in level of service (decrease in metric)

This AMP assesses the current performance and proposed performance of the Town using these levels of service attributes. The AMP will evaluate the Town's ability to afford the proposed (target) performance of these same service attributes.

1.4.2.3 Options for LOS Proposed Performance as per O.Reg. 588/17

The process for establishing levels of service can be seen in Figure 1-6. The regulation requires that the Town report on the current performance to meet the 2024 AMP requirements, and the proposed, or target, performance for the 2025 AMP requirements. As this AMP will meet the 2025 regulation, the current performance and target performance of the levels of service have been developed for this plan.

The current performance of each asset is required based on data from at most two calendar years prior to the year in which the plan was developed. The Town then must provide the proposed, or target, performance for the levels of service metrics for the 10 years of the forecast period of this AMP.



Various options and factors were considered when setting the proposed (target) performance for the LOS Metrics to balance achievability, affordability, risk, and the strategic priorities of the Town. Options included the following:

Decrease LOS: Lowering the level of service, while can decrease costs, can have far-reaching consequences and risks that affect customer satisfaction with services, organization reputation, legal compliance and increased risk of health and safety consequences and increased long-term costs.

Maintain Current LOS (Performance): Continue to provide the current LOS and performance of services.

Increase LOS to Meet Infrastructure Needs as Per Defined Lifecycle Strategies: Increase LOS, or performance of assets, based on strategies for lifecycle management developed by subject matter experts and best practices.

The Town must consider a variety of factors when determining appropriate proposed LOS targets. Asset management attempts to find the right balance between cost, risk and service. The risks associated with lifecycle management and the choices of proposed levels of service can be found in Section 12.2.5 Risk Associated with Lifecycle Strategies and Levels of Service.

O.Reg. 588/17, following the 2025 AMP deadline, requires the Town to provide Council with an annual review of the progress of implementing the AMP. Through this review, the Town will provide updates on the progress of meeting the proposed LOS, which will allow for further analysis if the targets are achievable and allow for Council and public engagement. At this time, the proposed LOS can be updated as required.



Develop LOS Metrics

- Reviewed O.Reg. 588/17 required metrics
- Reviewed previous AMP for relevant metrics for inclusion in this plan
- Workshops held with staff to finalize metrics that meet O.Reg. 588/17 and reflect Corporate Priorities

Determine Current Performance & Lifecycle Management Strategies

- The current performance of each metric was determined based 2023 data
- Lifecycle management strategies were developed for each asset type based on subject matter experts and best practices

Conduct Lifecycle Management Forecast

- Scenarios were run to determine the cost to maintain current LOS and the infrastructure needs as per the developed lifecycle strategies
- Workshops held to review current average funding, required expenditures to maintain current LOS and infrastructure needs

Review Options for Proposed LOS

- Options included decrease LOS, maintain LOS (as per lifecycle management scenario), increase LOS (to meet infrastructure needs as per lifecycle management strategies).

Finalize Proposed LOS & Annual Review

- Staff determined the appropriate proposed LOS were to meet the infrastructure needs as prescribed through the lifecycle management strategy.
- Review progress of meeting the proposed LOS during regulated review of the AMP

Figure 1-6. Level of Service Process



1.4.2.4 Lifecycle Management

The Lifecycle Management Strategy defines the set of planned actions that will enable the assets to provide their desired level of service in a sustainable way while mitigating risks and reducing costs throughout their life. The goal of this assessment is to capture the activities that are required to sustain the assets within each asset category. For the purposes of this plan, the lifecycle activity categories are as follows:

- **Disposal Activities:** Associated with disposing of an asset once it has reached the end of its useful life or is otherwise no longer needed by the municipality.
- **Growth Activities:** Planned activities required to extend services to previously unserved areas or expand services to meet growth demands to maintain LOS.
- **Non-Infrastructure Solution:** Actions or policies that can lower costs and contribute to the management of assets.
- **Operations & Maintenance Activities:** Including regulatory scheduled inspection and maintenance, or more significant repair and activities associated with unexpected events.
- **Renewal/Replacement Activities:** Significant repairs designed to extend the life of the asset, and eventual replacement activities that are expected to occur once an asset has reached the end of its useful life and rehab is no longer an option. The focus of this AMP is to assess the needs for these activities.
- **Service Improvement:** Planned activities to improve LOS. Example, an asset's capacity, quality, or system reliability. Not driven by growth needs. Examples include AODA compliance, new technologies or new services not previously provided by the Town.

The lifecycle activities for each asset class are detailed in the individual asset category chapters. These activities are aligned with the asset hierarchies and includes the frequency at which they are performed in terms of the assets' Estimated Service Life. Each asset type is unique in the needs for the activities that are completed within the asset's lifecycle.

1.4.2.5 Funding Lifecycle Activities

The goal of asset management aims to analyze and prepare for the entire lifecycle cost of asset ownership. The scope and assumptions of the lifecycle forecasts included in this AMP are as follows:

- The AMP focuses to identify renewal, rehabilitation and replacement needs for infrastructure investments.
- Expenditures required for the remaining lifecycle activities (non-infrastructure, service improvements, operations and maintenance, and growth) are assumed to be adequate



to meet the needs of the Town, based on the Operating and Capital Budget. These activities have been captured to analyze the full lifecycle cost of asset ownership.

- The forecast does not assume any increases in current funding over the forecast period for these activities. This is outside the scope of this AMP.
- Costs for non-infrastructure, service improvements, operations and maintenance and growth, in particular the costs for operations and maintenance, may not be reflective of actual operational needs and should be further analyzed.

O.Reg. 588/17 requires a 10-year plan that selects the lowest cost life cycle activity that will maintain service levels over the plan period. For the purposes of this AMP, the analysis is completed using the assumption that maintaining the current performance (condition) of assets, will ensure that the Town continues to provide service levels moving forward. As part of the Lifecycle Management Strategy, an assessment is also completed to understand not only the costs associated with the lifecycle activities, but to also forecast the performance (condition) of the Town's assets over the next 10 years.

Three forecasting scenarios are run to analyze the Town's assets, which provide insight on the Town's ability to continue to provide services into the future. This is achieved by comparing the performance of assets based on needs and various budgetary or condition-based targets.

The following three scenarios are run:

Scenario 1: Maintain Current Performance (Level of Service) – This scenario determines the cost that would be required to maintain the Town's assets in approximately the same condition they are currently assessed in over a 10-year forecast period. Understanding the cost to maintain current performance levels is a requirement of O.Reg. 588/17. For the purposes of this AMP, the current performance (condition) of the assets is used to determine the current level of service.

Scenario 2: Current Funding Model – Evaluates asset performance under the current funding level that the Town anticipates allocating towards each asset category. The current budgets were obtained from the Town's 2024 10-year capital budget and the operating budget. Only renewal, rehabilitation and replacement activities are completed that fit within the current funding allotted to the asset category as part of this forecast. The average annual expected spending of the 10-year period were used to compare the average annual needs. The operating budget the average of the first 3 years were used to determine the remaining years of the 10-year forecast. This is used to illustrate the change in performance (condition) under anticipated funding levels. It is also used as a baseline scenario, which can be used to assess the other scenarios analyzed below.



Scenario 3: Proposed Level of Service Target/Infrastructure Needs as Per Lifecycle

Strategies – This scenario is run to determine the required spending for the 10-year period to address infrastructure needs based on expected/planned rehabilitation, renewals, and replacements of assets as per their defined lifecycle strategy. This scenario also identifies rehabilitation and replacement requirements backlog, which is work that should have already been completed by the time of this assessment. Typically, these are assets that are beyond their identified service life. This scenario is not constrained by a budget, so any work that was planned based on the asset's lifecycle strategies are completed in the year it was triggered. Unlike the second scenario, the condition levels were not held to a specific target LOS, so the percent of asset value that fell into each condition grade varies based on where in their lifecycle the assets fall.

This scenario was determined to be the Town's target performance (or level of service), which was a requirement of O.Reg.588/17. This scenario completes the asset's lifecycle activities to achieve the Town's desired performance, which has been identified by infrastructure needs as per lifecycle strategies.

Using the results of these scenarios, the Financial Strategy was developed.

1.4.2.6 Financial Strategy

The financial plan provides a way for municipalities to integrate asset management planning with financial budgeting. It provides an overview of the required expenditures needed to address the infrastructure gap.

The Financial Strategy forecasts the total required annual expenditures for the Town to perform the lifecycle activities in alignment with the scenarios to maintain current performance and meeting infrastructure needs as per the lifecycle management strategies developed and compares the expected budget as identified in the Town's capital and operating budget.

The scenarios for each asset category will be combined to assess the Town's forecasted expenditures to understand the full cost of maintaining service levels and meeting infrastructure needs over the 10-year forecast period. Forecasts for expenditures will be compared to the capital budget (average annual budget) forecasts to determine if an infrastructure gap is present. Strategies to address this gap will also be discussed.

Note that forecasts for major capital works including renewal/rehabilitation and replacement activities are derived from analysis of the data provided by the Town, the level of service metrics developed with Town staff, and the lifecycle strategies developed with subject matter experts based on best practices. For other costs, such as maintenance, and non-infrastructure and service improvements, the assumption was made the funding levels for



these activities is enough to meet customer's expectations, unless there are documents or strategies that suggest otherwise. It is recommended that as the Town matures in their new maintenance management system that analysis of the operations be further analyzed.

1.4.2.7 Improvement and Monitoring Plan

As the Town matures in their Asset Management journey, the processes for Asset Management Planning will continue to evolve and improve. Within the Category chapters, the data confidence and improvement plan provide category specific opportunities for improvements. Each data source is given a data quality grade based on the criteria shown below in Table 1-4. The Improvement and Monitoring Plan will speak to the opportunities for maturity on a Town-wide or program level.

Table 1-4. Data Confidence Rating Scale

Grade		Criteria
A	Very Good	No assumptions, with available condition data from a reliable data source, and age and current replacement value are known.
B	Good	Minor assumptions are made for condition, age, or replacement values (e.g. most of condition, age, and replacement values are known). Data sources are reliable.
C	Fair	Assumptions are made for condition, age, or replacement values from moderately reliable sources.
D	Poor	Data comes from significantly out of date documents, data sources are moderately reliable, or values are unknown or unreliable.

1.5 Asset Management Plan Assumptions and Limitations

This Asset Management Plan was developed based on the best available information and by employing professional judgement and assumptions to address gaps where necessary. Asset specific assumptions are recorded in the category chapters.

Where gaps or opportunities were identified, they have been included in the improvement plan.

Assumptions:

- The scope of this AMP covers the assets directly owned by the Town of Fort Erie.
- All costs (including in the financial forecast) are presented in 2024 dollars, unless specified otherwise.

- 
- Service improvement to an asset is generally not included in replacement costs. Some exceptions include if it is standard practice to upgrade infrastructure such as replacing a cast iron pipe with PVC.
 - The cost of climate change has not been included in replacement costs identified in this AMP. Unexpected events such as severe storms attributed to climate change can cause immediate infrastructure replacement/renewal needs not identified in this AMP. Also not included are the likely effects climate change will have on the estimated useful life of the assets.
 - The Town has not implemented an asset risk management strategy that goes beyond legislative requirements for all assets. This will continue to be reviewed and enhanced for future iterations of the plan.
 - It is assumed that the projected capital budgets and expected available reserve funds will occur as planned over the period of analysis.
 - This AMP assumes that the current budgets are sufficient to meet current needs for non-infrastructure, operations and maintenance, and service improvement activities to maintain current levels of service.
 - Required growth activities for the asset categories have been established based on projects funded by development charges. It is assumed that all required growth activities have been appropriately budgeted for and are accounted for within this plan.

1.6 Asset Management Pressures

The management of public assets faces various pressures that can impact its operations, strategies, and overall success. Some of these pressures include:

Aging Infrastructure: The challenge of maintaining and upgrading aging infrastructure to address assets that are no longer meeting levels of service expected and required of them.

Budget Constraints & Funding Options: Balancing priorities within tight budgets and exploring financing options. Some external funding sources are unreliable and not guaranteed.

Climate Change & Natural Disasters: Investing in resilience measures to protect against climate-related risks. Climate change and natural disasters also may require assets need costly repairs, rehabilitation or replacement earlier than anticipated as a result of extreme weather events.

Data Management & Technology Adoption: Leveraging new technology is required for effective asset management, but these are often difficult to implement within organizations as there are competing priorities as a result of similar needs for all departments. Data



management and technology is an increasingly fast-paced environment with new and updated technologies available, as well as increased need for cyber security.

Environmental Regulations: Meeting environmental standards through upgrades and compliance efforts.

Limited Funding: Municipalities face pressures from the public to keep taxes/rates low, while also meeting levels of service.

Limited Human Resources: Recruiting and retaining qualified staff.

Market Volatility: Navigating changing market conditions, including increased costs, inflation, supply chain, vendor/labour availability. These pressures have increasingly been felt since the COVID-19 pandemic.

Political & Public Pressure: Balancing stakeholder needs and preferences.

Population Growth & Urbanization: Managing infrastructure demands by population growth in a sustainable way.

Regulatory Changes: Adapting to evolving regulations.

Resilience & Sustainability Goals: Prioritizing green infrastructure and renewable energy.

Overall, municipal asset management requires navigating a complex landscape of financial, regulatory, environmental, and social pressures to effectively manage infrastructure and deliver services to residents.

1.7 Growth and Climate Change

1.7.1 Growth

The Canada Census information published in 2021 indicated that Fort Erie's population increased from 30,710 in 2016 to 32,901. The Town of Fort Erie, is identified in the Greater Golden Horseshoe Growth plan area, but the population and employment forecasts are not indicated for the municipality in Schedule 3 or 7. As per O.Reg. 588/17 requirements for lower tier municipalities in the Greater Golden Horseshoe growth plan area, these forecasts are required to come from the official plan of the upper tier municipality, which is the Niagara Region, and have been outlined in Table 1-5. According to the Niagara Region Official Plan, the Town's population will rise to 48,050 by 2051 affecting the basic services provided by the Town. The Plan has also set a minimum residential intensification target of 50% for the Town which is equivalent to 3,680 units by 2051 to accommodate the growing population.



Table 1-5. Growth Projections

Growth Type	2021¹	2026²	2051³
Population	32,901	34,720	48,050
Employment	10,089	NA	18,430
Dwelling Units	14,080		

Growth within urban areas may require current infrastructure to be renewed and new assets required to meet the demand may be acquired, donated, or constructed by the Town. Acquiring new assets will commit the Town to ongoing operations, maintenance, and renewal costs in the future. These future costs will be considered in the 2025 AMP as per O.Reg. 588/17 requirements.

It should be noted that the More Homes Built Faster Act (2022) may impact our growth funding, potentially resulting in additional costs.

1.7.1.1 Growth and Asset Management

Population growth within Fort Erie places increased demand on infrastructure and services. Asset Management allows the Town to plan for growth strategically by identifying where new infrastructure is needed and how existing assets can be optimized to accommodate a growing population. Hence, the asset management plan will provide the linkage between the demand for services and the assets required. Significant capital expenditures expected from growth have been included in the asset chapters within this plan, based on the capital budgets provided by the Town which have been identified by activities funded by development charges. Expected operating expenditures have been assumed to be accounted for within the operating budgets provided by the Town.

1.7.2 Climate Change

1.7.2.1 Introduction

One of the most noticeable manifestations of climate change in Southern Ontario is the alteration of weather patterns. Winters are becoming milder, with decreased snowfall and shorter ice cover on lakes and rivers. Conversely, summers are growing hotter and more humid, leading to increased heatwaves that strain energy systems and pose health risks to vulnerable populations. Addressing climate change requires both global and local efforts,

¹ Town of Fort Erie 2021 Census, statcan.gc.ca

² Niagara 2041 Fostering an Environment for Economic Prosperity, [Niagara 2041 \(niagararegion.ca\)](https://niagararegion.ca)

³ Niagara Region Official Plan 2022, [Niagara Official Plan: Making our Mark \(niagararegion.ca\)](https://niagararegion.ca)

including reducing greenhouse gas emissions, transitioning to renewable energy sources, implementing adaptation measures, and raising awareness about the impacts of climate change on communities like Fort Erie.

A 2023 report published by the Financial Accountability Office (FAO) reveals that the Province is expected to see more frequent and intense extreme rainfall and extreme heat, and fewer freeze-thaw cycles on average compared to the 1976-2005 base period. Figure 1-7 below shows the projected changes in Ontario's annual number of hot days with daily maximum temperature above 30°C for all three emissions scenarios.

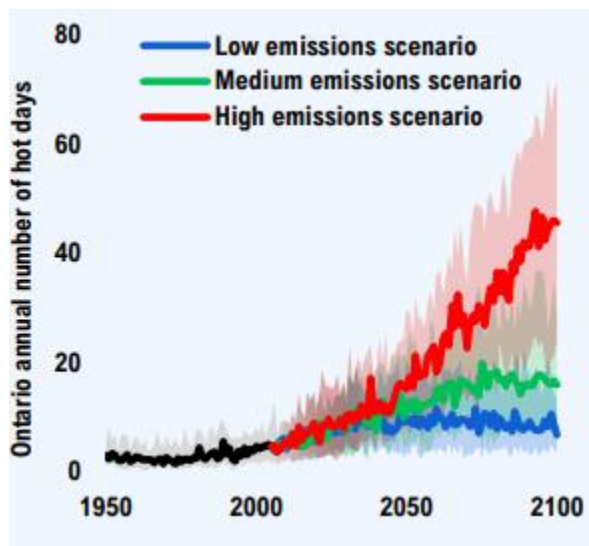


Figure 1-7. Trend for Extreme Heat in Ontario (Source: Canadian Centre for Climate Services)

These changes in the weather patterns can pose a significant risk to our infrastructure including but not limited to:

- Affect the asset lifecycle;
- Affect the levels of service that can be provided and the cost to maintain;
- Increase or change the demand on some of our systems; and,
- Increase or change the risks involved in delivering service.

According to the “Costing Climate Change Impacts to Public Infrastructure” (Financial Accountability Office of Ontario) Summary Report (2023) projections, the Province of Ontario’s \$708 billion portfolio of public infrastructure assets will cost an additional \$4.1 billion annually on average to maintain the existing infrastructure assets in the absence of adaptation to these changing climate conditions (Figure 1-8). This represents a 16% increase in infrastructure costs relative to a stable climate base scenario.

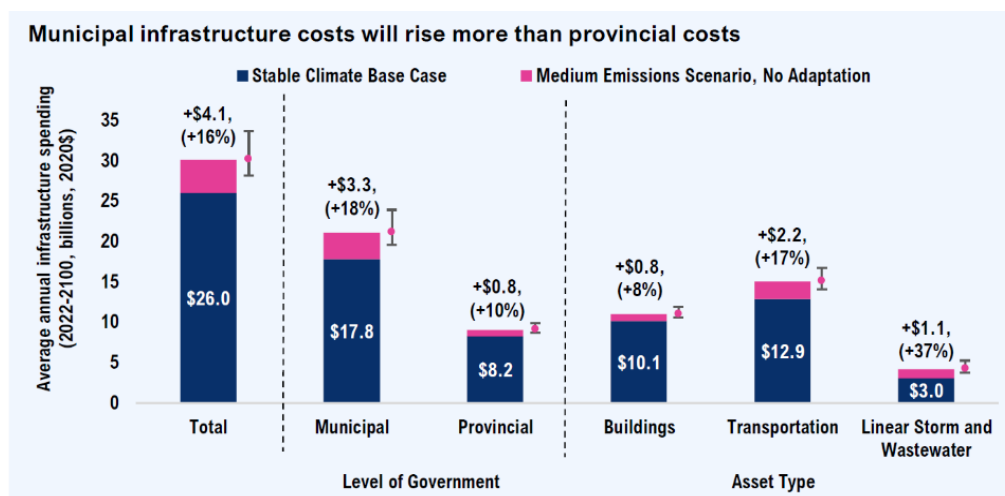


Figure 1-8. Infrastructure cost increase analysis per level of government and asset type (Financial Accountability Office of Ontario)

As further described in the report, municipalities will bear most of the climate-related infrastructure costs, in part because they manage 70% of the portfolio in scope, and because their portfolio is more susceptible to these climate hazards, such as increased temperatures and precipitation. The increase in costs shown are based on a medium emissions scenario, which the report identifies as the moderate scenario for planning. However, due to current emissions trajectory, a high-emission scenario is more likely until 2050. By late century, climate-related infrastructure costs under the high-emissions scenario are more than double those of the medium emission scenario. These costs do not include the societal costs of infrastructure service disruptions.

Depending on whether asset management strategies (Proactive/ Reactive) are implemented or not – municipal climate - related infrastructure costs in Ontario are expected to vary from \$2.4 billion to \$3.3 billion annually on average over the span of a century. Proactive adaptation occurs when asset managers adapt infrastructure to climate change either during an asset’s next major rehabilitation or upcoming renewal, whichever comes first. Reactive adaptation occurs when the infrastructure is adapted only when they are replaced at the end of their useful lives. The adoption of a proactive adaptation strategy would result in a considerable short-term increase in costs due to the substantial capital investments needed to adapt nearly half of the infrastructure portfolio. However, the rate of adaptation slows down in the middle of the century, and by the end of the century, all assets have been adapted and they are less infrastructure renewals which lowers the overall cost.

Figure 1-9 compares the climate-related infrastructure costs of all three asset management strategies and shows that Adaptation strategies result in lower average annual infrastructure costs. The proactive adaptation strategy results in the smallest increase in average annual infrastructure costs over the century at \$3.0 billion per year. These climate-related costs



represent an 11% increase in infrastructure costs above the stable climate base case and are \$1.1 billion lower per year on average than the no adaptation strategy. Across all climate scenarios, adaptation strategies are consistently less expensive over the century when compared with the no adaptation strategy, with the proactive strategy consistently the least expensive.

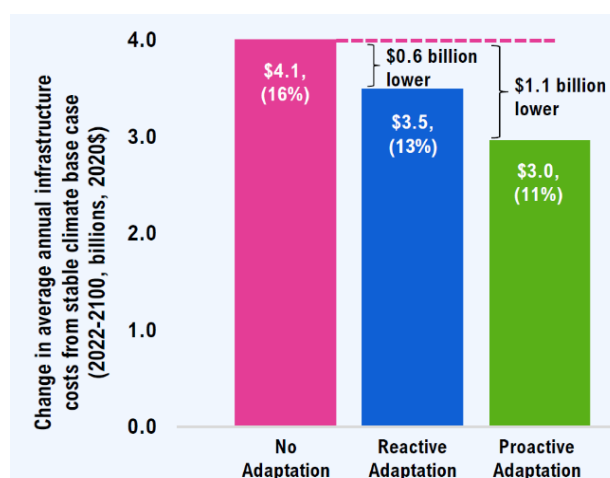


Figure 1-9. Adaptation can Lower Infrastructure Costs (Source: FAO report Costing Climate Change Impacts to Public Infrastructure)

1.7.2.2 Climate Change Resiliency

It is anticipated that climate change would have a detrimental effect on Fort Erie's ability to meet levels of service targets because of several factors which include more rapid asset deterioration, asset performance/failure and reliability concerns associated with these climatic changes. These impacts will likely cause increased pressure on operations and maintenance as well as increasing financial costs and liabilities. The following are some of the strategies/measures that the Town is considering:

Strategic Priority 5:



Environmental and Climate Change Resiliency

- Create, adopt, and implement Climate Change Plan and Policy Framework that incorporates adaptation, resiliency, and mitigation strategies.
- Improve resilience of and response to shoreline protection, stormwater management, drainage and flood control through infrastructure investments and maintenance.
- Assess the vulnerability of infrastructure to the climate change hazards and implement measures to enhance resiliency, such as retrofitting infrastructure to withstand extreme weather, improving drainage systems, and relocating assets away from high-risk areas.
- Incorporating climate-related risks into the risk assessment framework considering the physical risk (damage from extreme climate events), transition risks (policy changes and market shifts in response to climate change), liability risks (legal liabilities coming from climate-related impacts)



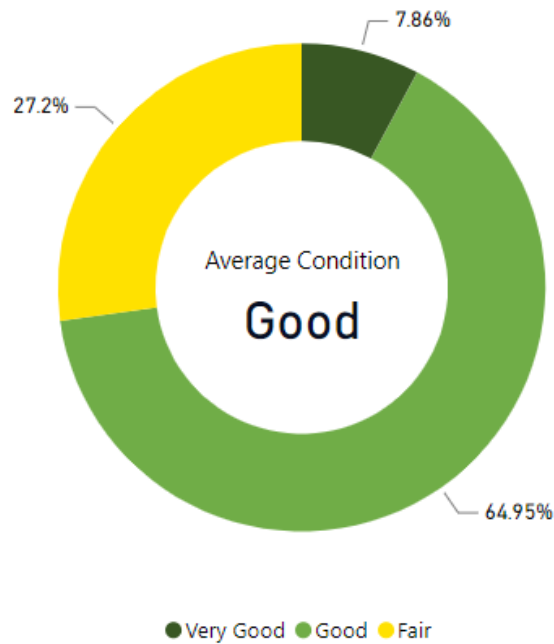
2.0 Bridges and Culverts



Replacement Value

\$62,232,400

Overall Average Asset Condition



**Average Annual Gap to Meet
Current LOS (Performance)**

\$1.1 M

**Average Annual Gap to Meet
Proposed LOS (Performance)**

\$1.0 M

Asset Inventory

- 97 Primary Structures and 26 Secondary Structures/Culverts
- Retaining Walls and Span Structures



2 Bridges and Culverts

Bridges and Culverts support the movement of people and goods throughout the Town, enabling efficient transportation networks. These structures serve as vital components of urban infrastructure connecting different parts of the town. Bridges and Culverts (called Primary Structures in this plan) are inspected every two years in conformance with the Ontario Structure Inspection Manual (OSIM) which provides a standardized, systematic assessment in accordance with O.Reg. 104/97. These inspections ensure the structural integrity, safety, and condition of these structures through renewal and rehabilitation recommendations.

2.1 State of the Infrastructure

2.1.1 Asset Valuation

Bridge and Culvert assets are made up of primary structures, retaining walls, secondary structures/culverts, and span structures. They have a current estimated replacement value of \$62 million. Table 2-1 shows the asset inventory and the current replacement value.

Table 2-1. Inventory and Current Replacement Value – Bridges and Culverts

Asset Type	Count	Quantity Unit	2024 Estimated Replacement Value
Primary Structures	97	Units	\$17,756,200
Retaining Walls	10	Units	\$3,447,100
Secondary Structures/Culverts	26	Units	\$2,078,300
Span Structures	52	Units	\$38,950,800
Total			\$62,232,400

2.1.2 Asset Condition

Condition was assigned to bridges and culverts based on OSIM inspections using bridge condition index scores and remaining assets using age. Table 2-2 below shows the conditions rating scale for age/estimated service life and bridge condition index (BCI).

Table 2-2. Condition Rating Scale – Bridges and Culverts

Condition	Age/ESL	BCI
Very Good	>80% life remaining	> 86
Good	60-80% life remaining	70 – 86
Fair	40-60% life remaining	61 – 70
Poor	20-40% life remaining	41 – 61
Very Poor	0-20% life remaining	< 41
Unknown		

Figure 2-1 below illustrates the condition distribution of the Town's Bridges and Culverts assets.

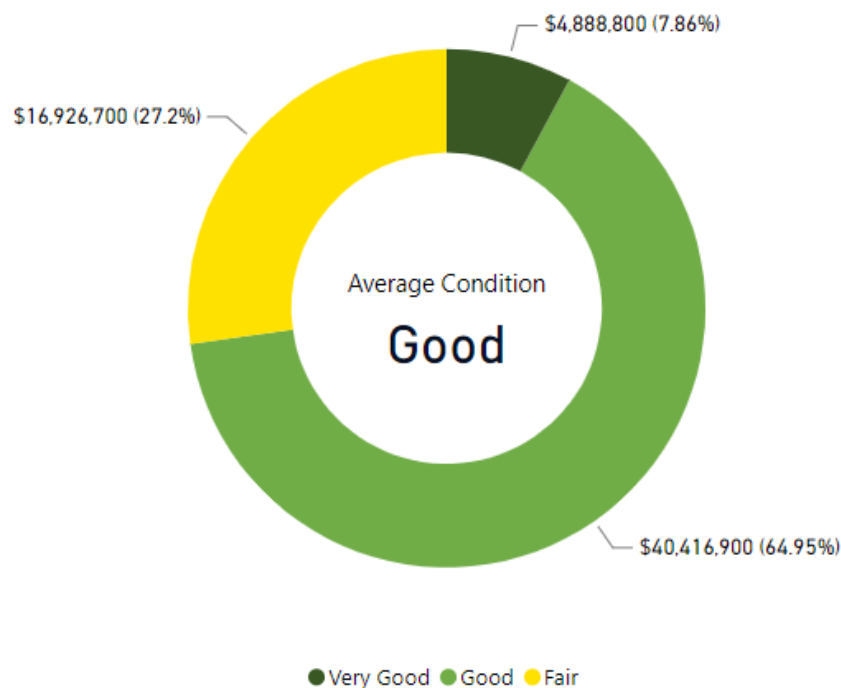


Figure 2-1. Overall Asset Condition (by Replacement Value) – Bridges and Culverts

Bridges and Culverts are on average in good condition. Over 72% of these assets are in good or better condition, with no assets falling below fair condition. Figure 2-2 shows the condition distribution breakdown for asset types in the Bridge and Culvert asset category.

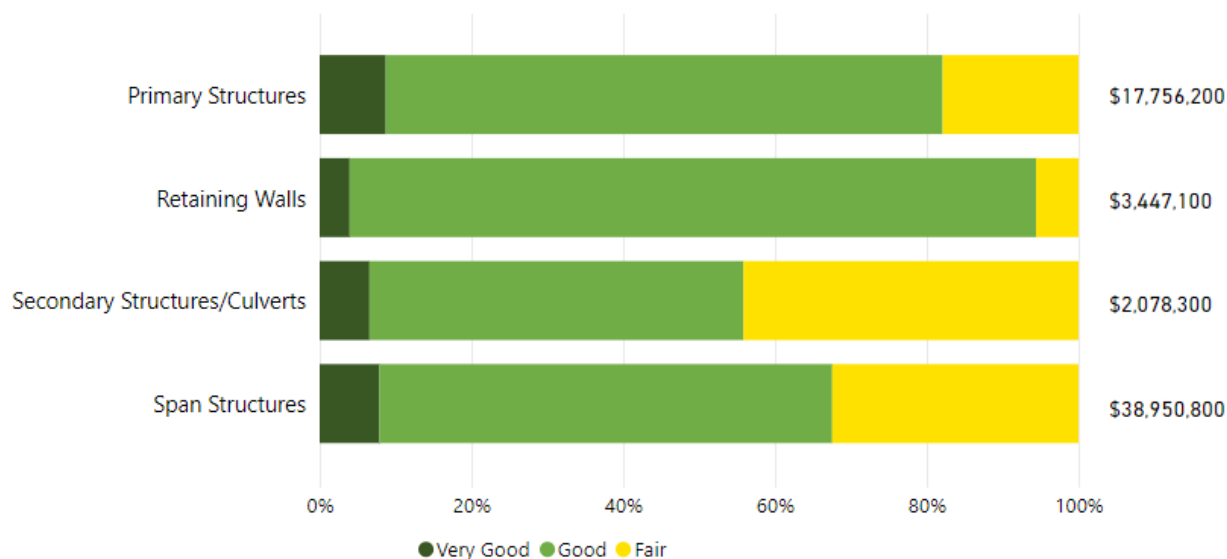


Figure 2-2. Asset Type Condition (by Replacement Value) – Bridges and Culverts

All assets are in fair or better condition. Bridge and Culvert assets are inspected regularly, with primary structures falling under regulations in O.Reg. 104/97 to have inspections completed every two years.

2.1.3 Average Age

Comparing average asset age to average estimated service life is a tool to further analyze the health of the asset system. Average age and average estimated service life for Bridges and Culverts is shown below in Figure 2-3.

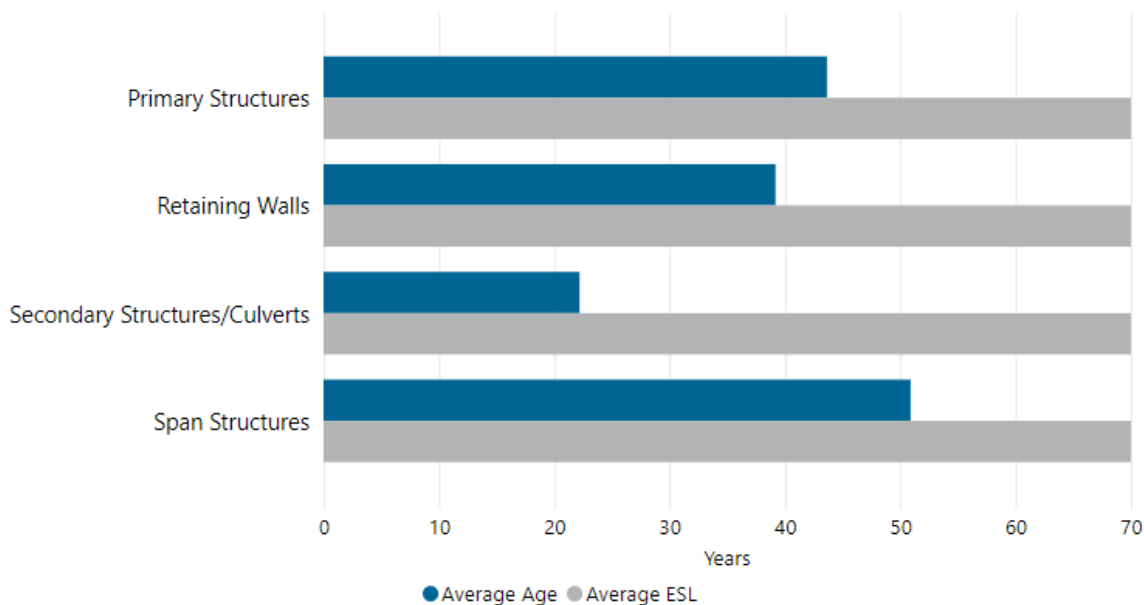


Figure 2-3. Average Age and Average Estimated Service Life – Bridges and Culverts



All assets have an average age below the average estimated service life. Bridges and Culverts are typically long-lasting assets, as they have frequent inspections and robust preventative maintenance programs in place to ensure they can provide safe and reliable service to the community.

2.2 Levels of Service

Service Statement: Efficiently providing operational and accessible bridges at the appropriate quality that supports drivers, cyclists, and pedestrians.

Levels of service metrics are a foundational part of the Town's Asset Management Strategy. It allows the Town to assess performance, identify areas for improvement and make informed decisions to better meet the needs of the community while optimizing resource allocation. Level of service metrics help municipalities promote accountability and transparency in municipal government. The Town has developed level of service metrics to align with community values and corporate priorities. There are metrics required by O.Reg. 588/17, and Town defined metrics. Customer and technical level of services metrics can be found below in Table 2-3 and Table 2-4.

The proposed LOS targets have been set by staff based on subject matter experts and through the development of the lifecycle management strategies discussed in the following section. Several factors and options were considered in the development of these targets, including costs, risks, and achievability. The differences between the current performance and proposed can be seen in the tables below.

The targets established for LOS represent the comprehensive approach required to minimize risks and lifecycle costs for the Town. The activities and strategies required to meet the proposed performance can be found in 2.3 Lifecycle Management Strategy, as well as the analysis of the impact to condition and costs used to determine the appropriate proposed (target) LOS. The proposed LOS are appropriate as they provide the best chance to avoid the risks associated with asset ownership. The risks associated with not meeting the proposed LOS can be significant and wide-ranging, which are further explained in 12.2.5 Risk Associated with Lifecycle Strategies and Levels of Service. Addressing these risks requires a proactive approach to infrastructure planning, investment, and management, as outlined in the lifecycle strategies.

The proposed LOS will only be achievable if the Town adopts financial strategies to close the infrastructure gap identified in this plan.



Table 2-3. Customer / Council Focused Level of Service Requirements – Bridges and Culverts

Key Service Attribute	Performance Measure	Current Performance	Proposed Performance	Difference Between Current & Proposed
Cost Efficient	Cost to provide service (2024 Operating & Capital Budget/household)	\$101/household	\$101/household	
Quality	Description or images of the condition of bridges and how this would affect use of the bridges.*	On average, majority of bridges in good condition, thus providing reliable bridge availability	On average, majority of bridges in good condition, thus providing reliable bridge availability	
Quality	Description or images of the condition of culverts and how this would affect use of the culverts.*	On average, majority of culverts in good condition, thus providing reliable culvert availability	On average, majority of culverts in good condition, thus providing reliable culvert availability	
Scope	Description of the traffic that is supported by Fort Erie bridges (e.g., heavy transport vehicles, motor vehicles, emergency vehicles, pedestrians, cyclists)*	All ranges of traffic types are supported by almost all bridges, unless otherwise posted.	All ranges of traffic types are supported by all bridges wherever practicable.	

*Mandatory under O.Reg. 588/17



Table 2-4. Technical Focused Level of Service Requirements – Bridges and Culverts

Key Service Attribute	Performance Measure	Current Performance	Proposed Performance	Difference Between Current & Proposed
Quality	For bridges in the municipality, average bridge condition index value. *	69	70	
Quality	For structural culverts in the municipality, average bridge condition index value. *	68	70	
Scope	Percent of bridges in the municipality with loading or dimensional restrictions. *	2.0%	2.0%	
Quality	Percentage and value of bridge assets in very poor condition	0%	0%	
Cost Efficient	Percent of annual reserve contribution meeting required reserve contribution based on the Reserve Policy	198% ⁴	100%	

*Mandatory under O.Reg. 588/17

⁴ This metric was calculated based on optimal reserve contribution based on a previously established asset replacement value, as per the Town's Capital Reserve Fund Policy. It is recommended that the replacement values used to calculate this metric be updated to reflect 2024 replacement values.



2.3 Lifecycle Management Strategy

The goal of our Asset Management Strategy is to establish and implement a series of planned activities, based on industry best practices. This will enable our assets to consistently provide a sustainable level of service to the residents of Fort Erie, while managing risk at the lowest lifecycle cost. The Town works to coordinate rehabilitation and replacement projects across asset groups where opportunities exist. This may result in asset strategies being delayed or advanced to accommodate the overall benefit of coordinated work across asset groups.

The Town continues to improve its approach to the management of its assets and will continue to put in place processes, procedures, and tools to enable a more consistent approach across the Town's Service Areas. Detailed below is an overview of some of the current asset management practices in place across the Town.

2.3.1 Lifecycle Activities

Lifecycle activities for Bridges and Culverts involve processes and tasks aimed at managing the entire lifespan of an asset. Following these activities allows Bridges and Culverts to continue to provide services efficiently, effectively, and sustainably through their lifecycle, maximizing the value they provide to the community. This approach aligns with best practices in asset management, where preventive maintenance and timely repairs are crucial for preserving the functionality, safety, and longevity of infrastructure assets.

By maintaining Bridges and Culverts in optimal condition, the Town can provide services at the lowest possible cost by extending their lifespan and mitigate the risk of costly major repairs or premature replacement. It also ensures that residents continue to benefit from high-quality services offered by well maintained Bridge and Culvert infrastructure. Following the lifecycle activities and strategies also ensures the Town avoid the risks associated with asset ownership, which can be significant. These risks are further outlined in 12.2.5 Risk Associated with Lifecycle Strategies and Levels of Service. Completing lifecycle activities and following the strategies outlined in this plan can enhance the resilience and sustainability of infrastructure while minimizing potential risks.

The lifecycle activity categories include non-infrastructure, operations and maintenance, renewal/rehabilitation, disposal, and service improvement and growth. A description of each activity category can be found in Section 1.4.2.4, specific asset management practices or planned actions as well as specific frequencies associated with these actions are outlined in in Table 2-5.



Table 2-5. Asset Management Practices and Associated Risks – Asset Category

Asset Management Practices/ Planned Actions	Frequency Associated with Practices / Planned Actions
Non-Infrastructure	
• OSIM inspections	• Biennial, as defined by provincial regulations
Operations & Maintenance Activities	
• Structural reinforcement inspection	• Biennial
• Minor maintenance	• As required
• Scour protection	• As required
Renewal/Replacement Activities	
• Renewal (Rehabilitation)	• Based on inspections
• Deck renewal	• As required
• Replacement	• As needed based on useful life
Disposal Activities	
• Dispose of assets in line with replacements	• As required
Service Improvement & Growth Activities	
• New assets for developments to service growth	• As needed
• New assets as part of service improvement	• As identified in studies



2.4 Funding the Lifecycle Activities

The Town uses the lifecycle management strategies described above in Section 2.3 to plan work and determine future expenditure needs for Bridge and Culvert assets. The activities, along with the scenarios below provide a framework of expenditures required for managing assets and ensuring the Town can meet the demands of current services and existing infrastructure.

All three scenarios consider only renewal, rehabilitation and replacement lifecycle activity costs and needs. These lifecycle activities ensure infrastructure remains in a state of good repair and can continue to provide services to residents. Further details of the funding required for the remaining lifecycle activities (non-infrastructure, service improvements, operations and maintenance, and growth) have been accounted for in the Scenario Comparison, found below in Section 2.4.4, which are based on the operating and capital budgets for the Town.

For the purposes of this AMP, these activities, and their costs, are assumed to be enough to meet the community's expectations. This AMP does not provide an analysis on optimizing these activities and costs. Growth needs are captured based on the planned projects that are funded through development charges or are activities to address the growing Town population.

2.4.1 Scenario 1: Cost to Maintain Current Performance (Level of Service)

Scenario one calculates the approximate annual cost of the renewal, rehabilitation and replacement activities required to maintain assets in a similar performance (condition) as their current state. This is used to determine the annual cost to provide the current level of service for Bridges and Culverts (as mandated by O.Reg. 588/17).

The performance forecast for scenario one is shown below in Figure 2-4. It was determined that an annual budget of \$2.1 million for renewal, rehabilitation & replacement activities is needed to maintain performance for Bridges and Culverts. There is a funding gap of approximately \$1 million compared the anticipated funding levels. Using this budget assets will increase in condition towards the end of the forecast period, ending with approximately 95% of assets in good or very good condition.

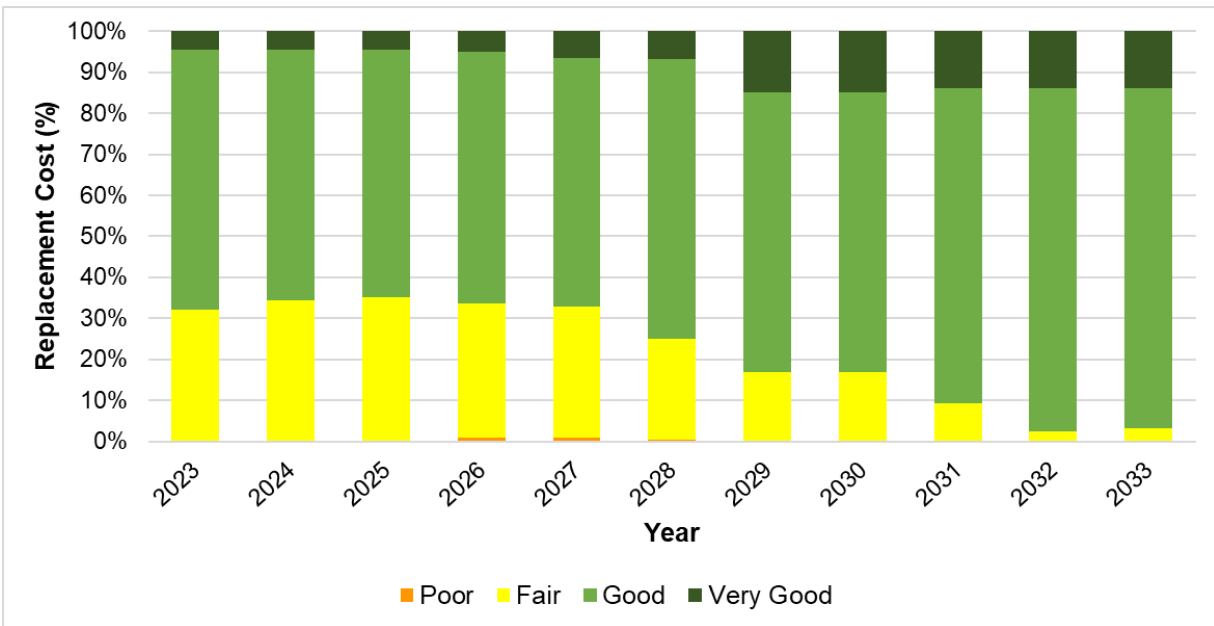


Figure 2-4. Bridges and Culverts Performance Forecast to Maintain Levels of Service

2.4.2 Scenario 2: Current Funding

Scenario two looks at the impact of current anticipated funding on the asset performance (condition) over the 10-year forecast period. The anticipated annual funding for renewal, rehabilitation and replacement activities for Bridges and Culverts is \$1.1 million. The condition distribution for the anticipated funding scenario is shown below in Figure 2-5. In this scenario the performance (condition) of assets decreases slightly by 3%, ending at 65% of assets in good or very good condition.

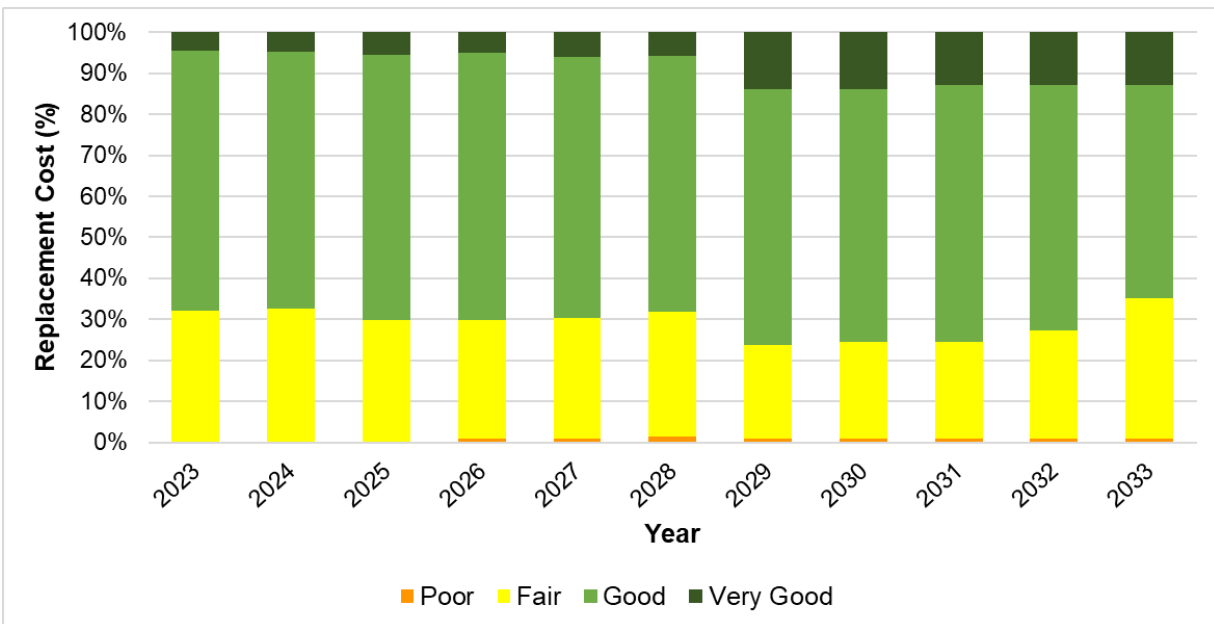


Figure 2-5. Bridges and Culverts Performance Forecast with Current Funding



2.4.3 Scenario 3: Proposed LOS Target/Infrastructure Needs Assessment

Scenario three calculates the average budget needed to achieve the proposed levels of service, which has been determined using infrastructure needs as per lifecycle strategies. The lifecycle strategies were developed in consultation with Town staff, and using industry best practices for the renewal, rehabilitation, and replacement activities. The renewal, rehabilitation, and replacement activities listed above in Table 2-5 have been used to develop the strategies for the infrastructure needs and include the lifecycle activities that need to be undertaken to achieve the proposed levels of service. Following the infrastructure needs and maintaining assets as prescribed in this AMP will provide the lowest lifecycle cost. This scenario is mandated by O.Reg. 588/17.

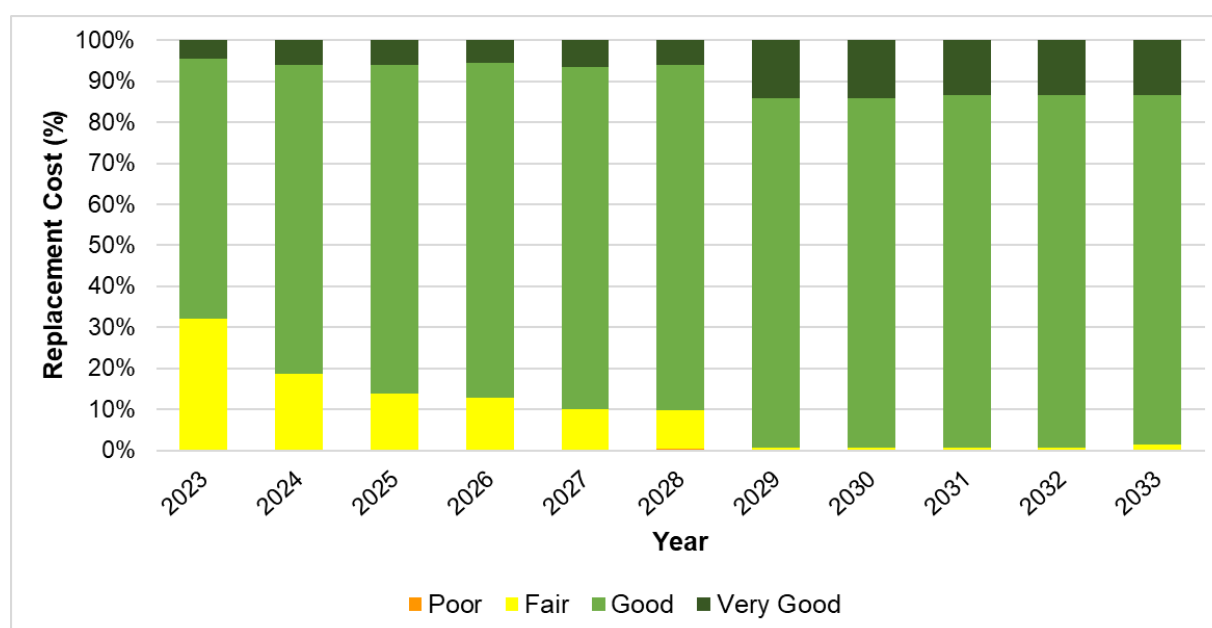


Figure 2-6. Bridges and Culverts Performance Forecast with Proposed Levels of Service Targets/Infrastructure Needs as per Lifecycle Strategies

It was determined that a budget of \$2.1 million for renewal, rehabilitation & replacement activities is needed to achieve the proposed levels of service. There is a funding gap of approximately \$1 million compared to current anticipated funding levels. The performance forecast for this scenario is shown below in Figure 2-6. The performance of Bridges and Culverts increases during the 10-year forecast period. Assets in good to very good condition start at 68% and increase to 98% at the end of the forecast.

2.4.4 Scenario Comparison & Infrastructure Gap

With the above information, Town staff can determine if there are gaps in funding to address infrastructure needs. This information will support future decision making on how to address any gaps. The investment needs under each of the three scenarios are shown below in



Figure 2-7 and Table 2-6. Figure 2-7 shows a bar graph of the forecasted renewal, rehabilitation, and replacement expenditures for the proposed level of service targets/infrastructure needs according to scenario three, as well as any remaining lifecycle expenditures informed by the Town's anticipated budget. The bars in Figure 2-7 are colour coded by lifecycle activities. The solid and dashed lines represent the average annual investment needs of the three scenarios described above.

The scenario comparison highlights a gap of approximately \$1 million compared to anticipated annual funding to maintain current performance (condition) of assets and to achieve proposed level of service targets and optimize the performance of assets based on lifecycle strategies.

The backlog is also highlighted in Figure 2-7 in the year 2024. The backlog represents renewal, rehabilitation, and replacement activities that have been identified as necessary but have not yet been completed. Continuing to defer renewals creates a risk of higher financial costs, potential decreased availability, and potential decreased satisfaction with asset performance.

Continuing to delay renewals can put the Town at risk for not achieving intergenerational equality. Future generations may be unable to maintain the levels of service customers currently enjoy. Continued deferrals can also lead to higher operational and maintenance costs, potentially limiting future service availability. Timely and adequately funded renewals will ensure that assets remain functional and reliable into the future.

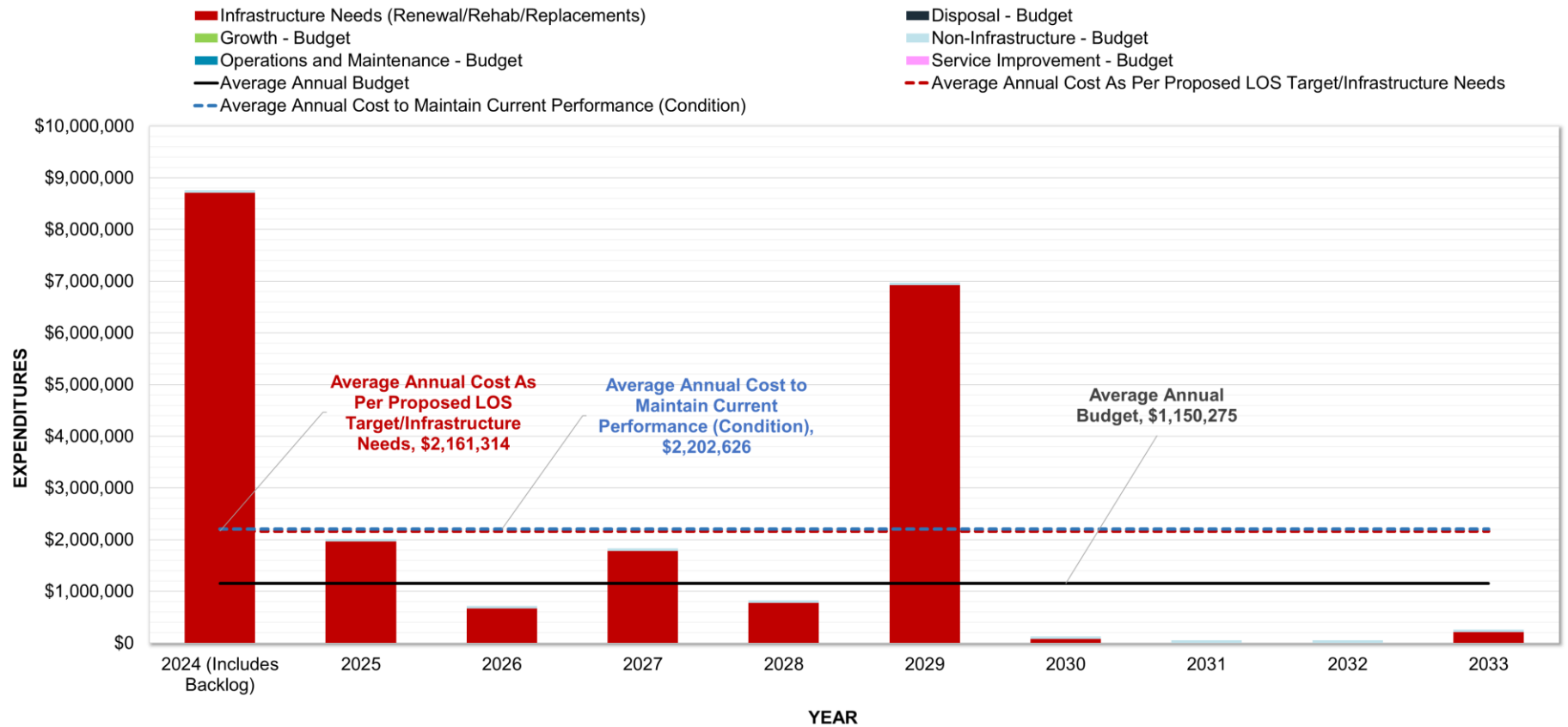


Figure 2-7. Bridges and Culverts Scenario Comparison



2.4.4.1 Forecasted Infrastructure Gap

The infrastructure gap is summarized below in Table 2-6. Current funding for capital budgets presented are the annual average of approved budgets (as of 2023) for the 2023-2033 fiscal years.

Table 2-6. Current and Optimal Capital Funding and Funding Gap – Bridges and Culverts

Lifecycle Activity	Average Annual Budget	Average Annual Cost to Maintain Current LOS	Average Annual Cost As Per Proposed LOS Target/ Infrastructure Needs
Disposal	\$0	\$0	\$0
Growth	\$0	\$0	\$0
Non-Infrastructure	\$50,000	\$50,000	\$50,000
Operations & Maintenance	\$0	\$0	\$0
Renewal, Rehabilitation & Replacement	\$1,100,275	\$2,152,626	\$2,111,314
Service Improvement	\$0	\$0	\$0
Total	\$1,150,275	\$2,202,626	\$2,161,314
Average Annual Spending Gap		\$1,052,351	\$1,011,039
Percentage Increase Required to Address Gap		96%	92%

Other lifecycle activities for Bridges and Culverts like growth, non-infrastructure, operations and maintenance are handled through the budgets for the roads department and could not be broken out further for this exercise. Through the implementation of the Town's maintenance management software, it is expected that full lifecycle costing and activities are more easily tracked. It is recommended that the Town's budget process be updated to include the asset service function, as well as capture lifecycle management activities to more accurately assess the full lifecycle cost of their assets.



2.6 Data Confidence and Improvement Plan

Table 2-7 outlines the main data sources and overall confidence in the data used for this AMP. Data confidence is based on how many assumptions needed to be made and the reliability of the data sources.

Table 2-7. Bridges and Culverts – Data Confidence

Asset Type	Data Source	Data Confidence
Bridges & Culverts	OSIM Inspections (2021)	B

2.6.1 Recommendations for Improvements

Opportunities for improvement for Bridges & Culverts include:

Data Management: Keep and maintain asset register with Bridges & Culverts connected to condition data and work management tasks to track outcomes of OSIM inspections through the Town's implementation of maintenance management.

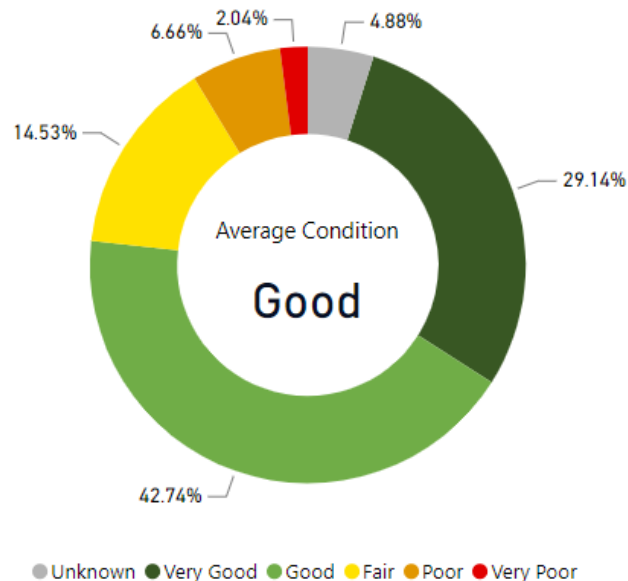


3.0 Roads

Replacement Value

\$306,848,075

Overall Average Asset Condition



**Average Annual Gap to Meet
Current LOS (Performance)**

\$3.2 M

**Average Annual Gap to Meet
Proposed LOS (Performance)**

\$3.4 M

Asset Inventory

- 422 km of road centreline maintained throughout the town (830 lane km) which include curbs and roadbase
- Supporting assets including sidewalks, guide rails, signage and streetlights



3 Roads

Roads help connect different parts of the Town, ensuring residents and visitors can travel safely throughout the town and through the Region. Roads help facilitate the movement of people and goods throughout the town, travelling to work, school, or places of leisure and recreation. Well maintained roads, sidewalks and active transportation networks contribute to community satisfaction and well-being.

3.1 State of the Infrastructure

3.1.1 Asset Valuation

Road assets in the Town consists of guiderails, roads, including curbs and road base, sidewalks, signage, and streetlights with a total current replacement value of \$536 million. Table 3-1 shows the asset inventory and the current estimated replacement value.

Table 3-1. Inventory and Current Replacement Value – Roads

Asset Type	Count	Quantity Unit	2024 Estimated Replacement Value
Guide Rails	27	Units	\$1,350,000
Roads	422	km	\$509,010,804
Sidewalks	142	km	\$24,110,422
Signage	925	Units	\$185,000
Streetlights	3183	Units	\$2,291,760
Total			\$536,947,985

3.1.2 Asset Condition

Condition is an important part of asset management planning. Roads have condition assigned through inspections resulting in a pavement condition index (PCI) for each road segment. The remaining assets have condition assigned using age. The condition rating scale can be seen below in Table 3-2.

Table 3-2. Condition Rating Scale - Roads

Condition	Age/ESL	PCI
Very Good	>80% life remaining	> 80
Good	60-80% life remaining	67 – 80
Fair	40-60% life remaining	55 – 67
Poor	20-40% life remaining	35 – 55
Very Poor	0-20% life remaining	< 35
Unknown		

Figure 3-1 and Figure 3-2 illustrates the overall condition distribution of the Town's Roads assets. The roads were recently evaluated in 2023 and are highly reliable. The Town also employs the DOT system to manage, update and forecast the needs of the roads.

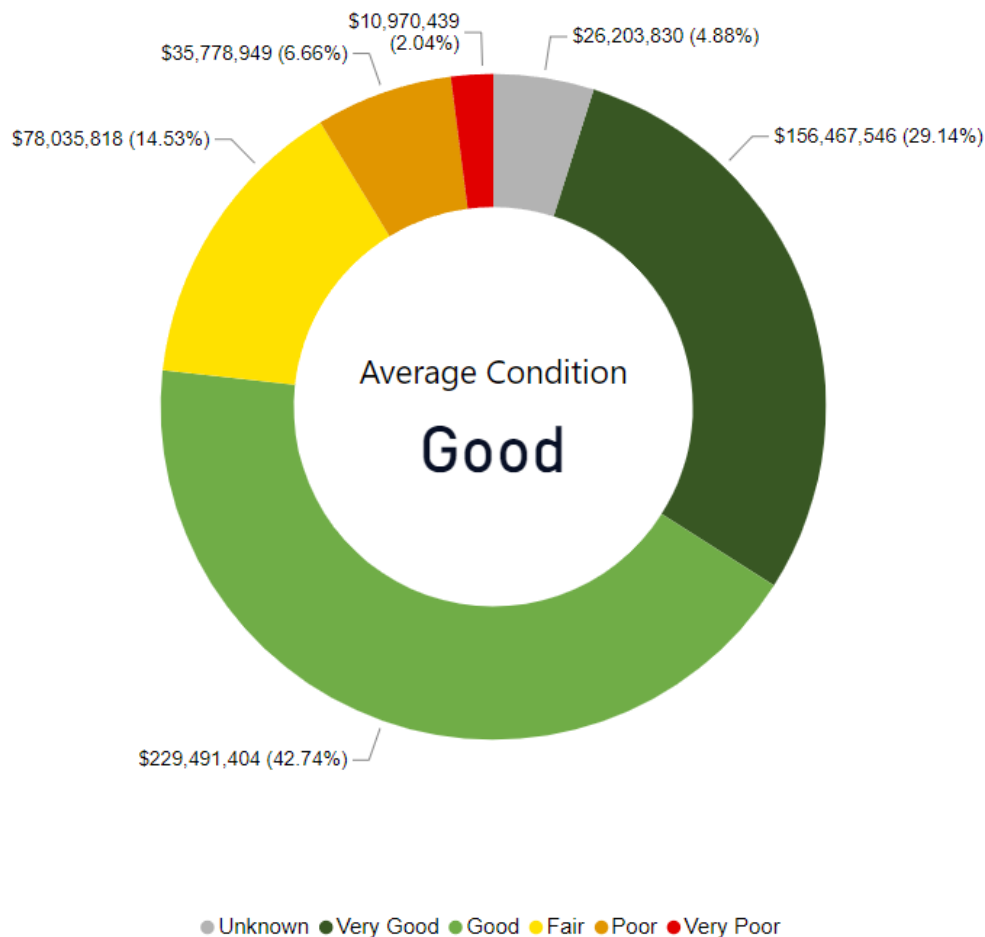


Figure 3-1. Overall Asset Condition (by Replacement Value) - Roads

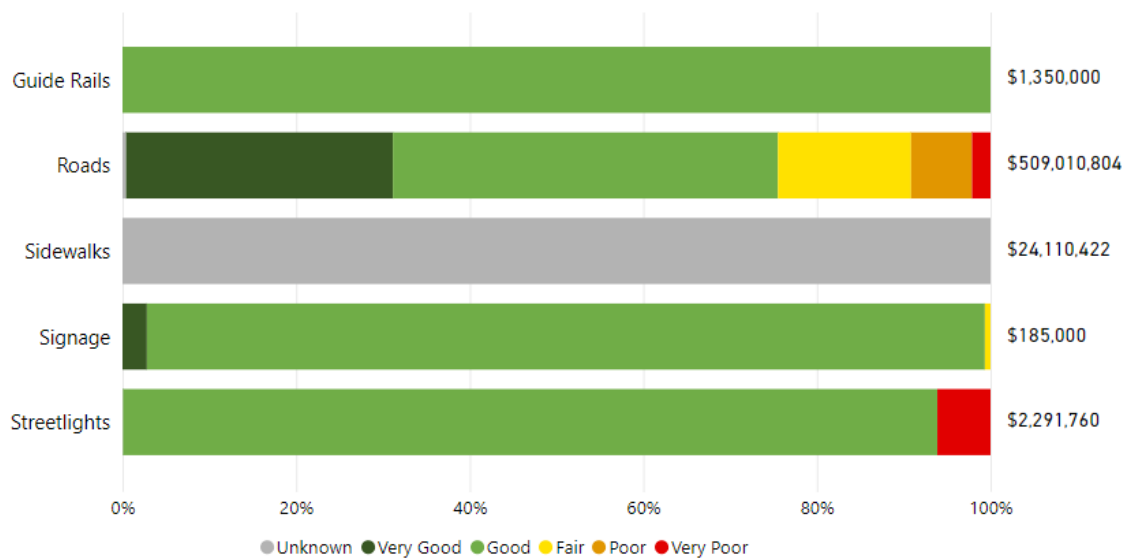


Figure 3-2. Asset Type Condition (by Replacement Value) - Roads

The average condition for roads assets is good with over 71% of assets in good to very good condition. Sidewalks currently do not have a condition metric that could be used in this AMP. The Town does collect defect data, and bases decisions on the sidewalks on this information and maintain them accordingly, it is currently not linked to a sidewalk segment/register information. Upon the implementation of the work management system, the defect information collected will be applied to the asset register, which will improve the reporting for asset management purposes.

3.1.3 Average Age

Comparing average asset age to average estimated service life is a tool to further analyze the health of the asset system. The average age of roads and streetlights is below the average estimated service life. Sidewalks and signage assets do not currently have install date information and do not have an age. Sidewalk needs are not assessed based on age, and the Town continues to make information based on current condition of the assets, so the gathering of this information is a low priority. Age information on signage is also difficult to gather, and maintain, and a low priority for the Town. Replacements of signs is on an as-needed basis, determined by road patrols, and considered an operations and maintenance task.

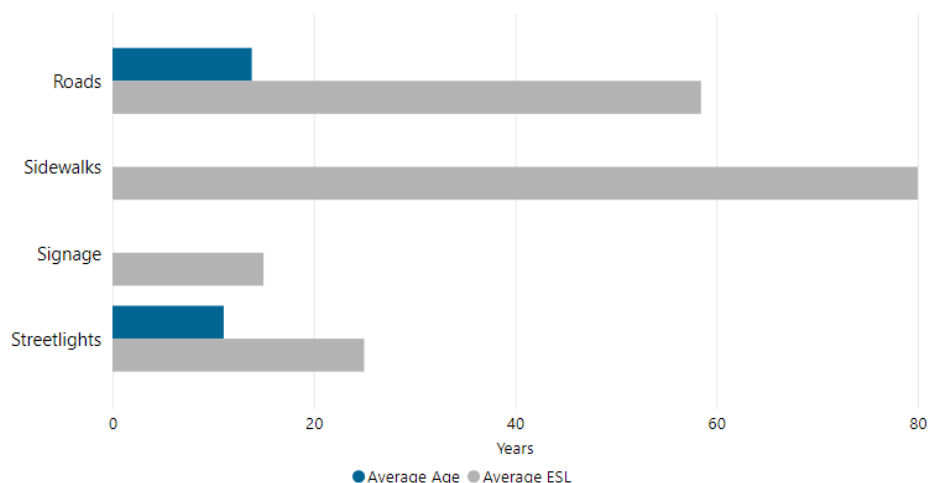


Figure 3-3. Average Age and Average Estimated Service Life – Roads

3.2 Levels of Service

Service Statement: Efficiently providing operational and accessible roads that support drivers, cyclists, and pedestrians.

Levels of service metrics are a foundational part of the Town's Asset Management Strategy. It allows the Town to assess performance, identify areas for improvement and make informed decisions to better meet the needs of the community while optimizing resource allocation. Level of service metrics help municipalities promote accountability and transparency in municipal government. The Town has developed level of service metrics to align with community values and corporate priorities. There are metrics required by O. Reg. 588/17, and Town defined metrics. Customer and technical level of services metrics can be found below in Table 3-3 and Table 3-4.

The proposed LOS targets have been set by staff based on subject matter experts and through the development of the lifecycle management strategies discussed in the following section. Several factors and options were considered in the development of these targets, including costs, risks, and achievability. The differences between the current performance and proposed can be seen in the tables below.

The targets established for LOS represent the comprehensive approach required to minimize risks and lifecycle costs for the Town. The activities and strategies required to meet the proposed performance can be found in 3.3 Lifecycle Management Strategy, as well as the analysis of the impact to condition and costs used to determine the appropriate proposed (target) LOS. The proposed LOS are appropriate as they provide the best chance to avoid the risks associated with asset ownership. The risks associated with not meeting the proposed LOS can be significant and wide-ranging, which are further explained in 12.2.5 Risk



Associated with Lifecycle Strategies and Levels of Service. Addressing these risks requires a proactive approach to infrastructure planning, investment, and management, as outlined in the lifecycle strategies.

The proposed LOS will only be achievable if the Town adopts financial strategies to close the infrastructure gap identified in this plan.



Table 3-3. Customer / Council Focused Level of Service Requirements – Roads and Right of Way

Key Service Attribute	Performance Measure	Current Performance	Proposed Performance	Difference Between Current & Proposed												
Cost Efficient	Cost to provide service (2024 Operating & Capital Budget/household)	\$555/household	\$555/household													
Quality	Description or images that illustrate the different levels of road class pavement condition*	The Town assesses condition of roads based on Pavement Condition Index, which are determined based on inspections of the roads. <table><tr><th>Condition</th><th>PCI</th></tr><tr><td>Very Good</td><td>> 80</td></tr><tr><td>Good</td><td>67 – 80</td></tr><tr><td>Fair</td><td>55 – 67</td></tr><tr><td>Poor</td><td>35 – 55</td></tr><tr><td>Very Poor</td><td>< 35</td></tr></table>	Condition	PCI	Very Good	> 80	Good	67 – 80	Fair	55 – 67	Poor	35 – 55	Very Poor	< 35	As stated in Current Performance.	
Condition	PCI															
Very Good	> 80															
Good	67 – 80															
Fair	55 – 67															
Poor	35 – 55															
Very Poor	< 35															
Accessible	Description, which may include maps, of the road network in the municipality and its level of connectivity*	Good connectivity of a range of minor arterial, collector and local roads throughout the Town.	Good connectivity of a range of minor arterial, collector and local roads throughout the Town.													

*Mandatory under O.Reg. 588/17



Table 3-4. Technical Focused Level of Service Requirements – Roads and Right of Way

Key Service Attribute	Performance Measure	Current Performance	Proposed Performance	Difference Between Current & Proposed
Quality	For paved roads in the municipality, the average pavement condition index value. *	72	75	
Quality	For unpaved roads in the municipality, the average surface condition. *	78	78	
Quality	Percentage replacement value of paved roads in very poor condition	6.49%	0%	
Quality	Percentage replacement value of other road and right-of-way assets in very poor condition	5.67%	0%	
Accessible	Number of lane-kilometres of each of arterial, collector, local roads as a proportion of square kilometres of land area of the municipality.*	Arterial = 0.348 Collector = 4.607 Local = 4.014	Arterial = 0.348 Collector = 4.607 Local = 4.014	
Cost Efficient	Percent of annual reserve contribution meeting required reserve contribution based on the Reserve Policy	67% ⁵	100%	

*Mandatory under O.Reg. 588/17

⁵ This metric was calculated based on optimal reserve contribution based on a previously established asset replacement value, as per the Town's Capital Reserve Fund Policy. It is recommended that the replacement values used to calculate this metric be updated to reflect 2024 replacement values.



3.3 Lifecycle Management Strategy

The goal of our Asset Management Strategy is to establish and implement a series of planned activities, based on industry best practices. This will enable our assets to consistently provide a sustainable level of service to the residents of Fort Erie, while managing risk at the lowest lifecycle cost. The Town works to coordinate rehabilitation and replacement projects across asset groups where opportunities exist. This may result in asset strategies being delayed or advanced to accommodate the overall benefit of coordinated work across asset groups.

The Town continues to improve its approach to the management of its assets and will continue to put in place processes, procedures, and tools to enable a more consistent approach across the Town's Service Areas. Detailed below is an overview of some of the current asset management practices in place across the Town.

3.3.1 Lifecycle Activities

Lifecycle activities for Roads involve processes and tasks aimed at managing the entire lifespan of an asset. Following these activities allows Roads to continue to provide services efficiently, effectively, and sustainably through their lifecycle, maximizing the value they provide to the community. This approach aligns with best practices in asset management, where preventive maintenance and timely repairs are crucial for preserving the functionality, safety, and longevity of infrastructure assets.

By maintaining Roads in optimal condition, the Town can provide services at the lowest possible cost by extending their lifespan and mitigate the risk of costly major repairs or premature replacement. It also ensures that residents continue to benefit from high-quality services offered by well maintained roads and transportation infrastructure. Following the lifecycle activities and strategies also ensures the Town avoid the risks associated with asset ownership, which can be significant. These risks are further outlined in 12.2.5 Risk Associated with Lifecycle Strategies and Levels of Service. Completing lifecycle activities and following the strategies outlined in this plan can enhance the resilience and sustainability of infrastructure while minimizing potential risks.

The lifecycle activity categories include non-infrastructure, operations and maintenance, renewal/rehabilitation, disposal, and service improvement and growth. A description of each activity category can be found in Section 1.4.2.4. Specific asset management practices or planned actions as well as specific frequencies associated with these actions are outlined in Table 3-5.



Table 3-5. Asset Management Practices and Associated Risks – Roads and Right of Way

Asset Management Practices/ Planned Actions	Frequency Associated with Practices / Planned Actions
Non-Infrastructure	
• Roads Needs Study	• 2 years
• Overweight/load permit process for demand management	• Annually
• Half load on rural roads to manage roadway deterioration	• As required
• Public awareness (encouragement to use public transportation, active transportation, and other modes of transportation)	• Annually
• Ditch inspection (for Rural Ditch Strategy)	• Every 5 years
• Sidewalk engineering design criteria (development engineering guidelines) and municipal standards	• As required
• Visual inspections of sidewalks (condition ratings for physical defects such as cracking, weathering, uneven panels, presence of previous maintenance (grinding/patching))	• Annually as defined in Minimum Maintenance Standards (MMS), as needed to address inquiries
• Streetlight inspection program (inspections for deficiencies)	• Annually
• Active Transportation Master Plan	• As required
Operations & Maintenance Activities	
• Roads scheduled inspections and patrols	• As defined in Minimum Maintenance Standards (MMS)
• Pothole repair	• As required
• Street sweeping	• As required
• Salting and snow removal	• Seasonally
• Roads pavement marking	• As required



Asset Management Practices/ Planned Actions	Frequency Associated with Practices / Planned Actions
Planned routine maintenance (crack seal, slurry seal, micro-surface activities)	As required
Sidewalk grinding and minor cold patch repairs	As required
Replace sidewalk panel	As required
Renewal/Replacement Activities	
Surface grinding and full depth asphalt removal/repaving	As required
Replacement/reconstruction of road	As required
Replacement of full section of sidewalk	As required
Disposal Activities	
Dispose of assets in line with replacements	As required
Service Improvement & Growth Activities	
New assets for developments to service growth	As needed
New assets as part of service improvement	As identified in studies



3.4 Funding the Lifecycle Activities

The Town uses the lifecycle management strategies described above in Section 3.3 to plan work and determine future expenditure needs for Roads assets. The activities, along with the scenarios below provide a framework of expenditures required for managing assets and ensuring the Town can meet the demands of current services and existing infrastructure.

All three scenarios consider only renewal, rehabilitation and replacement lifecycle activity costs and needs. These lifecycle activities ensure infrastructure remains in a state of good repair and can continue to provide services to residents. Further details of the funding required for the remaining lifecycle activities (non-infrastructure, service improvements, operations and maintenance, and growth) have been accounted for in the Scenario Comparison, found below in Section 3.4.4, which are based on the operating and capital budgets for the Town. For the purposes of this AMP, these activities, and their costs, are assumed to be enough to meet the community's expectations. This AMP does not provide an analysis on optimizing these activities and costs. Growth needs are captured based on the planned projects that are funded through development charges or are activities to address the growing Town population.

3.4.1 Scenario 1: Cost to Maintain Current Performance (Level of Service)

Scenario one calculates the approximate annual cost of the renewal, rehabilitation and replacement activities required to maintain assets in a similar performance (condition) as their current state. This is used to determine the annual cost to provide the current level of service for Roads (as mandated by O. Reg. 588/17).

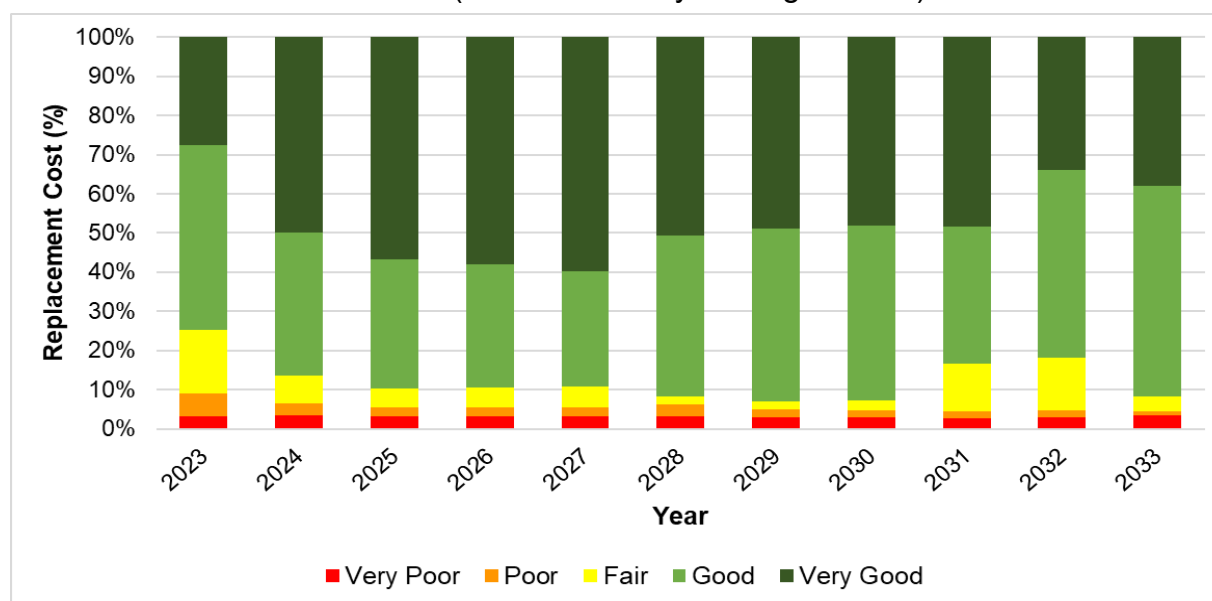


Figure 3-4. Roads Performance Forecast to Maintain Levels of Service



It was determined that an annual budget of \$7.1 million for renewal, rehabilitation and replacement activities is needed to maintain performance for Roads. There is a funding gap of approximately \$3.2 million compared to the anticipated funding levels. This highlights the challenges the Town may face in keeping assets in the same condition over the forecast period with the current budget allocation.

The performance forecast for scenario one is shown in Figure 3-4. The overall condition increases, with assets in good to very good condition increasing by 17% over the 10-year forecast, ending at 92%.

3.4.2 Scenario 2: Current Funding

Scenario two looks at the impact of current anticipated funding on the asset performance (condition) over the 10-year forecast period. The anticipated annual funding for renewal, rehabilitation and replacement activities for Roads is \$3.8 million. The condition distribution for the anticipated funding scenario is shown below in Figure 3-5. The performance (condition) of assets decreases in this scenario. Assets in very poor condition increase by 13%, ending at 16% of the overall condition.

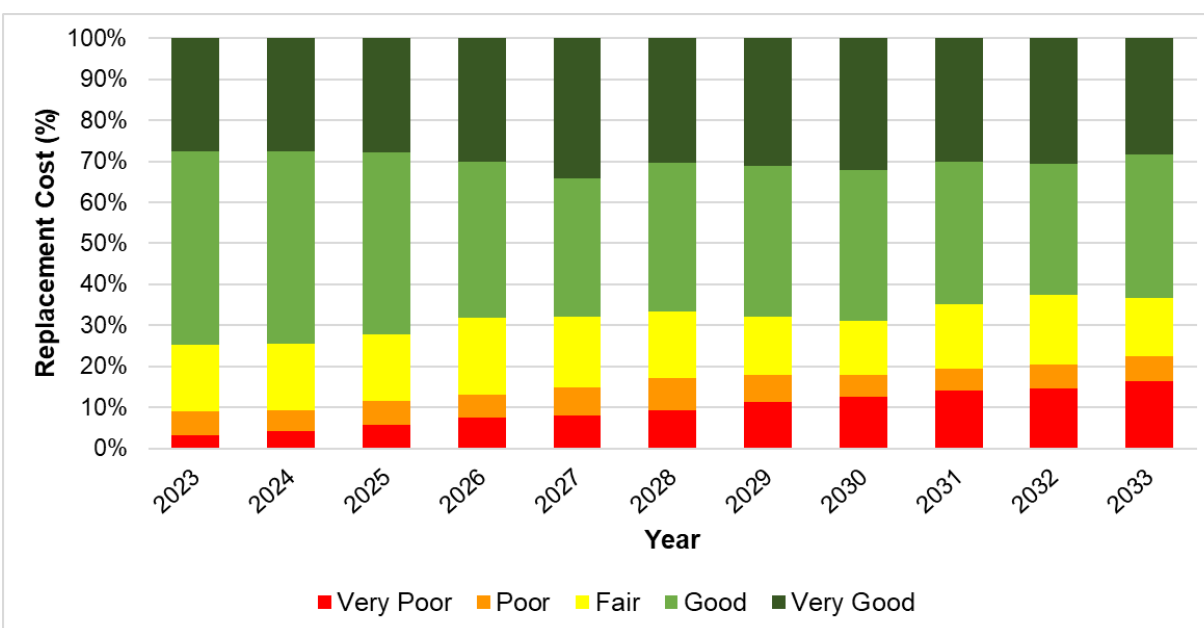


Figure 3-5. Roads Performance Forecast with Current Funding

3.4.3 Scenario 3: Proposed LOS Target/Infrastructure Needs Assessment

Scenario 3 calculates the average budget needed to achieve the proposed levels of service, which has been determined using infrastructure needs as per lifecycle strategies. The lifecycle strategies were developed in consultation with Town staff, and using industry best practices for the renewal, rehabilitation, and replacement activities. The renewal,



rehabilitation, and replacement activities listed above in Table 3-5 have been used to develop the strategies for the infrastructure needs and include the lifecycle activities that need to be undertaken to achieve the proposed levels of service. Following the infrastructure needs and maintaining assets as prescribed in this AMP will provide the lowest lifecycle cost. This scenario is mandated by O. Reg. 588/17.

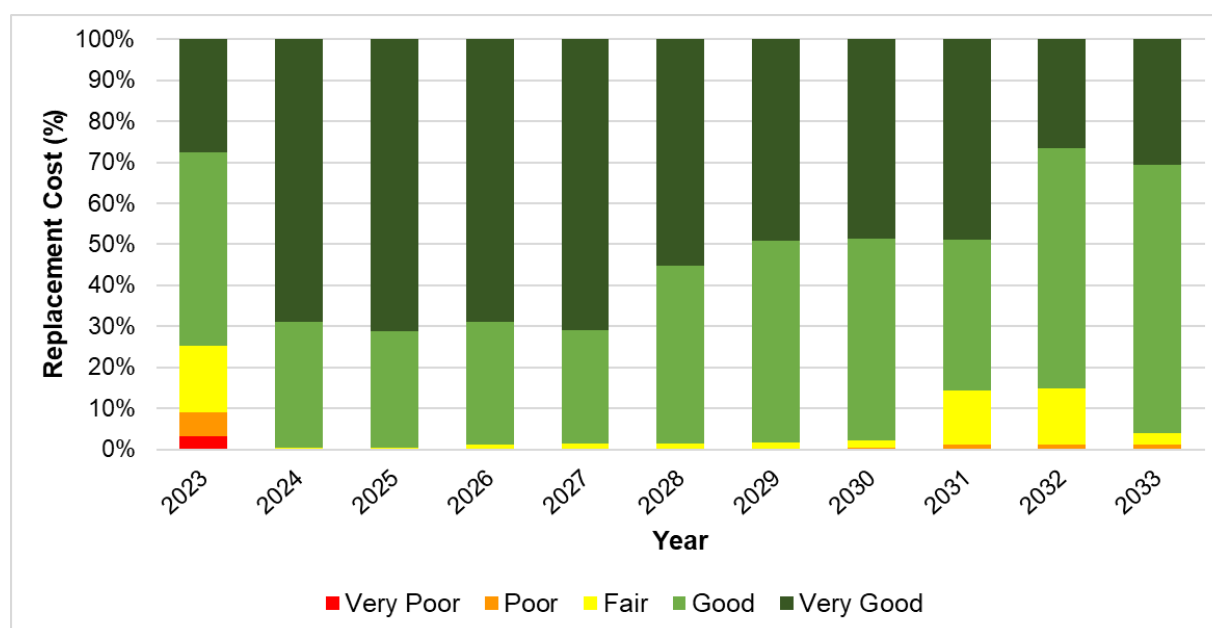


Figure 3-6. Roads Performance Forecast with Proposed Level of Service Targets/Infrastructure Needs as per Lifecycle Strategies

It was determined that a budget of \$7.3 million for renewal, rehabilitation and replacement activities is needed to achieve the proposed levels of service. There is a funding gap of approximately \$3.4 million compared to current anticipated funding levels. The performance forecast for this scenario is shown below in Figure 3-6. The performance of Roads increases during the 10-year forecast period. Assets in good to very good condition start at 75% and increase to 96% at the end of the forecast.

3.4.4 Scenario Comparison & Infrastructure Gap

With the above information, Town staff can determine if there are gaps in funding to address infrastructure needs. This information will support future decision making on how to address any gaps. The investment needs under each of the three scenarios are shown below in Figure 3-7 and Table 3-6.

Figure 3-7 shows a bar graph of the forecasted renewal, rehabilitation, and replacement expenditures for the proposed level of service targets/infrastructure needs according to scenario three, as well as any remaining lifecycle expenditures informed by the Town's anticipated budget. The bars in Figure 3-7 are colour coded by lifecycle activities. The solid



and dashed lines represent the average annual investment needs of the three scenarios described above.

The scenario comparison highlights a gap of approximately \$3.2 million to maintain current performance (condition) of assets and a gap of \$3.4 million to achieve proposed level of service targets and optimize the performance of assets based on lifecycle strategies compared to anticipated annual funding.

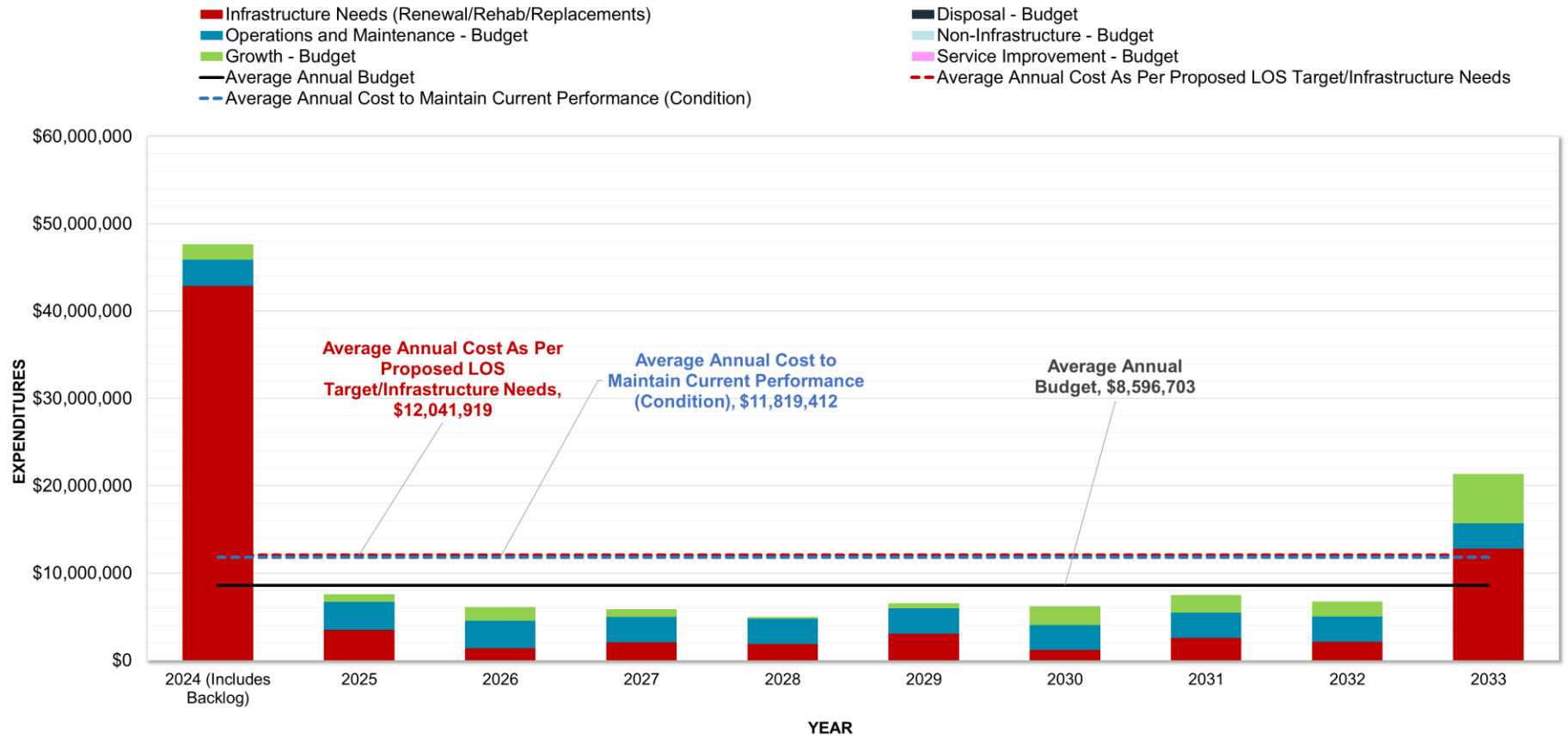


Figure 3-7. Roads Scenario Comparison



The backlog is also highlighted in Figure 3-7 in the year 2024. The backlog represents renewal, rehabilitation, and replacement activities that have been identified as necessary but have not yet been completed. Continuing to defer renewals creates a risk of higher financial costs, potential decreased availability, and potential decreased satisfaction with asset performance.

Continuing to delay renewals may put the Town at risk for intergenerational inequality. Future generations may not be able to maintain the levels of service customers currently enjoy. Continued project deferrals can also lead to higher operational and maintenance costs, potentially limiting the availability of services in the future. Timely and adequately funded renewals and replacements will ensure that assets continue to remain functional and reliable into the future, at the lowest possible cost.

3.4.4.1 Forecasted Infrastructure Gap

The infrastructure gap is summarized below in Table 3-6. Current funding for capital budgets presented are the annual average of approved budgets (as of 2023) for the 2023-2033 fiscal years.

Table 3-6. Current and Optimal Capital Funding and Funding Gap – Roads

Lifecycle Activity	Average Annual Budget	Average Annual Cost to Maintain Current LOS	Average Annual Cost As Per Proposed LOS Target/ Infrastructure Needs
Disposal	\$7,500	\$7,500	\$7,500
Growth	\$1,733,500	\$1,733,500	\$1,733,500
Non-Infrastructure	\$0	\$0	\$0
Operations & Maintenance	\$2,960,174	\$2,960,174	\$2,960,174
Renewal, Rehabilitation & Replacement	\$3,895,529	\$7,118,238	\$7,340,745
Service Improvement	\$0	\$0	\$0
Total	\$8,596,703	\$11,819,412	\$12,041,919
Average Annual Spending Gap		\$3,222,709	\$3,445,216
Percentage Increase Required to Address Gap		37%	40%



3.5 Data Confidence and Improvement Plan

Table 3-7 outlines the main data sources and overall confidence in the data used for this AMP. Data confidence is based on how many assumptions needed to be made and the reliability of the data sources.

Table 3-7. Roads – Data Confidence

Asset Type	Data Source	Data Confidence
Guiderails	2022 Assessment of Guiderails (spreadsheet)	C
Roads	Road Inventory excel sheet, shapefiles (GIS), 2023 PCI	B
Sidewalks	Shapefile (GIS) for inventory and Sidewalk Defects	C
Signage	2022 Assessment (spreadsheet)	C
Streetlights	Shapefile (GIS)	A

3.5.1 Recommendations for Improvements

It is recommended that the Town further review and establish registers for any further outstanding assets to be included in the Roads category. Traffic signals have been identified that have not been included in this plan. These assets, while managed by the Niagara Region, are Town assets and should be included in the valuation of assets.

Opportunities for Improvements for the Roads assets includes:

Guiderails: Condition information of the guiderails is reliable as they were assessed, but information on the location, type, estimated service life and installation dates of these assets were unknown. This information should be captured within an asset register and these gaps filled to better plan for this asset type.

Roads: Condition data was recently acquired to provide an accurate assessment of the condition of these assets. The Town also uses DOT pavement management system to analyze their road system and make forecasts.

Multiple asset registers were used to provide the best information available. There are multiple GIS (shapefiles) files and other asset registers that should be compiled and consolidated and verified in a single source of truth for this asset class. The Town is currently working to complete this with the implementation of the work management system.

Sidewalks: The sidewalk defects and condition information currently does not connect to the GIS data to be able to assess the full picture of these assets. It is recommended to connect



the defect/condition information to the sidewalk register to better understand the condition of these assets. The install date of the sidewalks was also unknown.

Signage: Condition information of the road signage is reliable as they were assessed, but information on the location, type, estimated service life and installation dates of these assets were unknown. This information should be captured within an asset register in the GIS and these gaps filled.

Streetlights: Inventory seems to be mostly complete for this asset type and up to date. The implementation of the Town's work management system will assist in tracking work completed on these assets and track outages and further needs.

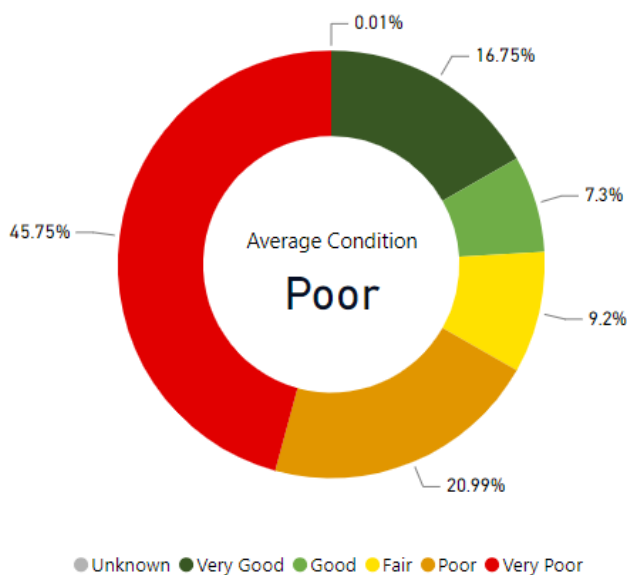


4.0 Stormwater

Replacement Value

\$401,462,862

Overall Average Asset Condition



**Average Annual Gap to Meet
Current LOS (Performance)**

\$6.3 M

**Average Annual Gap to Meet
Proposed LOS (Performance)**

\$16.2 M

Asset Inventory

- 135 km of storm sewers throughout the urban area
- Supporting assets including ditches, driveway culverts and 9 stormwater facilities

4 Stormwater

The Town of Fort Erie maintains stormwater infrastructure throughout the municipality. Stormwater infrastructure helps manage rainfall and runoff through flood control, erosion control, and water quality management. With more frequent extreme weather events, proper management of these assets is vital to ensure residents can continue to receive quality services.

4.1 State of the Infrastructure

4.1.1 Asset Valuation

Stormwater assets include ditches, driveway culverts, storm sewers and stormwater facilities including tanks and stormwater management ponds. These assets have a current total replacement value of \$401 million. Table 4-1 details the asset inventory and current estimated replacement value.

Table 4-1. Inventory and Current Replacement Value – Stormwater

Asset Type	Count	Quantity Unit	2024 Estimated Replacement Value
Ditches	243	Units	Unknown Replacement Value
Driveway Culverts	1617	Units	\$1,462,819
Storm Sewers	135	km	\$399,121,134
Stormwater Facilities (Tanks / Ponds)	9	Units	\$878,909
Total			\$401,462,862

4.1.2 Asset Condition

Asset condition is an important piece of asset management planning. Condition of stormwater assets was assigned using Pipeline Assessment Certification Program (PACP) peak structural scores for storm sewers that have Closed-Circuit Television (CCTV) inspections, and age for remaining assets. 62.2% (based on count of records) of the system had condition scores available to assign condition, the remaining records used age/ESL to determine condition. The Town on average has assessed 22km of pipe a year since 2019 in their efforts to gain reliable condition information on the storm system. The condition ratings scales can be found below in Table 4-2.



Table 4-2. Condition Rating Scale - Stormwater

Condition	Age/ESL	PACP Condition Rating
Very Good	>80% life remaining	0 or 1
Good	60-80% life remaining	2
Fair	40-60% life remaining	3
Poor	20-40% life remaining	4
Very Poor	0-20% life remaining	5
Unknown		

Figure 4-1 and Figure 4-2 illustrates the condition distribution of the Town's Stormwater infrastructure assets.

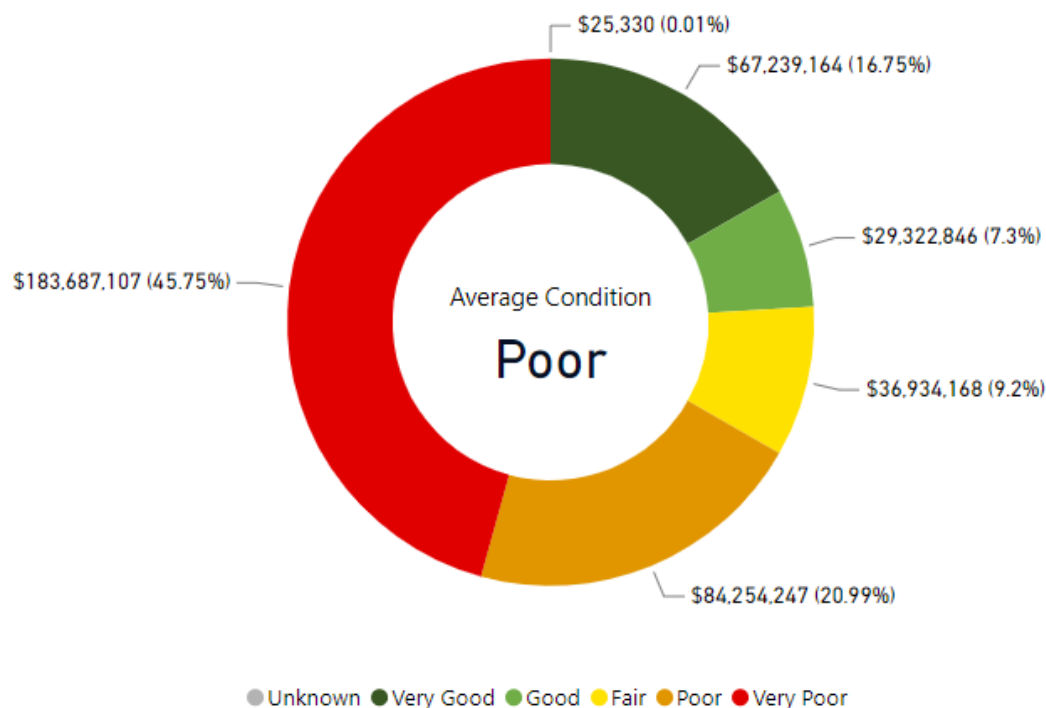


Figure 4-1. Overall Asset Condition (by Replacement Value) – Stormwater

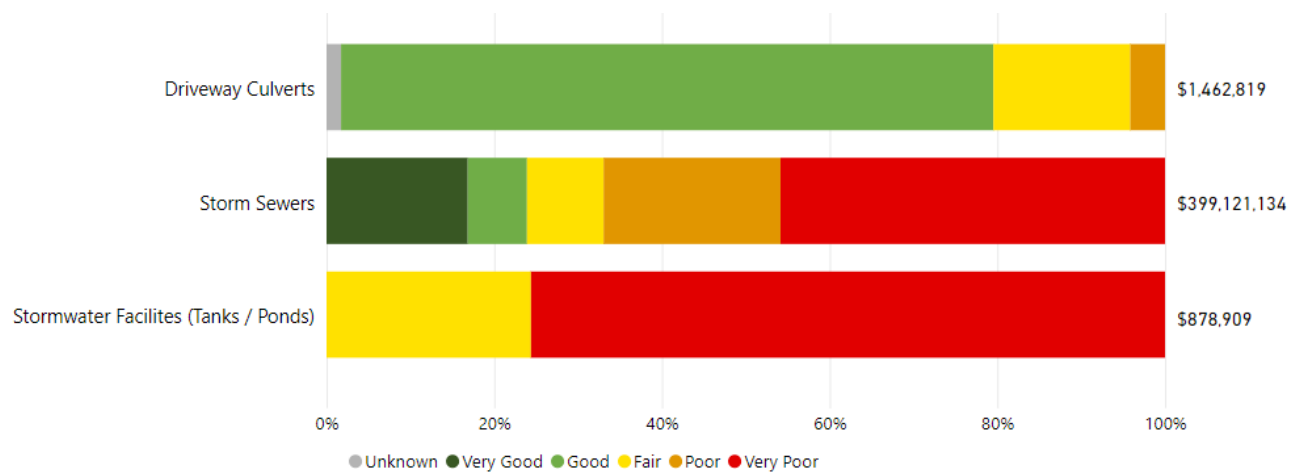


Figure 4-2. Condition by Asset Type (by Replacement Value) – Stormwater

Most of the Stormwater Facilities are in very poor condition. Seven out of nine facilities are in very poor condition. Condition assessments for stormwater facilities measuring sediment depth will give a better idea of the condition of these assets. Stormwater management ponds are not typically replaced, instead sediment removal is completed to ensure the storage of the storm ponds is appropriate to function as intended.

On average, stormwater assets are in poor condition. Much of the value for the Stormwater network is comprised of storm sewers, where over 66% of assets are in poor or very poor condition. As condition information continues to be collected for storm sewers the condition profile may change for this asset class, currently 62.2% (based on count of records) of the sewers condition scores provided from CCTV inspections. Figure 4-3 shows the breakdown of condition for storm sewers based on age versus those that were CCTV inspected.

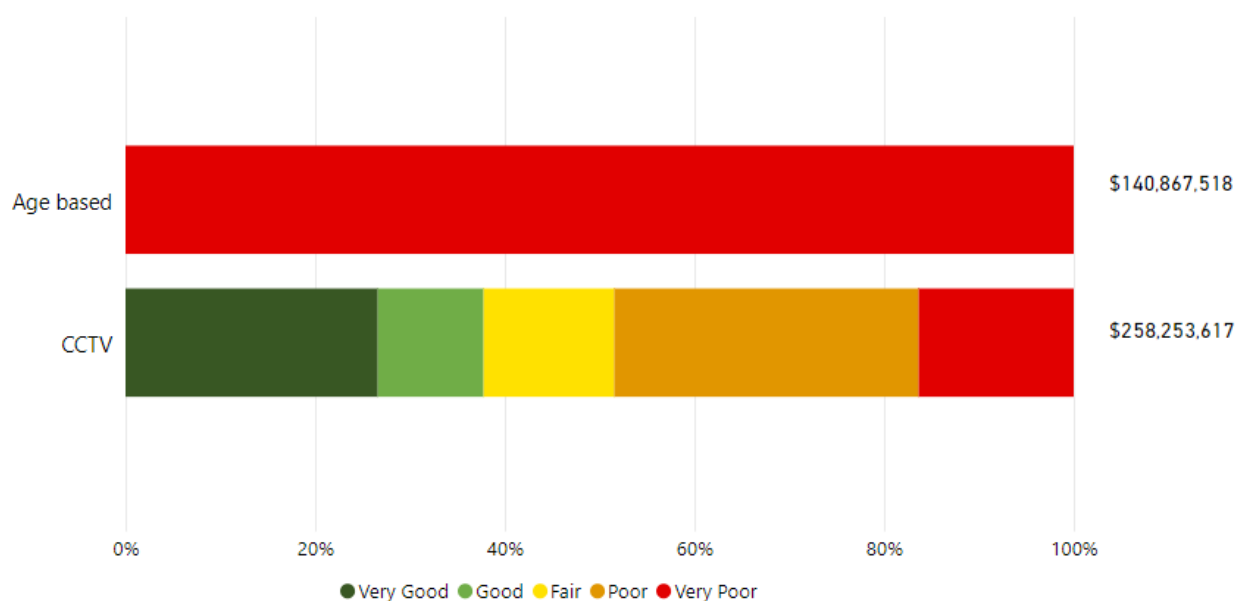


Figure 4-3. Storm Sewer Condition (by Replacement Value) by Condition Method



The figure highlights the importance of condition assessment-based information on assets, as all the sewers, where condition is assigned based on age and estimated service life, are all in very poor condition. In comparison, the sewers that have an assessed condition, has provided a more accurate breakdown of the condition of the storm sewer assets. If age alone is relied on, there is potential to overstate the infrastructure needs of the assets. It should also be noted though, that some of the assets were unable to assessed by CCTV inspections because of various factors, such as water levels, or inaccessible pipes. The Town will continue its efforts to collect condition information on the storm network.

4.1.3 Average Age

Comparing average asset age to average estimated service life is a tool to further analyze the health of the asset system. The average age and average estimated service life for storm sewers and stormwater facilities is shown in Figure 4-4.

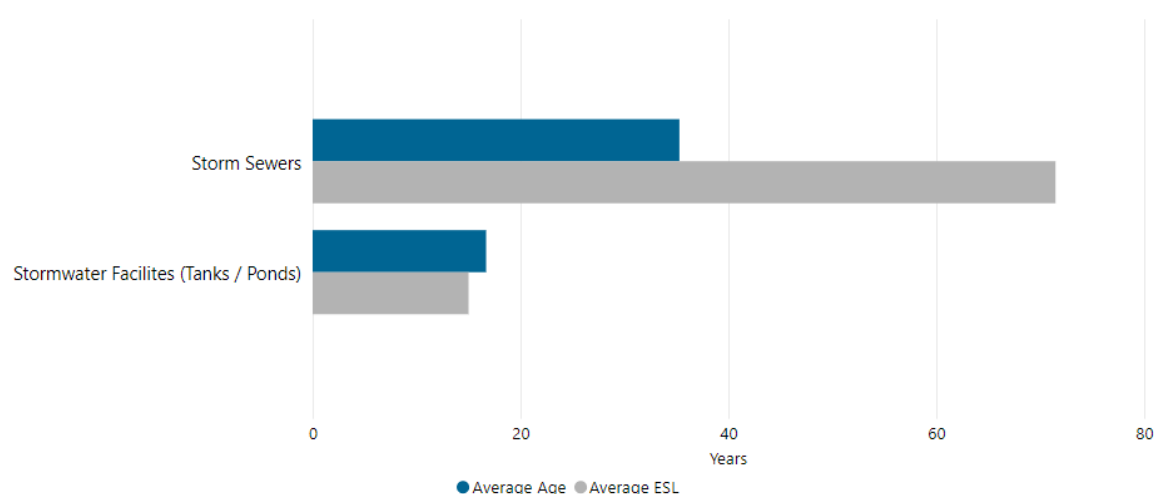


Figure 4-4. Average Age and Average Estimated Service Life – Stormwater



4.2 Levels of Service

Service Statement: Efficiently providing reliable stormwater services that protect the community and natural environment.

Levels of service metrics are a foundational part of the Town's Asset Management Strategy. It allows the Town to assess performance, identify areas for improvement and make informed decisions to better meet the needs of the community while optimizing resource allocation. Level of service metrics help municipalities promote accountability and transparency in municipal government. The Town has developed level of service metrics to align with community values and corporate priorities. There are metrics required by O.Reg. 588/17, and Town defined metrics. Customer and technical level of services metrics can be found below in Table 4-3 and Table 4-4.

The proposed LOS targets have been set by staff based on subject matter experts and through the development of the lifecycle management strategies discussed in the following section. Several factors and options were considered in the development of these targets, including costs, risks, and achievability. The differences between the current performance and proposed can be seen in the tables below.

The targets established for LOS represent the comprehensive approach required to minimize risks and lifecycle costs for the Town. The activities and strategies required to meet the proposed performance can be found in 4.3 Lifecycle Management Strategy, as well as the analysis of the impact to condition and costs used to determine the appropriate proposed (target) LOS. The proposed LOS are appropriate as they provide the best chance to avoid the risks associated with asset ownership. The risks associated with not meeting the proposed LOS can be significant and wide-ranging, which are further explained in 12.2.5 Risk Associated with Lifecycle Strategies and Levels of Service. Addressing these risks requires a proactive approach to infrastructure planning, investment, and management, as outlined in the lifecycle strategies.

The proposed LOS will only be achievable if the Town adopts financial strategies to close the infrastructure gap identified in this plan.



Table 4-3. Customer / Council Focused Level of Service Requirements – Stormwater

Key Service Attribute	Performance Measure	Current Performance	Proposed Performance	Difference Between Current & Proposed
Cost Efficient	Cost to provide service (2024 Operating & Capital Budget/household)	\$514 per household	\$514 per household	
Scope	Description, which may include maps, of the user groups or areas of the municipality that are protected from flooding, including the extent of the protection provided by the municipal stormwater management system.*	Some urban areas protected from ROW/infrastructure flooding through urban ditch system or underground storm collection, some with defined outlets. Most rural areas protected from flooding through provision of municipal drains or rural ditch systems, some with defined outlets	Some urban areas protected from ROW flooding through urban ditch system or underground storm collection, some with defined outlets. Most rural areas protected from flooding through provision of municipal drains or rural ditch systems, some with defined outlets	

*Mandatory under O.Reg. 588/17



Table 4-4. Technical Focused Level of Service Requirements – Stormwater

Key Service Attribute	Performance Measure	Current Performance	Proposed Performance	Difference Between Current & Proposed
Scope	Percent of properties in municipality resilient to a 100-year storm.*	To be reviewed as part of the 2024 Storm Master Plan	To Be Determined	
Scope	Percent of the municipal stormwater management system resilient to a 5-year storm.*	To be reviewed as part of the 2024 Storm Master Plan	To Be Determined	
Quality	Percentage of replacement value & replacement value of stormwater main assets in very poor condition	45.87%	21%	
Cost Efficient	Percent of annual reserve contribution meeting required reserve contribution based on the Reserve Policy	78% ⁶	100%	

*Mandatory under O.Reg. 588/17

⁶ This metric was calculated based on optimal reserve contribution based on a previously established asset replacement value, as per the Town's Capital Reserve Fund Policy. It is recommended that the replacement values used to calculate this metric be updated to reflect 2024 replacement values.



4.3 Lifecycle Management Strategy

The goal of our Asset Management Strategy is to establish and implement a series of planned activities, based on industry best practices. This will enable our assets to consistently provide a sustainable level of service to the residents of Fort Erie, while managing risk at the lowest lifecycle cost. The Town works to coordinate rehabilitation and replacement projects across asset groups where opportunities exist. This may result in asset strategies being delayed or advanced to accommodate the overall benefit of coordinated work across asset groups.

The Town continues to improve its approach to the management of its assets and will continue to put in place processes, procedures, and tools to enable a more consistent approach across the Town's Service Areas. Detailed below is an overview of some of the current asset management practices in place across the Town.

4.3.1 Lifecycle Activities

Lifecycle activities for Stormwater involve processes and tasks aimed at managing the entire lifespan of an asset. Following these activities allows Stormwater to continue to provide services efficiently, effectively, and sustainably through their lifecycle, maximizing the value they provide to the community. This approach aligns with best practices in asset management, where preventive maintenance and timely repairs are crucial for preserving the functionality, safety, and longevity of infrastructure assets.

By maintaining Stormwater in optimal condition, the Town can provide services at the lowest possible cost by extending their lifespan and mitigate the risk of costly major repairs or premature replacement. It also ensures that residents continue to benefit from high-quality services offered by well maintained Stormwater infrastructure. Following the lifecycle activities and strategies also ensures the Town avoid the risks associated with asset ownership, which can be significant. These risks are further outlined in 12.2.5 Risk Associated with Lifecycle Strategies and Levels of Service. Completing lifecycle activities and following the strategies outlined in this plan can enhance the resilience and sustainability of infrastructure while minimizing potential risks.

The lifecycle activity categories include non-infrastructure, operations and maintenance, renewal/rehabilitation, disposal, and service improvement and growth. A description of each activity category can be found in Section 1.4.2.4. Specific asset management practices or planned actions as well as specific frequencies associated with these actions are outlined in Table 4-5.



Table 4-5. Asset Management Practices and Associated Risks – Stormwater

Asset Management Practices/ Planned Actions	Frequency Associated with Practices / Planned Actions
Non-Infrastructure	
• Policies for sustainability prioritization of natural watersheds for storm water management functions and climate change considerations	• As required
• Stormwater Drainage Master Plan	• 5 years
• Inspections of storm sewers using CCTV	• Annual
• Storm pond sediment surveys and inspections	• As required as per ECA
• Ditch and culvert data collection (culverts <3m)	• As required
• OGS inspections	• As required as per ECA
• Storm Sub watershed Studies	• As required
Operations & Maintenance Activities	
• OGS and catch basin flushing/cleaning	• As required
• Storm system flushing	• As CCTV
• Ditch cleaning	• As per study
• Storm pond dredging/cleaning	• As identified through inspections
• Maintenance to address erosion	• As identified
• Maintenance hole adjustments	• As required
• Maintain road drainage	• As required
Renewal/Replacement Activities	
• Lining and trenchless technologies	• As identified in CCTV inspection
• Sewer replacement	• As required



Asset Management Practices/ Planned Actions	Frequency Associated with Practices / Planned Actions
Disposal Activities	
• Dispose of assets in line with replacements	• As required
Service Improvement & Growth Activities	
• New assets for developments to service growth	• As needed
• New assets as part of service improvement	• As identified in studies



4.4 Funding the Lifecycle Activities

The Town uses the lifecycle management strategies described above in Section 4.3 to plan work and determine future expenditure needs for Stormwater assets. The activities, along with the scenarios below provide a framework of expenditures required for managing assets and ensuring the Town can meet the demands of current services and existing infrastructure.

All three scenarios consider only renewal, rehabilitation and replacement lifecycle activity costs and needs. These lifecycle activities ensure infrastructure remains in a state of good repair and can continue to provide services to residents. Further details of the funding required for the remaining lifecycle activities (non-infrastructure, service improvements, operations and maintenance, and growth) have been accounted for in the Scenario Comparison, found below in Section 4.4.4, which are based on the operating and capital budgets for the Town.

For the purposes of this AMP, these activities, and their costs, are assumed to be enough to meet the community's expectations. This AMP does not provide an analysis on optimizing these activities and costs. Growth needs are captured based on the planned projects that are funded through development charges or are activities to address the growing Town population.

4.4.1 Scenario 1: Cost to Maintain Current Performance (Level of Service)

Scenario one calculates the approximate annual cost of the renewal, rehabilitation and replacement activities required to maintain assets in a similar performance (condition) as their current state. This is used to determine the annual cost to provide the current level of service for Stormwater (as mandated by O.Reg. 588/17).

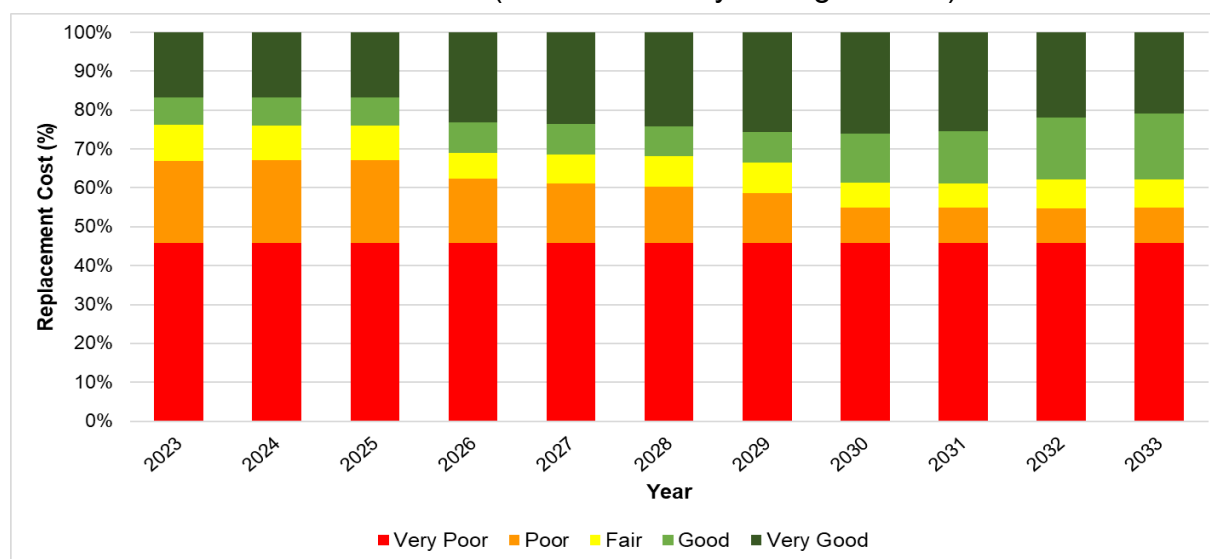


Figure 4-5. Stormwater Performance Forecast to Maintain Levels of Service



It was determined that an annual budget of \$8.5 million is needed for renewal, rehabilitation and replacement activities to maintain performance for Stormwater. There is a funding gap of approximately \$6.2 million compared the anticipated funding levels. This highlights the challenges the Town may face in keeping assets in the same condition over the forecast period with the current budget allocation.

The performance forecast for scenario one is shown in Figure 4-5. The overall condition of Stormwater assets increases in this scenario. The percentage of assets in good to very good condition increases by 14% over the 10-year forecast period, ending at 38%.

4.4.2 Scenario 2: Current Funding

Scenario two looks at the impact of current anticipated funding on the asset performance (condition) over the 10-year forecast period. The anticipated annual funding for renewal, rehabilitation and replacement activities for Stormwater is \$2.1 million. The condition distribution for the anticipated funding scenario is shown below in Figure 4-6. The overall condition of assets decrease in this scenario. Although assets in good to very good condition only decrease by 2%, ending at 22%, assets in very poor condition increases by 16% ending the forecast period at 62% of overall asset condition.

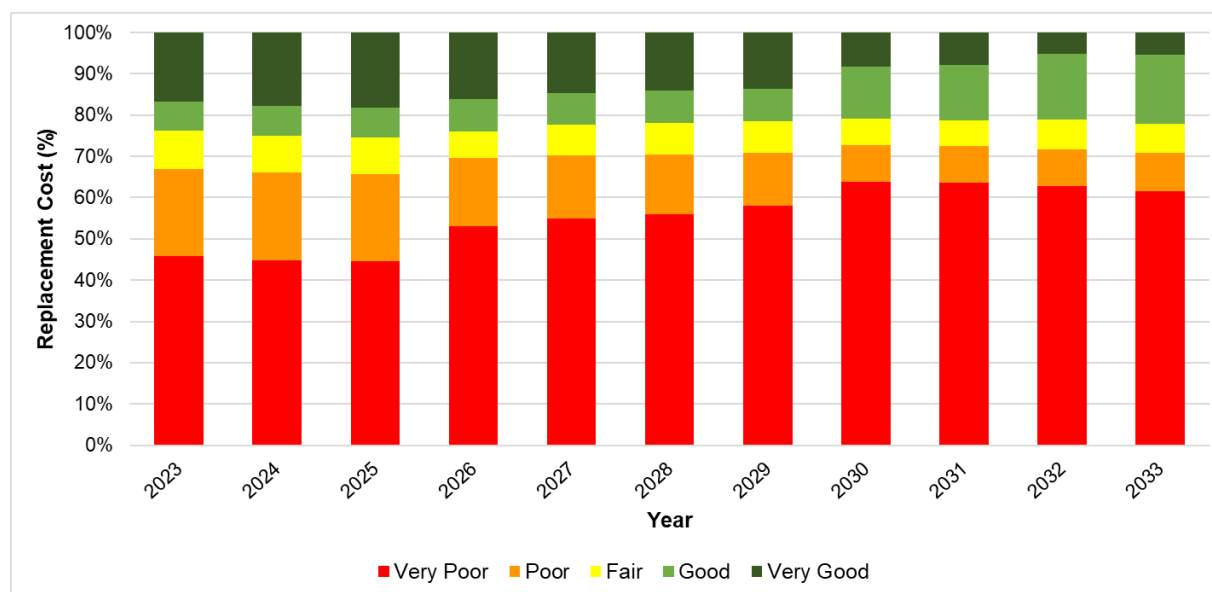


Figure 4-6. Stormwater Performance Forecast with Current Funding

4.4.3 Scenario 3: Proposed LOS Target/Infrastructure Needs Assessment

Scenario three calculates the average budget needed to achieve the proposed levels of service, which has been determined using infrastructure needs as per lifecycle strategies. The lifecycle strategies were developed in consultation with Town staff, and using industry best practices for the renewal, rehabilitation, and replacement activities. The renewal,



rehabilitation, and replacement activities listed above in Table 4-5 have been used to develop the strategies for the infrastructure needs and include the lifecycle activities that need to be undertaken to achieve the proposed levels of service. Following the infrastructure needs and maintaining assets as prescribed in this AMP will provide the lowest lifecycle cost. This scenario is mandated by O.Reg. 588/17.

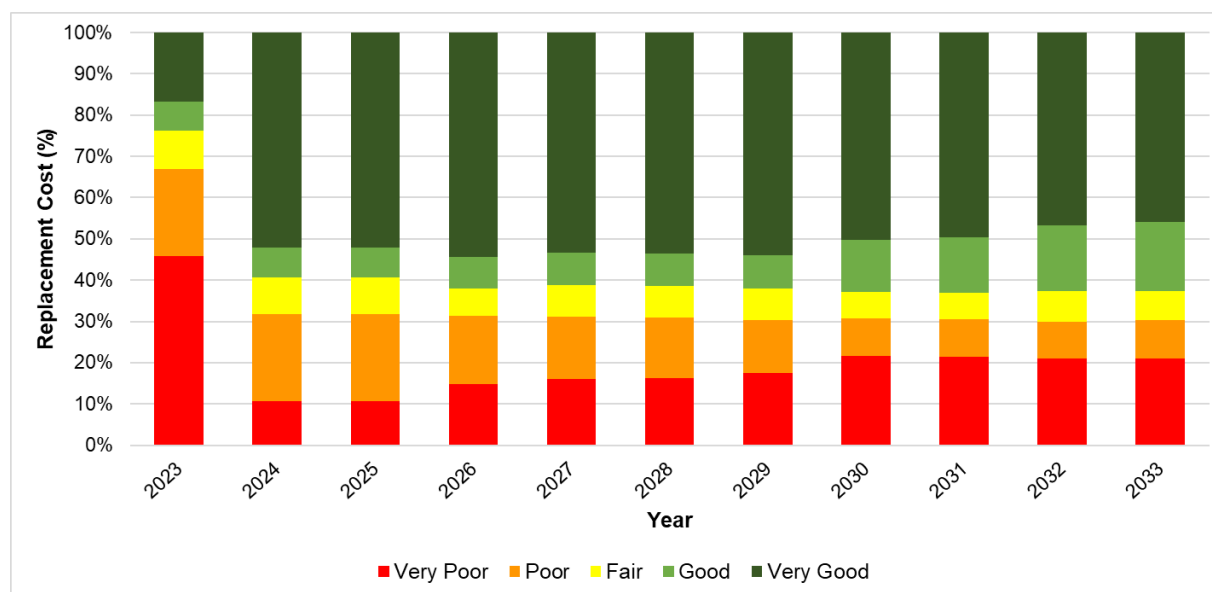


Figure 4-7. Stormwater Performance Forecast with Proposed Level of Service Targets/Infrastructure Needs as per Lifecycle Strategies

It was determined that a budget of \$18.3 million for renewal, rehabilitation and replacement activities is needed to achieve the proposed levels of service. There is a funding gap of approximately \$16.2 million compared to current anticipated funding levels. The performance forecast for this scenario is shown below in Figure 4-7. The performance of Stormwater increases during the 10-year forecast period. Assets in good to very good condition start at 24% and increase to 63% at the end of the forecast.

4.4.4 Scenario Comparison & Infrastructure Gap

With the above information, Town staff can determine if there are gaps in funding to address infrastructure needs. This information will support future decision making on how to address any gaps. The investment needs under each of the three scenarios are shown below in Figure 4-8 and Table 4-6. Figure 4-8 shows a bar graph of the forecasted renewal, rehabilitation, and replacement expenditures for the proposed level of service targets/ infrastructure needs according to scenario three, as well as any remaining lifecycle expenditures informed by the Town's anticipated budget. The bars in Figure 4-8 are colour coded by lifecycle activities. The solid and dashed lines represent the average annual investment needs of the three scenarios described above.



The scenario comparison highlights a gap of approximately \$6.2 million to maintain current performance (condition) of assets and a gap of \$16.2 million to achieve proposed level of service targets and optimize the performance of assets based on lifecycle strategies compared to anticipated annual funding.

The forecast for storm assets assumes that the assets will be replaced, which is a contributing factor to the high backlog and needs assessed in this AMP. It is recommended that the Town further review possible rehabilitation options to improve the condition of the stormwater assets, at a lower cost. Options would include spot repairs, and relining of the pipes where appropriate, rather than full replacement. The Town is planning on a storm water master plan, which will also provide additional information for infrastructure needs for this asset category. These options will improve the condition of the pipes at a lower cost than full replacement.

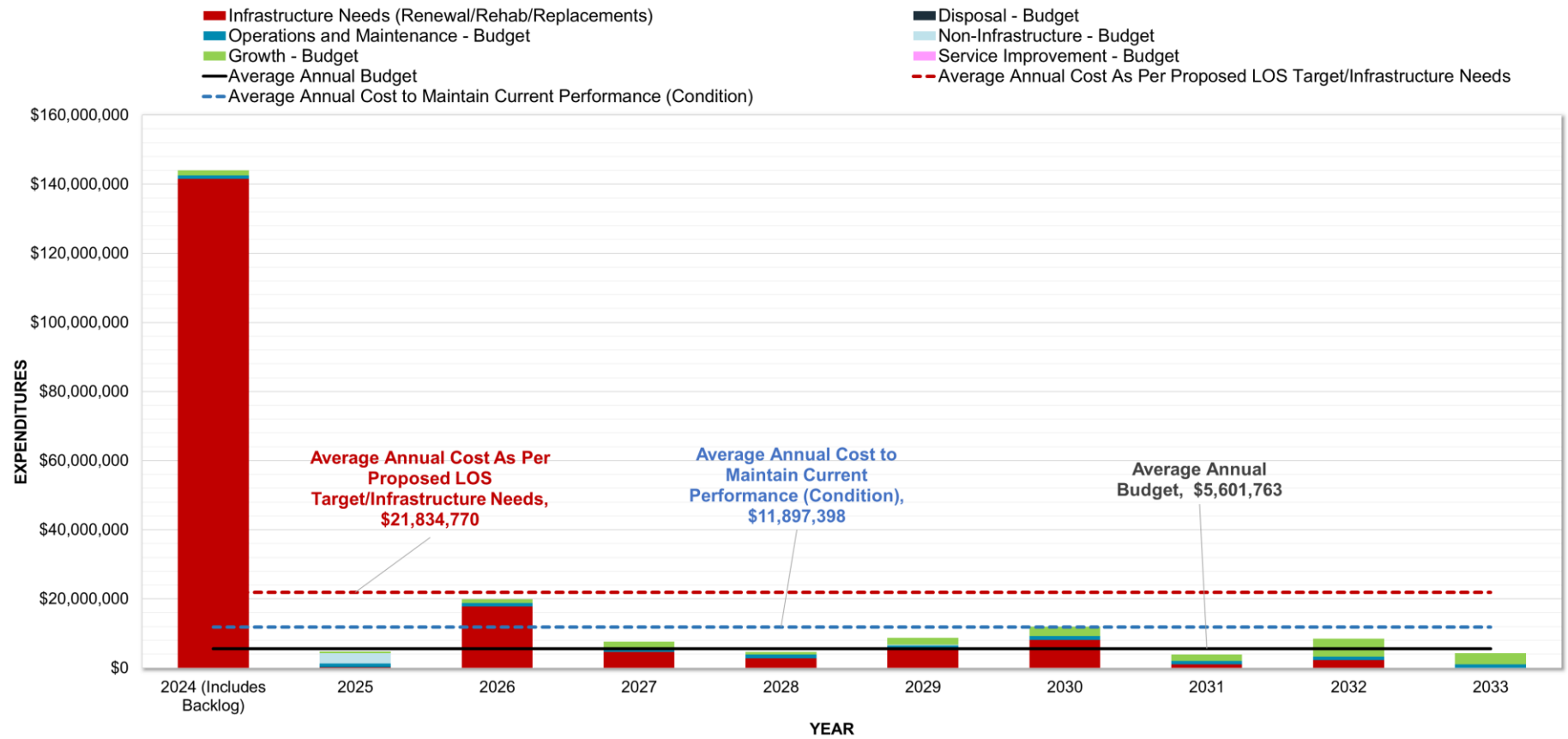


Figure 4-8. Stormwater Scenario Comparison



The backlog is also highlighted in Figure 4-8 in the year 2024. The backlog represents the replacement activities that have been identified as necessary, but have not yet been completed. Continuing to defer renewals creates a risk of higher financial costs, potential decreased availability, and potential decreased satisfaction with asset performance.

Continuing to delay renewals may put the Town at risk for intergenerational inequality. Future generations may not be able to maintain the levels of service customers currently enjoy. Continued project deferrals can also lead to higher operational and maintenance costs, potentially limiting the availability of services in the future. Timely and adequately funded renewals and replacements will ensure that assets continue to remain functional and reliable into the future, at the lowest possible cost.

4.4.4.1 Forecasted Infrastructure Gap

The infrastructure gap is summarized below in Table 4-6. Current funding for capital budgets presented are the annual average of approved budgets (as of 2023) for the 2023-2033 fiscal years.

Table 4-6. Current and Optimal Capital Funding and Funding Gap - Stormwater

Lifecycle Activity	Average Annual Budget	Average Annual Cost to Maintain Current LOS	Average Annual Cost As Per Proposed LOS Target/ Infrastructure Needs
Disposal	\$7,500	\$7,500	\$7,500
Growth	\$2,088,121	\$2,088,121	\$2,088,121
Non-Infrastructure	\$333,600	\$333,600	\$333,600
Operations & Maintenance	\$1,015,406	\$1,015,406	\$1,015,406
Renewal, Rehabilitation & Replacement	\$2,157,136	\$8,452,771	\$18,390,143
Service Improvement	\$0	\$0	\$0
Total	\$5,601,763	\$11,897,398	\$21,834,770
Average Annual Spending Gap		\$6,295,635	\$16,233,006
Percentage Increase Required to Address Gap		112%	290%



4.5 Data Confidence and Improvement Plan

Table 4-7 outlines the main data sources and overall confidence in the data used for this AMP. Data confidence is based on how many assumptions needed to be made and the reliability of the data sources.

Table 4-7. Stormwater – Data Confidence

Asset Segment	Data Source	Data Confidence
Ditches	2022 Assessment (Spreadsheet)	B
Driveway Culverts	Shapefile (GIS)	B
Storm Sewers	Shapefile (GIS)	B
Stormwater Facilities (Tanks/Ponds)	Shapefile (GIS)	B

4.5.1 Recommendations for Improvements

Opportunities for improvements include the following:

Ditches: Although condition information was tracked for these assets, no further information was available for these assets (location, etc.). This inventory should be further assessed for accuracy. The Town is currently working on completing an inventory with location-based information on the ditches.

Driveway Culverts: Although condition, material and diameter were known for these asset types, length and install dates were unknown. Length of culverts would assist in planning for replacements of these assets.

Storm Sewers: Minimal gaps were found for the storm sewers, but condition was based on age and estimated service life, where CCTV data was not available. Currently over 62% of the system has an assessed condition, some of the system was unable to be inspected due to increased lake levels and surcharge in the system.

It is recommended to develop a prioritized CCTV inspection program that defines frequency of inspections based on specific criteria (age of pipe, condition, risk, etc.)

It is also recommended that the Town review rehabilitation options for storm pipes that will decrease the infrastructure gap while also improving performance.

Stormwater Facilities (Tanks/Ponds): Information on these assets were updated to include all required information for asset management reporting. It is recommended that the Town have the ponds assessed for further needs for dredging/cleaning.



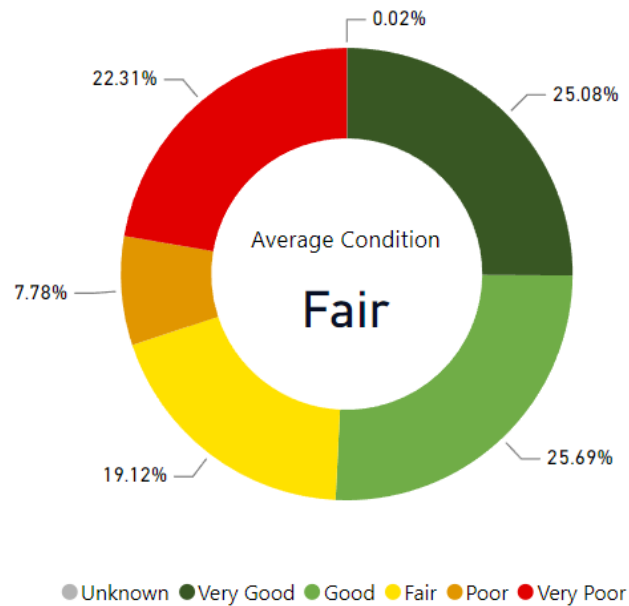
5.0 Wastewater



Replacement Value

\$392,336,423

Overall Average Asset Condition



**Average Annual Gap to Meet
Current LOS (Performance)**

No Gap

**Average Annual Gap to Meet
Proposed LOS (Performance)**

\$4.8 M

Asset Inventory

- 201 km of sanitary sewer pipes
- Supporting assets including manholes, laterals, cleanouts



5 Wastewater

Wastewater infrastructure is an important part of the Town's underground infrastructure network helping to protect the environment and provide reliable service to residents, visitors, and businesses. Wastewater infrastructure collects wastewater from homes and businesses throughout the Town's serviced area.

Wastewater is a two-tier system in the Town of Fort Erie. The Town owns 201 km of gravity sewers where wastewater flows along the slope of the pipe to one of the 12 pump stations owned by the Niagara Region. Wastewater is pumped through forcemains and flows through Niagara Region owned large diameter trunk sewers, eventually reaching one of the two wastewater treatment plants or the Stevensville / Douglastown sewage treatment lagoon in the Town of Fort Erie.

5.1 State of the Infrastructure

5.1.1 Asset Valuation

The Wastewater network includes sanitary sewer pipes with supporting assets with a current replacement value of over \$392 million, shown in Table 5-1.

Table 5-1. Inventory and Current Replacement Value – Wastewater

Asset Type	Count	Quantity Unit	2024 Estimated Replacement Value
Sanitary Sewer Pipe	201	km	\$392,336,423
Total			\$392,336,423

5.1.2 Asset Condition

Asset condition is an important piece of asset management planning. Condition of wastewater assets was assigned using PACP peak structural scores for sanitary sewers that have CCTV inspections, and age for remaining assets. The condition rating scales are shown in Table 5-2.

Table 5-2. Condition Rating Scale – Wastewater

Condition	Age/ESL	PACP Condition Rating
Very Good	>80% life remaining	0 or 1
Good	60-80% life remaining	2
Fair	40-60% life remaining	3
Poor	20-40% life remaining	4
Very Poor	0-20% life remaining	5
Unknown		

Figure 5-1 and Figure 5-2 shows the condition distribution of the Town's Wastewater assets.

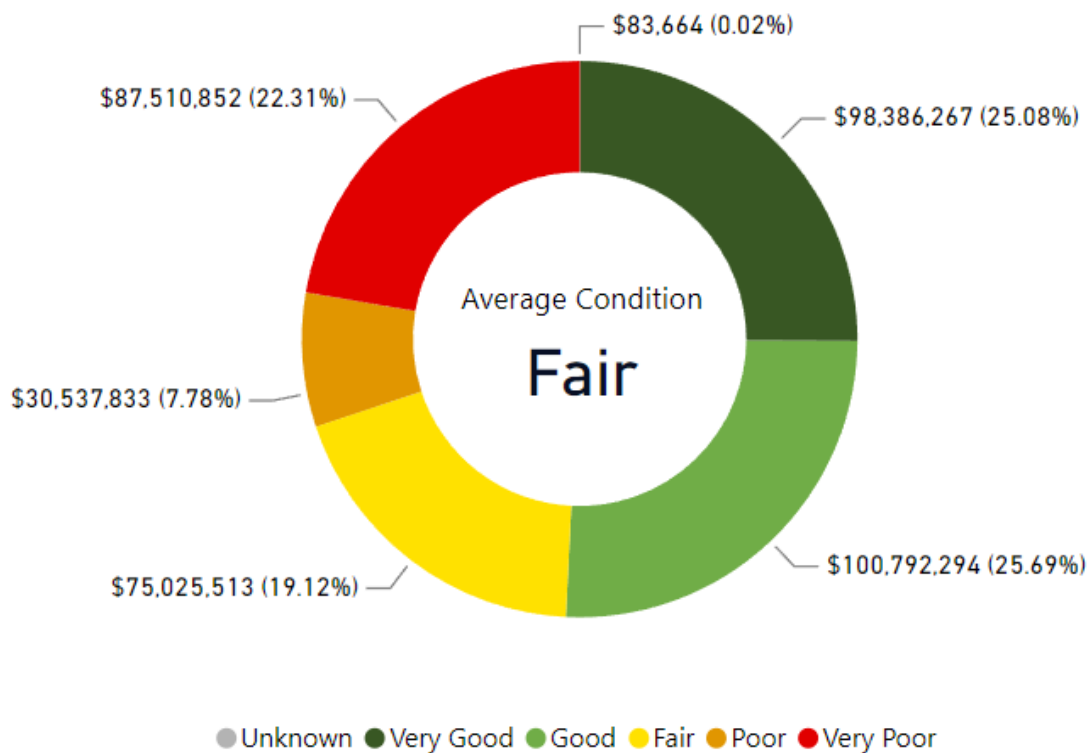


Figure 5-1. Overall Asset Condition (by Replacement Value) - Wastewater

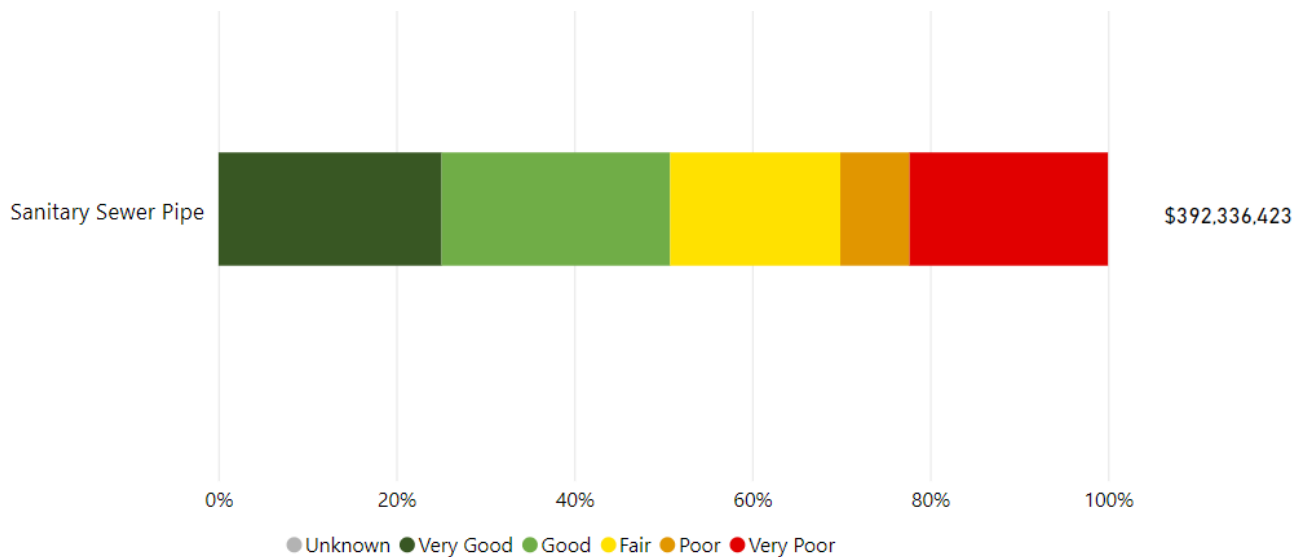


Figure 5-2. Asset Type Condition (by Replacement Value) – Wastewater

The Town's Wastewater sanitary sewer pipes are on average in fair condition with over 69% of assets in fair or better condition. As the Town continues to collect more accurate CCTV inspection data for the entire wastewater network, conditions in future AMPs may look drastically different.

5.1.3 Average Age

Comparing average asset age to average estimated service life is a tool to further analyze the health of the asset system. The average age and estimated service life for sanitary sewer pipes is shown in Figure 5-3.

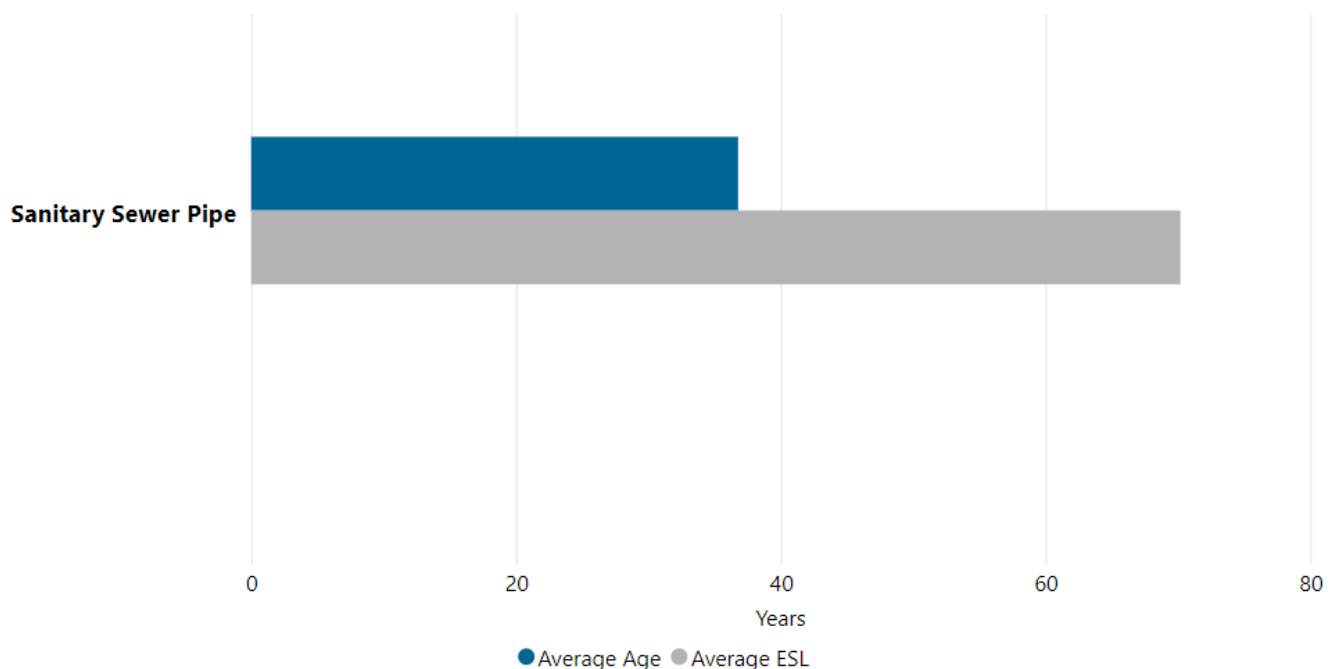


Figure 5-3. Average Age and Average Estimated Service Life – Wastewater



Sanitary sewer pipes have varying estimated service lives based on their material type. On average, sanitary sewer pipes are just under 40 years old, with an average estimated service life of approximately 70 years. Based on this information and with the condition information, sanitary sewers still have many years of providing reliable service to the community.

5.2 Levels of Service

Service Statement: Efficiently providing reliable wastewater services that are conscious of impacts to private property and the environment.

Levels of service metrics are a foundational part of the Town's Asset Management Strategy. It allows the Town to assess performance, identify areas for improvement and make informed decisions to better meet the needs of the community while optimizing resource allocation. Level of service metrics help municipalities promote accountability and transparency in municipal government. The Town has developed level of service metrics to align with community values and corporate priorities. There are metrics required by O.Reg. 588/17, and Town defined metrics. Customer and technical level of services metrics can be found below in Table 5-3 and Table 5-4.

The proposed LOS targets have been set by staff based on subject matter experts and through the development of the lifecycle management strategies discussed in the following section. Several factors and options were considered in the development of these targets, including costs, risks, and achievability. The differences between the current performance and proposed can be seen in the tables below.

The targets established for LOS represent the comprehensive approach required to minimize risks and lifecycle costs for the Town. The activities and strategies required to meet the proposed performance can be found in 5.3 Lifecycle Management Strategy, as well as the analysis of the impact to condition and costs used to determine the appropriate proposed (target) LOS. The proposed LOS are appropriate as they provide the best chance to avoid the risks associated with asset ownership. The risks associated with not meeting the proposed LOS can be significant and wide-ranging, which are further explained in 12.2.5 Risk Associated with Lifecycle Strategies and Levels of Service. Addressing these risks requires a proactive approach to infrastructure planning, investment, and management, as outlined in the lifecycle strategies.

The proposed LOS will only be achievable if the Town adopts financial strategies to close the infrastructure gap identified in this plan.



Table 5-3. Customer / Council Focused Level of Service Requirements – Wastewater

Key Service Attribute	Performance Measure	Current Performance	Proposed Performance	Difference Between Current & Proposed
Cost Efficient	Cost to provide service (2024 Operating & Capital/connection)	\$1,128/connection	\$1,128/connection	
Safe	Description of how combined sewers in the Fort Erie wastewater system are designed with overflow structures in place (to prevent backups into homes by allowing overflow during storm events)*	N/A	N/A	
Safe	Description of the frequency and volume of overflows in combined sewers in the Fort Erie wastewater system that occur in habitable areas or beaches*	N/A	N/A	
Safe	Description of how stormwater can get into sanitary sewers in the Fort Erie wastewater system, causing sewage to overflow into streets or backup into homes*	Some Inflow and Infiltration into sanitary system exists, through private connections, cross connections and system infrastructure deficiencies, such as cracks & leaks.	Some Inflow and Infiltration into sanitary system exists, through private connections, cross connections and system infrastructure deficiencies, such as cracks & leaks.	



Key Service Attribute	Performance Measure	Current Performance	Proposed Performance	Difference Between Current & Proposed
Safe	Description of how sanitary sewers in the Fort Erie wastewater system are designed to be resilient to avoid storm events*	Design and construction criteria for sanitary sewers in place, to ensure consistent and industry-accepted performance requirements, materials, and installation methods are used.	Design and construction criteria for sanitary sewers in place, to ensure consistent and industry-accepted performance requirements, materials, and installation methods are used.	
Safe	Description of the effluent that is discharged from sewage treatment plants in the municipal wastewater*	N/A (Regional Jurisdiction)	N/A (Regional Jurisdiction)	
Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal wastewater system.*	See Appendix B	See Appendix B	

*Mandatory under O.Reg. 588/17



Table 5-4. Technical Focused Level of Service Requirements – Wastewater

Key Service Attribute	Performance Measure	Current Performance	Proposed Performance	Difference Between Current & Proposed
Scope	Percentage of properties connected to the municipal wastewater system*	12,775 (Residential & ICI)	12,775	
Safe	Number 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	N/A	
Safe	The number of connection-days per year due to wastewater backups compared to the total number of properties connected to the municipal wastewater system.*	.055	0	
Safe	The number of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system.*	N/A	N/A	
Quality	Percentage of replacement value of sewers in very poor condition	22.31%	8%	
Reliable	Number of customers that experience basement flooding caused by system surcharge	7	0	
Environmental Stewardship	Number of relief pumping events	1	0	



Key Service Attribute	Performance Measure	Current Performance	Proposed Performance	Difference Between Current & Proposed
Environmental Stewardship	Total volume of untreated wastewater discharged into the natural environment via relief pumping events (m3)	213	0	
Cost Efficient	Percent of annual reserve contribution meeting required reserve contribution based on the Reserve Policy	103% ⁷	100%	

*Mandatory under O.Reg. 588/17

⁷ This metric was calculated based on optimal reserve contribution based on a previously established asset replacement value, as per the Town's Capital Reserve Fund Policy. It is recommended that the replacement values used to calculate this metric be updated to reflect 2024 replacement values.



5.3 Lifecycle Management Strategy

The goal of our Asset Management Strategy is to establish and implement a series of planned activities, based on industry best practices. This will enable our assets to consistently provide a sustainable level of service to the residents of Fort Erie, while managing risk at the lowest lifecycle cost. The Town works to coordinate rehabilitation and replacement projects across asset groups where opportunities exist. This may result in asset strategies being delayed or advanced to accommodate the overall benefit of coordinated work across asset groups.

The Town continues to improve its approach to the management of its assets and will continue to put in place processes, procedures, and tools to enable a more consistent approach across the Town's Service Areas. Detailed below is an overview of some of the current asset management practices in place across the Town.

5.3.1 Lifecycle Activities

Lifecycle activities for Wastewater involve processes and tasks aimed at managing the entire lifespan of an asset. Following these activities allows Wastewater to continue to provide services efficiently, effectively, and sustainably through their lifecycle, maximizing the value they provide to the community. This approach aligns with best practices in asset management, where preventive maintenance and timely repairs are crucial for preserving the functionality, safety, and longevity of infrastructure assets.

By maintaining Wastewater in optimal condition, the Town can provide services at the lowest possible cost by extending their lifespan and mitigate the risk of costly major repairs or premature replacement. It also ensures that residents continue to benefit from high-quality services offered by well maintained Wastewater infrastructure. Following the lifecycle activities and strategies also ensures the Town avoid the risks associated with asset ownership, which can be significant. These risks are further outlined in 12.2.5 Risk Associated with Lifecycle Strategies and Levels of Service. Completing lifecycle activities and following the strategies outlined in this plan can enhance the resilience and sustainability of infrastructure while minimizing potential risks.

The lifecycle activity categories include non-infrastructure, operations and maintenance, renewal/rehabilitation, disposal, and service improvement and growth. A description of each activity category can be found in Section 1.4.2.4. Specific asset management practices or planned actions as well as specific frequencies associated with these actions are outlined in in Table 5-5.



Table 5-5. Asset Management Practices and Associated Risks – Wastewater

Asset Management Practices/ Planned Actions	Frequency Associated with Practices / Planned Actions
Non-Infrastructure	
• Disconnecting downspouts	• As identified
• Weeping tile disconnection to manage sewer demand	• As identified
• Smoke testing	• As identified
• CCTV program	• Annual; 25km per year
• Flow and level monitoring	• As identified
• GIS for record management	• On-going
• Inflow and infiltration monitoring	• Continuous
• Wastewater Master Servicing Plan and Pollution Prevention and Control Plan	• 5 years
Operations & Maintenance Activities	
• Maintenance and inspection programs (cleaning and flushing, minor repairs and maintenance hole repairs)	• Regularly (unscheduled or unplanned emergency activities)
• Maintenance hole adjustments and minor sewer repairs	• As identified. Regularly (unscheduled or unplanned emergency activities)
• Replacement of clay pipe	• As identified in 10-year plan
Renewal/Replacement Activities	
• Replacement of clay pipe	• As required
• Relining	• As required
• Replacement of sewers	• Annual
Disposal Activities	
• Dispose of assets in line with replacements	• As required
Service Improvement & Growth Activities	
• New assets for developments to service growth	• As needed
• New assets as part of service improvement	• As identified in studies



5.4 Funding the Lifecycle Activities

The Town uses the lifecycle management strategies described above in Section 5.3 to plan work and determine future expenditure needs for Wastewater assets. The activities, along with the scenarios below provide a framework of expenditures required for managing assets and ensuring the Town can meet the demands of current services and existing infrastructure.

All three scenarios consider only renewal, rehabilitation and replacement lifecycle activity costs and needs. These lifecycle activities ensure infrastructure remains in a state of good repair and can continue to provide services to residents. Further details of the funding required for the remaining lifecycle activities (non-infrastructure, service improvements, operations and maintenance, and growth) have been accounted for in the Scenario Comparison, found below in Section 5.4.4, which are based on the operating and capital budgets for the Town.

For the purposes of this AMP, these activities, and their costs, are assumed to be enough to meet the community's expectations. This AMP does not provide an analysis on optimizing these activities and costs. Growth needs are captured based on the planned projects that are funded through development charges or are activities to address the growing Town population.

5.4.1 Scenario 1: Cost to Maintain Current Performance (Level of Service)

Scenario one calculates the approximate annual cost of the renewal, rehabilitation and replacement activities required to maintain assets in a similar performance (condition) as their current state. This is used to determine the annual cost to provide the current level of service for Wastewater (as mandated by O.Reg. 588/17).

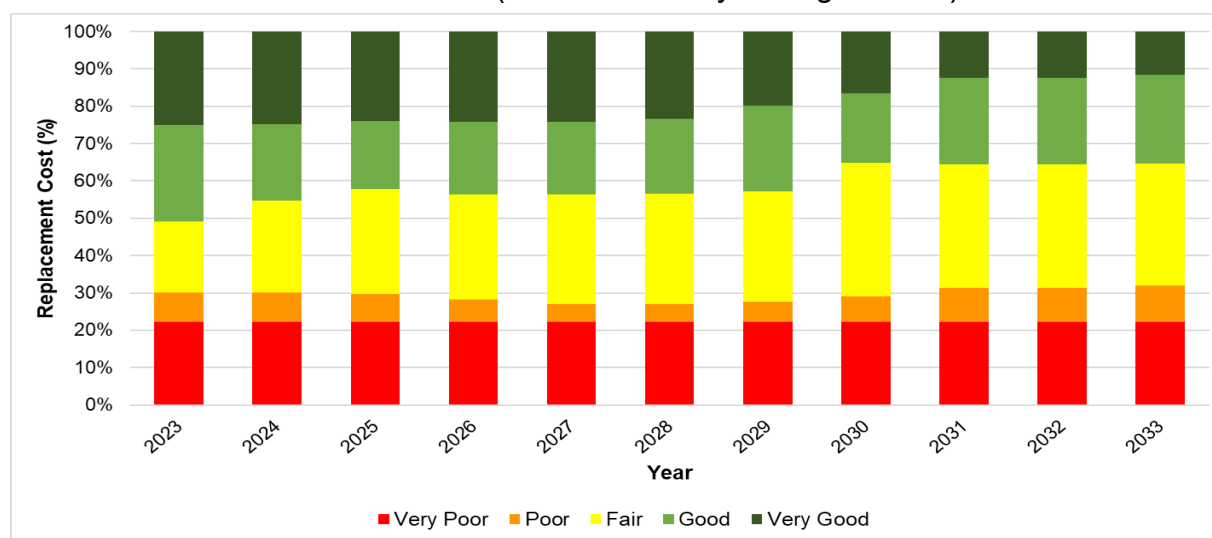


Figure 5-4. Wastewater Performance Forecast to Maintain Levels of Service



It was determined that an annual budget of \$3.1 million for renewal, rehabilitation and replacement activities is needed to maintain performance for Wastewater. There is no funding gap compared to the anticipated funding levels. The performance forecast for scenario one is shown in Figure 5-4. Assets in good to very good condition decreases by 16% over the 10-year forecast, ending at 35%.

5.4.2 Scenario 2: Current Funding

Scenario two looks at the impact of current anticipated funding on the asset performance (condition) over the 10-year forecast period. The anticipated annual funding for renewal, rehabilitation and replacement activities for Wastewater is \$3.9 million. The condition distribution for the anticipated funding scenario is shown below in Figure 5-5. Overall condition decreases in this scenario. While assets in poor to very poor stays steady at 30%, assets in fair condition increases by 14% to end the 10-year forecast at 33% of overall condition.

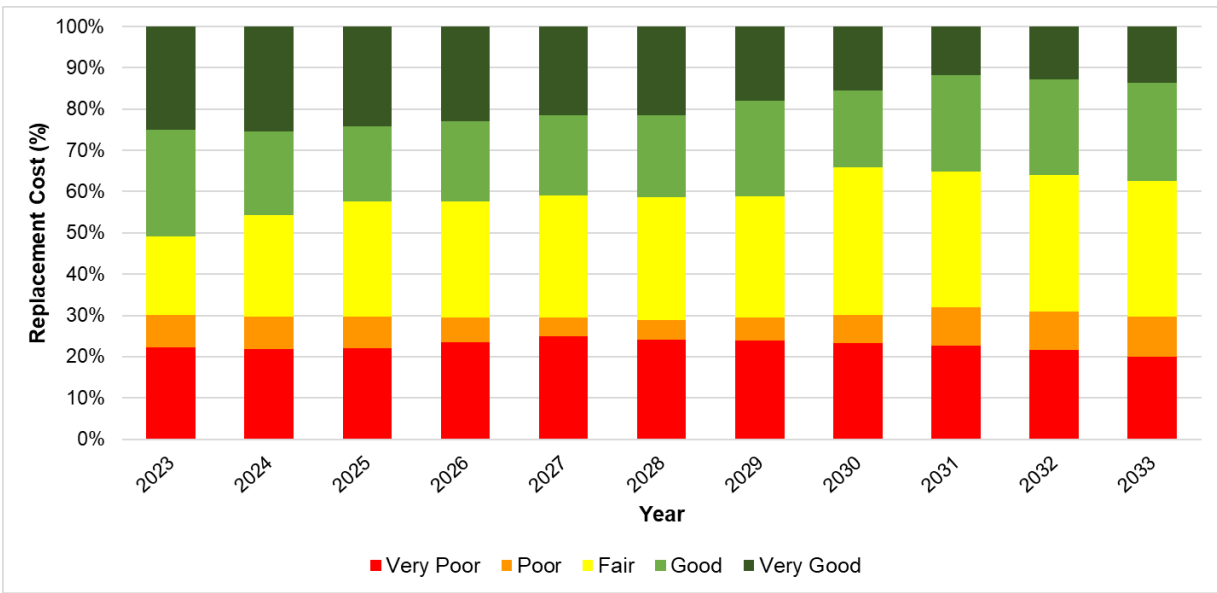


Figure 5-5. Wastewater Performance Forecast with Current Funding

5.4.3 Scenario 3: Proposed LOS Target/Infrastructure Needs Assessment

Scenario three calculates the average budget needed to achieve the proposed levels of service, which has been determined using infrastructure needs as per lifecycle strategies. The lifecycle strategies were developed in consultation with Town staff, and using industry best practices for the renewal, rehabilitation, and replacement activities. The renewal, rehabilitation, and replacement activities listed above in Table 5-5 have been used to develop the strategies for the infrastructure needs and include the lifecycle activities that need to be undertaken to achieve the proposed levels of service. Following the infrastructure needs and



maintaining assets as prescribed in this AMP will provide the lowest lifecycle cost. This scenario is mandated by O.Reg. 588/17.

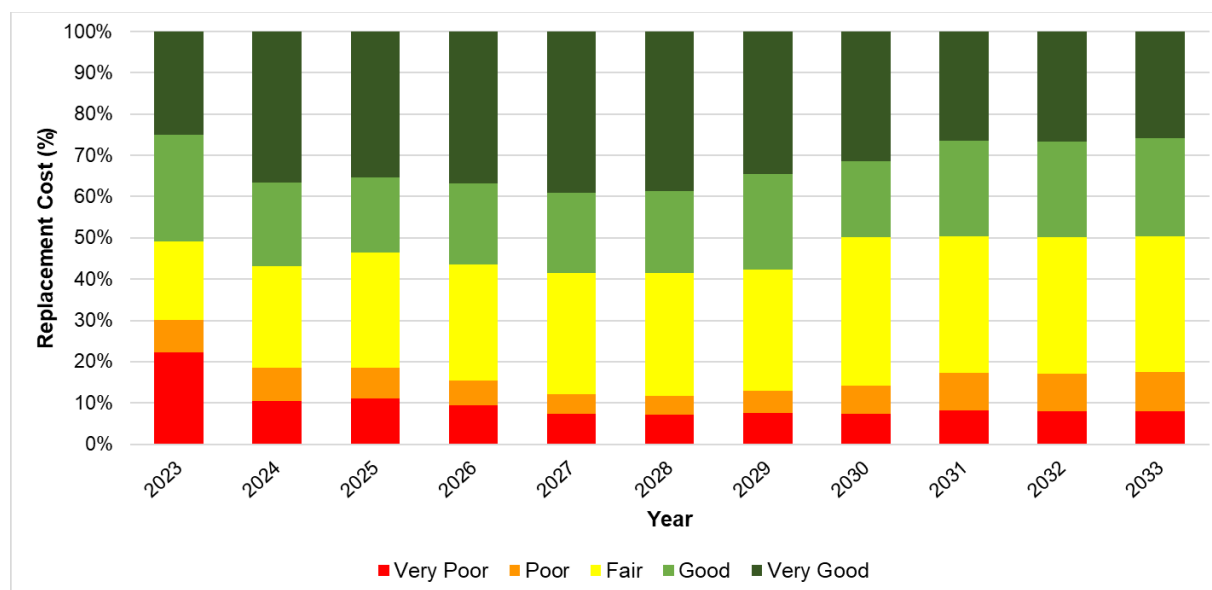


Figure 5-6. Wastewater Performance Forecast with Proposed Level of Service Targets/Infrastructure Needs as per Lifecycle Strategies

It was determined that a budget of \$8.7 million for renewal, rehabilitation and replacement activities is needed to achieve the proposed levels of service. There is a funding gap of approximately \$4.7 million compared to current anticipated funding levels. The performance forecast for this scenario is shown below in Figure 5-6. The performance of Wastewater increases during the 10-year forecast period. Assets in good to very good condition stay steady at 50% and assets in poor to very poor condition decrease from 30% to 18%.

5.4.4 Scenario Comparison & Infrastructure Gap

With the above information, Town staff can determine if there are gaps in funding to address infrastructure needs. This information will support future decision making on how to address any gaps. The investment needs under each of the three scenarios are shown below in Figure 5-7 and Table 4-6. Figure 5-7 shows a bar graph of the forecasted renewal, rehabilitation, and replacement expenditures for the proposed level of service targets/infrastructure needs according to scenario three, as well as any remaining lifecycle expenditures informed by the Town's anticipated budget. The bars in Figure 5-7 are colour coded by lifecycle activities. The solid and dashed lines represent the average annual investment needs of the three scenarios described above.



The scenario comparison highlights no gap to maintain current performance (condition) of assets and a gap of \$4.7 million to achieve proposed level of service targets and optimize the performance of assets based on lifecycle strategies compared to anticipated annual funding.

The forecast for sanitary assets assumes that the assets will be replaced, which is a contributing factor to the high backlog and needs assessed in this AMP. It is recommended that the Town further review possible rehabilitation options to improve the condition of the sanitary assets, at a lower cost. Options would include spot repairs, and relining of the pipes where appropriate, rather than full replacement. These options will improve the condition of the pipes at a lower cost than full replacement.

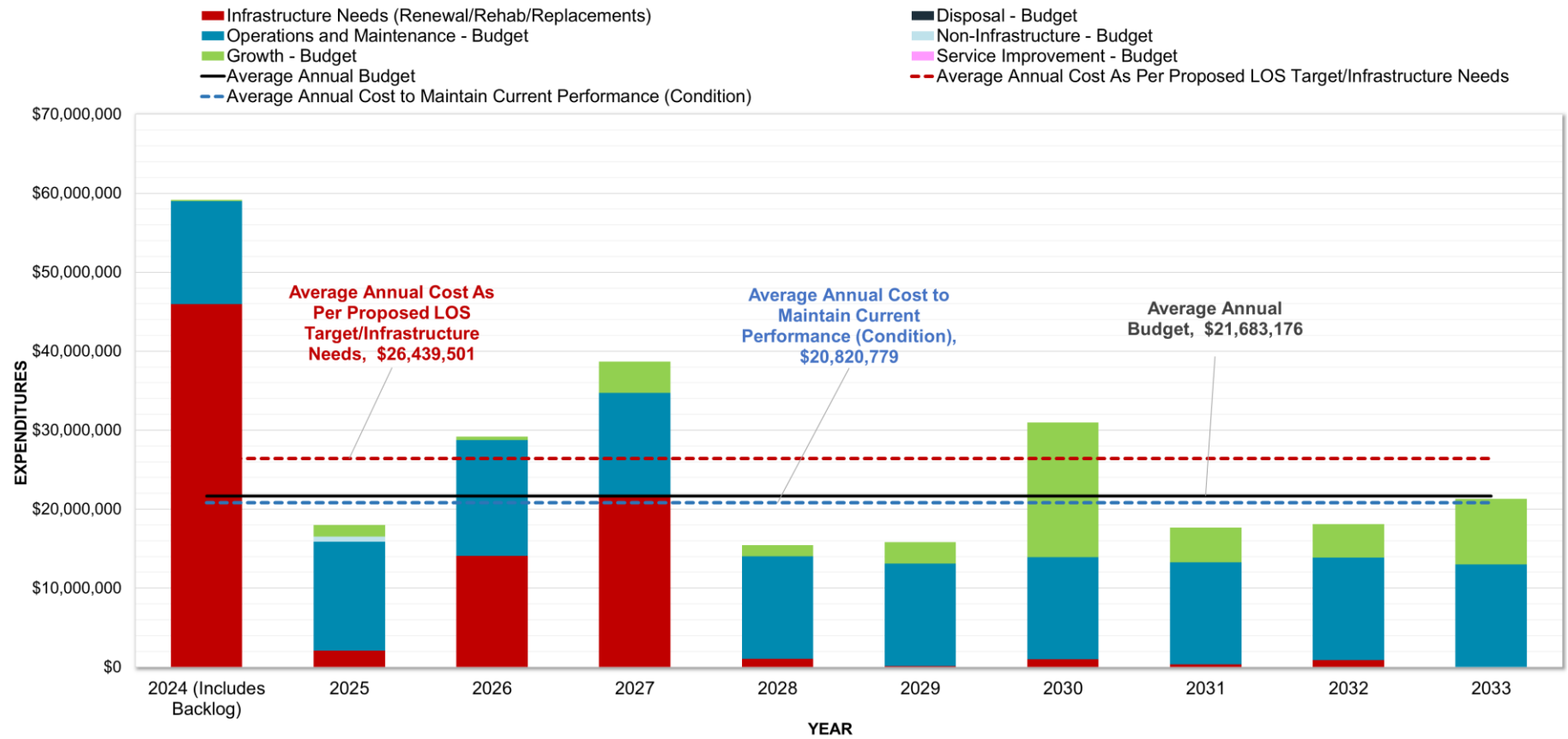


Figure 5-7. Wastewater Scenario Comparison



The backlog is also highlighted in Figure 5-7 in the year 2024. The backlog represents renewal, rehabilitation, and replacement activities that have been identified as necessary but have not yet been completed. Continuing to defer renewals creates a risk of higher financial costs, potential decreased availability, and potential decreased satisfaction with asset performance.

Continuing to delay renewals may put the Town at risk for intergenerational inequality. Future generations may not be able to maintain the levels of service customers currently enjoy. Continued project deferrals can also lead to higher operational and maintenance costs, potentially limiting the availability of services in the future. Timely and adequately funded renewals and replacements will ensure that assets continue to remain functional and reliable into the future, at the lowest possible cost.

5.4.4.1 Forecasted Infrastructure Gap

The infrastructure gap is summarized below in Table 5-6. Current funding for capital budgets presented are the annual average of approved budgets (as of 2023) for the 2023-2033 fiscal years.

Table 5-6. Current and Optimal Capital Funding and Funding Gap - Wastewater

Lifecycle Activity	Average Annual Budget	Average Annual Cost to Maintain Current LOS	Average Annual Cost As Per Proposed LOS Target/ Infrastructure Needs
Disposal	\$0	\$0	\$0
Growth	\$4,420,116	\$4,420,116	\$4,420,116
Non-Infrastructure	\$62,500	\$62,500	\$62,500
Operations & Maintenance	\$13,228,774	\$13,228,774	\$13,228,774
Renewal, Rehabilitation & Replacement	\$3,971,787	\$3,109,389	\$8,728,111
Service Improvement	\$0	\$0	\$0
Total	\$21,683,176	\$20,820,779	\$26,439,501
Average Annual Spending Gap		No Gap	\$4,756,325
Percentage Increase Required to Address Gap			22%



5.5 Data Confidence and Improvement Plan

Table 5-7 outlines the main data sources and overall confidence in the data used for this AMP. Data confidence is based on how many assumptions needed to be made and the reliability of the data sources.

Table 5-7. Wastewater – Data Confidence

Asset Segment	Data Source	Data Confidence
Sanitary Sewer Pipe	Shapefile (GIS) & CCTV Inspection Records	A

5.5.1 Recommendations for Improvements

Opportunities for improvement include:

Sanitary Sewer Pipe: Continue to keep up to date records and condition data for sewer pipes. Continue to expand on lifecycle strategies for pipes and how condition data is used to inform decisions on rehabilitation and replacements.

It is recommended to develop a prioritized CCTV inspection program that defines frequency of inspections based on specific criteria (age of pipe, condition, risk, etc.)

It is also recommended that the Town review rehabilitation options for storm pipes that will decrease the infrastructure gap while also improving performance.

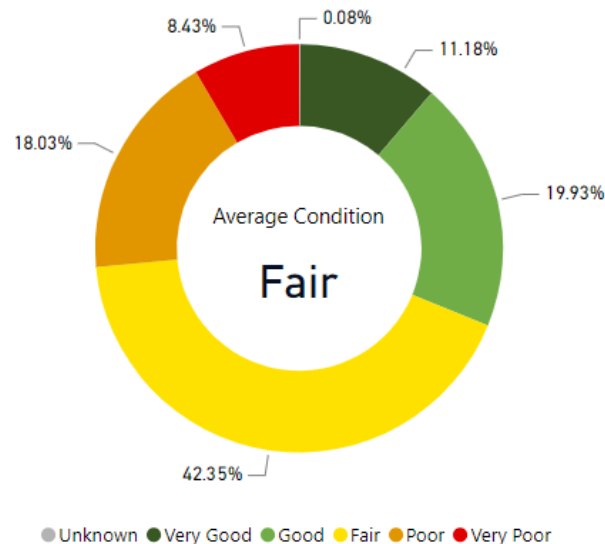


6.0 Water

Replacement Value

\$371,352,898

Overall Average Asset Condition



**Average Annual Gap to Meet
Current LOS (Performance)**

\$2.2 M

**Average Annual Gap to Meet
Proposed LOS (Performance)**

\$2.2 M

Asset Inventory

- Maintains 282 km of distribution watermain & appurtenances
- 2 Bulk Water Stations and 60 Water Sample Stations



6 Water

Water infrastructure is a crucial part of the Town's underground infrastructure network, providing clean and safe drinking water to residents and businesses. Water infrastructure in the Town of For Erie is a two-tier system. The Niagara Region owns and operates a water treatment plant and supporting facilities, and transmission watermains that deliver water to distribution watermains throughout the municipality. The Town owns and operates 282km of distribution watermains along with many supporting assets. Municipal water systems are regulated by the Ministry of Environment, Conservation and Parks under the Safe Drinking Water Act (2002). The Town follows these regulations and undergoes testing and inspections to ensure compliance. The safe operations of the water system is crucial to community health and well-being.

6.1 State of the Infrastructure

6.1.1 Asset Valuation

The Water asset category includes bulk water stations, water meters, water sample stations and watermains and appurtenances (including hydrants, valves, laterals, and curb stops) with a total estimated replacement value of \$371 million. The individual asset inventory and current replacement value is shown in Table 6-1.

Table 6-1. Inventory and Current Replacement Value – Water

Asset Type	Count	Quantity Unit	2024 Estimated Replacement Value
Bulk Water Station	2	Units	\$300,000
Water Meters	14,041	Units	\$12,687,385
Water Sample Station	60	Units	\$60,000
Watermains & Appurtenances	282	km	\$358,665,513
Total			\$371,712,898

6.1.2 Asset Condition

Asset condition is an important piece in asset management planning. Condition was assigned to assets in Water based on age/estimated service life. For watermains, where no breaks have occurred, age/estimated service life were used to determine condition. Where break

information was available this was a factor in the condition rating of the watermain. The condition rating scale is shown below in Table 6-2.

Table 6-2. Condition Rating Scale - Water

Condition	Age/ESL	Breaks
Very Good	>80% life remaining	0
Good	60-80% life remaining	0
Fair	40-60% life remaining	0
Poor	20-40% life remaining	1-2
Very Poor	0-20% life remaining	3-5
Unknown		

Figure 6-1 and Figure 6-2 illustrates the condition distribution of the Town's Water assets.

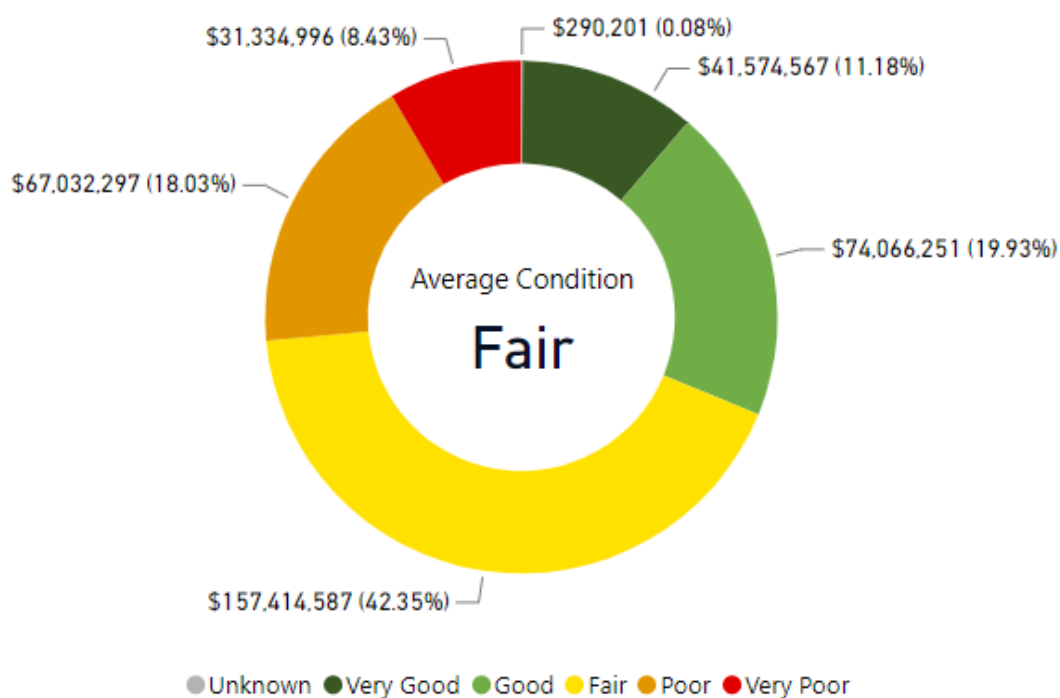


Figure 6-1. Overall Asset Condition (by Replacement Value) - Water

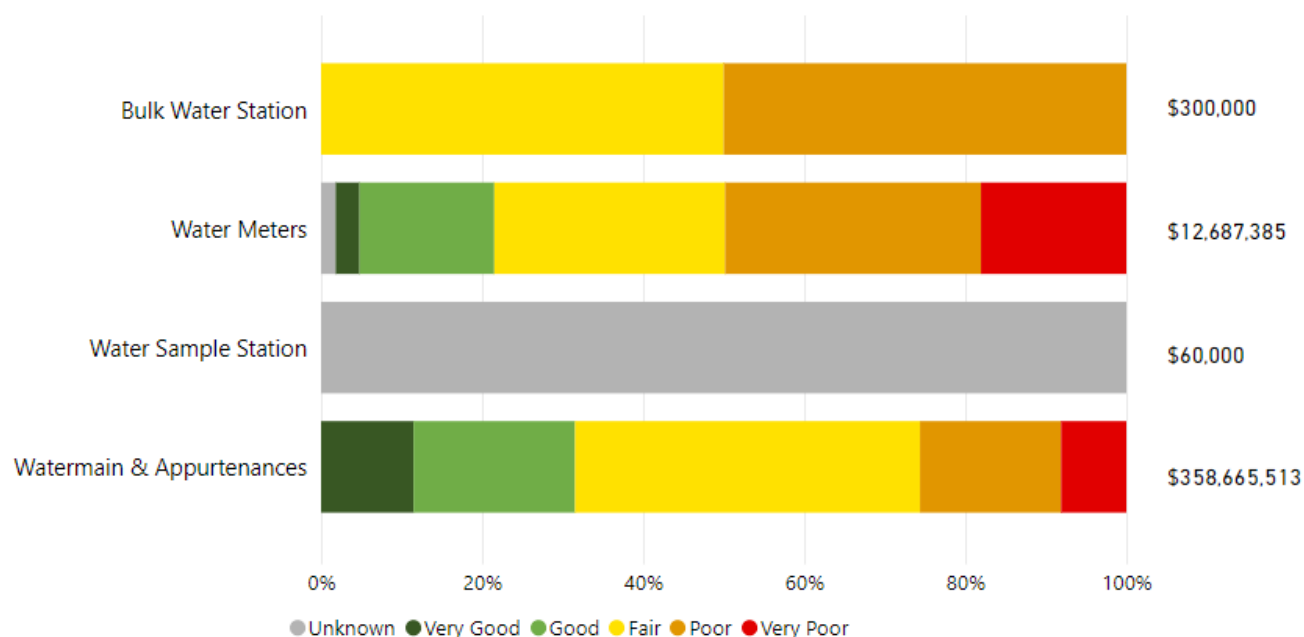


Figure 6-2. Asset Type Condition (by Replacement Value) - Water

The average condition of Water assets is fair, with approximately 73% of assets in fair or better condition. About half of water meters are in poor or very poor condition, as seen in Figure 6-2. These assets are at or near replacement, with 40% or less of their estimated service lives left. The Town can plan for their upcoming replacement in the Capital plan. Water Sample Stations currently have unknown condition, it is recommended that this information is tracked, and gaps are filled for this asset class.

6.1.3 Average Age

Comparing average asset age to average estimated service life is a tool to further analyze the health of the asset system. The average age and average estimated service life for bulk water stations, water meters and watermains and appurtenances is shown in Figure 6-3.

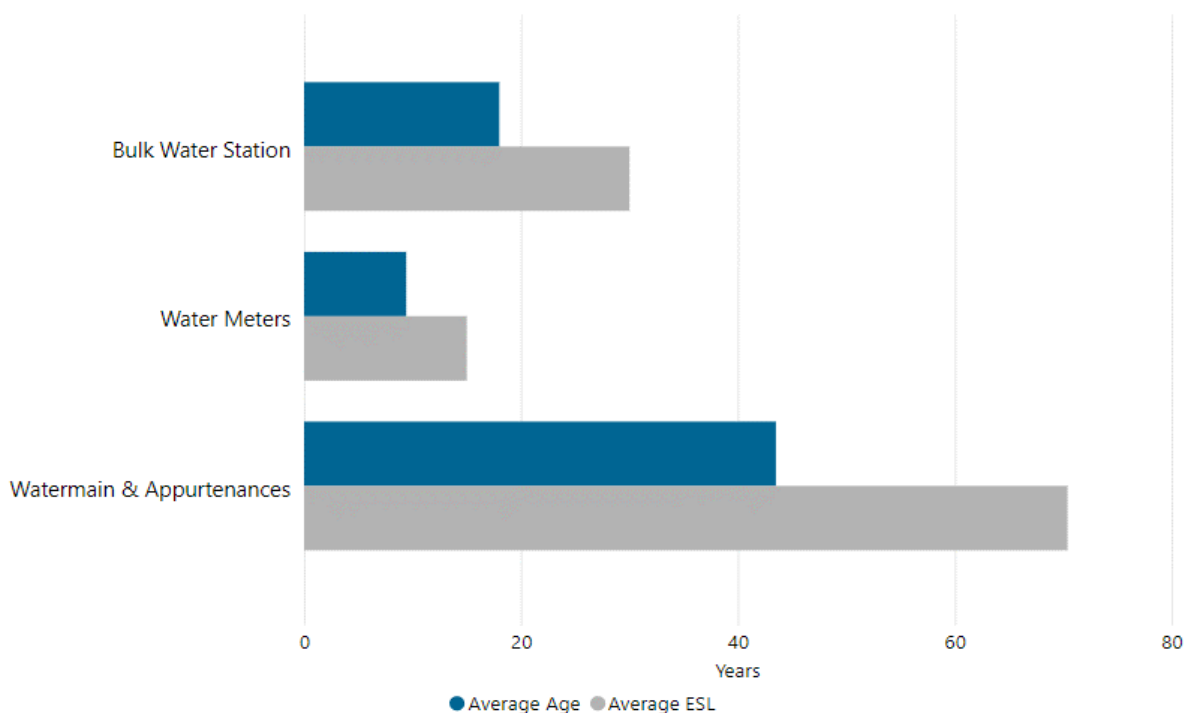


Figure 6-3. Average Age and Average Estimated Service Life - Water

6.2 Levels of Service

Service Statement: The Town of Fort Erie will strive to provide safe, clean drinking water of adequate pressure and flow with minimum service interruptions.

Levels of service metrics are a foundational part of the Town's Asset Management Strategy. It allows the Town to assess performance, identify areas for improvement and make informed decisions to better meet the needs of the community while optimizing resource allocation. Level of service metrics help municipalities promote accountability and transparency in municipal government. The Town has developed level of service metrics to align with community values and corporate priorities. There are metrics required by O.Reg. 588/17, and Town defined metrics. Customer and technical level of services metrics can be found below in Table 6-3 and Table 6-4.

The proposed LOS targets have been set by staff based on subject matter experts and through the development of the lifecycle management strategies discussed in the following section. Several factors and options were considered in the development of these targets, including costs, risks, and achievability. The differences between the current performance and proposed can be seen in the tables below.

The targets established for LOS represent the comprehensive approach required to minimize risks and lifecycle costs for the Town. The activities and strategies required to meet the proposed performance can be found in 6.3 Lifecycle Management Strategy, as well as the



analysis of the impact to condition and costs used to determine the appropriate proposed (target) LOS. The proposed LOS are appropriate as they provide the best chance to avoid the risks associated with asset ownership. The risks associated with not meeting the proposed LOS can be significant and wide-ranging, which are further explained in 12.2.5 Risk Associated with Lifecycle Strategies and Levels of Service. Addressing these risks requires a proactive approach to infrastructure planning, investment, and management, as outlined in the lifecycle strategies.

The proposed LOS will only be achievable if the Town adopts financial strategies to close the infrastructure gap identified in this plan.



Table 6-3. Customer / Council Focused Level of Service Requirements – Water

Key Service Attribute	Performance Measure	Current Performance	Proposed Performance	Difference Between Current & Proposed
Safe and Reliable	Descriptions of boil water advisories and service interruptions*	0	0	
Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal water system.*	Most properties within urban area are connected to the municipal water system.	Most properties within urban area connected to the municipal water system.	
Scope	Description, which may include maps, of the user groups or areas of the municipality that have fire flow.*	Most properties within urban area connected to the municipal water system for fire flow.	Most properties within urban area connected to the municipal water system for fire flow.	
Cost Efficient	Cost to provide service (2024 Operating & Capital/connection) *Cost to provide services is not disproportionate to CPI	\$604/household	\$604/household	
Safe	Percent of community with sufficient fire flow protection	97.6%	100%	
Quality	Number of complaints due to rusty/discoloured water	19	0	
Quality	Number of complaints due to low pressure	12	0	



Key Service Attribute	Performance Measure	Current Performance	Proposed Performance	Difference Between Current & Proposed
Reliable	Watermain break(s)	24	Decrease/Maintain	

*Mandatory under O.Reg. 588/17

Table 6-4. Technical Focused Level of Service Requirements – Water

Key Service Attribute	Performance Measure	Current Performance	Proposed Performance	Difference Between Current & Proposed
Safe and Reliable	Number of connection-days per year due to water main breaks compared to the total number of properties connected to the municipal water system.*	4.5 days shut down compared to 14,410 properties connected to the water system	0	
Safe and Reliable	Number 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.*	1	0	
Scope	Percent of properties connected to the municipal water system*	88%	88%	
Scope	Percent of properties where fire flow is available*	88%	88%	
Safe	Number of confirmed adverse water quality tests	11	0	



Key Service Attribute	Performance Measure	Current Performance	Proposed Performance	Difference Between Current & Proposed
Quality	Percent length of system that is CI/DI/AC	21.93%	16.27%	
Reliable	Percentage of replacement value of watermain in very poor condition	14%	14%	
Cost Efficient	Percent of annual reserve contribution meeting required reserve contribution based on the Reserve Policy	110% ⁸	100%	
Environmental Stewardship	Infrastructure Leakage Index (ILI)	4.1 (2023)	3.84	

*Mandatory under O.Reg. 588/17

⁸ This metric was calculated based on optimal reserve contribution based on a previously established asset replacement value, as per the Town's Capital Reserve Fund Policy. It is recommended that the replacement values used to calculate this metric be updated to reflect 2024 replacement values.



6.3 Lifecycle Management Strategy

The goal of our Asset Management Strategy is to establish and implement a series of planned activities, based on industry best practices. This will enable our assets to consistently provide a sustainable level of service to the residents of Fort Erie, while managing risk at the lowest lifecycle cost. The Town works to coordinate rehabilitation and replacement projects across asset groups where opportunities exist. This may result in asset strategies being delayed or advanced to accommodate the overall benefit of coordinated work across asset groups.

The Town continues to improve its approach to the management of its assets and will continue to put in place processes, procedures, and tools to enable a more consistent approach across the Town's Service Areas. Detailed below is an overview of some of the current asset management practices in place across the Town.

6.3.1 Lifecycle Activities

Lifecycle activities for Water involve processes and tasks aimed at managing the entire lifespan of an asset. Following these activities allows Water to continue to provide services efficiently, effectively, and sustainably through their lifecycle, maximizing the value they provide to the community. This approach aligns with best practices in asset management, where preventive maintenance and timely repairs are crucial for preserving the functionality, safety, and longevity of infrastructure assets.

By maintaining Water in optimal condition, the Town can provide services at the lowest possible cost by extending their lifespan and mitigate the risk of costly major repairs or premature replacement. It also ensures that residents continue to benefit from high-quality services offered by well maintained Water infrastructure. Following the lifecycle activities and strategies also ensures the Town avoid the risks associated with asset ownership, which can be significant. These risks are further outlined in 12.2.5 Risk Associated with Lifecycle Strategies and Levels of Service. Completing lifecycle activities and following the strategies outlined in this plan can enhance the resilience and sustainability of infrastructure while minimizing potential risks.

The lifecycle activity categories include non-infrastructure, operations and maintenance, renewal/rehabilitation, disposal, and service improvement and growth. A description of each activity category can be found in Section 1.4.2.4. Specific asset management practices or planned actions as well as specific frequencies associated with these actions are outlined in Table 6-5.



Table 6-5. Asset Management Practices and Associated Risks – Water

Asset Management Practices/ Planned Actions	Frequency Associated with Practices / Planned Actions
Non-Infrastructure	
• Leak detection program	• Annually; continuously
• Water Master Servicing Plan	• 5 years
• DWQMS Risk Assessment	• 3 years
Operations & Maintenance Activities	
• Monitoring with hydrant flow tests for fire flow/hydrants	• As needed
• Procedures. Monitor other watermain-related items	• On-going
• Preventative maintenance	• On-going
• Valve exercising program	• On-going
• Hydrant flow and code program	• Continuous
• Dead end flushing program	• Continuous monthly dead-end flushing, all dead ends flushed semi-annually
Renewal/Replacement Activities	
• Watermain replacement	• As identified in the 10-year plan
Disposal Activities	
• Dispose of assets in line with replacements	• As required
Service Improvement & Growth Activities	
• New assets for developments to service growth	• As needed
• New assets as part of service improvement	• As identified in studies



6.4 Funding the Lifecycle Activities

The Town uses the lifecycle management strategies described above in Section 6.3 to plan work and determine future expenditure needs for Water assets. The activities, along with the scenarios below provide a framework of expenditures required for managing assets and ensuring the Town can meet the demands of current services and existing infrastructure.

All three scenarios consider only renewal, rehabilitation and replacement lifecycle activity costs and needs. These lifecycle activities ensure infrastructure remains in a state of good repair and can continue to provide services to residents. Further details of the funding required for the remaining lifecycle activities (non-infrastructure, service improvements, operations and maintenance, and growth) have been accounted for in the Scenario Comparison, found below in Section 6.4.4, which are based on the operating and capital budgets for the Town.

For the purposes of this AMP, these activities, and their costs, are assumed to be enough to meet the community's expectations. This AMP does not provide an analysis on optimizing these activities and costs. Growth needs are captured based on the planned projects that are funded through development charges or are activities to address the growing Town population.

6.4.1 Scenario 1: Cost to Maintain Current Performance (Level of Service)

Scenario one calculates the approximate annual cost of the renewal, rehabilitation and replacement activities required to maintain assets in a similar performance (condition) as their current state. This is used to determine the annual cost to provide the current level of service for Water (as mandated by O.Reg. 588/17).

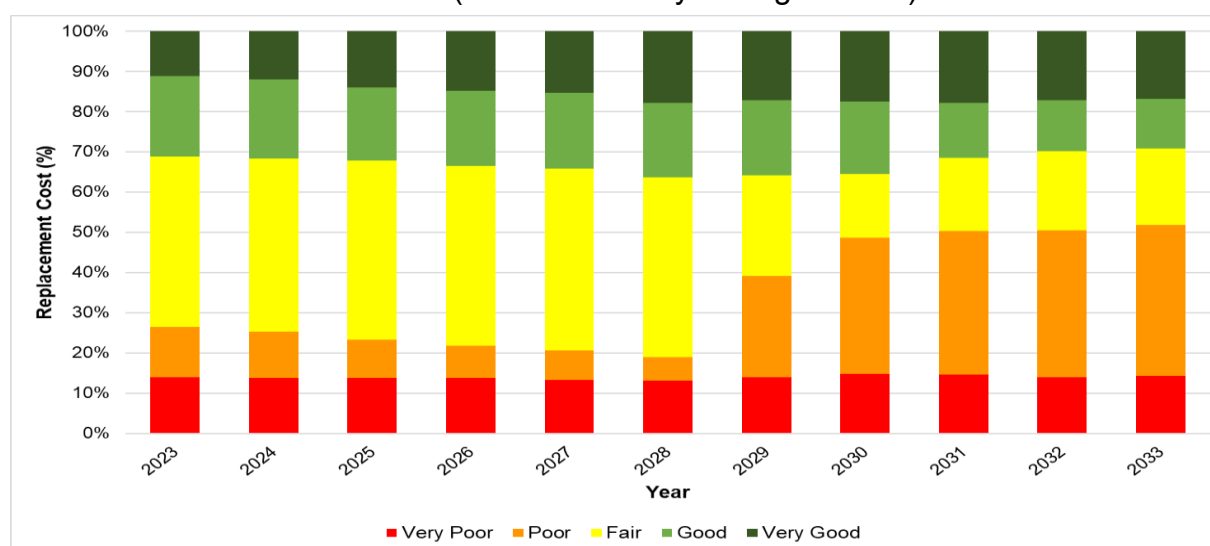


Figure 6-4. Water Performance Forecast to Maintain Levels of Service



It was determined that an annual budget of \$5 million in rehabilitation and replacement activities is needed to maintain performance for Water, which means there is currently a gap of \$2.2M. The performance forecast for scenario one is shown in Figure 6-4. The overall performance (condition) of assets decreases slightly in this scenario. Asset in poor to very poor condition increases by 25%, ending at 52%, while assets in good to very good condition decrease by 2%. In the year 2029, there are a significant amount of watermains, that based on the service life and deterioration of assets, move from Fair to Poor contributing to the significant increase assets in Poor condition in this year.

6.4.2 Scenario 2: Current Funding

Scenario two looks at the impact of current anticipated funding on the asset performance (condition) over the 10-year forecast period. The anticipated annual funding for renewal, rehabilitation and replacement activities for Water is \$2.7 million. The condition distribution for the anticipated funding scenario is shown below in Figure 6-5. The overall condition of assets decreases over this scenario forecast period. Assets in poor to very poor condition end this scenario forecast at 58%. This highlights the challenges the Town may face in keeping up with infrastructure needs with the current budget allocation. Similar to the previous scenario, a large portion of watermains moves into the Poor category in the year 2029.

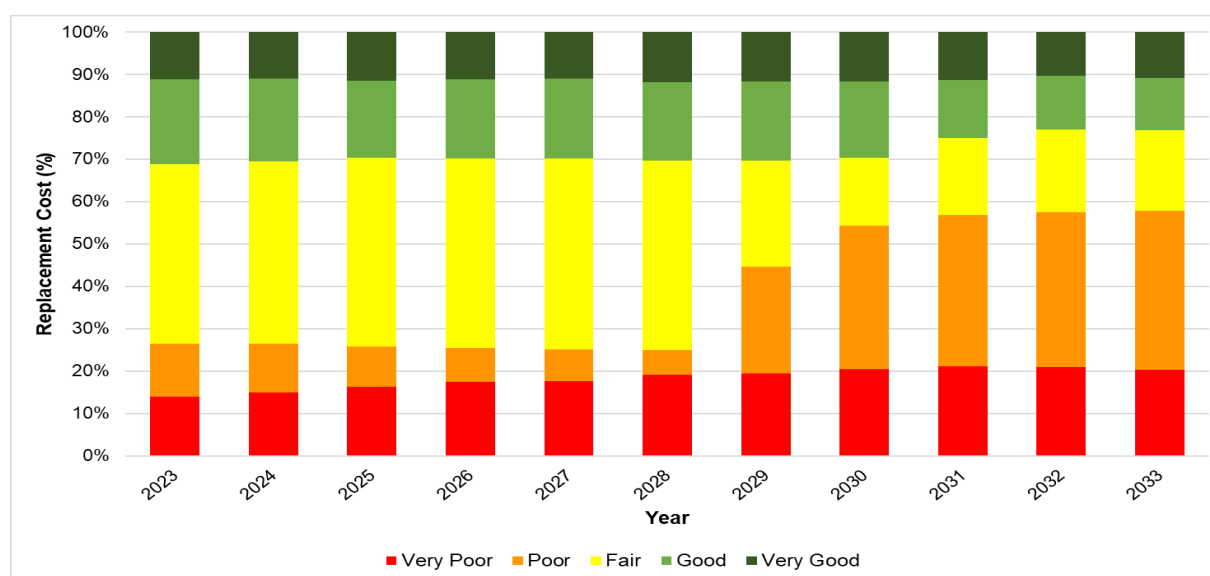


Figure 6-5. Water Performance Forecast with Current Funding

6.4.3 Scenario 3: Proposed LOS Target/Infrastructure Needs Assessment

Scenario three calculates the average budget needed to achieve the proposed levels of service, which has been determined using infrastructure needs as per lifecycle strategies. The lifecycle strategies were developed in consultation with Town staff, and using industry best practices for the renewal, rehabilitation, and replacement activities. The renewal,



rehabilitation, and replacement activities listed above in Table 6-5 have been used to develop the strategies for the infrastructure needs and include the lifecycle activities that need to be undertaken to achieve the proposed levels of service. Following the infrastructure needs and maintaining assets as prescribed in this AMP will provide the lowest lifecycle cost. This scenario is mandated by O.Reg. 588/17.

It was determined that a budget of \$5 million is needed for renewal, rehabilitation and replacement activities to achieve the proposed levels of service. There is a funding gap of approximately \$2.2 million compared to current anticipated funding levels. The performance forecast for this scenario is shown below in Figure 6-6. The performance of Water decreases during the 10-year forecast period. Assets in good to very good condition start at 32% and decrease to 28% at the end of the forecast. Similar to the previous scenario, a large portion of watermains moves into the Poor category in the year 2029.

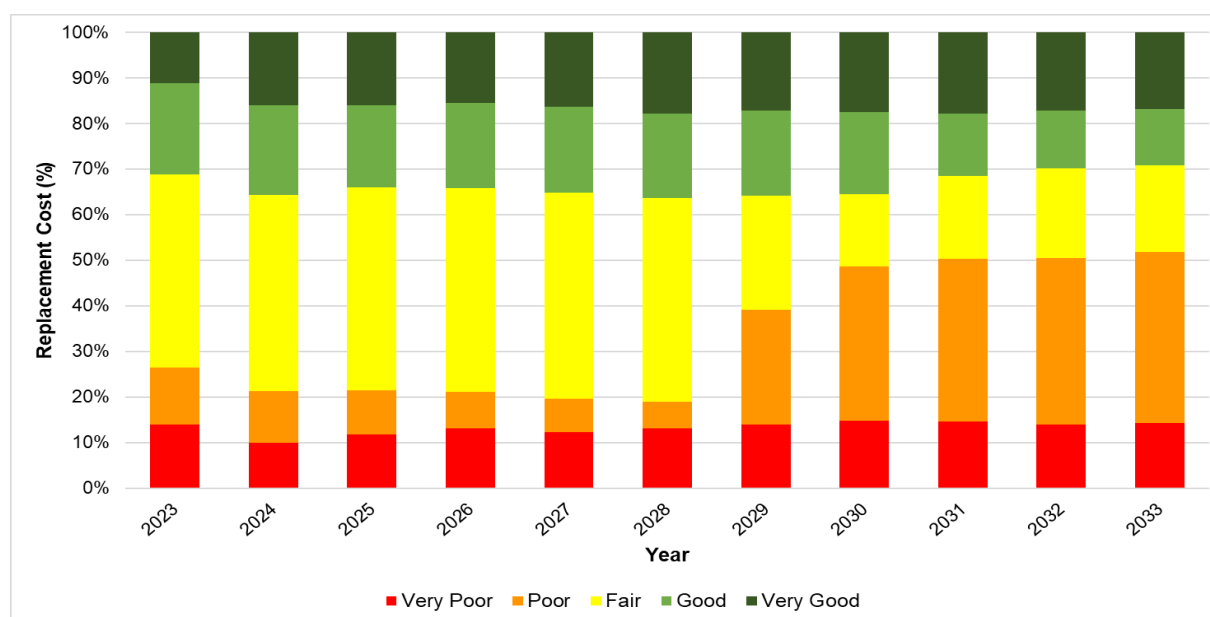


Figure 6-6. Water Performance Forecast with Proposed Level of Service Targets/Infrastructure Needs as per Lifecycle Strategies

6.4.4 Scenario Comparison & Infrastructure Gap

With the above information, Town staff can determine if there are gaps in funding to address infrastructure needs. This information will support future decision making on how to address any gaps. The investment needs under each of the three scenarios are shown below in Figure 6-7 and Table 6-6. Figure 6-7 shows a bar graph of the forecasted renewal, rehabilitation, and replacement expenditures for the proposed level of service targets/ infrastructure needs according to scenario three, as well as any remaining lifecycle expenditures informed by the Town's anticipated budget. The bars in Figure 6-7 are colour



coded by lifecycle activities. The solid and dashed lines represent the average annual investment needs of the three scenarios described above.

The scenario comparison highlights a gap of approximately \$2.2 million to maintain current performance (condition) of assets and a gap of \$2.2 million to achieve proposed level of service targets and optimize the performance of assets based on lifecycle strategies compared to anticipated annual funding.

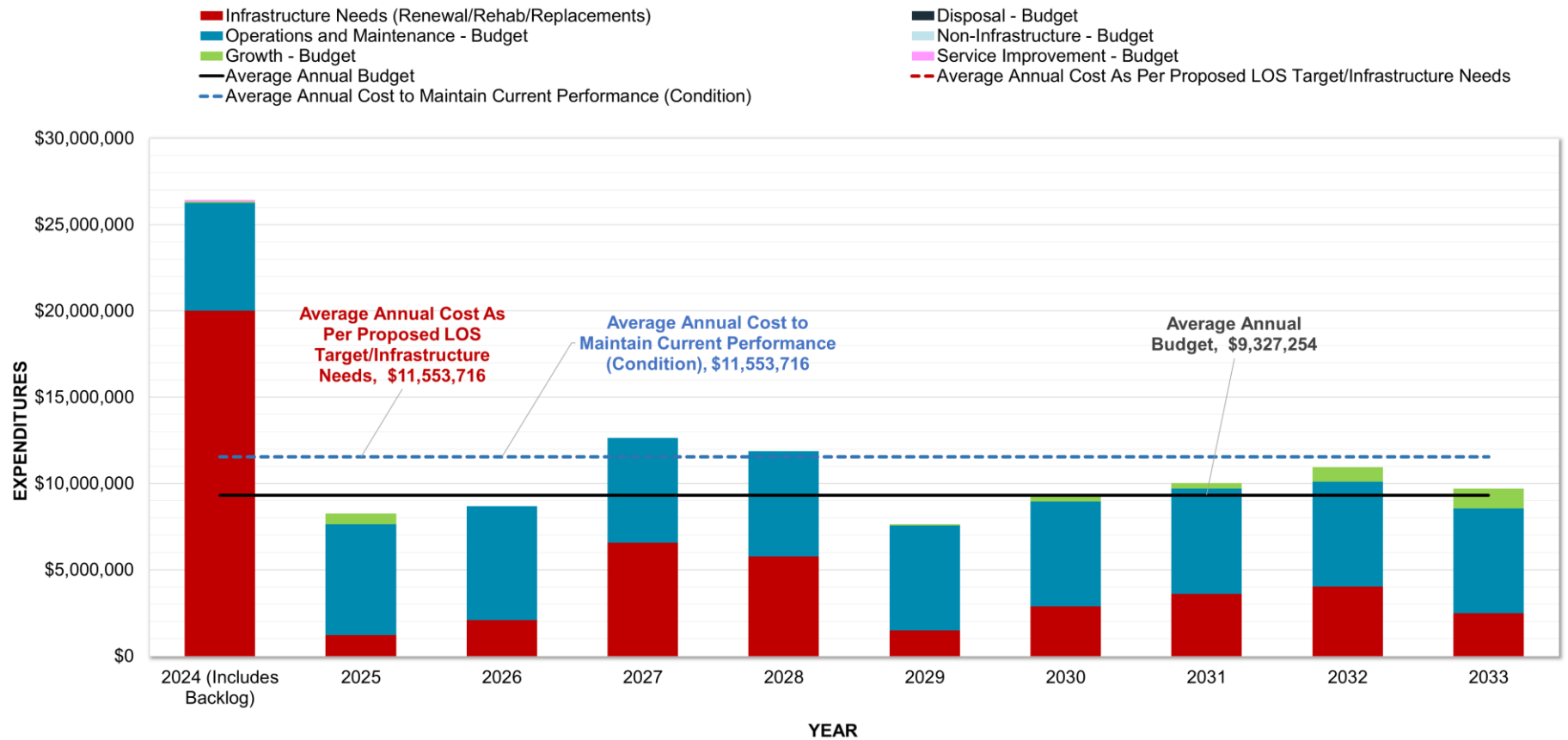


Figure 6-7. Water Scenario Comparison



The backlog is also highlighted in Figure 6-7 in the year 2024. The backlog represents renewal, rehabilitation, and replacement activities that have been identified as necessary but have not yet been completed. Continuing to defer renewals creates a risk of higher financial costs, potential decreased availability, and potential decreased satisfaction with asset performance.

Continuing to delay renewals may put the Town at risk for intergenerational inequality. Future generations may not be able to maintain the levels of service customers currently enjoy. Continued project deferrals can also lead to higher operational and maintenance costs, potentially limiting the availability of services in the future. Timely and adequately funded renewals and replacements will ensure that assets continue to remain functional and reliable into the future, at the lowest possible cost.

6.4.4.1 Forecasted Infrastructure Gap

The infrastructure gap is summarized below in Table 6-6. Current funding for capital budgets presented are the annual average of approved budgets (as of 2023) for the 2023-2033 fiscal years.

Table 6-6. Current and Optimal Capital Funding and Funding Gap - Water

Lifecycle Activity	Average Annual Budget	Average Annual Cost to Maintain Current LOS	Average Annual Cost As Per Proposed LOS Target/ Infrastructure Needs
Disposal	\$0	\$0	\$0
Growth	\$348,151	\$348,151	\$348,151
Non-Infrastructure	\$0	\$0	\$0
Operations & Maintenance	\$6,183,729	\$6,183,729	\$6,183,729
Renewal, Rehabilitation & Replacement	\$2,784,375	\$5,010,837	\$5,010,837
Service Improvement	\$11,000	\$11,000	\$11,000
Total	\$9,327,254	\$11,553,716	\$11,553,716
Average Annual Spending Gap		\$2,226,462	\$2,226,462
Percentage Increase Required to Address Gap		24%	24%



6.5 Data Confidence and Improvement Plan

Table 6-7 outlines the main data sources and overall confidence in the data used for this AMP. Data confidence is based on how many assumptions needed to be made and the reliability of the data sources.

Table 6-7. Water – Data Confidence

Asset Segment	Data Source	Data Confidence
Bulk Water Station		D
Water Meters	Vailtech water meter system	B
Water Sample Station	Shapefile (GIS)	D
Watermain & Appurtenances	Shapefile (GIS)	A

6.5.1 Recommendations for Improvements

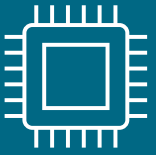
Opportunities for improvement include:

Bulk Water Station: Assess the replacement value of these stations and ensure the service life and recommendations for this station are adequate.

Water Meters: Ensure data management processes are in place to continually update this data set with updated replacement values for appropriate planning, ensure the data from the Vailtech water meter system is integrated with the asset register.

Water Sample Stations: Limited information was available on these assets. A review of the asset information available for these assets should be completed to ensure the information is accurate and fill in gaps for install dates, service life, and condition.

Watermain & Appurtenances: Water information is well maintained. Continue to update this information. Through the implementation of the work management system, water breaks and other information should be connected to watermain assets to better identify assets that are failing and require replacement.

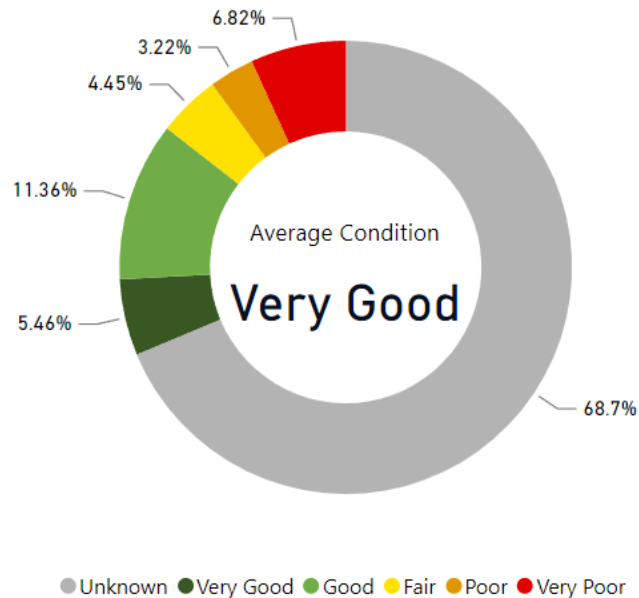


7.0 Digital Services

Replacement Value

\$3,325,184

Overall Average Asset Condition



**Average Annual Gap to Meet
Current LOS (Performance)**

No Gap

**Average Annual Gap to Meet
Proposed LOS (Performance)**

No Gap

Asset Inventory

- 11 different types of Hardware assets including computers, printers, servers & surveillance equipment
- Software assets including in-house, on premises, and SAAS applications



7 Digital Services

Digital Services in the Town of Fort Erie supports service delivery throughout the entire municipality by supporting and enhancing overall efficiency. Hardware and software assets support staff in completing their day-to-day jobs. Digital Services plays a crucial role in continually modernizing and optimizing the operations of the Town.

7.1 State of the Infrastructure

7.1.1 Asset Valuation

Digital Services includes several different types of hardware and software assets with a total replacement value of approximately 3.3M. The individual asset inventory and current estimated replacement value is shown in Table 7-1.

Table 7-1. Inventory and Current Replacement Value – Digital Services

Asset Type	Count	Quantity Unit	2024 Estimated Replacement Value
Hardware Assets			
Accessories	91	Units	\$36,300
Cellular	128	Units	\$47,293
Computer	251	Units	\$508,875
Monitor	305	Units	\$151,000
Network	211	Units	\$191,290
Phone	240	Units	\$108,000
Power	22	Units	\$40,029
Printer	47	Units	\$162,290
Server	42	Units	\$320,500
Surveillance	94	Units	\$28,200
Software Assets			
Main “in-house” applications	71	Units	\$1,420,000
Main “on premise” applications	19	Units	\$225,057
Main “software as a service” applications	10	Units	\$14,350



Asset Type	Count	Quantity Unit	2024 Estimated Replacement Value
Standard “base” staff installation	4	Units	\$72,000
Total			\$3,325,184

7.1.2 Asset Condition

Asset condition is an important piece in asset management planning. Condition was assigned to assets in Digital Services based on age/estimated service life. The condition rating scale is shown below in Table 7-2.

Table 7-2. Condition Rating Scale – Digital Services

Condition	Age/ESL
Very Good	>80% life remaining
Good	60-80% life remaining
Fair	40-60% life remaining
Poor	20-40% life remaining
Very Poor	0-20% life remaining
Unknown	

Figure 7-1 and Figure 7-2 illustrates the Condition distribution of the Town’s Digital Services assets.

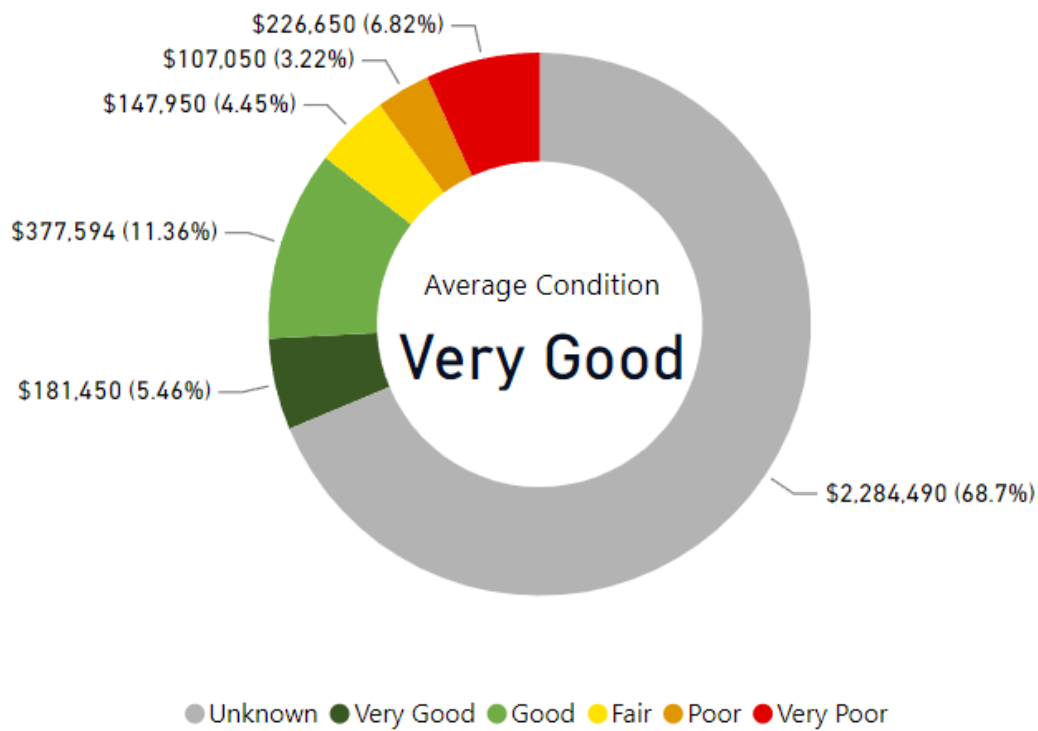


Figure 7-1. Overall Asset Condition (by Replacement Value) – Digital Services

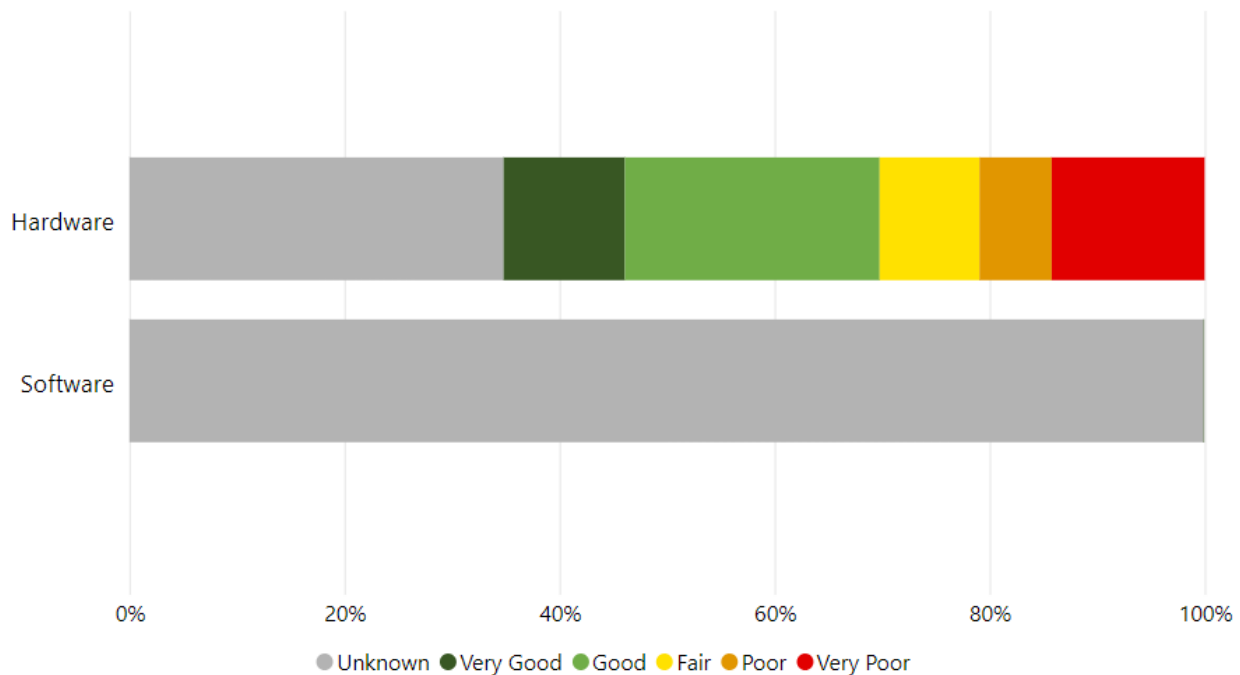


Figure 7-2. Asset Type Condition (by Replacement Value) – Digital Services

The average condition of Digital Services assets is good. A large portion of assets currently have an unknown condition (68%). Figure 7-2 shows that the condition of software assets is entirely unknown and approximately 34% of hardware assets have an unknown condition.



The Town worked to provide an assessment of both equipment and software assets for inclusion in the AMP, but further efforts are required to expand on this asset type. Software is a difficult asset to assess for condition, without an overall review of the adequacy of the systems used within the Town. It is recommended the Town further analyze how software condition can be accurately assessed.

7.1.3 Average Age

Comparing average asset age to average estimated service life is a tool to further analyze the health of the asset system. The average age and average estimated service life for hardware and software assets is shown in Figure 7-3.

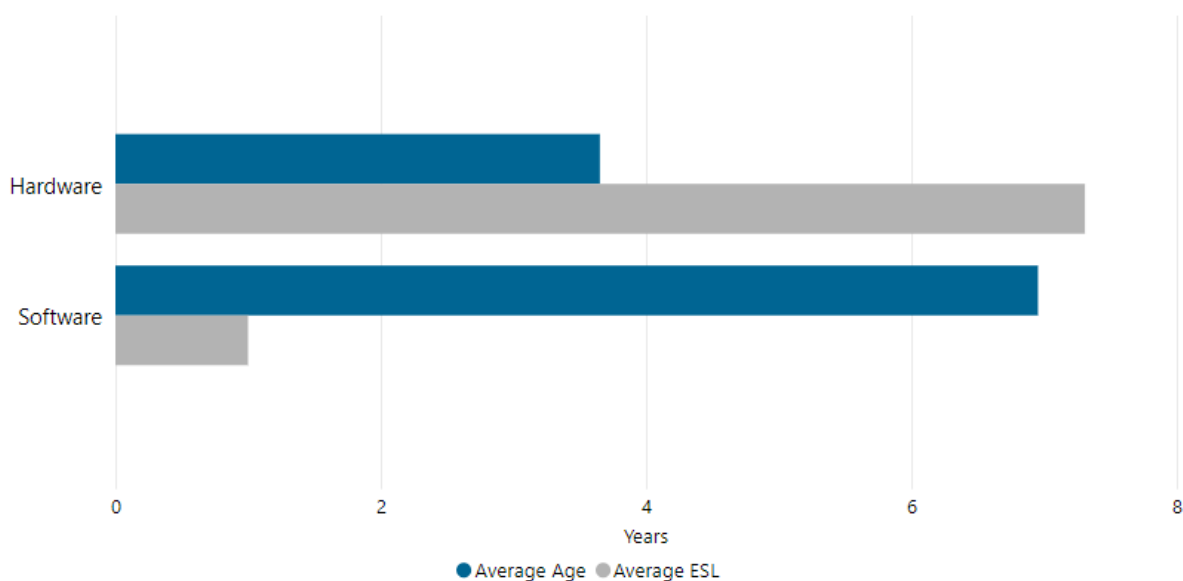


Figure 7-3. Average Age and Average Estimated Service Life – Digital Services



7.2 Levels of Service

Service Statement: At the Digital Services Department of the Town of Fort Erie, we are committed to providing cutting-edge and reliable technology solution to empower our community and enhance the efficiency of municipal operations. Our mission is to leverage innovative IT strategies to support the municipality's goals, promote transparency, and ensure the delivery of exceptional public services.

Levels of service metrics are a foundational part of the Town's Asset Management Strategy. It allows the Town to assess performance, identify areas for improvement and make informed decisions to better meet the needs of the community while optimizing resource allocation. Level of service metrics help municipalities promote accountability and transparency in municipal government. The Town has developed level of service metrics to align with community values and corporate priorities. There are metrics required by O. Reg. 588/17, and Town defined metrics. Customer and technical level of services metrics can be found below in Table 7-3 and Table 7-4.

The proposed LOS targets have been set by staff based on subject matter experts and through the development of the lifecycle management strategies discussed in the following section. Several factors and options were considered in the development of these targets, including costs, risks, and achievability. The differences between the current performance and proposed can be seen in the tables below.

The targets established for LOS represent the comprehensive approach required to minimize risks and lifecycle costs for the Town. The activities and strategies required to meet the proposed performance can be found in 7.3 Lifecycle Management Strategy, as well as the analysis of the impact to condition and costs used to determine the appropriate proposed (target) LOS. The proposed LOS are appropriate as they provide the best chance to avoid the risks associated with asset ownership. The risks associated with not meeting the proposed LOS can be significant and wide-ranging, which are further explained in 12.2.5 Risk Associated with Lifecycle Strategies and Levels of Service. Addressing these risks requires a proactive approach to infrastructure planning, investment, and management, as outlined in the lifecycle strategies.

The proposed LOS will only be achievable if the Town adopts financial strategies to close the infrastructure gap identified in this plan.



Table 7-3. Customer / Council Focused Level of Service Requirements – Digital Services

Key Service Attribute	Performance Measure	Current Performance	Proposed Performance	Difference Between Current & Proposed
Cost Efficient	Cost to provide service (2024 Operating & Capital Budget/household)	\$116	\$116	

Table 7-4. Technical Focused Level of Service Requirements – Digital Services

Key Service Attribute	Performance Measure	Current Performance	Proposed Performance	Difference Between Current & Proposed
Cost Efficient	Percentage of total replacement cost for IT assets past their estimated useful life	7.53%	0%	
Cost Efficient	Percent of annual reserve contribution meeting required reserve contribution based on the Reserve Policy	162% ⁹	100%	
Quality	Percentage of digital services assets in very poor condition	21.78%	18%	
Reliable	Average Initial Response time to tickets	Corporate standard response (Regular initial response: 1 business day; After hours/on call to system down events: 1 hour)	Corporate standard response	

⁹ This metric was calculated based on optimal reserve contribution based on a previously established asset replacement value, as per the Town's Capital Reserve Fund Policy. It is recommended that the replacement values used to calculate this metric be updated to reflect 2024 replacement values.



7.3 Lifecycle Management Strategy

The goal of our Asset Management Strategy is to establish and implement a series of planned activities, based on industry best practices. This will enable our assets to consistently provide a sustainable level of service to the residents of Fort Erie, while managing risk at the lowest lifecycle cost. The Town works to coordinate rehabilitation and replacement projects across asset groups where opportunities exist. This may result in asset strategies being delayed or advanced to accommodate the overall benefit of coordinated work across asset groups.

The Town continues to improve its approach to the management of its assets and will continue to put in place processes, procedures, and tools to enable a more consistent approach across the Town's Service Areas. Detailed below is an overview of some of the current asset management practices in place across the Town.

7.3.1 Lifecycle Activities

Lifecycle activities for Digital Services involve processes and tasks aimed at managing the entire lifespan of an asset. Following these activities allows Digital Services to continue to provide services efficiently, effectively, and sustainably through their lifecycle, maximizing the value they provide to the community. This approach aligns with best practices in asset management, where preventive maintenance and timely repairs are crucial for preserving the functionality, safety, and longevity of infrastructure assets.

By maintaining Digital Services in optimal condition, the Town can provide services at the lowest possible cost by extending their lifespan and mitigate the risk of costly major repairs or premature replacement. It also ensures that residents continue to benefit from high-quality services offered by well maintained Digital Services infrastructure. Following the lifecycle activities and strategies also ensures the Town avoid the risks associated with asset ownership, which can be significant. These risks are further outlined in 12.2.5 Risk Associated with Lifecycle Strategies and Levels of Service. Completing lifecycle activities and following the strategies outlined in this plan can enhance the resilience and sustainability of infrastructure while minimizing potential risks.

The lifecycle activity categories include non-infrastructure, operations and maintenance, renewal/rehabilitation, disposal, and service improvement and growth. A description of each activity category can be found in Section 1.4.2.4. Specific asset management practices or planned actions as well as specific frequencies associated with these actions are outlined in Table 7-5.



Table 7-5. Asset Management Practices and Associated Risks – Digital Services

Asset Management Practices/ Planned Actions	Frequency Associated with Practices / Planned Actions
Non-Infrastructure	
Disaster Recovery Plan, Business Continuity, Response Planning	As required
Network and Security Audit	Every 2 years
Strategic Plan	As required
Contingency and Redundancy Planning	As required
Operations & Maintenance Activities	
Planned maintenance (PM) – updates on firmware and software	As required
Service requested maintenance	As required
Alerts for software updates and defective equipment	Monthly
Purchase of small equipment and materials	As required
Software licensing	Annually
Renewal/Replacement Activities	
Asset replacement	As required – when assets reach end of service life or are no longer fit for purpose; no longer supported (increased risk)
Disposal Activities	
Disposals	Coordinated with asset replacement
Service Improvement & Growth Activities	
New assets	Driven by growth in the Town
New assets	To improve LOS and not supported by growth identified through planning and studies
New technology	As identified by IS or other departments
Business process improvements	As required



7.4 Funding the Lifecycle Activities

The Town uses the lifecycle management strategies described above in Section 7.3 to plan work and determine future expenditure needs for Digital Services assets. The activities, along with the scenarios below provide a framework of expenditures required for managing assets and ensuring the Town can meet the demands of current services and existing infrastructure.

All three scenarios consider only renewal, rehabilitation and replacement lifecycle activity costs and needs. These lifecycle activities ensure infrastructure remains in a state of good repair and can continue to provide services to residents. Further details of the funding required for the remaining lifecycle activities (non-infrastructure, service improvements, operations and maintenance, and growth) have been accounted for in the Scenario Comparison, found below in Section 7.4.4, which are based on the operating and capital budgets for the Town.

For the purposes of this AMP, these activities, and their costs, are assumed to be enough to meet the community's expectations. This AMP does not provide an analysis on optimizing these activities and costs. Growth needs are captured based on the planned projects that are funded through development charges or are activities to address the growing Town population.

7.4.1 Scenario 1: Cost to Maintain Current Performance (Level of Service)

Scenario one calculates the approximate annual cost of the renewal, rehabilitation and replacement activities required to maintain assets in a similar performance (condition) as their current state. This is used to determine the annual cost to provide the current level of service for Digital Services (as mandated by O.Reg. 588/17).

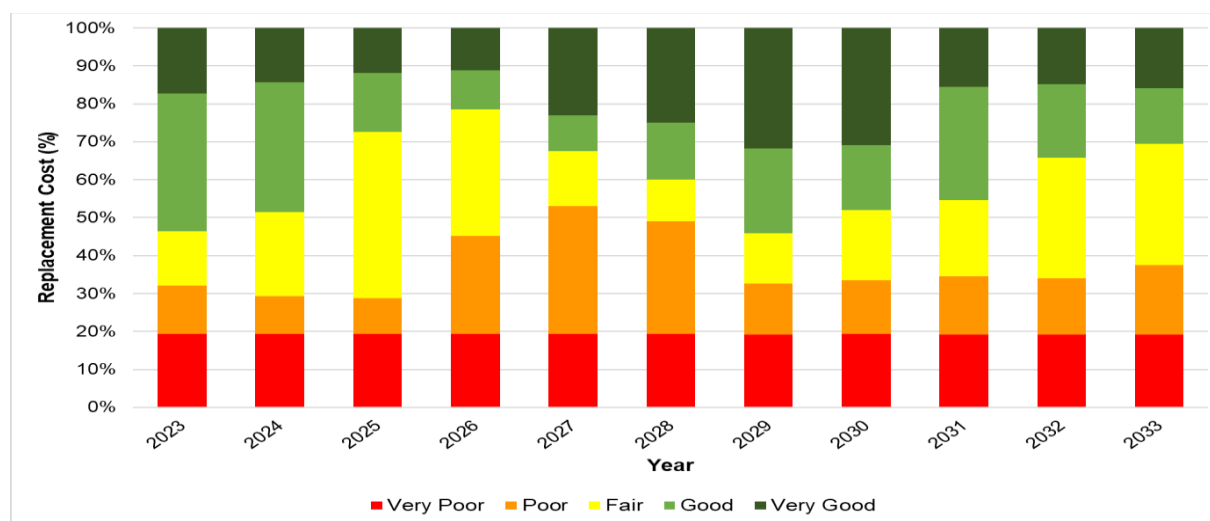


Figure 7-4. Digital Services Performance Forecast to Maintain Levels of Service



It was determined that an annual budget of \$143,000 for renewal, rehabilitation and replacement activities is needed to maintain performance for Digital Services. There is no funding gap compared the anticipated funding levels. The performance forecast for scenario one is shown n Figure 7-4. Assets in good to very good condition starts at 54% and decreases to 31% at the end of the 10-year period, while assets in very poor condition stays steady at 19%.

7.4.2 Scenario 2: Current Funding

Scenario two looks at the impact of current anticipated funding on the asset performance (condition) over the 10-year forecast period. The anticipated annual funding for renewal, rehabilitation and replacement activities for Digital Services is \$170,000. The condition distribution for the anticipated funding scenario is shown below in Figure 7-5. Overall condition decreases slightly in this scenario, with assets in good to very good condition decreasing by 3%, ending at 51%.

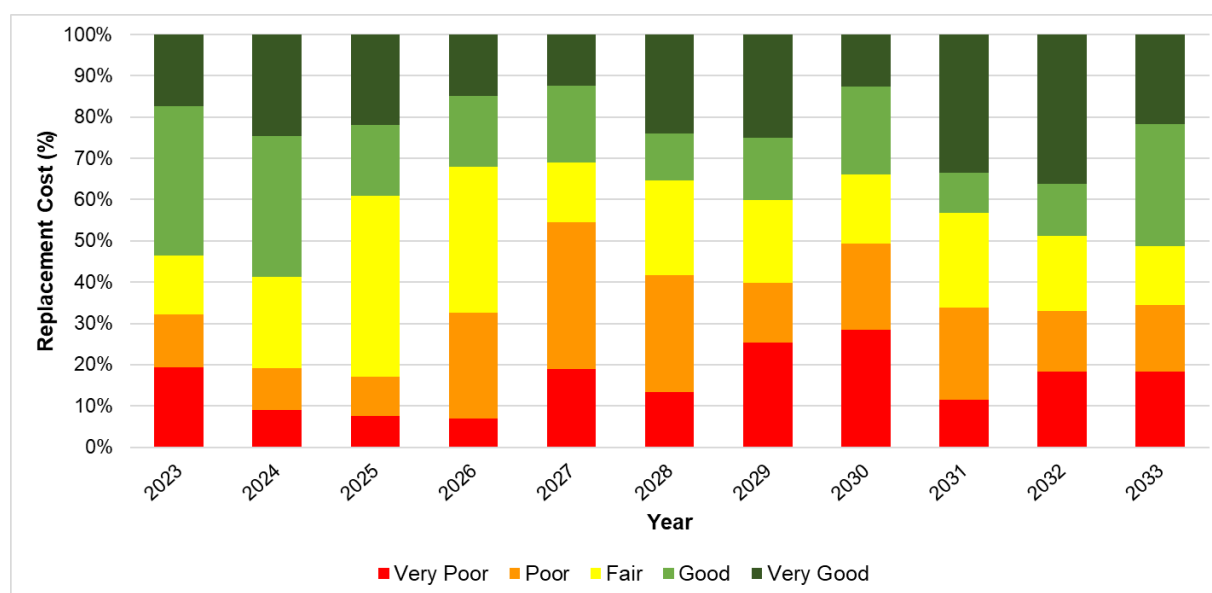


Figure 7-5. Digital Services Performance Forecast with Current Funding

7.4.3 Scenario 3: Proposed LOS Target/Infrastructure Needs Assessment

Scenario three calculates the average budget needed to achieve the proposed levels of service, which has been determined using infrastructure needs as per lifecycle strategies. The lifecycle strategies were developed in consultation with Town staff, and using industry best practices for the renewal, rehabilitation, and replacement activities. The renewal, rehabilitation, and replacement activities listed above in Table 7-5 have been used to develop the strategies for the infrastructure needs and include the lifecycle activities that need to be undertaken to achieve the proposed levels of service. Following the infrastructure needs and



maintaining assets as prescribed in this AMP will provide the lowest lifecycle cost. This scenario is mandated by O. Reg. 588/17.

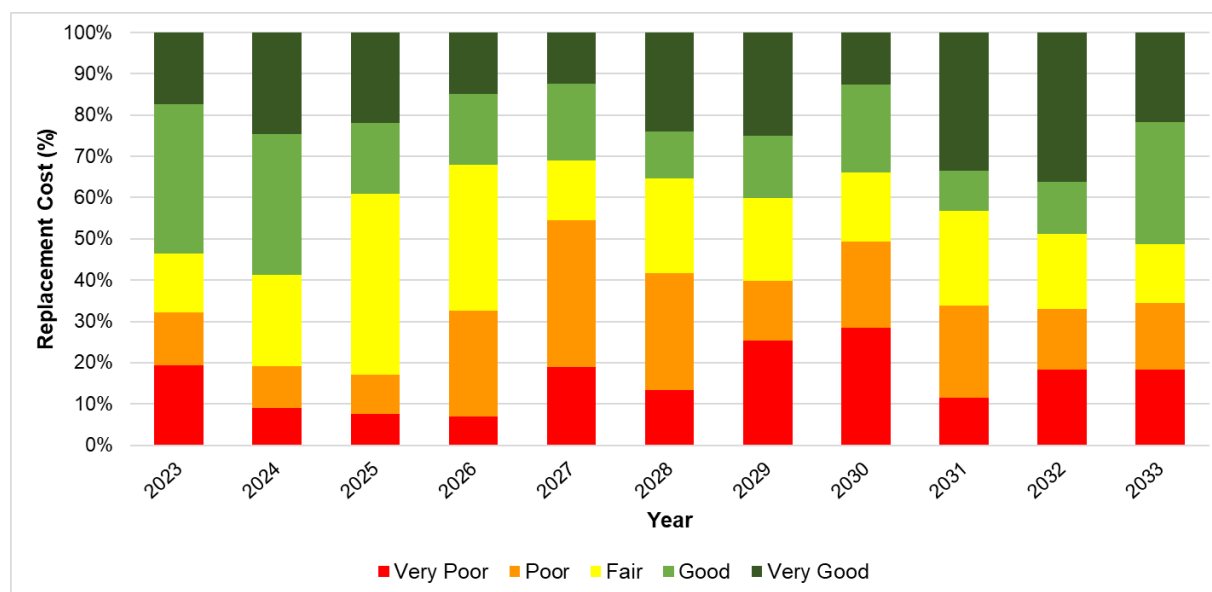


Figure 7-6. Digital Services Performance Forecast with Proposed Level of Service Targets/Infrastructure Needs as per Lifecycle Strategies

It was determined that a budget of \$153,000 for renewal, rehabilitation and replacement activities is needed to achieve the proposed levels of service. There no funding gap compared to current anticipated funding levels. The performance forecast for this scenario is shown below in Figure 7-6. The performance of Digital Services decreases slightly during the 10-year forecast period. Overall condition decreases slightly in this scenario, with assets in good to very good condition decreasing by 3%, ending at 51%.

7.4.4 Scenario Comparison & Infrastructure Gap

With the above information, Town staff can determine if there are gaps in funding to address infrastructure needs. This information will support future decision making on how to address any gaps. The investment needs under each of the three scenarios are shown below in Figure 7-7 and Table 7-6. Figure 7-7 shows a bar graph of the forecasted renewal, rehabilitation, and replacement expenditures for the proposed level of service targets/infrastructure needs according to scenario three, as well as any remaining lifecycle expenditures informed by the Town's anticipated budget. The bars in Figure 7-7 are colour coded by lifecycle activities. The solid and dashed lines represent the average annual investment needs of the three scenarios described above.

The scenario comparison highlights no gap to maintain current performance (condition) of assets or achieve proposed level of service targets and optimize the performance of assets based on lifecycle strategies compared to anticipated annual funding.

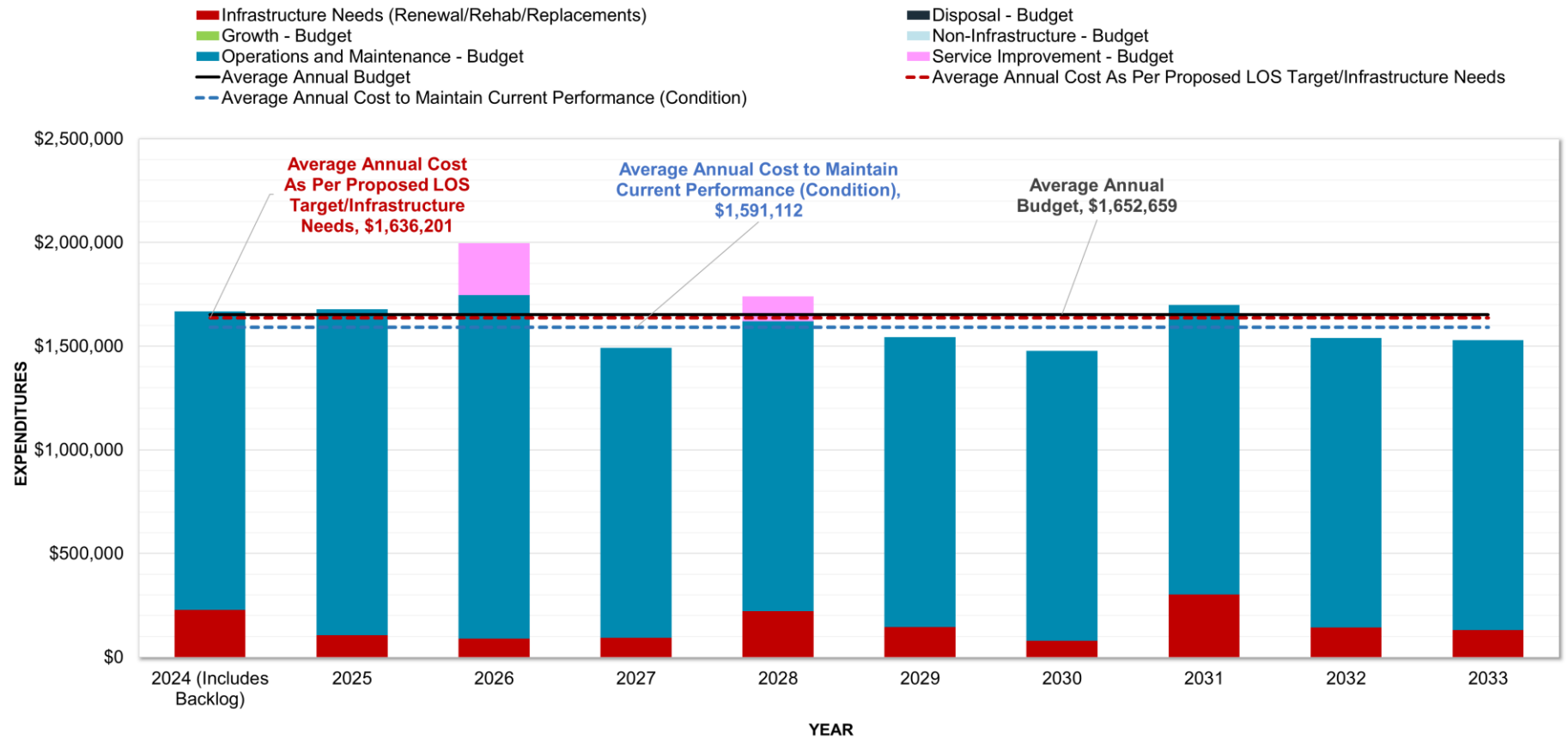


Figure 7-7. Digital Services Scenario Comparison



7.4.4.1 Forecasted Infrastructure Gap

The infrastructure gap is summarized below in Table 7-6. Current funding for capital budgets presented are the annual average of approved budgets (as of 2023) for the 2023-2033 fiscal years. The information and infrastructure needs within this AMP are based on best available information at the development of this plan. It is expected that this asset category will significantly change in the future as more information is made available on hardware and software assets.

Table 7-6. Current and Optimal Capital Funding and Funding Gap – Digital Services

Lifecycle Activity	Average Annual Budget	Average Annual Cost to Maintain Current LOS	Average Annual Cost As Per Proposed LOS Target/ Infrastructure Needs
Disposal	\$0	\$0	\$0
Growth	\$0	\$0	\$0
Non-Infrastructure	\$0	\$0	\$0
Operations & Maintenance	\$1,445,307	\$1,445,307	\$1,445,307
Renewal, Rehabilitation & Replacement	\$170,353	\$143,445	\$153,895
Service Improvement	\$37,000	\$37,000	\$37,000
Total	\$1,652,659	\$1,625,751	\$1,636,201
Average Annual Spending Gap		No Gap	No Gap
Percentage Increase Required to Address Gap		0%	0%

Although currently there is no gap for Digital Services, this is expected to change as the Town expands on its knowledge of this asset type to include all assets, and a more thorough analysis of the needs for infrastructure.

Digital Services is an integral part of the Town's operations for all departments, and there are increasing pressures on these assets to provide efficient service delivery for new technologies, as well as the security of all Town information.



7.5 Data Confidence and Improvement Plan

Table 7-7 outlines the main data sources and overall confidence in the data used for this AMP. Data confidence is based on how many assumptions needed to be made and the reliability of the data sources.

Table 7-7. Digital Services– Data Confidence

Asset Segment	Data Source	Data Confidence
Hardware	Spreadsheet	C
Software	Spreadsheet	D

7.5.1 Recommendations for Improvements

Opportunities for improvement include:

Hardware: Efforts were made to compile a register for hardware assets where information was available, this information needs to be updated to include information on install dates and continue to review replacement values as well as include in any assets that have not been included in the asset register at this time. Document processes and responsibilities for staff to maintain this information on an ongoing basis.

Software: Although software is a complicated asset to plan for, the information included in this register should be filled out for replacement/operating costs where applicable, and an assessment of software assets should be reviewed for asset management planning purposes. Continue to evolve how information on software is maintained and addressed within the Town and develop metrics and ways of determining software viability for the Town to ensure applications currently in use are meeting the needs of end users.



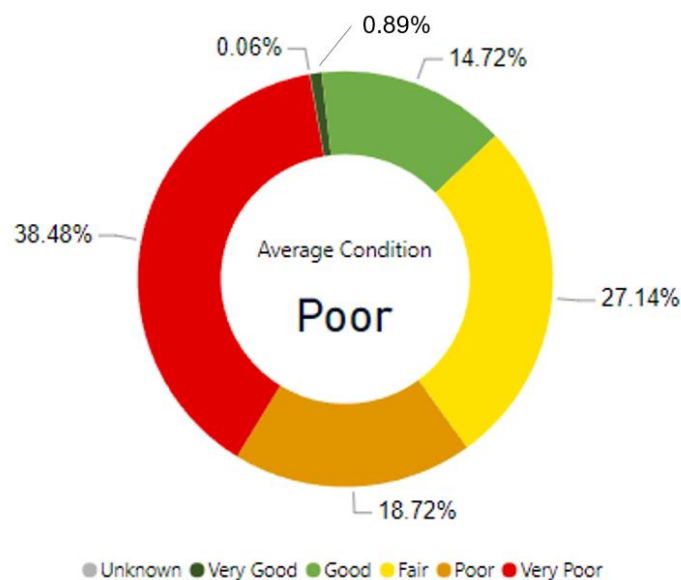
8.0 Emergency Services



Replacement Value

\$13,996,590

Overall Average Asset Condition



**Average Annual Gap to Meet
Current LOS (Performance)**

\$0.6 M

**Average Annual Gap to Meet
Proposed LOS (Performance)**

\$0.6 M

Asset Inventory

- 14 Fire Fleet units
- 1418 pieces of Fire Equipment

8 Emergency Services

Emergency Services is an essential part of community infrastructure, providing critical services that contribute to public safety, well-being, and resilience. They play important role in keeping the community safe through education, community engagement, and front-line service delivery. The Town of Fort Erie has five fire stations throughout the municipality, with Fire Fleet and Equipment that is used to support services.

8.1 State of the Infrastructure

8.1.1 Asset Valuation

Emergency Services has Fleet and Equipment assets with a total estimated replacement value of \$14M. The asset inventory and current estimated replacement value is shown in Table 8-1.

Table 8-1. Inventory and Current Replacement Value – Emergency Services

Asset Type	Count	Quantity Unit	2024 Estimated Replacement Value
Fire Equipment	1418	Units	\$1,796,590
Fire Fleet	14	Units	\$12,200,000
Total			\$13,996,590

8.1.2 Asset Condition

Asset condition is an important piece in asset management planning. Condition was assigned to assets in Emergency Services based on age/estimated service life. The condition rating scale is shown below in Table 6-2.

Table 8-2. Condition Rating Scale – Emergency Services

Condition	Age/ESL
Very Good	>80% life remaining
Good	60-80% life remaining
Fair	40-60% life remaining
Poor	20-40% life remaining
Very Poor	0-20% life remaining
Unknown	



Figure 8-1 and Figure 8-2 illustrate the condition distribution of the Town's Emergency Services assets.

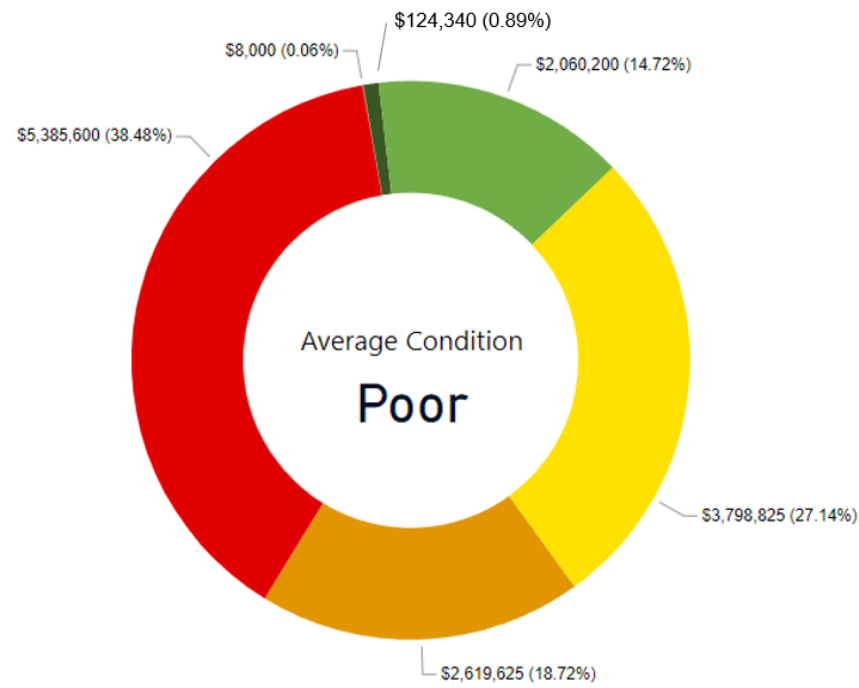


Figure 8-1. Overall Asset Condition (by Replacement Value) – Emergency Services

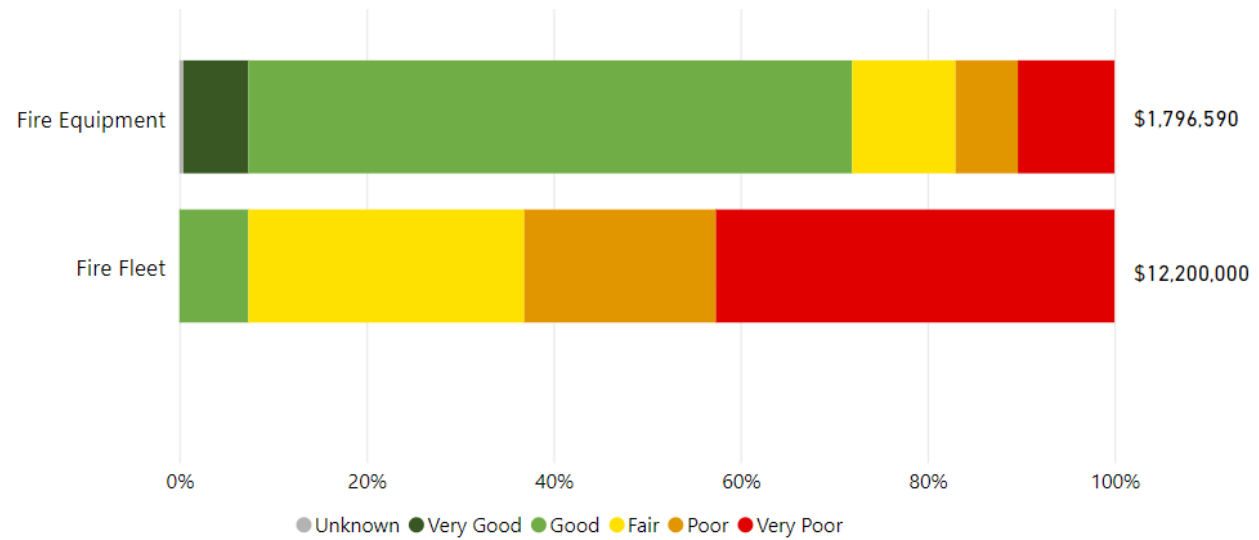


Figure 8-2. Asset Type Condition (by Replacement Value) – Emergency Services

The overall condition of Emergency Services assets is poor, with approximately 57% of assets in poor or worse condition. This average condition can be mostly accounted for from Fire Fleet assets, as seen in Figure 8-2 where approximately 63% of assets are in poor or worse condition. These assets have 40% or less remaining life and will be planned for replacement in upcoming capital plans.



8.1.3 Average Age

Comparing average asset age to average estimated service life is a tool to further analyze the health of the asset system. The average age and average estimated service life for Fire Equipment and Fleet is shown in Figure 8-3.

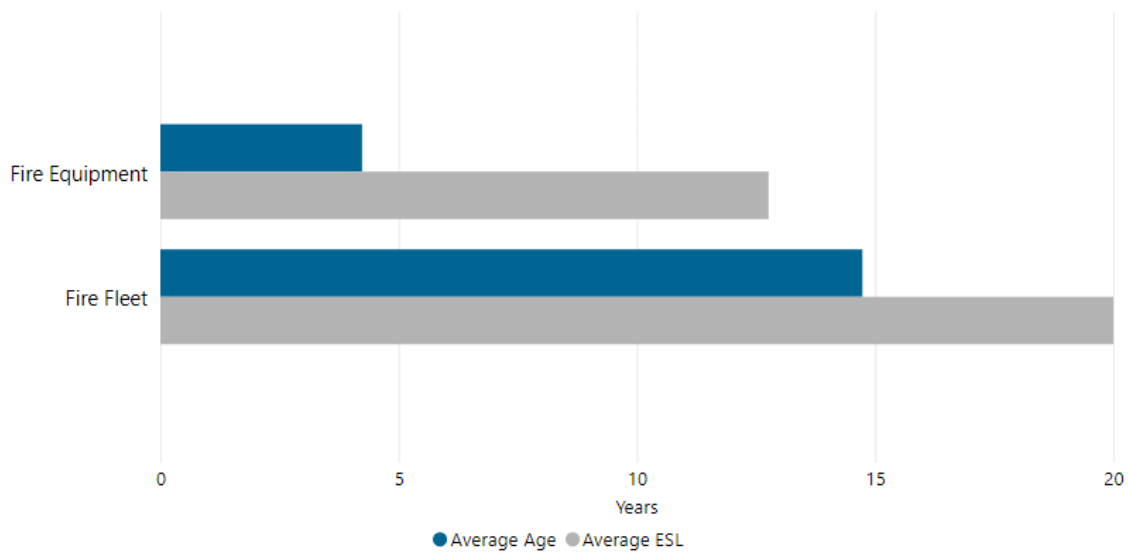


Figure 8-3. Average Age and Average Estimated Service Life – Emergency Services



8.2 Levels of Service

Service Statement: The Fort Erie Fire Departments mission is to safely; protect life, property, and the environment through the skilled and continued delivery of public education, fire prevention, and emergency response.

Levels of service metrics are a foundational part of the Town's Asset Management Strategy. It allows the Town to assess performance, identify areas for improvement and make informed decisions to better meet the needs of the community while optimizing resource allocation. Level of service metrics help municipalities promote accountability and transparency in municipal government. The Town has developed level of service metrics to align with community values and corporate priorities. There are metrics required by O.Reg. 588/17, and Town defined metrics. Customer and technical level of services metrics can be found below in Table 8-3 and Table 8-4.

The proposed LOS targets have been set by staff based on subject matter experts and through the development of the lifecycle management strategies discussed in the following section. Several factors and options were considered in the development of these targets, including costs, risks, and achievability. The differences between the current performance and proposed can be seen in the tables below.

The targets established for LOS represent the comprehensive approach required to minimize risks and lifecycle costs for the Town. The activities and strategies required to meet the proposed performance can be found in 8.3 Lifecycle Management Strategy, as well as the analysis of the impact to condition and costs used to determine the appropriate proposed (target) LOS. The proposed LOS are appropriate as they provide the best chance to avoid the risks associated with asset ownership. The risks associated with not meeting the proposed LOS can be significant and wide-ranging, which are further explained in 12.2.5 Risk Associated with Lifecycle Strategies and Levels of Service. Addressing these risks requires a proactive approach to infrastructure planning, investment, and management, as outlined in the lifecycle strategies.

The proposed LOS will only be achievable if the Town adopts financial strategies to close the infrastructure gap identified in this plan.



Table 8-3. Customer / Council Focused Level of Service Requirements – Emergency Services

Key Service Attribute	Performance Measure	Current Performance	Proposed Performance	Difference Between Current & Proposed
Cost Efficient	Cost to provide service (2024 Operating & Capital Budget/household)	\$183	\$183	

Table 8-4. Technical Focused Level of Service Requirements – Emergency Services

Key Service Attribute	Performance Measure	Current Performance	Proposed Performance	Difference Between Current & Proposed
Quality	Percentage of total replacement cost of assets in very poor condition	38.5%	21%	
Quality	Percentage of total replacement cost of assets past their estimated useful life	12.8%	0%	
Cost Efficient	Percent of annual reserve contribution meeting required reserve contribution based on the Reserve Policy	101% ¹⁰	100%	

¹⁰ This metric was calculated based on optimal reserve contribution based on a previously established asset replacement value, as per the Town's Capital Reserve Fund Policy. It is recommended that the replacement values used to calculate this metric be updated to reflect 2024 replacement values.



8.3 Lifecycle Management Strategy

The goal of our Asset Management Strategy is to establish and implement a series of planned activities, based on industry best practices. This will enable our assets to consistently provide a sustainable level of service to the residents of Fort Erie, while managing risk at the lowest lifecycle cost. The Town works to coordinate rehabilitation and replacement projects across asset groups where opportunities exist. This may result in asset strategies being delayed or advanced to accommodate the overall benefit of coordinated work across asset groups.

The Town continues to improve its approach to the management of its assets and will continue to put in place processes, procedures, and tools to enable a more consistent approach across the Town's Service Areas. Detailed below is an overview of some of the current asset management practices in place across the Town.

8.3.1 Lifecycle Activities

Lifecycle activities for Emergency Services involve processes and tasks aimed at managing the entire lifespan of an asset. Following these activities allows Emergency Services to continue to provide services efficiently, effectively, and sustainably through their lifecycle, maximizing the value they provide to the community. This approach aligns with best practices in asset management, where preventive maintenance and timely repairs are crucial for preserving the functionality, safety, and longevity of infrastructure assets.

By maintaining Emergency Services in optimal condition, the Town can provide services at the lowest possible cost by extending their lifespan and mitigate the risk of costly major repairs or premature replacement. It also ensures that residents continue to benefit from high-quality services offered by well-maintained Emergency Services infrastructure. Following the lifecycle activities and strategies also ensures the Town avoid the risks associated with asset ownership, which can be significant. These risks are further outlined in 12.2.5 Risk Associated with Lifecycle Strategies and Levels of Service. Completing lifecycle activities and following the strategies outlined in this plan can enhance the resilience and sustainability of infrastructure while minimizing potential risks.

The lifecycle activity categories include non-infrastructure, operations and maintenance, renewal/rehabilitation, disposal, and service improvement and growth. A description of each activity category can be found in Section 1.4.2.4. Specific asset management practices or planned actions as well as specific frequencies associated with these actions are outlined in Table 8-5.



Table 8-5. Asset Management Practices and Associated Risks – Emergency Services

Asset Management Practices/ Planned Actions	Frequency Associated with Practices / Planned Actions
Non-Infrastructure	
• Fire Master Plan	• 10 years
• Contingency Planning	• As required
• Other technical studies and assessments	• As required
Operations & Maintenance Activities	
• Planned maintenance (PM)	• As required
• Reactive maintenance	• As required
• Equipment inspections	• Daily; as regulated
• Purchase of personal protective and rescue equipment, small equipment, and materials	• As legislated or as required (10 years or less)
Renewal/Replacement Activities	
• Replacement	• End of service life as per strategy
• Spare fire fleet replacement	• Fleet is front run for first 15 years of service, then rotated to a spare for 5 years and decommissioned at 20 years
Disposal Activities	
• Sell off vehicles, fleet & equipment	• Opportunistically
Service Improvement & Growth Activities	
• New assets	• As per regulations
• Expansion or major renovation of existing facilities	• To improve LOS and not supported by growth. As identified through planning and studies
• Interior facility renovations; accessibility needs	• As required



8.4 Funding the Lifecycle Activities

The Town uses the lifecycle management strategies described above in Section 8.3 to plan work and determine future expenditure needs for Emergency Services assets. The activities, along with the scenarios below provide a framework of expenditures required for managing assets and ensuring the Town can meet the demands of current services and existing infrastructure.

All three scenarios consider only renewal, rehabilitation and replacement lifecycle activity costs and needs. These lifecycle activities ensure infrastructure remains in a state of good repair and can continue to provide services to residents. Further details of the funding required for the remaining lifecycle activities (non-infrastructure, service improvements, operations and maintenance, and growth) have been accounted for in the Scenario Comparison, found below in Section 8.4.4, which are based on the operating and capital budgets for the Town.

For the purposes of this AMP, these activities, and their costs, are assumed to be enough to meet the community's expectations. This AMP does not provide an analysis on optimizing these activities and costs. Growth needs are captured based on the planned projects that are funded through development charges or are activities to address the growing Town population.

8.4.1 Scenario 1: Cost to Maintain Current Performance (Level of Service)

Scenario one calculates the approximate annual cost of the renewal, rehabilitation and replacement activities required to maintain assets in a similar performance (condition) as their current state. This is used to determine the annual cost to provide the current level of service for Emergency Services (as mandated by O.Reg. 588/17).

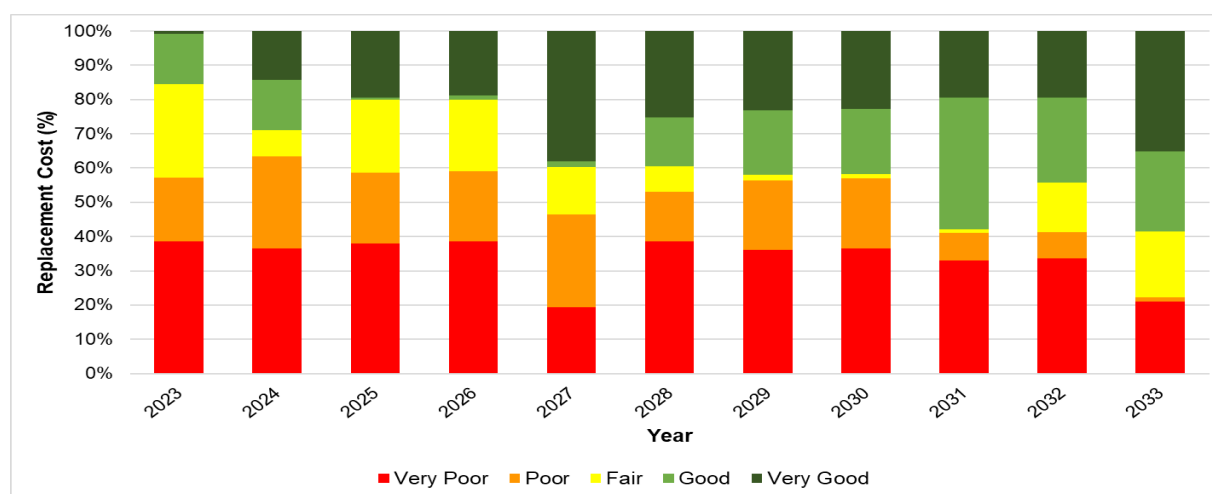


Figure 8-4. Emergency Services Performance Forecast to Maintain Levels of Service



It was determined that an annual budget of \$1.1 million for renewal, rehabilitation and replacement activities is needed to maintain performance for Emergency Services. There is a funding gap of approximately 560,000 compared the anticipated funding levels. The performance forecast for scenario one is shown in Figure 8-4. Overall performance increases in this scenario with assets in good to very good condition increasing by 43%, ending at 59%.

8.4.2 Scenario 2: Current Funding

Scenario two looks at the impact of current anticipated funding on the asset performance (condition) over the 10-year forecast period. The anticipated annual funding for renewal, rehabilitation and replacement activities for Emergency Services is \$555,000. The condition distribution for the anticipated funding scenario is shown below in Figure 8-5. Overall condition decreases in this scenario with assets in very poor condition increasing by 27% ending the forecast period at 66%.

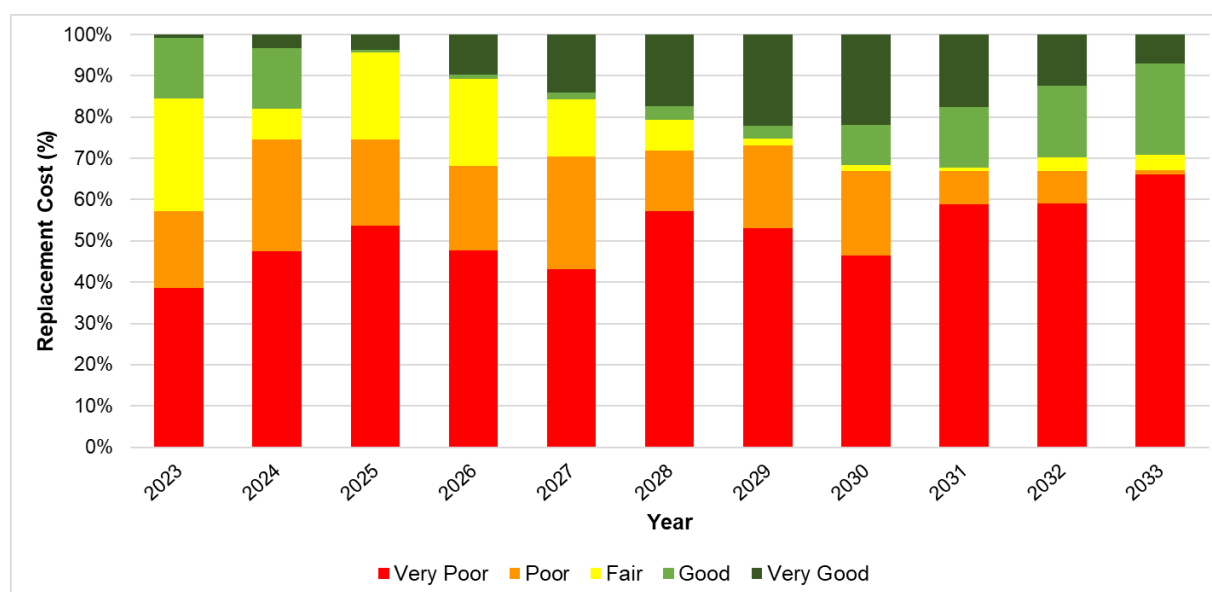


Figure 8-5. Emergency Services Performance Forecast with Current Funding

8.4.3 Scenario 3: Proposed LOS Target/Infrastructure Needs Assessment

Scenario three calculates the average budget needed to achieve the proposed levels of service, which has been determined using infrastructure needs as per lifecycle strategies. The lifecycle strategies were developed in consultation with Town staff, and using industry best practices for the renewal, rehabilitation, and replacement activities. The renewal, rehabilitation, and replacement activities listed above in Table 8-5 have been used to develop the strategies for the infrastructure needs and include the lifecycle activities that need to be undertaken to achieve the proposed levels of service. Following the infrastructure needs and



maintaining assets as prescribed in this AMP will provide the lowest lifecycle cost. This scenario is mandated by O.Reg. 588/17.

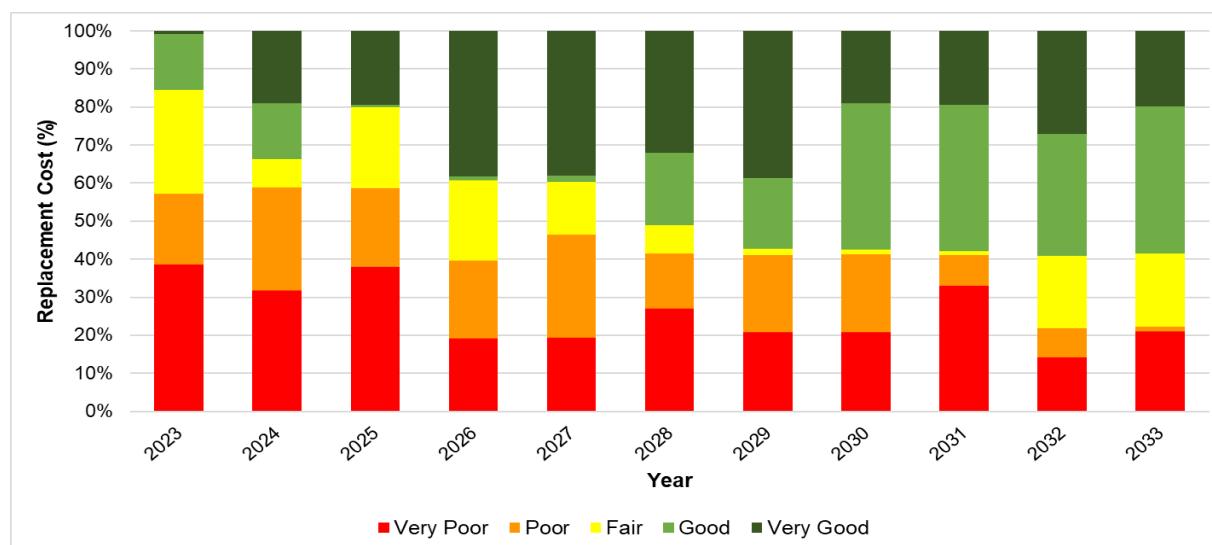


Figure 8-6. Emergency Services Performance Forecast with Proposed Level of Service Targets/Infrastructure Needs as per Lifecycle Strategies

It was determined that a budget of \$1.1 million for renewal, rehabilitation and replacement activities is needed to achieve the proposed levels of service. There is a funding gap of approximately \$563,000 compared to current anticipated funding levels. The performance forecast for this scenario is shown below in Figure 8-6. The performance of Emergency Services increases during the 10-year forecast period. Assets in good to very good condition start at 16% and increase to 59% at the end of the forecast.

8.4.4 Scenario Comparison & Infrastructure Gap

With the above information, Town staff can determine if there are gaps in funding to address infrastructure needs. This information will support future decision making on how to address any gaps. The investment needs under each of the three scenarios are shown below in Figure 8-7 and Table 8-6. Figure 8-7 shows a bar graph of the forecasted renewal, rehabilitation, and replacement expenditures for the proposed level of service targets/infrastructure needs according to scenario three, as well as any remaining lifecycle expenditures informed by the Town's anticipated budget. The bars in Figure 8-7 are colour coded by lifecycle activities. The solid and dashed lines represent the average annual investment needs of the three scenarios described above.

The scenario comparison highlights a gap of approximately \$563,000 to maintain current performance (condition) of assets and a gap of \$563,000 to achieve proposed level of service targets and optimize the performance of assets based on lifecycle strategies compared to anticipated annual funding.

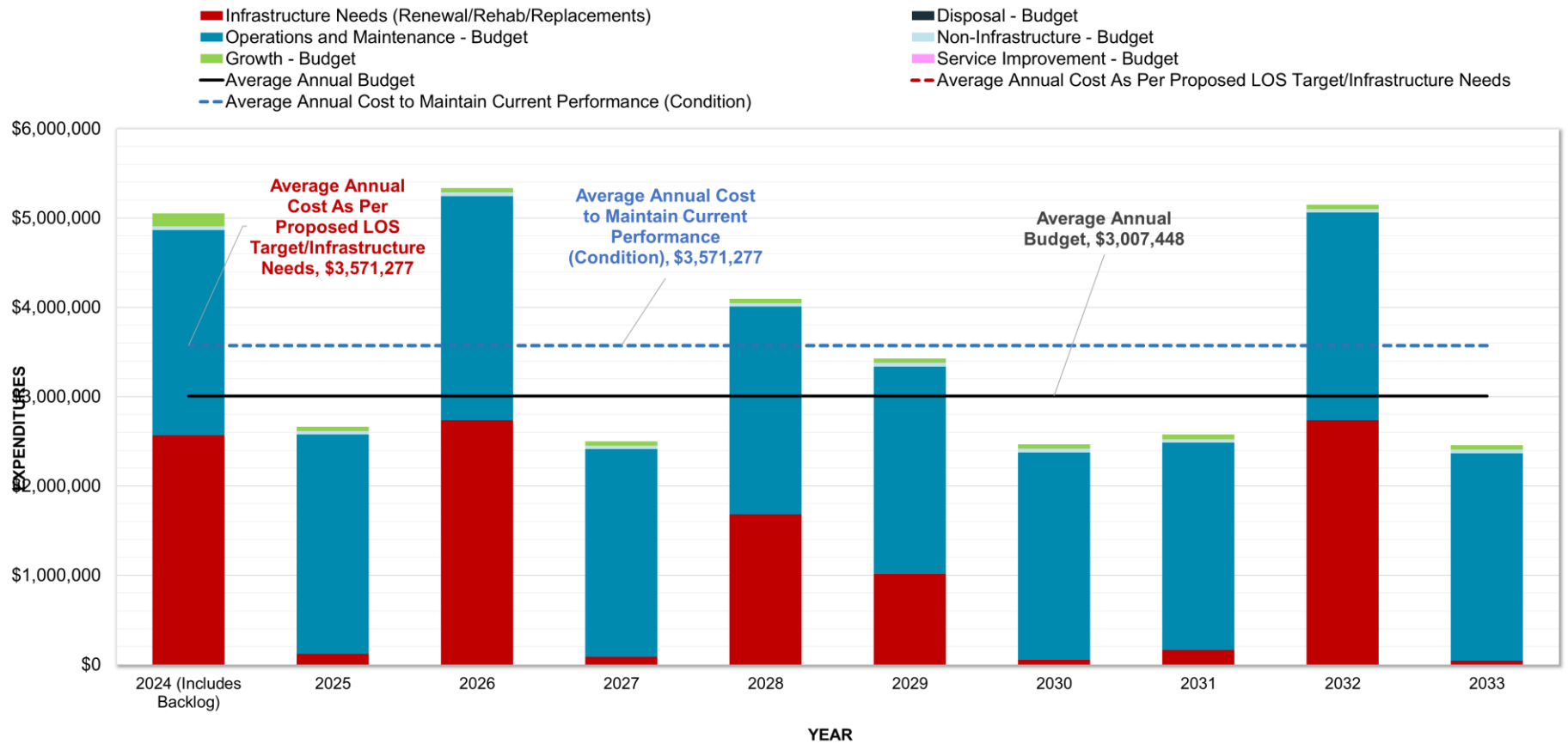


Figure 8-7. Emergency Services Scenario Comparison



The backlog is also highlighted in Figure 8-7 in the year 2024. The backlog represents renewal, rehabilitation, and replacement activities that have been identified as necessary but have not yet been completed. Continuing to defer renewals creates a risk of higher financial costs, potential decreased availability, and potential decreased satisfaction with asset performance.

Continuing to delay renewals may put the Town at risk for intergenerational inequality. Future generations may not be able to maintain the levels of service customers currently enjoy. Continued project deferrals can also lead to higher operational and maintenance costs, potentially limiting the availability of services in the future. Timely and adequately funded renewals and replacements will ensure that assets continue to remain functional and reliable into the future, at the lowest possible cost.

8.4.4.1 Forecasted Infrastructure Gap

The infrastructure gap is summarized below in Table 8-6. Current funding for capital budgets presented are the annual average of approved budgets (as of 2023) for the 2023-2033 fiscal years.

Table 8-6. Current and Optimal Capital Funding and Funding Gap – Emergency Services

Lifecycle Activity	Average Annual Budget	Average Annual Cost to Maintain Current LOS	Average Annual Cost As Per Proposed LOS Target/ Infrastructure Needs
Disposal	\$0	\$0	\$0
Growth	\$58,455	\$58,455	\$58,455
Non-Infrastructure	\$40,000	\$40,000	\$40,000
Operations & Maintenance	\$2,353,793	\$2,353,793	\$2,353,793
Renewal, Rehabilitation & Replacement	\$555,200	\$1,119,029	\$1,119,029
Service Improvement	\$0	\$0	\$0
Total	\$3,007,448	\$3,571,277	\$3,571,277
Average Annual Spending Gap		\$563,829	\$563,829
Percentage Increase Required to Address Gap		19%	19%



8.5 Data Confidence and Improvement Plan

Table 8-7 outlines the main data sources and overall confidence in the data used for this AMP. Data confidence is based on how many assumptions needed to be made and the reliability of the data sources.

Table 8-7. Data Confidence – Emergency Services

Asset Segment	Data Source	Data Confidence
Fire Equipment	Emergency Reporting (Emergency Services Software)	B
Fire Fleet	Emergency Reporting (Emergency Services Software)	A

8.5.1 Recommendations for Improvements

Opportunities for Improvement Include:

Fire Equipment: Information on fire equipment was updated for the purposes of this AMP to include updated replacement values and fill in gaps where applicable. It is recommended that Emergency Services continue their efforts to keep this information updated on an ongoing basis to ensure that relevant replacement values are used to inform asset planning decisions.

Fire Fleet: Through the implementation of the maintenance management software, it is recommended to determine how maintenance records can be used to further inform condition of fleet assets. It is also recommended to continue to update this inventory and ensure adequate replacement values are used for asset planning decisions.

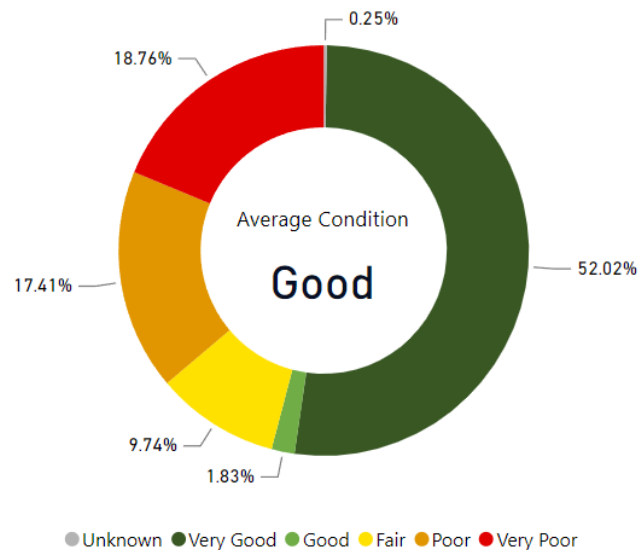


9.0 Facilities

Replacement Value

\$214,221,386

Overall Average Asset Condition



**Average Annual Gap to Meet
Current LOS (Performance)**

No Gap

**Average Annual Gap to Meet
Proposed LOS (Performance)**

\$0.1 M

Asset Inventory

- 45 buildings supporting various services across the Town

9 Facilities

Facilities in the Town of Fort Erie provides services across the community through Culture and Recreation which provides spaces for community gathering, Fire Stations which support safety, and administration and operations which serve as municipal work sites and areas for residents to access Town services. The proper management of Facilities through their entire lifespan ensures they can continue to offer benefits to Town residents and visitors.

9.1 State of the Infrastructure

9.1.1 Asset Valuation

Facilities has 45 buildings across five different service delivery groups with a total estimated replacement value of \$214M. The asset inventory and current estimated replacement value is shown in Table 9-1.

Table 9-1. Inventory and Current Replacement Value – Facilities

Facility Name	Total Square Feet	2024 Estimated Replacement Value
Centennial Library	16,000	\$9,371,420
Central Fire Station	13,340	\$8,712,311
CN B-1 Station	814	\$542,872
Crystal Ridge Arena	28,000	\$12,384,649
Crystal Ridge Community Centre	17,000	\$11,337,621
Crystal Ridge Library	6,000	\$3,514,282
Fire Station 3	12,000	\$7,719,453
Fire Station 4	4,500	\$2,894,795
Fire Station 5	7,500	\$4,824,658
Fire Station 6	5,500	\$3,538,083
Fire Station 4 (new) ¹¹	11,388	\$7,325,761

¹¹ This building was not included in the Building Condition Assessments completed in 2018, and further information other than size and replacement value was not available at the time of the development of this AMP, and therefore not included in the analysis in the remainder of this chapter. It is recommended when the Town updates the BCA to include all buildings listed in this plan.



Facility Name	Total Square Feet	2024 Estimated Replacement Value
GTR Station Museum	1,028	\$685,593
JL Gibson Operations Centre	22,855	\$12,438,772
Gibson Storage Building	7,300	\$2,182,000
Leisureplex	128,000	\$56,615,540
Ridge Road Historical Museum	4,746	\$3,165,197
Stevensville Hall (Includes Library Within)	9,500	\$6,335,730
Town Hall	38,000	\$25,736,849
EJ Freeland Community Centre	41,700	\$29,190,000
Bay Beach Admission Booth ¹²	350	\$70,000
Bay Beach Pavilion ¹²	1,056	\$105,600
Bay Beach Washroom ¹²	1,798	\$899,000
Bertie Centennial Clubhouse ¹²	1,920	\$768,000
Bertie Centennial Pavilion ¹²	760	\$76,000
Bill Connolly Clubhouse ¹²	2,600	\$1,040,000
Crystal Ridge Park Pavilion ¹²	1,152	\$115,200
Lions Field Pavilion ¹²	192	\$19,200
Municipal Park Pavilion ¹²	254	\$25,400
Oakes Park Office Building ¹²	900	\$360,000
Oakes Park Storage Shed ¹²	400	\$100,000
Oakes Park Washroom ¹²	435	\$217,500
Optimist Park Pavilion ¹²	816	\$81,600
Ott Rd. Park Clubhouse ¹²	1,060	\$424,000
Queen Circle Pavilion ¹²	314	\$31,400

¹² These buildings were not assessed in the previous BCA, so have not been included in the analysis of this AMP. It is recommended the next iteration of the BCA include these facilities.



Facility Name	Total Square Feet	2024 Estimated Replacement Value
Ridgeway Battlefield Pavilion¹²	1,560	\$156,000
Stevensville Memorial Pavilion¹²	415	\$41,500
Stevensville Memory Pavilion¹²	254	\$25,400
Stevensville Mini Park Pavilion¹²	720	\$72,000
Tennis Club Pavilion¹²	400	\$40,000
Tennis Clubhouse¹²	1,100	\$440,000
Trans Canada Pavilion¹²	144	\$14,400
Village Square Pavilion¹²	1,386	\$138,600
Waterfront Park Pavilion¹²	690	\$69,000
Waterfront Park Washroom¹²	470	\$188,000
Waverly Beach Washroom¹²	470	\$188,000
Total		\$214,221,386

The summary in Table 9-1 presents the replacement values of the Town's facilities based on updated square footage replacement costs. It's important to note that these values are not a direct aggregation of the replacement costs for the individual components of the facilities. The overall cost to replace an entire facility is higher than the sum of replacing each component separately. This higher cost considers factors such as demolition, land acquisition, and other complexities that may arise when replacing an entire facility rather than its parts. It is recommended that the Town continue to evaluate these costs in the future.

Subsequent sections of the analysis focus on component-level data. This data is derived from Building Condition Assessments (BCAs), which provide detailed evaluations of the condition and replacement needs of individual facility components. By analyzing at the component level, a more granular and accurate understanding of rehabilitation and replacement priorities can be achieved, informing more effective facility management and budget allocation strategies. As noted above, many of the smaller buildings and structures (i.e. Washrooms, pavilions) were not included in the 2018 BCA, and therefore not included in the analysis below. It is recommended that the Town include these in the planned update to the BCA.

Facilities have been grouped into Administration, Culture, Emergency Services, Operations and Recreation.

9.1.2 Asset Condition

Asset condition is an important piece in asset management planning. Condition was assigned to Facilities based on age/estimated remaining life. The condition rating scale is shown below in Table 9-2. Although the BCA was completed in 2018, the data derived from this assessment was updated to reflect the current age and remaining life of the components within the facilities.

Table 9-2. Condition Rating Scale – Facilities

Condition	Age/ESL
Very Good	>80% life remaining
Good	60-80% life remaining
Fair	40-60% life remaining
Poor	20-40% life remaining
Very Poor	0-20% life remaining
Unknown	

Figure 9-1 and Figure 9-2 show the condition profile for Facilities assets.

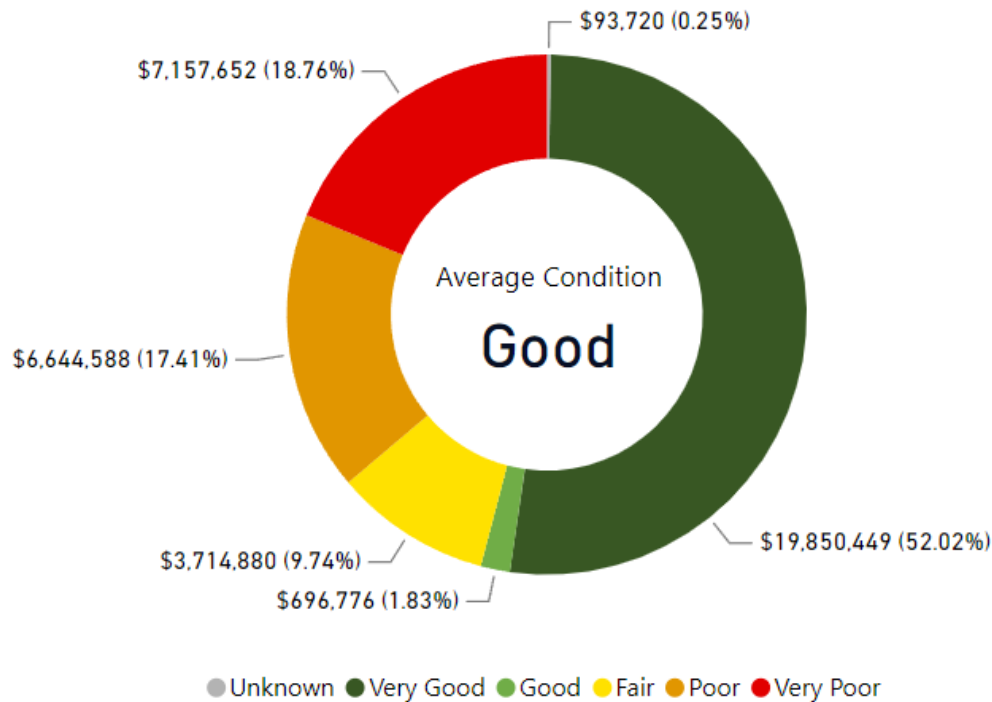


Figure 9-1. Overall Asset Condition (by Replacement Value) - Facilities

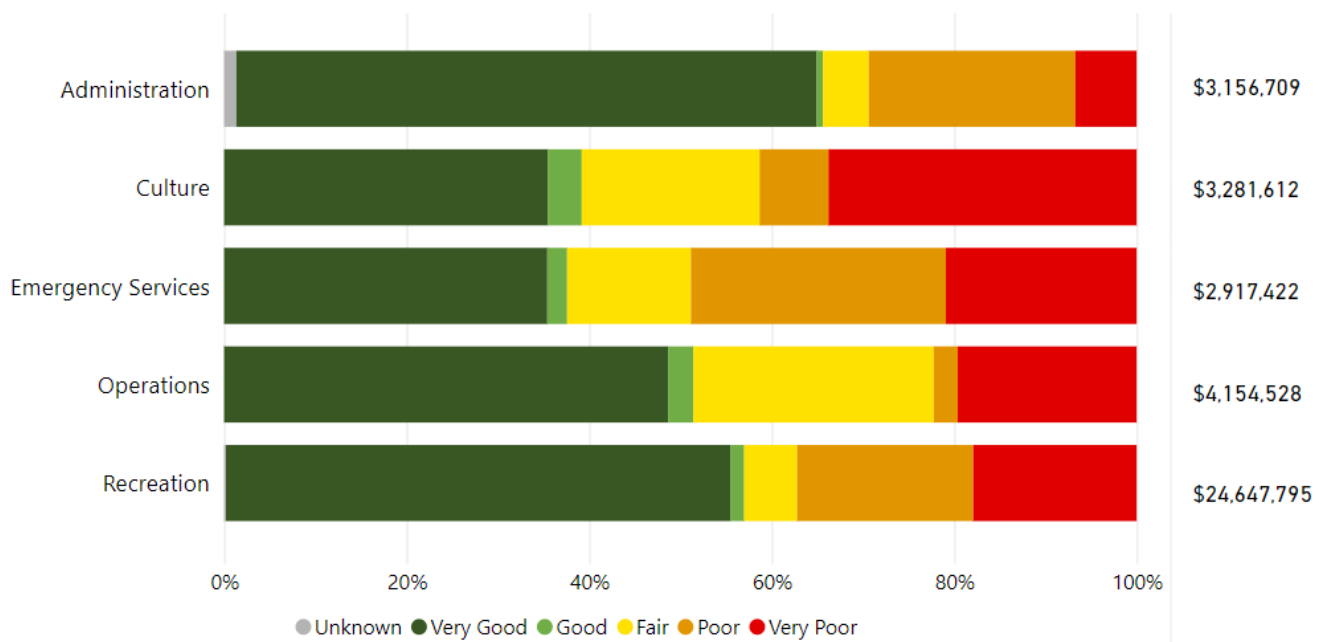


Figure 9-2. Asset Type Condition (by Replacement Value) – Facilities

The average condition of Facilities is fair, with approximately 63% of assets in fair or better condition. A small portion (just over 1%) of Administration facility components have an unknown condition.

9.1.3 Average Age

Comparing average asset age to average estimated service life is a tool to further analyze the health of the asset system. The average age and average estimated service life for Facilities assets is shown in Figure 9-3.

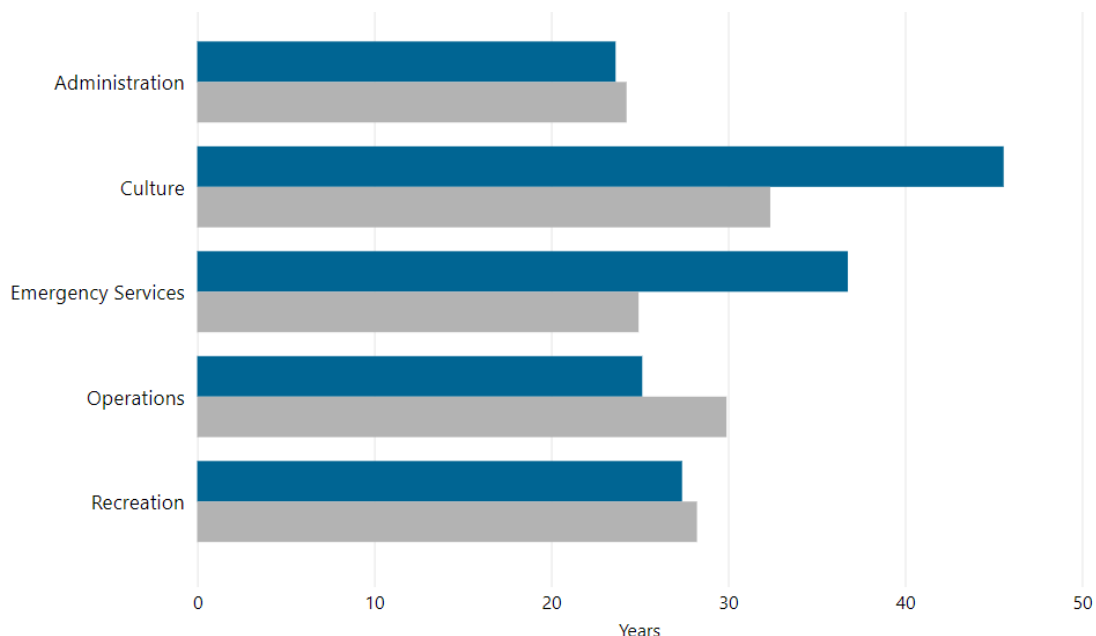


Figure 9-3. Average Age and Average Estimated Service Life - Facilities



9.2 Levels of Service

Service Statement: Efficiently providing high quality, safe, accessible, and energy efficient facilities for the community.

Levels of service metrics are a foundational part of the Town's Asset Management Strategy. It allows the Town to assess performance, identify areas for improvement and make informed decisions to better meet the needs of the community while optimizing resource allocation. Level of service metrics help municipalities promote accountability and transparency in municipal government. The Town has developed level of service metrics to align with community values and corporate priorities. There are metrics required by O. Reg. 588/17, and Town defined metrics. Customer and technical level of services metrics can be found below in Table 9-3 and Table 9-4.

The proposed LOS targets have been set by staff based on subject matter experts and through the development of the lifecycle management strategies discussed in the following section. Several factors and options were considered in the development of these targets, including costs, risks, and achievability. The differences between the current performance and proposed can be seen in the tables below.

The targets established for LOS represent the comprehensive approach required to minimize risks and lifecycle costs for the Town. The activities and strategies required to meet the proposed performance can be found in 9.3 Lifecycle Management Strategy, as well as the analysis of the impact to condition and costs used to determine the appropriate proposed (target) LOS. The proposed LOS are appropriate as they provide the best chance to avoid the risks associated with asset ownership. The risks associated with not meeting the proposed LOS can be significant and wide-ranging, which are further explained in 12.2.5 Risk Associated with Lifecycle Strategies and Levels of Service. Addressing these risks requires a proactive approach to infrastructure planning, investment, and management, as outlined in the lifecycle strategies.

The proposed LOS will only be achievable if the Town adopts financial strategies to close the infrastructure gap identified in this plan.



Table 9-3. Customer / Council Focused Level of Service Requirements – Facilities

Key Service Attribute	Performance Measure	Current Performance	Proposed Performance	Difference Between Current & Proposed
Cost Efficient	Cost to provide service (2024 Operating & Capital Budget/sqft)	\$30/sq ft	\$30/sq ft	

Table 9-4. Technical Focused Level of Service Requirements – Facilities

Key Service Attribute	Performance Measure	Current Performance	Proposed Performance	Difference Between Current & Proposed
Cost Efficient	Percent of annual reserve contribution meeting required reserve contribution based on the Reserve Policy	58% ¹³	100%	
Quality	Percentage of replacement cost of assets in poor to very poor condition	40.62%	40%	

¹³ This metric was calculated based on optimal reserve contribution based on a previously established asset replacement value, as per the Town's Capital Reserve Fund Policy. It is recommended that the replacement values used to calculate this metric be updated to reflect 2024 replacement values.



9.3 Lifecycle Management Strategy

The goal of our Asset Management Strategy is to establish and implement a series of planned activities, based on industry best practices. This will enable our assets to consistently provide a sustainable level of service to the residents of Fort Erie, while managing risk at the lowest lifecycle cost. The Town works to coordinate rehabilitation and replacement projects across asset groups where opportunities exist. This may result in asset strategies being delayed or advanced to accommodate the overall benefit of coordinated work across asset groups.

The Town continues to improve its approach to the management of its assets and will continue to put in place processes, procedures, and tools to enable a more consistent approach across the Town's Service Areas. Detailed below is an overview of some of the current asset management practices in place across the Town.

9.3.1 Lifecycle Activities

Lifecycle activities for Facilities involve processes and tasks aimed at managing the entire lifespan of an asset. Following these activities allows Facilities to continue to provide services efficiently, effectively, and sustainably through their lifecycle, maximizing the value they provide to the community. This approach aligns with best practices in asset management, where preventive maintenance and timely repairs are crucial for preserving the functionality, safety, and longevity of infrastructure assets.

By maintaining Facilities in optimal condition, the Town can provide services at the lowest possible cost by extending their lifespan and mitigate the risk of costly major repairs or premature replacement. It also ensures that residents continue to benefit from high-quality services offered by well-maintained Facilities infrastructure. Following the lifecycle activities and strategies also ensures the Town avoid the risks associated with asset ownership, which can be significant. These risks are further outlined in 12.2.5 Risk Associated with Lifecycle Strategies and Levels of Service. Completing lifecycle activities and following the strategies outlined in this plan can enhance the resilience and sustainability of infrastructure while minimizing potential risks.

The lifecycle activity categories include non-infrastructure, operations and maintenance, renewal/rehabilitation, disposal, and service improvement and growth. A description of each activity category can be found in Section 1.4.2.4. Specific asset management practices or planned actions as well as specific frequencies associated with these actions are outlined in Table 9-5.



Table 9-5. Asset Management Practices and Associated Risks – Facilities

Asset Management Practices/ Planned Actions	Frequency Associated with Practices / Planned Actions
Non-Infrastructure	
• Condition assessment	• 10 years
• Asset management plan	• Every 5 years
• Energy audit	• As required
• Asbestos survey	• As required
• AODA assessment	• As required
• Other technical studies (structural assessment, roof assessment, etc.)	• As required
Operations & Maintenance Activities	
• Inspections	• As required (H&S, maintenance, internal, etc.)
• Planned maintenance (HVAC, etc.)	• As required
• Reactive maintenance	• Daily
• Service request response	• Daily
• Cleaning	• Daily
• Ice maintenance	• As required
• Equipment maintenance	• As required
• Security	• As required
• Public event/private function	• As required
• Snow removal	• Seasonally
• Horticulture	• Seasonally
• Facility site maintenance	• As required



Asset Management Practices/ Planned Actions	Frequency Associated with Practices / Planned Actions
• Waste removal	• As required
• Seasonal ice setup and removal	• Seasonally
• Holiday setup	• Seasonally
• Minor renovations	• As required
Renewal/Replacement Activities	
• Replacement of major components	• As identified in studies
Disposal Activities	
• Dispose of assets in line with replacements	• As required
Service Improvement & Growth Activities	
• New assets for developments to service growth	• As needed
• New assets as part of service improvement	• As identified in studies



9.4 Funding the Lifecycle Activities

The Town uses the lifecycle management strategies described above in Section 9.3 to plan work and determine future expenditure needs for Facilities assets. The activities, along with the scenarios below provide a framework of expenditures required for managing assets and ensuring the Town can meet the demands of current services and existing infrastructure.

All three scenarios consider only renewal, rehabilitation and replacement lifecycle activity costs and needs. These lifecycle activities ensure infrastructure remains in a state of good repair and can continue to provide services to residents. Further details of the funding required for the remaining lifecycle activities (non-infrastructure, service improvements, operations and maintenance, and growth) have been accounted for in the Scenario Comparison, found below in Section 9.4.4, which are based on the operating and capital budgets for the Town.

For the purposes of this AMP, these activities, and their costs, are assumed to be enough to meet the community's expectations. This AMP does not provide an analysis on optimizing these activities and costs. Growth needs are captured based on the planned projects that are funded through development charges or are activities to address the growing Town population.

9.4.1 Scenario 1: Cost to Maintain Current Performance (Level of Service)

Scenario one calculates the approximate annual cost of the renewal, rehabilitation and replacement activities required to maintain assets in a similar performance (condition) as their current state. This is used to determine the annual cost to provide the current level of service for Facilities (as mandated by O.Reg. 588/17).

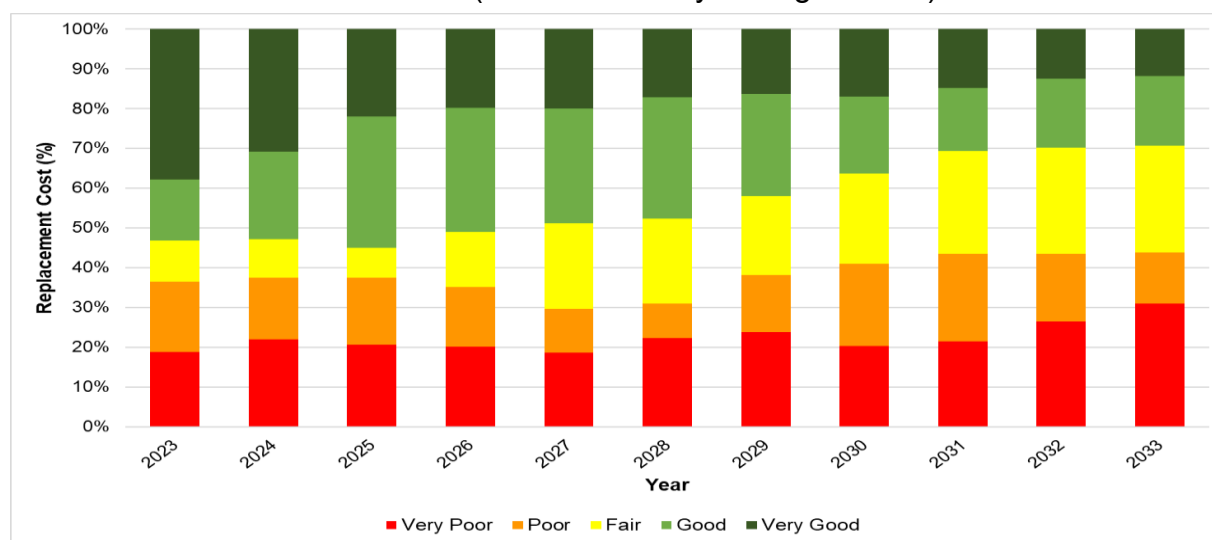


Figure 9-4. Facilities Performance Forecast to Maintain Levels of Service



It was determined that an annual budget of \$1.8 million for renewal, rehabilitation and replacement activities is needed to maintain performance for Facilities. There is a funding gap of approximately \$780,000 compared the anticipated funding levels. The performance forecast for scenario one is shown in Figure 9-4. The performance of Facilities assets decreases in this scenario. Assets in good to very good condition decreases by 24%, ending at 29% at the end of the forecast period.

9.4.2 Scenario 2: Current Funding

Scenario two looks at the impact of current anticipated funding on the asset performance (condition) over the 10-year forecast period. The anticipated annual funding for renewal, rehabilitation and replacement activities for Facilities is \$1 million. The condition distribution for the anticipated funding scenario is shown below in Figure 9-5. The overall condition decreases in this scenario with assets in good to very good condition decreasing by 25%, ending at 28%.

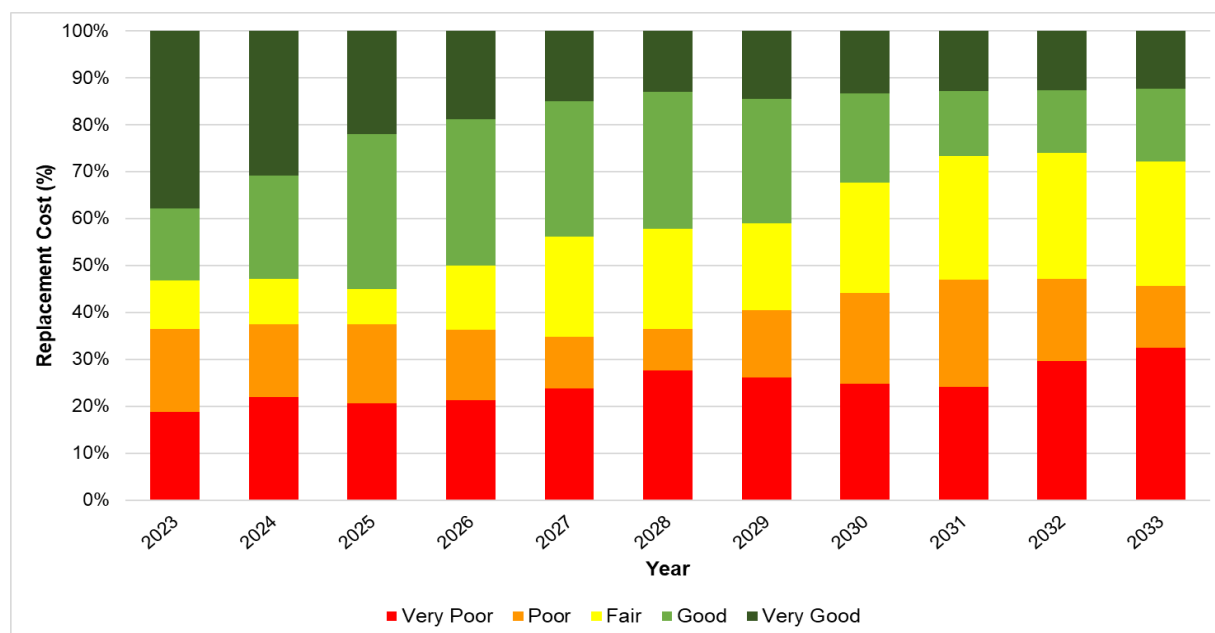


Figure 9-5. Facilities Performance Forecast with Current Funding

9.4.3 Scenario 3: Proposed LOS Target/Infrastructure Needs Assessment

Scenario three calculates the average budget needed to achieve the proposed levels of service, which has been determined using infrastructure needs as per lifecycle strategies. The lifecycle strategies were developed in consultation with Town staff, and using industry best practices for the renewal, rehabilitation, and replacement activities. The renewal, rehabilitation, and replacement activities listed above in Table 9-5 have been used to develop the strategies for the infrastructure needs and include the lifecycle activities that need to be undertaken to achieve the proposed levels of service. Following the infrastructure needs and



maintaining assets as prescribed in this AMP will provide the lowest lifecycle cost. This scenario is mandated by O.Reg. 588/17.

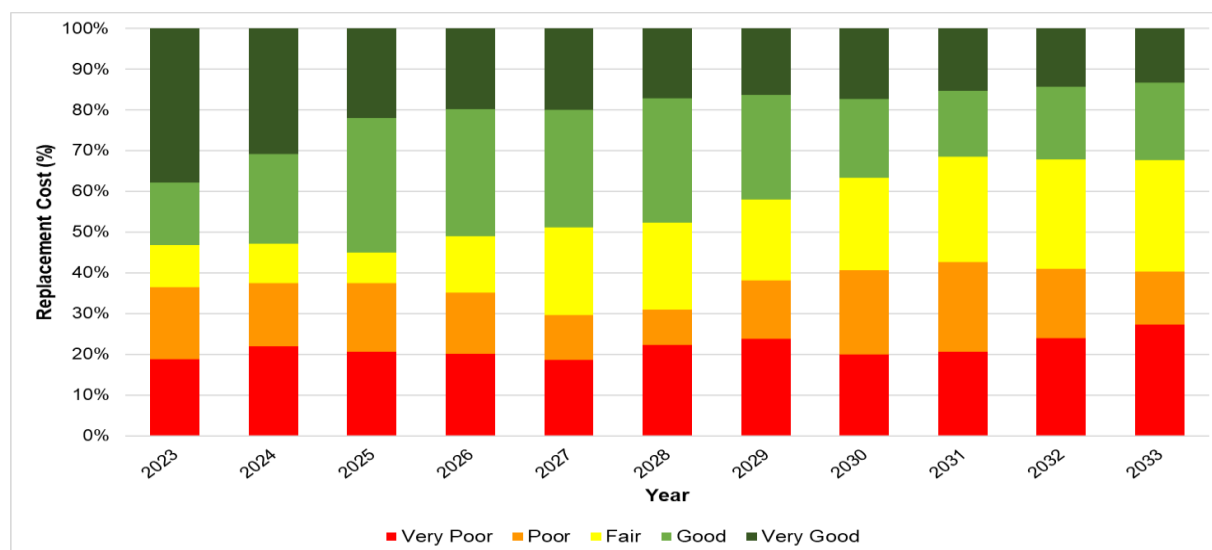


Figure 9-6. Facilities Performance Forecast with Proposed Level of Service Targets/Infrastructure Needs as per Lifecycle Strategies

It was determined that a budget of \$1.2 million for renewal, rehabilitation and replacement activities is needed to achieve the proposed levels of service. There is a funding gap of approximately \$146,000 compared to current anticipated funding levels. The performance forecast for this scenario is shown below in Figure 9-6. The performance of Facilities decreases slightly during the 10-year forecast period. Assets in good to very good condition start at 53% and decrease to 32% at the end of the forecast.

9.4.4 Scenario Comparison & Infrastructure Gap

With the above information, Town staff can determine if there are gaps in funding to address infrastructure needs. This information will support future decision making on how to address any gaps. The investment needs under each of the three scenarios are shown below in Figure 9-7 and Table 9-6. Figure 9-7 shows a bar graph of the forecasted renewal, rehabilitation, and replacement expenditures for the proposed level of service targets/ infrastructure needs according to scenario three, as well as any remaining lifecycle expenditures informed by the Town's anticipated budget. The bars in Figure 9-7 are colour coded by lifecycle activities. The solid and dashed lines represent the average annual investment needs of the three scenarios described above.

The scenario comparison highlights a gap of approximately \$778,000 to maintain current performance (condition) of assets and a gap of \$2.2 million to achieve proposed level of service targets and optimize the performance of assets based on lifecycle strategies compared to anticipated annual funding.

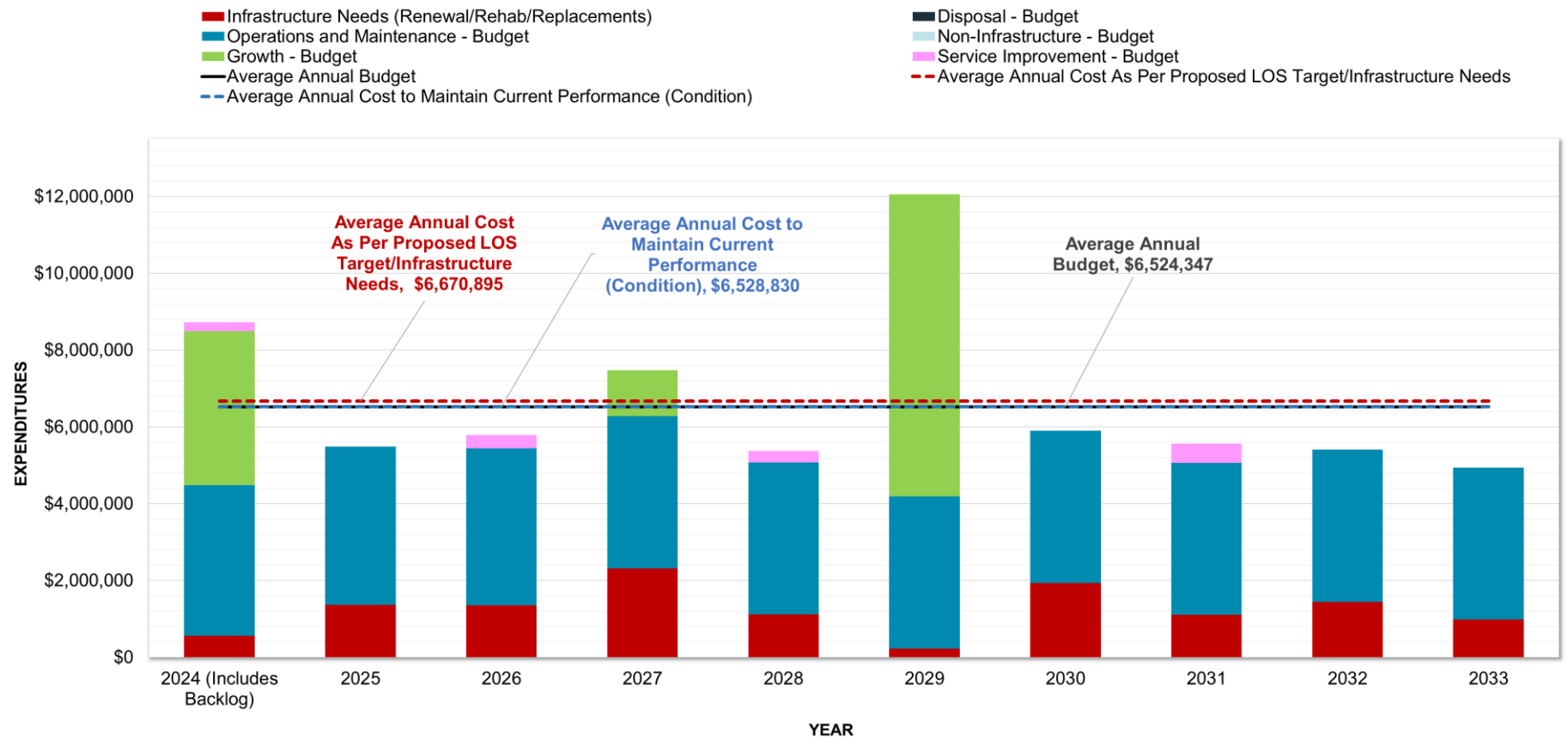


Figure 9-7. Facilities Scenario Comparison



9.4.4.1 Forecasted Infrastructure Gap

The infrastructure gap is summarized below in Table 9-6. Current funding for capital budgets presented are the annual average of approved budgets (as of 2023) for the 2023-2033 fiscal years.

Table 9-6. Current and Optimal Capital Funding and Funding Gap - Facilities

Lifecycle Activity	Average Annual Budget	Average Annual Cost to Maintain Current LOS	Average Annual Cost As Per Proposed LOS Target/ Infrastructure Needs
Disposal	\$0	\$0	\$0
Growth	\$1,307,300	\$1,307,300	\$1,307,300
Non-Infrastructure	\$0	\$0	\$0
Operations & Maintenance	\$3,984,847	\$3,984,847	\$3,984,847
Renewal, Rehabilitation & Replacement	\$1,093,500	\$1,097,983	\$1,240,047
Service Improvement	\$138,700	\$138,700	\$138,700
Total	\$6,524,347	\$6,528,830	\$6,670,895
Average Annual Spending Gap		\$4,483	\$146,547
Percentage Increase Required to Address Gap		0%	2%



9.5 Data Confidence and Improvement Plan

Table 9-7 outlines the main data sources and overall confidence in the data used for this AMP. Data confidence is based on how many assumptions needed to be made and the reliability of the data sources.

Table 9-7. Facilities– Data Confidence

Asset Segment	Data Source	Data Confidence
Facilities - All	Building Condition Assessments (2018) spreadsheets	C

9.5.1 Recommendations for Improvements

Opportunities for improvement include:

Facilities: Although the information within the building condition assessments is thorough and complete, the information is 6 years old and requires to be updated (the Town has already planned to update this information). It is recommended that all Town facilities be assessed (included Pavilions and Washrooms). The Town has made efforts to use this information for decision-making since the completion of the assessment. It is recommended in advance of the building condition assessment update that the Town review data best practices and asset planning needs to ensure that the resulting data is provided to the Town that can be easily transferable for asset planning purposes.

The information should be continually updated in the work management system for work completed, to keep track of the backlog of work recommended from the resulting BCAs. This will also allow the Town to assess the actual costs of recommended work to establish if the costs recommended in the BCAs are accurate.

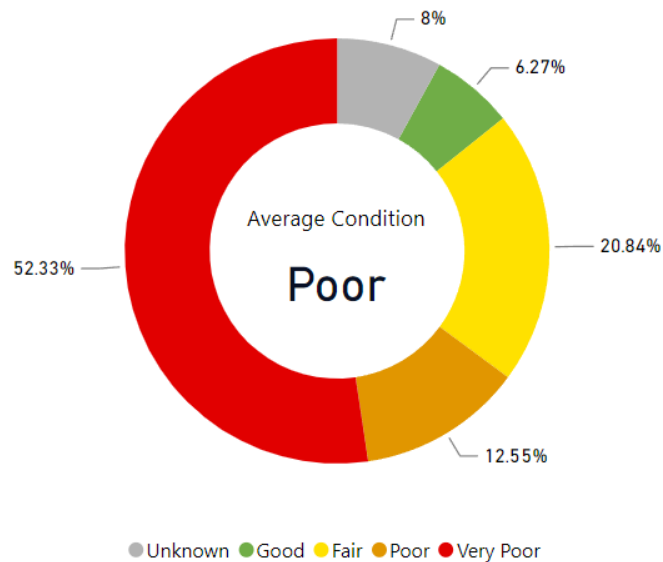


10.0 Fleet

Replacement Value

\$13,300,576

Overall Average Asset Condition



**Average Annual Gap to Meet
Current LOS (Performance)**

No Gap

**Average Annual Gap to Meet
Proposed LOS (Performance)**

\$0.5 M

Asset Inventory

- Equipment, trailers, small and large vehicles



10 Fleet

Fleet services is an important service support group in the Town of Fort Erie. Fleet ensures that each municipal department in the Town has the appropriate vehicles and equipment needed in good working order to complete their jobs, providing high quality services to residents. Fleet supports several municipal departments including planning and building, engineering, parks and cemeteries, facilities, roads and drainage, and water and wastewater. The proper management of Fleet assets is crucial to ensure operations run smoothly, and high-quality services are delivered to residents.

10.1 State of the Infrastructure

10.1.1 Asset Valuation

Fleet has equipment, small and large vehicles, and trailers with a total estimated replacement value of \$13M. The asset inventory and current estimated replacement value is shown in Table 10-1.

Table 10-1. Inventory and Current Replacement Value – Fleet

Asset Type	Count	Quantity Unit	2024 Estimated Replacement Value
Equipment	43	Units	\$2,227,576
Large Vehicles	21	Units	\$8,540,000
Small Vehicles	41	Units	\$2,533,000
Trailers	14	Units	Replacement Cost Unknown
Total			\$13,300,576

10.1.2 Asset Condition

Asset condition is an important piece in asset management planning. Condition scores were assigned to assets in Fleet based on age/estimated service life. The condition rating scale is shown below in Table 10-2.



Table 10-2. Condition Rating Scale – Fleet

Condition	Age/ESL
Very Good	>80% life remaining
Good	60-80% life remaining
Fair	40-60% life remaining
Poor	20-40% life remaining
Very Poor	0-20% life remaining
Unknown	

Figure 10-1 and Figure 10-2 illustrate the condition distribution for Fleet assets.

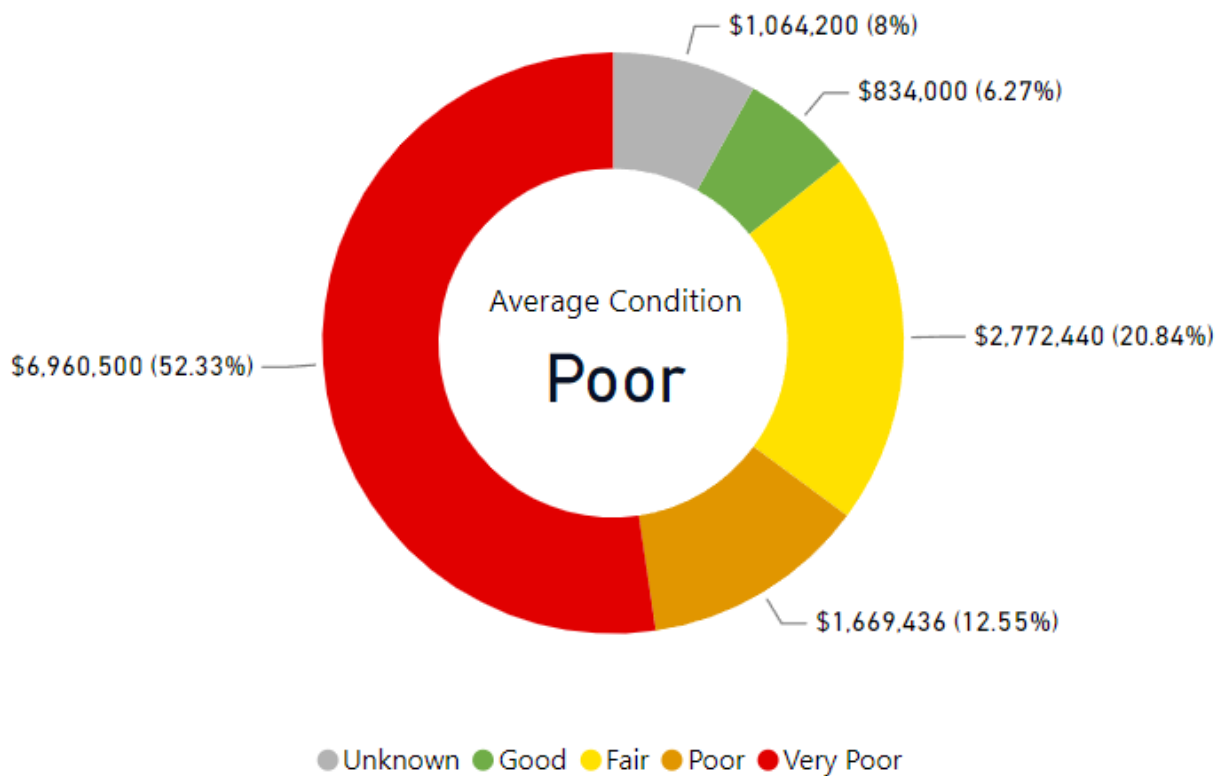


Figure 10-1. Overall Asset Condition (by Replacement Value) - Fleet

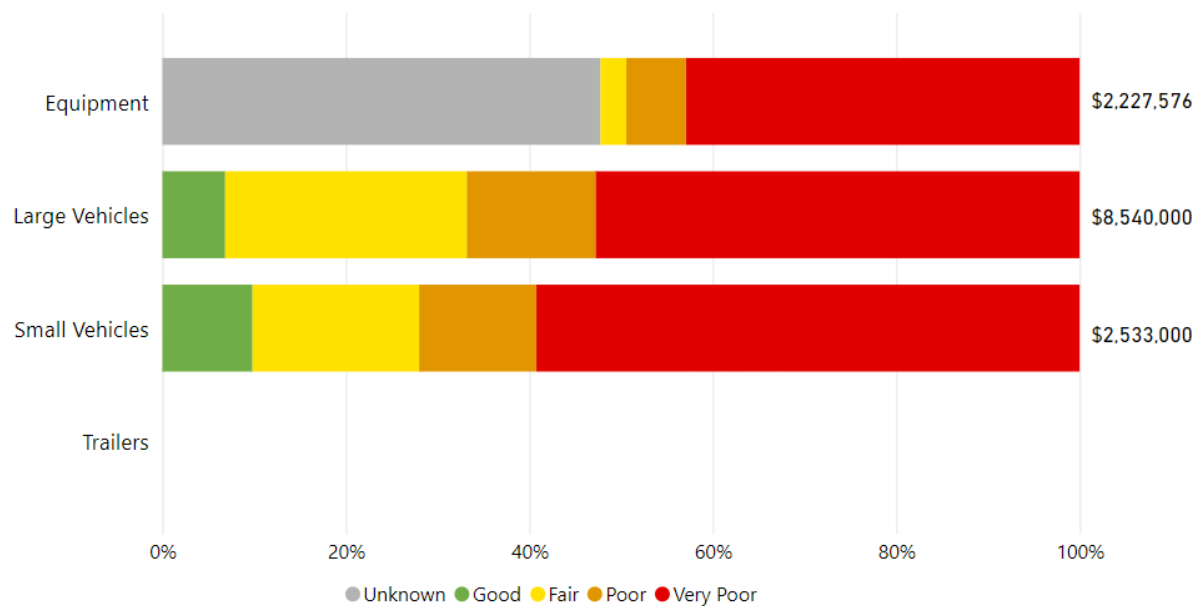


Figure 10-2. Asset Type Condition (by Replacement Value) – Fleet

Fleet assets are on average in poor condition, with approximately 64% of assets being in poor or very poor condition. 8% of the total replacement value of assets currently has an unknown condition, which account for almost 50% of Equipment assets having an unknown condition.

10.1.3 Average Age

Comparing average asset age to average estimated service life is a tool to further analyze the health of the asset system. The average age and average estimated service life for Fleet assets is shown in Figure 10-3.

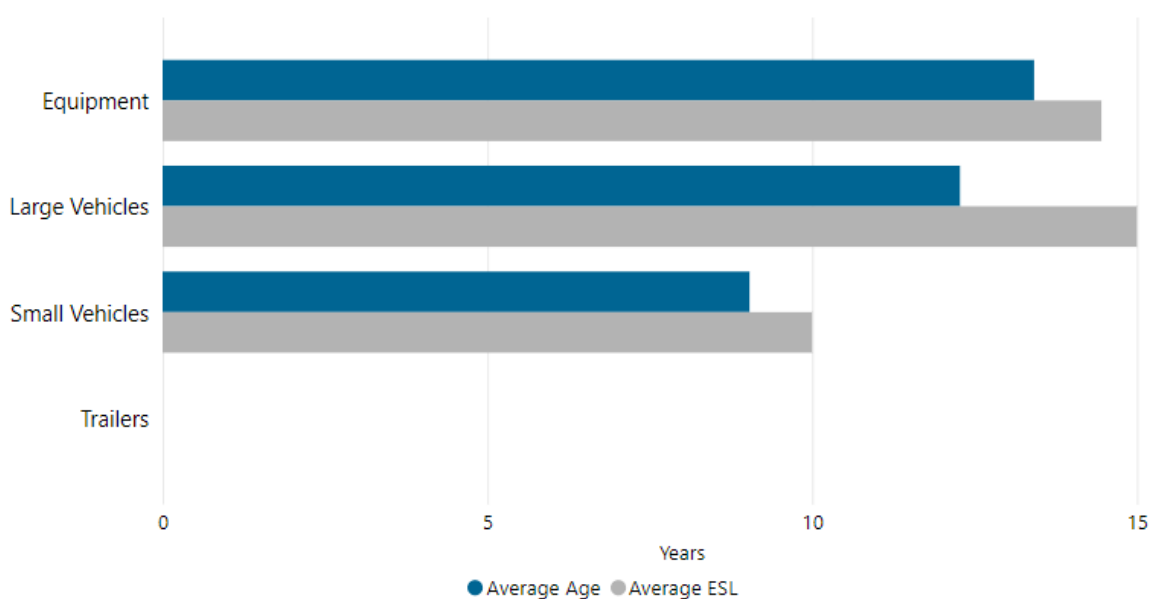


Figure 10-3. Average Age and Average Estimated Service Life – Fleet



Based on their average age, assets in Fleet are all nearing the end of their estimated service life. Trailers do not currently have known age information. D

10.2 Levels of Service

Service Statement: Keeping the Town's vehicles operational, safe, cost-efficient to support all municipal services and functions.

Levels of service metrics are a foundational part of the Town's Asset Management Strategy. It allows the Town to assess performance, identify areas for improvement and make informed decisions to better meet the needs of the community while optimizing resource allocation. Level of service metrics help municipalities promote accountability and transparency in municipal government. The Town has developed level of service metrics to align with community values and corporate priorities. There are metrics required by O.Reg. 588/17, and Town defined metrics. Customer and technical level of services metrics can be found below in Table 10-3 and Table 10-4.

The proposed LOS targets have been set by staff based on subject matter experts and through the development of the lifecycle management strategies discussed in the following section. Several factors and options were considered in the development of these targets, including costs, risks, and achievability. The differences between the current performance and proposed can be seen in the tables below.

The targets established for LOS represent the comprehensive approach required to minimize risks and lifecycle costs for the Town. The activities and strategies required to meet the proposed performance can be found in 10.3 Lifecycle Management Strategy, as well as the analysis of the impact to condition and costs used to determine the appropriate proposed (target) LOS. The proposed LOS are appropriate as they provide the best chance to avoid the risks associated with asset ownership. The risks associated with not meeting the proposed LOS can be significant and wide-ranging, which are further explained in 12.2.5 Risk Associated with Lifecycle Strategies and Levels of Service. Addressing these risks requires a proactive approach to infrastructure planning, investment, and management, as outlined in the lifecycle strategies.

The proposed LOS will only be achievable if the Town adopts financial strategies to close the infrastructure gap identified in this plan.



Table 10-3. Customer / Council Focused Level of Service Requirements – Fleet

Key Service Attribute	Performance Measure	Current Performance	Proposed Performance	Difference Between Current & Proposed
Cost Efficient	Cost to provide service (2024 Capital Operating Budget/household)	\$163	\$163	

Table 10-4. Technical Focused Level of Service Requirements – Fleet

Key Service Attribute	Performance Measure	Current Performance	Proposed Performance	Difference Between Current & Proposed
Quality	Percentage of total replacement cost of assets in good to very good condition	5.93%	28%	
Cost Efficient	Percent of annual reserve contribution meeting required reserve contribution based on the Reserve Policy	119% ¹⁴	100%	
Quality	Percent of fleet vehicles in conformance with lifecycle strategy	58.06%	100%	

¹⁴ This metric was calculated based on optimal reserve contribution based on a previously established asset replacement value, as per the Town's Capital Reserve Fund Policy. It is recommended that the replacement values used to calculate this metric be updated to reflect 2024 replacement values.



10.3 Lifecycle Management Strategy

The goal of our Asset Management Strategy is to establish and implement a series of planned activities, based on industry best practices. This will enable our assets to consistently provide a sustainable level of service to the residents of Fort Erie, while managing risk at the lowest lifecycle cost. The Town works to coordinate rehabilitation and replacement projects across asset groups where opportunities exist. This may result in asset strategies being delayed or advanced to accommodate the overall benefit of coordinated work across asset groups.

The Town continues to improve its approach to the management of its assets and will continue to put in place processes, procedures, and tools to enable a more consistent approach across the Town's Service Areas. Detailed below is an overview of some of the current asset management practices in place across the Town.

10.3.1 Lifecycle Activities

Lifecycle activities for Fleet involve processes and tasks aimed at managing the entire lifespan of an asset. Following these activities allows Fleet to continue to provide services efficiently, effectively, and sustainably through their lifecycle, maximizing the value they provide to the community. This approach aligns with best practices in asset management, where preventive maintenance and timely repairs are crucial for preserving the functionality, safety, and longevity of infrastructure assets.

By maintaining Fleet in optimal condition, the Town can provide services at the lowest possible cost by extending their lifespan and mitigate the risk of costly major repairs or premature replacement. It also ensures that residents continue to benefit from high-quality services offered by well-maintained Fleet. Following the lifecycle activities and strategies also ensures the Town avoid the risks associated with asset ownership, which can be significant. These risks are further outlined in 12.2.5 Risk Associated with Lifecycle Strategies and Levels of Service. Completing lifecycle activities and following the strategies outlined in this plan can enhance the resilience and sustainability of infrastructure while minimizing potential risks.

The lifecycle activity categories include non-infrastructure, operations and maintenance, renewal/rehabilitation, disposal, and service improvement and growth. A description of each activity category can be found in Section 1.4.2.4. Specific asset management practices or planned actions as well as specific frequencies associated with these actions are outlined in Table 10-5.



Table 10-5. Asset Management Practices and Associated Risks – Fleet

Asset Management Practices/ Planned Actions	Frequency Associated with Practices / Planned Actions
Non-Infrastructure	
• Condition assessments, Feasibility studies, management plans	• As required
• Planning, collision review committee, etc.	• As required
Operations & Maintenance Activities	
• MTO inspections	• As required
• Seasonal inspections on seasonal equipment	• Seasonally
• Third party inspections (crane/hoist, compressor)	• As required
• In-house inspections	• As required
• Reactive maintenance and repairs	• As required
• Daily inspections	• Daily
• Health and safety inspections	• Daily
• Preventative maintenance schedule by class of vehicle	• As required
• Reactive maintenance (damage, accidents, breakdowns, etc.)	• As required
• Spraying of vehicles	• As required
Renewal/Replacement Activities	
• Vehicle refurbishments	• As required
• Replacement	• As required
Disposal Activities	
• Sell-auction	• As required
• Keep for spare parts	• As required
• Sell to department	• As required
• Junk	• As required
Service Improvement & Growth Activities	
• Fleet additions requiring new equipment	• As required
• New assets	• As required
• Vehicle upgrade	• As required



10.4 Funding the Lifecycle Activities

The Town uses the lifecycle management strategies described above in Section 10.3 to plan work and determine future expenditure needs for Fleet assets. The activities, along with the scenarios below provide a framework of expenditures required for managing assets and ensuring the Town can meet the demands of current services and existing infrastructure.

All three scenarios consider only renewal, rehabilitation and replacement lifecycle activity costs and needs. These lifecycle activities ensure infrastructure remains in a state of good repair and can continue to provide services to residents. Further details of the funding required for the remaining lifecycle activities (non-infrastructure, service improvements, operations and maintenance, and growth) have been accounted for in the Scenario Comparison, found below in Section 10.4.4, which are based on the operating and capital budgets for the Town.

For the purposes of this AMP, these activities, and their costs, are assumed to be enough to meet the community's expectations. This AMP does not provide an analysis on optimizing these activities and costs. Growth needs are captured based on the planned projects that are funded through development charges or are activities to address the growing Town population.

10.4.1 Scenario 1: Cost to Maintain Current Performance (Level of Service)

Scenario one calculates the approximate annual cost of the renewal, rehabilitation and replacement activities required to maintain assets in a similar performance (condition) as their current state. This is used to determine the annual cost to provide the current level of service for Fleet (as mandated by O.Reg. 588/17).



Figure 10-4. Fleet Performance Forecast to Maintain Levels of Service



It was determined that an annual budget of \$625,000 for renewal, rehabilitation and replacement activities is needed to maintain performance for Fleet. There is no funding gap compared to anticipated funding levels. The performance forecast for scenario one is shown below in Figure 10-4. The condition increases slightly during this scenario. Assets in good to very good condition increases by 12%, ending at 19%, while assets in poor to very poor condition decreases by 6%, ending at 65%.

10.4.2 Scenario 2: Current Funding

Scenario two looks at the impact of current anticipated funding on the asset performance (condition) over the 10-year forecast period. The anticipated annual funding for renewal, rehabilitation and replacement activities for Fleet is \$630,000. The condition distribution for the anticipated funding scenario is shown below in Figure 10-5. Overall condition increases in this scenario. Assets in good to very good condition increases by 17%, ending at 24% at the end of the forecast period.



Figure 10-5. Fleet Performance Forecast with Current Funding

10.4.3 Scenario 3: Proposed LOS Target/Infrastructure Needs Assessment

Scenario three calculates the average budget needed to achieve the proposed levels of service, which has been determined using infrastructure needs as per lifecycle strategies. The lifecycle strategies were developed in consultation with Town staff, and using industry best practices for the renewal, rehabilitation, and replacement activities. The renewal, rehabilitation, and replacement activities listed above in Table 10-5 have been used to develop the strategies for the infrastructure needs and include the lifecycle activities that need to be undertaken to achieve the proposed levels of service. Following the infrastructure



needs and maintaining assets as prescribed in this AMP will provide the lowest lifecycle cost. This scenario is mandated by O.Reg. 588/17.



Figure 10-6. Fleet Performance Forecast with Proposed Level of Service Targets/Infrastructure Needs as per Lifecycle Strategies

It was determined that a budget of \$1.1 million for renewal, rehabilitation and replacement activities is needed to achieve the proposed levels of service. There is a funding gap of approximately \$535,000 compared to current anticipated funding levels. The performance forecast for this scenario is shown below in Figure 10-6. The performance of Fleet increases during the 10-year forecast period. Assets in good to very good condition start at 7% and increase to 28% at the end of the forecast.

10.4.4 Scenario Comparison & Infrastructure Gap

With the above information, Town staff can determine if there are gaps in funding to address infrastructure needs. This information will support future decision making on how to address any gaps. The investment needs under each of the three scenarios are shown below in Figure 10-7 and Table 10-6. Figure 10-7 shows a bar graph of the forecasted renewal, rehabilitation, and replacement expenditures for the proposed level of service targets/infrastructure needs according to scenario three, as well as any remaining lifecycle expenditures informed by the Town's anticipated budget. The bars in Figure 10-7 are colour coded by lifecycle activities. The solid and dashed lines represent the average annual investment needs of the three scenarios described above.

The scenario comparison highlights no gap to maintain current performance (condition) of assets and a gap of \$535,000 to achieve proposed level of service targets and optimize the performance of assets based on lifecycle strategies compared to anticipated annual funding.

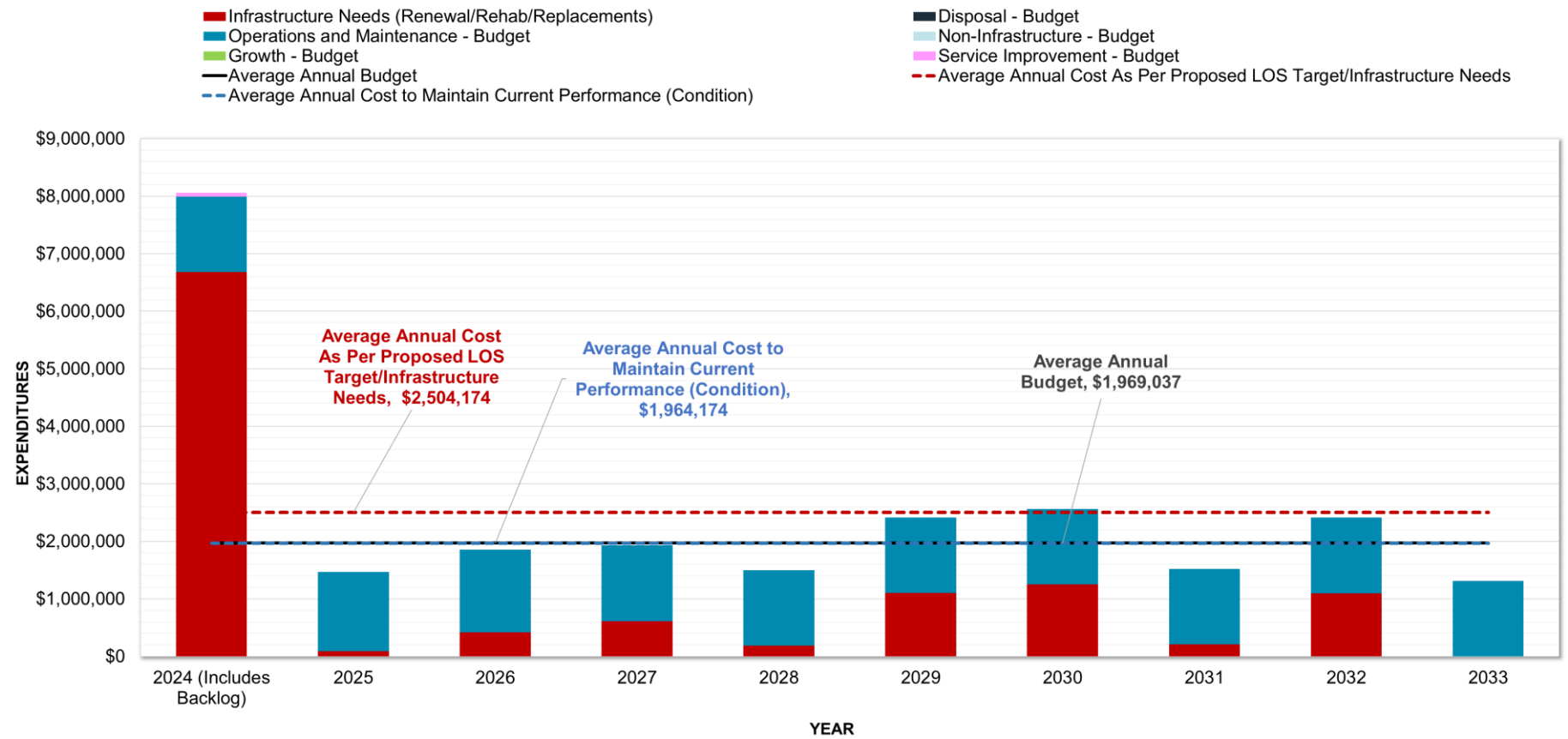


Figure 10-7. Fleet Scenario Comparison



The backlog is also highlighted in Figure 10-7 in the year 2024. The backlog represents renewal, rehabilitation, and replacement activities that have been identified as necessary but have not yet been completed. Continuing to defer renewals creates a risk of higher financial costs, potential decreased availability, and potential decreased satisfaction with asset performance.

Continuing to delay renewals may put the Town at risk for intergenerational inequality. Future generations may not be able to maintain the levels of service customers currently enjoy. Continued project deferrals can also lead to higher operational and maintenance costs, potentially limiting the availability of services in the future. Timely and adequately funded renewals and replacements will ensure that assets continue to remain functional and reliable into the future, at the lowest possible cost.

10.4.4.1 Forecasted Infrastructure Gap

The infrastructure gap is summarized below in Table 10-6. Current funding for capital budgets presented are the annual average of approved budgets (as of 2023) for the 2023-2033 fiscal years.

Table 10-6. Current and Optimal Capital Funding and Funding Gap - Fleet

Lifecycle Activity	Average Annual Budget	Average Annual Cost to Maintain Current LOS	Average Annual Cost As Per Proposed LOS Target/ Infrastructure Needs
Disposal	\$0	\$0	\$0
Growth	\$0	\$0	\$0
Non-Infrastructure	\$0	\$0	\$0
Operations & Maintenance	\$1,332,237	\$1,332,237	\$1,332,237
Renewal, Rehabilitation & Replacement	\$630,000	\$625,138	\$1,165,138
Service Improvement	\$6,800	\$6,800	\$6,800
Total	\$1,969,037	\$1,964,174	\$2,504,174
Average Annual Spending Gap		No Gap	\$535,138
Percentage Increase Required to Address Gap		No Gap	27%



10.5 Data Confidence and Improvement Plan

Table 10-7 outlines the main data sources and overall confidence in the data used for this AMP. Data confidence is based on how many assumptions needed to be made and the reliability of the data sources.

Table 10-7. Fleet – Data Confidence

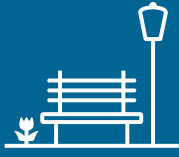
Asset Segment	Data Source	Data Confidence
Equipment	Spreadsheets, multiple	C
Large Vehicles	Spreadsheets, multiple	C
Small Vehicles	Spreadsheets, multiple	C
Trailers	Spreadsheets, multiple	C

10.5.1 Recommendations for Improvements

Opportunities for improvement:

Fleet and Equipment: Efforts were made for the purposes of this AMP to pull together the multiple sources of information on fleet and equipment, with many gaps required to be filled. It is recommended that the inventory be assessed and verified, including the values determined for current replacement costs.

Through the implementation of the maintenance management software, it is recommended to maintain this register and develop processes to track all maintenance activities on fleet and equipment. Asset management planning for fleet and equipment can be further enhanced by determining how maintenance records can be used to further inform condition of fleet assets.

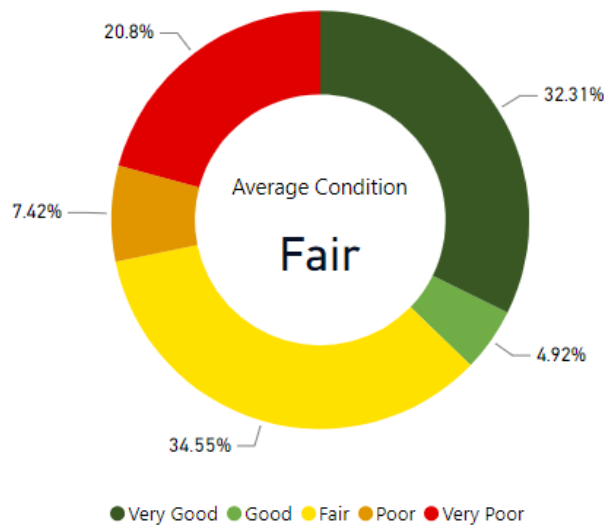


12.0 Parks and Cemeteries

Replacement Value

\$36,570,375

Overall Average Asset Condition



**Average Annual Gap to Meet
Current LOS (Performance)**

No Gap

**Average Annual Gap to Meet
Proposed LOS (Performance)**

\$0.3 M

Asset Inventory

- Outdoor Play Areas including 23 playgrounds and 6 spray pads
- Sports Facilities such as multi-use fields and courts, soccer fields, baseball diamonds and a skate park



11 Parks and Cemeteries

Parks and Cemeteries supports health and wellness in the community by providing recreation spaces for residents to gather in. Social interactions and community engagements happen in these outdoor spaces throughout the Town. Parks, outdoor spaces and play areas allow residents to take a break from their busy lives, providing a peaceful environment for relaxation.

Park assets include a variety of assets including amenities, equipment, sports fields and courts, and structures and parking lots to serve the community.

11.1 State of the Infrastructure

11.1.1 Asset Valuation

Parks and Cemeteries has outdoor open spaces and play areas, sports facilities, transportation surfaces like parking lots and trails, site services and utilities, park buildings and structures and site furnishing with a total estimated replacement value of \$36M. The asset inventory and current estimated replacement value is shown in Table 11-1.

Table 11-1. Inventory and Current Replacement Value – Parks and Cemeteries

Asset Type	Count	Quantity Unit	2024 Estimated Replacement Value
P – Outdoor Open Spaces	74	Units	\$946,040
R – Outdoor Play Areas	29	Units	\$4,939,470
S – Sports Facilities	49	Units	\$4,735,650
T – Transportation Surfaces	184	Units	\$12,791,246
U – Site Services & Utilities	92	Units	\$7,161,613
V – Park Building & Structures	130	Units	\$4,285,432
W – Site Furnishings	326	Units	\$1,710,923
Total			\$36,570,375

11.1.2 Asset Condition

Asset condition is an important piece in asset management planning. Condition was assigned to assets in Parks and Cemeteries based on staff assigned condition scores where available



or age/estimated service life for remaining assets. The condition rating scale is shown below in Table 11-2.

Table 11-2. Condition Rating Scale – Parks and Cemeteries

Condition	Age/ESL	Assigned Condition
Very Good	>80% life remaining	1
Good	60-80% life remaining	2
Fair	40-60% life remaining	3
Poor	20-40% life remaining	4
Very Poor	0-20% life remaining	5
Unknown		

Figure 11-1 and Figure 11-2 illustrates the condition distribution of the Town's Parks and Cemeteries assets.

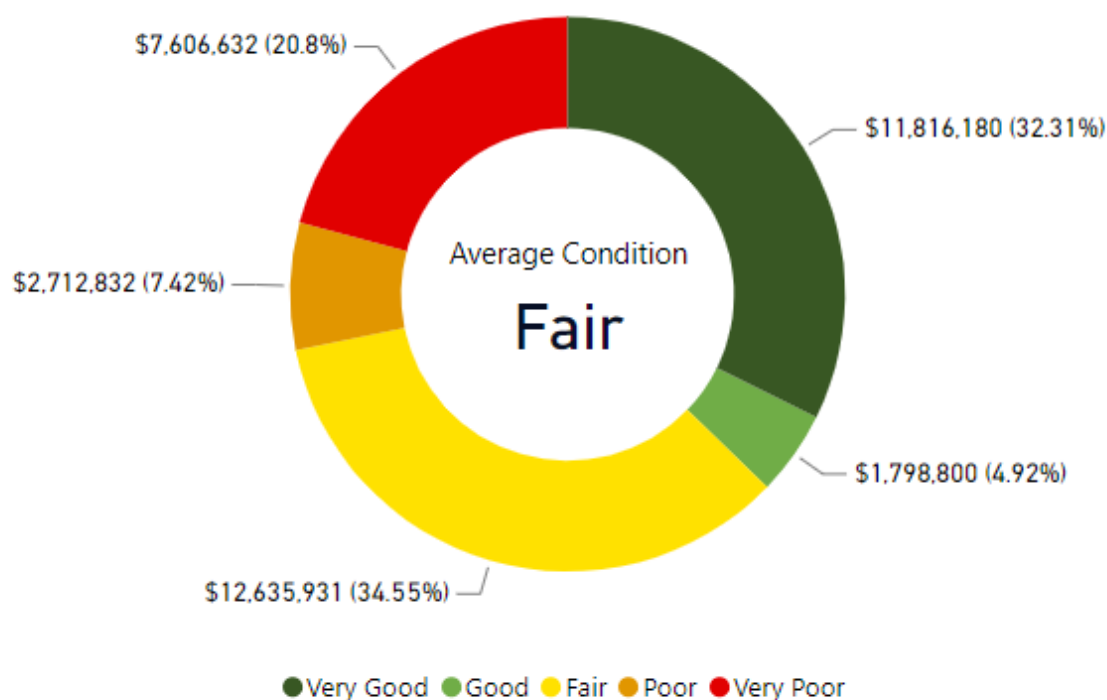


Figure 11-1. Overall Asset Condition (by Replacement Value) – Parks and Cemeteries

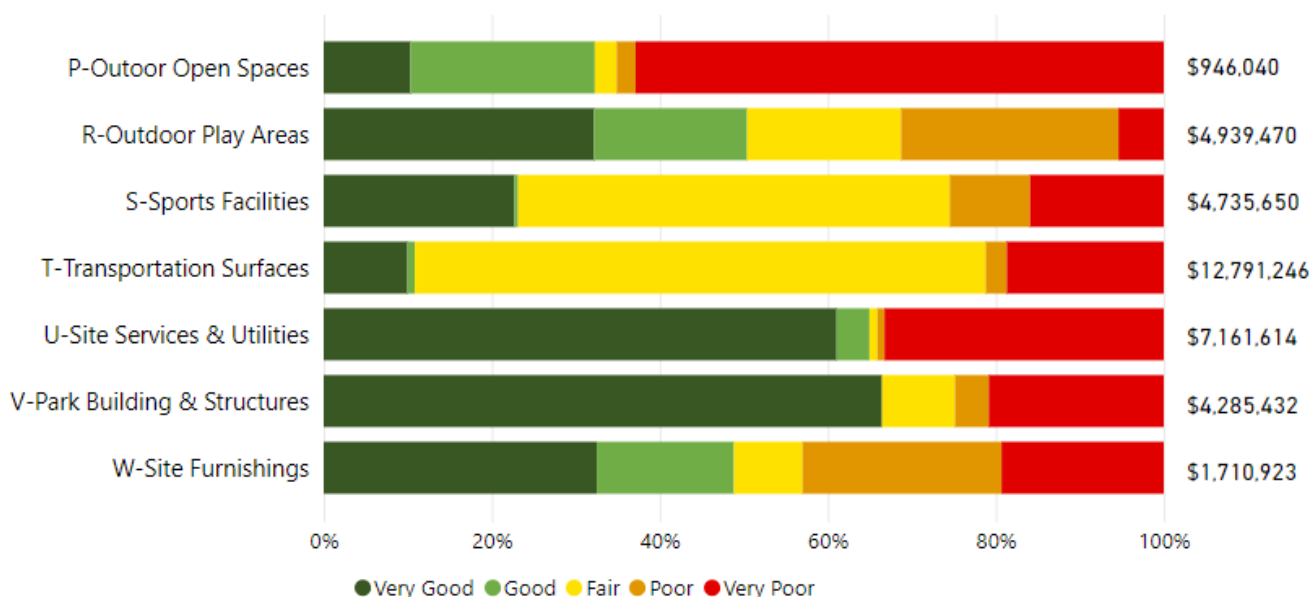


Figure 11-2. Asset Type Condition (by Replacement Value) – Parks and Cemeteries

The average condition of Parks and Cemeteries assets is fair. Approximately 71% of assets are in fair or better condition. Outdoor Open Spaces is over 60% in very poor condition, where all other asset types have less than 40% in very poor condition. The Town is continuing to collect condition data for all Parks asset types.

11.1.3 Average Age

Comparing average asset age to average estimated service life is a tool to further analyze the health of the asset system. The average age and average estimated service life for Parks and Cemeteries assets is shown in Figure 11-3.

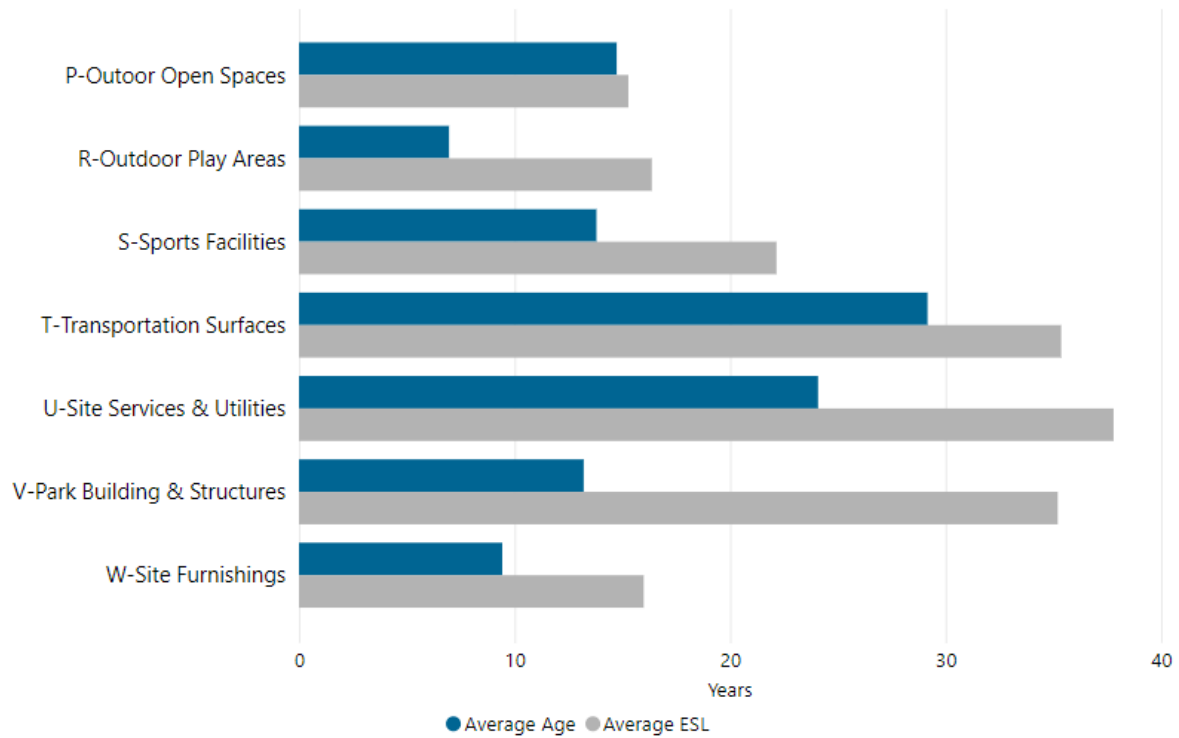


Figure 11-3. Average Age and Average Estimated Service Life – Parks and Cemeteries

All Parks and Cemeteries assets have an average age below the average estimated service life.





11.2 Levels of Service

Service Statement: Efficiently providing high quality, safe, accessible parks that promotes the quality of life and wellbeing of Town residents.

Levels of service metrics are a foundational part of the Town's Asset Management Strategy. It allows the Town to assess performance, identify areas for improvement and make informed decisions to better meet the needs of the community while optimizing resource allocation. Level of service metrics help municipalities promote accountability and transparency in municipal government. The Town has developed level of service metrics to align with community values and corporate priorities. There are metrics required by O.Reg. 588/17, and Town defined metrics. Customer and technical level of services metrics can be found below in Table 11-3 and Table 11-4.

The proposed LOS targets have been set by staff based on subject matter experts and through the development of the lifecycle management strategies discussed in the following section. Several factors and options were considered in the development of these targets, including costs, risks, and achievability. The differences between the current performance and proposed can be seen in the tables below.

The targets established for LOS represent the comprehensive approach required to minimize risks and lifecycle costs for the Town. The activities and strategies required to meet the proposed performance can be found in 11.3 Lifecycle Management Strategy, as well as the analysis of the impact to condition and costs used to determine the appropriate proposed (target) LOS. The proposed LOS are appropriate as they provide the best chance to avoid the risks associated with asset ownership. The risks associated with not meeting the proposed LOS can be significant and wide-ranging, which are further explained in 12.2.5 Risk Associated with Lifecycle Strategies and Levels of Service. Addressing these risks requires a proactive approach to infrastructure planning, investment, and management, as outlined in the lifecycle strategies.

The proposed LOS will only be achievable if the Town adopts financial strategies to close the infrastructure gap identified in this plan.



Table 11-3. Customer Focused Level of Service Requirements – Parks and Cemeteries

Key Service Attribute	Performance Measure	Current Performance	Proposed Performance	Difference Between Current & Proposed
Cost Efficient	Total cost to provide service (2024 Operating & Capital Budget/household)	\$550	\$550	

Table 11-4. Technical Focused Level of Service Requirements – Parks and Cemeteries

Key Service Attribute	Performance Measure	Current Performance	Proposed Performance	Difference Between Current & Proposed
Accessible	Percent of Playgrounds that are AODA compliant	95%	100%	
Accessible	Percent of the public parking Parks that are AODA compliant	75%	100%	
Accessible	Percent of paths and trails are AODA compliant	75%	100%	
Cost Efficient	Percent of annual reserve contribution meeting required reserve contribution based on the Reserve Policy	131% ¹⁵	100%	

¹⁵ This metric was calculated based on optimal reserve contribution based on a previously established asset replacement value, as per the Town's Capital Reserve Fund Policy. It is recommended that the replacement values used to calculate this metric be updated to reflect 2024 replacement values.



Key Service Attribute	Performance Measure	Current Performance	Proposed Performance	Difference Between Current & Proposed
Quality	Percentage of replacement cost of assets in very poor condition	20.8%	11%	



11.3 Lifecycle Management Strategy

The goal of our Asset Management Strategy is to establish and implement a series of planned activities, based on industry best practices. This will enable our assets to consistently provide a sustainable level of service to the residents of Fort Erie, while managing risk at the lowest lifecycle cost. The Town works to coordinate rehabilitation and replacement projects across asset groups where opportunities exist. This may result in asset strategies being delayed or advanced to accommodate the overall benefit of coordinated work across asset groups.

The Town continues to improve its approach to the management of its assets and will continue to put in place processes, procedures, and tools to enable a more consistent approach across the Town's Service Areas. Detailed below is an overview of some of the current asset management practices in place across the Town.

11.3.1 Lifecycle Activities

Lifecycle activities for Parks and Cemeteries involve processes and tasks aimed at managing the entire lifespan of an asset. Following these activities allows Parks and Cemeteries to continue to provide services efficiently, effectively, and sustainably throughout their lifecycle, maximizing the value they provide to the community. This approach aligns with best practices in asset management, where preventive maintenance and timely repairs are crucial for preserving the functionality, safety, and longevity of infrastructure assets.

By maintaining Parks and Cemeteries in optimal condition, the Town can provide services at the lowest possible cost by extending their lifespan and mitigate the risk of costly major repairs or premature replacement. It also ensures that residents continue to benefit from high-quality services offered by well-maintained Parks and Cemeteries infrastructure. Following the lifecycle activities and strategies also ensures the Town avoid the risks associated with asset ownership, which can be significant. These risks are further outlined in 12.2.5 Risk Associated with Lifecycle Strategies and Levels of Service. Completing lifecycle activities and following the strategies outlined in this plan can enhance the resilience and sustainability of infrastructure while minimizing potential risks.

The lifecycle activity categories include non-infrastructure, operations and maintenance, renewal/rehabilitation, disposal, and service improvement and growth. A description of each activity category can be found in Section 1.4.2.4. Specific asset management practices or planned actions as well as specific frequencies associated with these actions are outlined in Table 11-5.



Table 11-5. Asset Management Practices and Associated Risks – Parks and Cemeteries

Asset Management Practices/ Planned Actions	Frequency Associated with Practices / Planned Actions
Non-Infrastructure	
• Asset Management Planning	• Every 5 years
• Parks and Open Space Masterplan	• Every 10 years
• Cemetery Master Plan	• Every 10 years
Operations & Maintenance Activities	
• Grass cutting	• Weekly
• Irrigation maintenance	• As required
• Horticulture	• As required
• Sport Field management (lines, dragging, etc.)	• Weekly
• Garbage collection	• As required
• Beach bathroom cleaning and maintenance	• As required
• Replace lighting	• As required
• Parking lot maintenance	• As required
• Snow removal	• Seasonally
• Tree maintenance (tree removals, tree trimming, etc.)	• As required
• Park amenity maintenance (reactive and planned)	• As required
• Service request response	• As identified
• Trail maintenance (brushing, asphalt, crack sealing, line painting)	• As required
• Sign maintenance	• As required
• Beach maintenance (grooming and grading)	• Seasonally
• Public event support	• As required
• Public event management	• As required
• Cemetery - internments/disinterment's	• On-going



Asset Management Practices/ Planned Actions	Frequency Associated with Practices / Planned Actions
• Cemetery – grass cutting	• On-going
• Cemetery – monument foundations installation	• Twice a year
• Cemetery – grounds/turn maintenance	• On-going
• Cemetery – marker installation	• On-going
• Snow removal	• Seasonal
• Pest management	• On-going
• Turf management	• On-going
• Memorial flower removal	• Seasonal
• Seasonal displays	• Seasonal
Renewal/Replacement Activities	
• Replacement	• As needed based on useful life
Disposal Activities	
• Dispose of assets in line with replacements	• As required
Service Improvement & Growth Activities	
• New assets for developments to service growth	• As needed
• New assets as part of service improvement	• As identified in studies



11.4 Funding the Lifecycle Activities

The Town uses the lifecycle management strategies described above in Section 11.3 to plan work and determine future expenditure needs for Parks and Cemeteries assets. The activities, along with the scenarios below provide a framework of expenditures required for managing assets and ensuring the Town can meet the demands of current services and existing infrastructure.

All three scenarios consider only renewal, rehabilitation and replacement lifecycle activity costs and needs. These lifecycle activities ensure infrastructure remains in a state of good repair and can continue to provide services to residents. Further details of the funding required for the remaining lifecycle activities (non-infrastructure, service improvements, operations and maintenance, and growth) have been accounted for in the Scenario Comparison, found below in Section 11.4.4, which are based on the operating and capital budgets for the Town.

For the purposes of this AMP, these activities, and their costs, are assumed to be enough to meet the community's expectations. This AMP does not provide an analysis on optimizing these activities and costs. Growth needs are captured based on the planned projects that are funded through development charges or are activities to address the growing Town population.

11.4.1 Scenario 1: Cost to Maintain Current Performance (Level of Service)

Scenario one calculates the approximate annual cost of the renewal, rehabilitation and replacement activities required to maintain assets in a similar performance (condition) as their current state. This is used to determine the annual cost to provide the current level of service for Parks and Cemeteries (as mandated by O.Reg. 588/17).

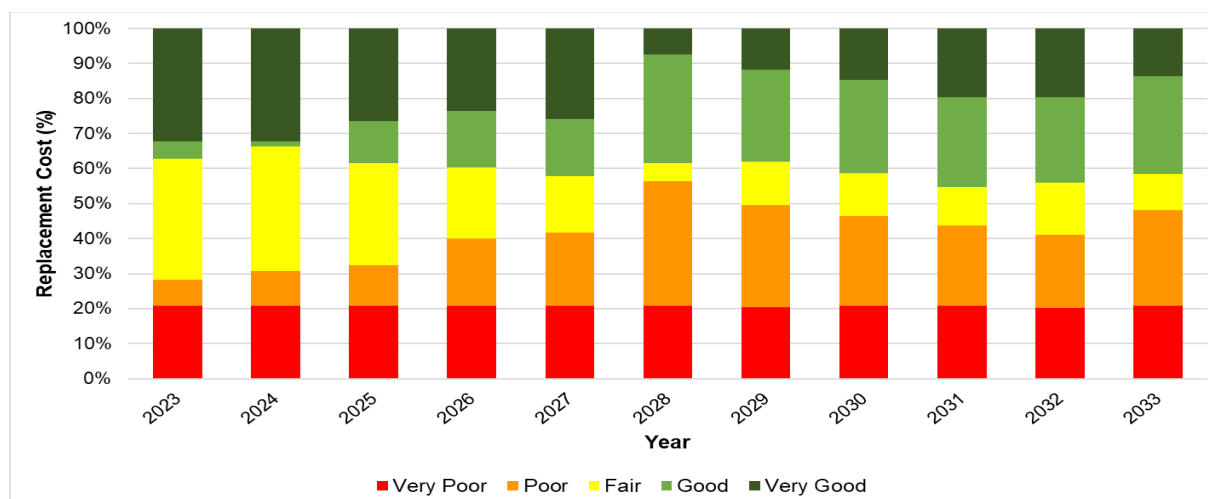


Figure 11-4. Parks and Cemeteries Performance Forecast to Maintain Levels of Service



It was determined that an annual budget of \$1.1 million for renewal, rehabilitation and replacement activities is needed to maintain performance for Parks and Cemeteries. There is no funding gap compared to the anticipated funding levels. The performance forecast for scenario one is shown in Figure 11-4. Assets in good to very good condition stays similar throughout the forecast, while assets in poor condition increases by 20%, ending at 27%.

11.4.2 Scenario 2: Current Funding

Scenario two looks at the impact of current anticipated funding on the asset performance (condition) over the 10-year forecast period. The anticipated annual funding for renewal, rehabilitation and replacement activities for Parks and Cemeteries is \$1.2 million. The condition distribution for the anticipated funding scenario is shown below in Figure 11-5. Similarly to scenario one, the overall condition of assets decreases slightly as assets in poor to very poor condition increases by 22%, ending at 50% at the end of the 10-year forecast.

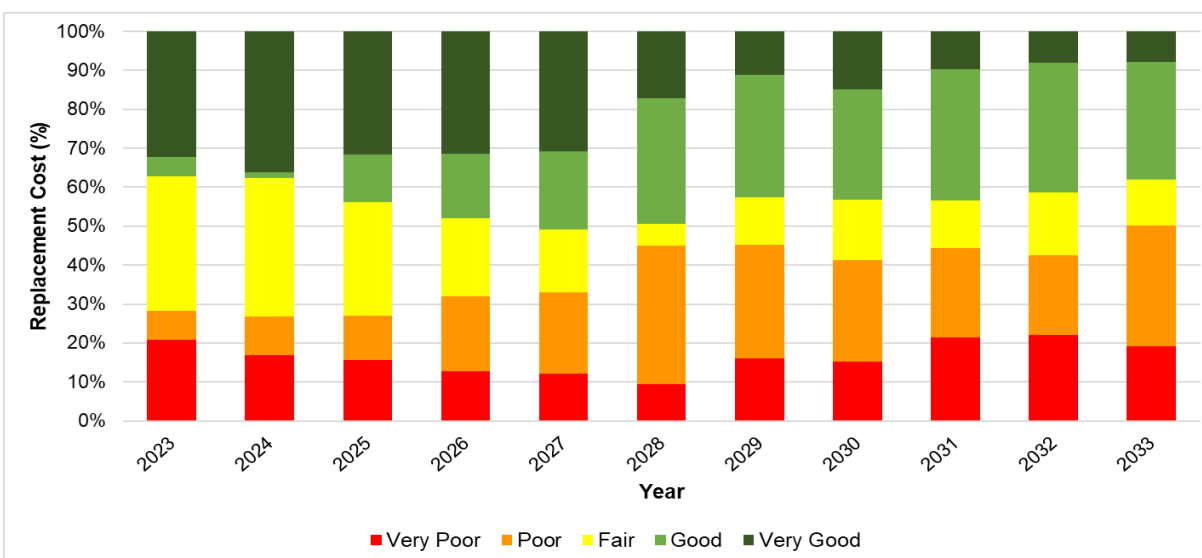


Figure 11-5. Parks and Cemeteries Performance Forecast with Current Funding

11.4.3 Scenario 3: Proposed LOS Target/Infrastructure Needs Assessment

Scenario three calculates the average budget needed to achieve the proposed levels of service, which has been determined using infrastructure needs as per lifecycle strategies. The lifecycle strategies were developed in consultation with Town staff, and using industry best practices for the renewal, rehabilitation, and replacement activities. The renewal, rehabilitation, and replacement activities listed above in Table 2-5 have been used to develop the strategies for the infrastructure needs and include the lifecycle activities that need to be undertaken to achieve the proposed levels of service. Following the infrastructure needs and maintaining assets as prescribed in this AMP will provide the lowest lifecycle cost. This scenario is mandated by O.Reg. 588/17.

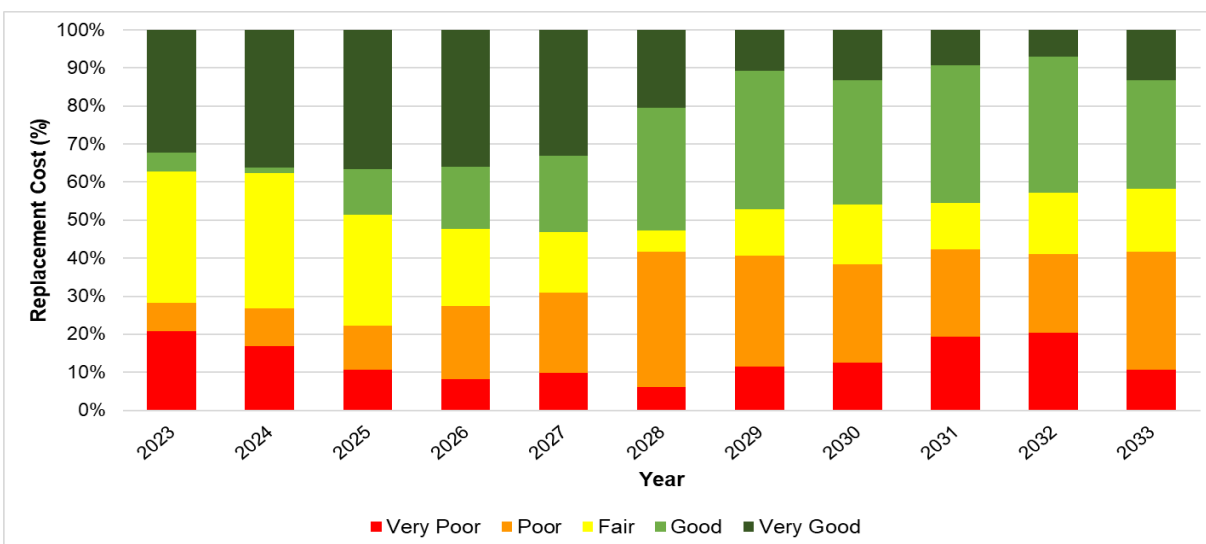


Figure 11-6. Parks and Cemeteries Performance Forecast with Proposed Level of Service Targets/Infrastructure Needs Assessment as per Lifecycle Strategies

It was determined that a budget of \$1.5 million for renewal, rehabilitation and replacement activities is needed to achieve the proposed levels of service. There is a funding gap of approximately \$313,000 compared to current anticipated funding levels. The performance forecast for this scenario is shown below in Figure 11-6. The performance of Parks and Cemeteries increases slightly during the 10-year forecast period. Assets in good to very good condition start at 37% and increase to 42% at the end of the forecast.

11.4.4 Scenario Comparison & Infrastructure Gap

With the above information, Town staff can determine if there are gaps in funding to address infrastructure needs. This information will support future decision making on how to address any gaps. The investment needs under each of the three scenarios are shown below in Figure 11-7 and Table 11-6. Figure 11-7 shows a bar graph of the forecasted renewal, rehabilitation, and replacement expenditures for the proposed level of service targets/infrastructure needs according to scenario three, as well as any remaining lifecycle expenditures informed by the Town's anticipated budget. The bars in Figure 11-7 are colour coded by lifecycle activities. The solid and dashed lines represent the average annual investment needs of the three scenarios described above.

The scenario comparison highlights no gap to maintain current performance (condition) of assets and a gap of \$313,000 to achieve proposed level of service targets and optimize the performance of assets based on lifecycle strategies compared to anticipated annual funding.

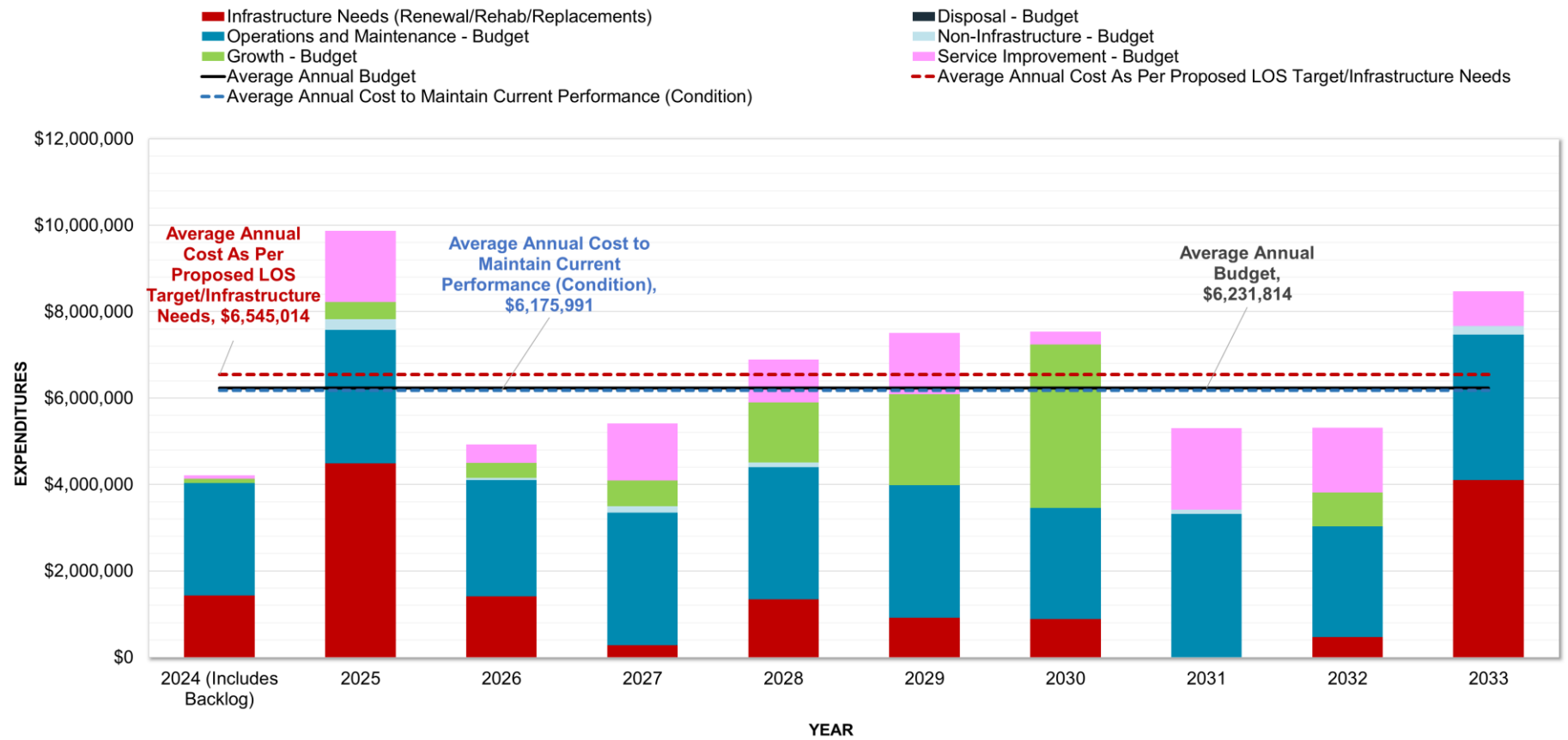


Figure 11-7. Parks and Cemeteries Scenario Comparison



The backlog is also highlighted in Figure 11-7 in the year 2024. The backlog represents renewal, rehabilitation, and replacement activities that have been identified as necessary but have not yet been completed. Continuing to defer renewals creates a risk of higher financial costs, potential decreased availability, and potential decreased satisfaction with asset performance.

Continuing to delay renewals may put the Town at risk for intergenerational inequality. Future generations may not be able to maintain the levels of service customers currently enjoy. Continued project deferrals can also lead to higher operational and maintenance costs, potentially limiting the availability of services in the future. Timely and adequately funded renewals and replacements will ensure that assets continue to remain functional and reliable into the future, at the lowest possible cost.

11.4.4.1 Forecasted Infrastructure Gap

The infrastructure gap is summarized below in Table 11-6. Current funding for capital budgets presented are the annual average of approved budgets (as of 2023) for the 2023-2033 fiscal years.

Table 11-6. Current and Optimal Capital Funding and Funding Gap – Parks & Cemeteries

Lifecycle Activity	Average Annual Budget	Average Annual Cost to Maintain Current LOS	Average Annual Cost As Per Proposed LOS Target/ Infrastructure Needs
Disposal	\$0	\$0	\$0
Growth	\$951,952	\$951,952	\$951,952
Non-Infrastructure	\$85,000	\$85,000	\$85,000
Operations & Maintenance	\$2,939,362	\$2,939,362	\$2,939,362
Renewal, Rehabilitation & Replacement	\$1,219,027	\$1,163,204	\$1,532,227
Service Improvement	\$1,036,473	\$1,036,473	\$1,036,473
Total	\$6,231,814	\$6,175,991	\$6,545,014
Average Annual Spending Gap		No Gap	\$313,199
Percentage Increase Required to Address Gap		No Gap	5%



11.5 Data Confidence and Improvement Plan

Table 11-7 outlines the main data sources and overall confidence in the data used for this AMP. Data confidence is based on how many assumptions needed to be made and the reliability of the data sources.

Table 11-7. Parks and Cemeteries – Data Confidence

Asset Segment		Data Source	Data Confidence
All assets		Parks condition assessment (2023), spreadsheet	A

11.5.1 Recommendations for Improvements

Opportunities for improvement include:

All Parks Data: The Town recently completed a comprehensive review of all of their parks and developed an inventory of assets and assessed them for condition. It is recommended that this information be implemented into the work management system to ensure that the information is kept up to date on an ongoing basis and that work completed on these assets gets tracked appropriately.



12.0 Financial Strategy



12 Financial Strategy

This financial strategy provides an analysis of the average annual funding available, the expenditures required to maintain current LOS, as well as the ideal expenditures required to meet the Town's proposed LOS and infrastructure needs based on the lifecycle strategies identified throughout this plan. The financial strategy in this AMP is based on the Town of Fort Erie's 2024 10-year capital budget and operating budget to determine the funding available to support infrastructure. All forecasted dollars are presented in 2024 dollars, and no inflationary measure has been included in the needs.

The financial strategy includes the following:

Budget Overview: The Town's budgets are developed to allocate funds to cover the costs of providing services, maintain existing assets, and the construction of new assets. The budgets are categorized into:

Operating Budget: The operating budget provides the necessary resources to fund programs and services to meet the community's needs and accommodates inflationary pressures. The operating budget is primarily funded with tax dollars and income from fees and service charges. The operating budget is used to plan for the municipality's day-to-day expenditures, such as:

- wages
- materials & supplies
- utilities
- maintenance of buildings
- repayment of debt for major projects to deliver those necessary programs and services.

Capital Budget: The capital budget and forecast is a 10-year financial plan. This plan identifies the capital requirements of growth and maintaining existing infrastructure. The capital budget is funded through the following:

- property taxes
- town reserves
- development charges
- debt



- Federal Gas Tax and grants

The capital budget is used to build or rehabilitate assets that will last more than one year.

The Town has a 10-year capital budget and forecast was leveraged for the analysis included in this AMP.

Revenue & Capital Funding Sources: the Town obtains revenues from various sources to fund the expenditures outlined in the Operating and Capital budgets. Revenue sources include property taxes, federal and provincial funding, grants and subsidies, and user rates. These revenues are then used to fund all aspects of the municipal services.

Reserves and Reserve Funds: Reserves and reserve funds provide the financing source for the capital budget. In addition, the reserves and reserve funds receive annual contributions from the operating budget. The contributions help create a solid financial position that supports the town's future cash requirements. Therefore, maintaining enough reserves and reserve funds balances is key to the municipality's long-term financial plan.

- It strengthens its long-term financial sustainability
- It helps to cut fluctuations in the tax rate
- Provides funding to sustain infrastructure.

Infrastructure Expenditure Needs & Infrastructure Gap Overview: The AMP aims to determine the funding levels needed to support the capital expenditures, LOS, and infrastructure needs across all asset categories.

The total infrastructure spending needs required to meet current LOS, and to meet the proposed LOS for infrastructure needs as per the lifecycle management strategy. The gap is calculated based on the forecast scenarios and average budget.

Risks Associated with Lifecycle Strategies & Risk Management Strategies: There are inherent risks with not following lifecycle strategies which have been defined and the strategies in place to manage these risks.

Financial Strategies to Address the Gap: The Town will need to review and implement various strategies that will address the infrastructure gap. Options of strategies are outlined within this plan.

12.1 Budget Overview

12.1.1 Planned Expenditures

The planned expenditures represent the anticipated average annual budget based on the 10-year capital budget, and the operations budget over the 10-year analysis period.

**Table 12-1. Anticipated Average Annual Budget (Based on 10-year Capital Budget)**

AMP Asset Class	Anticipated Average Annual Budget¹⁶
Bridges and Culverts	\$ 1,100,275
Roads	\$8,596,703
Stormwater	\$5,601,763
Wastewater	\$21,683,176
Water	\$9,327,254
Digital Services	\$1,652,659
Emergency Services	\$3,007,448
Facilities	\$6,524,347
Fleet	\$1,969,037
Park and Cemeteries	\$6,231,814
Total	\$65,694.476

12.1.2 Revenues

The Town's revenues, by source, are outlined in Table 12-2. Revenues include those generated from property taxes, contributions from senior levels of government, and user fees, and other miscellaneous sources.

Table 12-2. Town Funding Sources (2021-2023)

Funding Source	2023	2022	2021
Taxation	\$32,249,348	\$31,462,422	\$29,848,202
Interest and Penalties	\$2,021,200	\$1,457,800	\$1,236,945
Grants	\$1,849,815	\$2,086,488	\$2,115,609
Water Wastewater Billings	\$21,571,607	\$20,352,134	\$19,496,501
User Fees	\$4,065,184	\$3,696,861	\$2,576,205
Gaming	\$257,000	\$12,000	\$101,500
Other	\$382,830	\$301,493	\$237,979
Total	\$62,396,984	\$59,369,198	\$55,612,941

¹⁶ The amounts referenced in this table include a summary of the annual average budget amounts from the Town's 10-year Capital Budget and Forecast, and Operating Budget. Only expenditures forecasted that were tied to a specific asset category/service and lifecycle activity have been included. These totals do not represent the total Town Budget.



As shown, the majority of the Town's revenues are from taxation and water and wastewater user fees.

12.2 Infrastructure Expenditure Needs

The results of the lifecycle management strategy have been compiled within this section to provide an overall view of the Town's ability to meet current LOS as well as to meet the target LOS, or infrastructure needs, for the whole organization. The AMP uses Scenario 1 and 3 to determine the infrastructure needs of the Town's assets. Scenario 2 provides the budget analysis within the chapters to review the impact of Town's anticipated budget on the asset's performance.

Scenario 1: Cost to Maintain Current Performance (LOS) calculates the approximate annual cost of the renewal, rehabilitation and replacement activities required to maintain assets in a similar performance (condition) as their current state. This is used to determine the annual cost to provide the current level of service for each asset category (as mandated by O.Reg. 588/17).

Scenario 2 – Current Funding: Determines the impact of the current 10-year capital budget on the condition (performance) of the assets. The average annual budget is used to compare to Scenario 1 and 3.

Scenario 3: Proposed LOS Target/Infrastructure Needs Assessment calculates the average budget needed to achieve the proposed levels of service, which has been determined using infrastructure needs as per lifecycle strategies. The lifecycle strategies were developed in consultation with Town staff, and using industry best practices for the renewal, rehabilitation, and replacement activities.

For the purposes of this AMP only renewal, rehabilitation and replacement lifecycle activity costs and needs are analyzed. These lifecycle activities ensure infrastructure remains in a state of good repair and can continue to provide services to residents. Further details of the expenditures and funding required for the remaining lifecycle activities (non-infrastructure, service improvements, operations and maintenance, and growth) have been reported on to consider the whole lifecycle cost of the Town's assets and services, which are based on the operating and capital budgets for the Town. For the purposes of this AMP, these activities, and their costs, are assumed to be enough to meet the community's expectations. This AMP does not provide an analysis on optimizing these activities and costs. Growth needs are captured based on the planned projects that are funded through development charges or are activities to address the growing Town population.

These scenarios have been compiled for all assets below to show the overall impact on performance (condition) to Town assets.



Figure 12-1. Scenario 1: Maintain Current LOS - All Assets



Figure 12-2. Scenario 2: Current Funding - All Assets



Figure 12-3. Scenario 3: Proposed LOS Target - All Assets



The graphs above show the impact the scenarios developed for this AMP have on the condition of the Town's assets. Scenario 1 maintains the assets in approximately the same condition they are currently in. Scenario 2 sees a decrease in the overall performance (condition) of the assets by the end of the 10-year forecast period. This analysis is based on the planned spending as per the 10-year capital budget. If the Town follows Scenario 3, to meet proposed LOS targets as per identified lifecycle management strategies, there will be an improvement to the performance of the Town's assets.

The compiled investment needs (expenditures) under each of the analysis scenarios are presented in Figure 12-4. This figure illustrates the calculated infrastructure needs based on both the Average Annual Cost to Maintain Current LOS (Scenario 1), as well as the Average Annual Cost for the Proposed LOS as Per Infrastructure Needs (Scenario 3) and compares these to the average annual funding available for assets (based on the Town's budget) (Scenario 2). The costs identified as the Infrastructure Needs Renewal/Rehab/Replacements) identify the lifecycle activity expenditures required for the 10-year forecast to meet proposed LOS, as per O.Reg. 588/17 requirements. These costs represent the Town's best alternative to provide services at the lowest possible cost, to avoid risk and to meet levels of service.

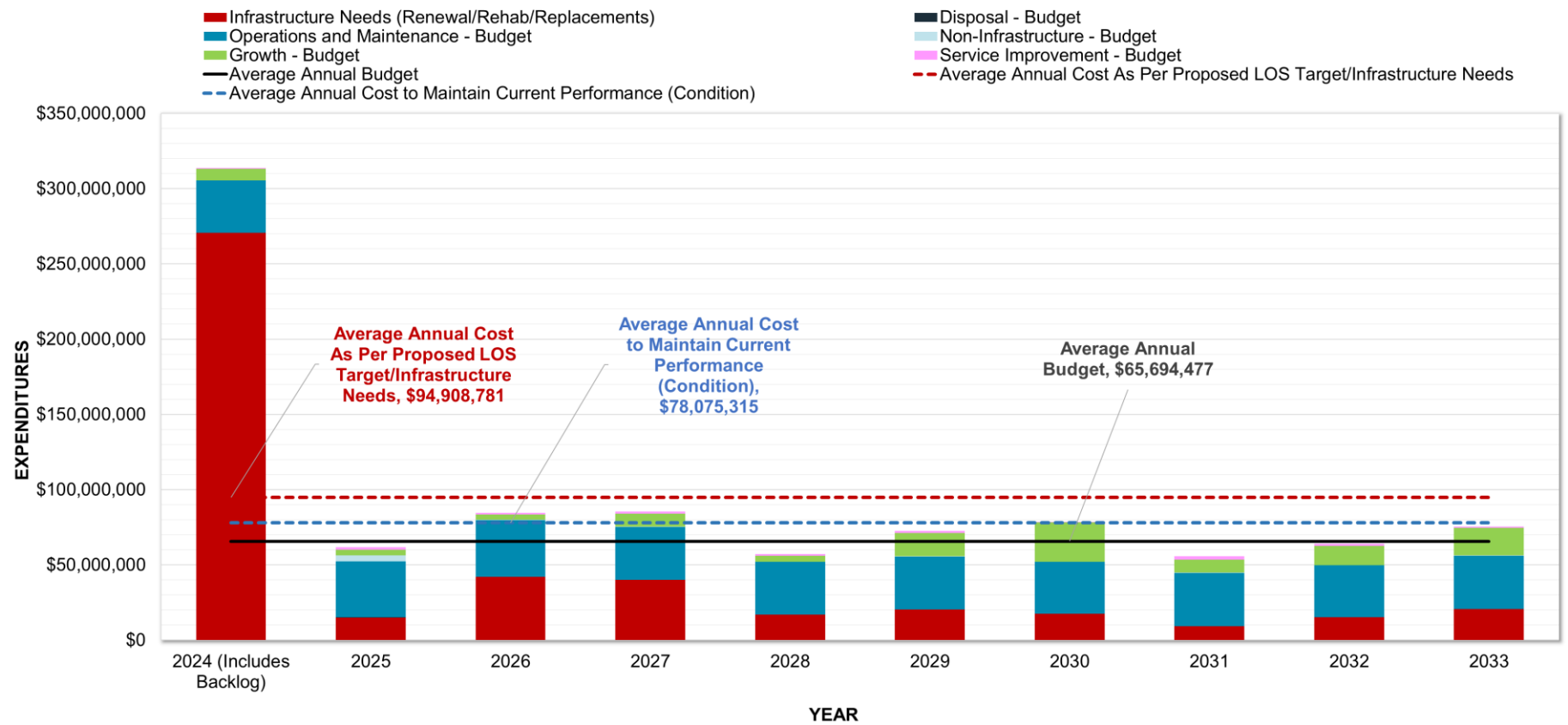


Figure 12-4. Town of Fort Erie Overall Required Expenditures - Scenario Comparison



12.2.1 Overall Infrastructure Gap

The overall infrastructure gap can be reviewed below for the Town. This information is then further broken down to tax supported and rate supported assets to reflect the different revenue sources of the assets.

12.2.1.1 Contributing Factors

There are many factors that have contributed to the infrastructure gap the Town is facing, particularly since the recommendations provided in the previous AMP. These factors include the following:

High Inflation Rates and Impact of COVID: Recent years, primarily since the COVID-19, have seen significant increases in inflation rates, as well as costs of all assets and their replacement costs (including construction, etc.). These increased costs have impacted municipality's ability to meet infrastructure needs, even when previous financial strategies were considered strong in years prior to COVID.

Updated Current Replacement Values: The Town has put significant efforts to ensure the replacement values represented in this plan are in line with present market conditions and reflect the increased costs across all asset categories. Construction costs of core infrastructure, replacement values for facilities and fleet have been particularly affected by these increases. The replacement values for the 2024 AMP have been compared to the 2019 AMP in Table 12-3. Since the previous AMP, the replacement values of Town assets have grown from \$1B to over \$2B. The previous AMP did not report on Digital Services, Emergency Services or Parks and Cemeteries.

Updated Condition Assessments: Since the previous AMP, the Town has updated many condition assessments to provide more accurate forecasts for the purposes of asset management. This has increased awareness and knowledge of the assets to provide a more accurate assessment than previously available.

Proposed LOS Targets: Setting proposed LOS targets, and a scenario to review the cost to achieve this target is something that was previously not provided in the last AMP. This requirement of the O.Reg. 588/17 is not required until July 2025. This new information has been assessed and provided as a part of this plan.

Improved Asset Information: The Town has improved information to be included within this plan, and have included assets not previously reported on, or have improved the information available on these assets. The previous plan did not have strong information to develop recommendations from and relied on a high-level assessment of the needs required for



assets. This plan has improved upon the information for assets and leveraged this information to provide enhance analysis of infrastructure needs.

Updated Lifecycle Strategies: The Town has leveraged technologies where available and have updated and developed lifecycle strategies where previously not available in the previous AMP. These strategies for the basis of the forecasts for the infrastructure needs, rather than a proposed reinvestment rate, as was leveraged in the previous AMP.

Table 12-3. 2019 and 2024 AMP Replacement Value Comparison

Asset Category	2019 AMP Replacement Value	2024 AMP Replacement Value	Percent Increase
Bridges and Culverts	\$37,350,500	\$62,232,400	67%
Digital Services	Not Reported	\$3,325,184	
Emergency Services	Not Reported	\$13,996,590	
Facilities	\$98,423,527	\$214,221,386 ¹⁷	118%
Fleet	Not Reported	\$13,300,576	
Natural Assets	Not Reported	\$115,760,000	
Parks and Cemeteries	Not Reported	\$36,570,375	
Roads	\$412,136,282	\$536,947,986	30%
Stormwater	\$156,184,476	\$401,462,862	157%
Wastewater	\$136,003,666	\$392,336,423	188%
Water	\$171,796,084	\$371,712,898	116%
Total	\$1,011,894,535	\$2,161,866,680	

12.2.1.2 Overall Infrastructure Gap

The infrastructure gap is calculated by comparing the forecasted renewal, rehabilitation, and replacement expenditures under each scenario against the Average Annual Budget attributed

¹⁷ Replacement value is based on the overall replacement value of the facility (similar to the 2019 AMP). The remainder of the analysis completed for the facilities within this AMP is based on the components of the facility derived from the building condition assessments.



to these assets. The AMP has identified an annual funding gap of \$12 million to maintain current LOS, and an annual gap of \$29 M to meet the proposed LOS as per lifecycle strategies that have been documented throughout this plan. An overview of the gap for all asset categories combined can be found in Table 12-4.

Table 12-4. Overall Average Annual Expenditures and Infrastructure Gap

Lifecycle Activity	Average Annual Budget	Average Annual Cost to Maintain Current LOS	Average Annual Cost As Per Proposed LOS Target/ Infrastructure Needs
Disposal	\$15,000	\$15,000	\$15,000
Growth	\$10,907,595	\$10,907,595	\$10,907,595
Non-Infrastructure	\$521,100	\$521,100	\$521,100
Operations & Maintenance	\$35,443,628	\$35,443,628	\$35,443,628
Renewal, Rehabilitation & Replacement	\$17,577,181	\$29,958,019	\$46,791,485
Service Improvement	\$1,229,973	\$1,229,973	\$1,229,973
Total	\$65,694,477	\$78,075,315	\$94,908,781
Average Annual Spending Gap		\$12,380,838	\$29,214,304
Percentage Increase Required to Address Gap		19%	44%

The gap has been determined based on the difference between the average annual budget for renewal, rehabilitation and replacement activities and the required annual average expenditures required for these activities to maintain current LOS and proposed LOS (as per infrastructure needs). The gap being faced by the Town is a result of a combination of aging infrastructure, increased replacement costs (as a result of the current market and inflation), as well as improved asset information that has been provided by the Town based on updated condition assessments completed since the previous 2019 AMP.

The cumulative results of these scenarios demonstrate that significant investment, along with the adoption of strategic asset management practices and policies will be required to meet expected spending requirements to meet current LOS, and an additional gap to meet proposed LOS. Left unaddressed, the impact of not developing strategies to close the gap can be seen in Figure 12-5. This shows the 10-year infrastructure gap at the end of the 10-year period, including the impact of inflation (this assumes a 2.5% rate of inflation).

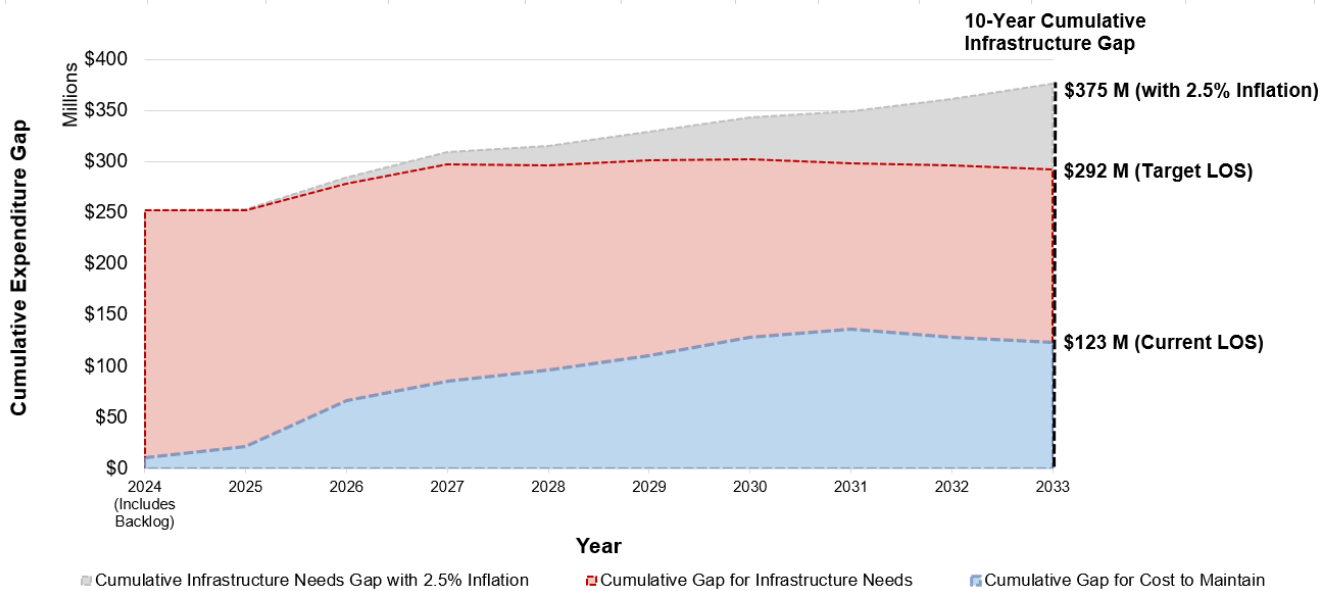


Figure 12-5. Cumulative 10-Year Infrastructure Gap and Impact of Inflation

Without strategies in place to close the infrastructure gap, the Town faces a total gap of \$375 million at the end of the 10-year period, factoring in inflation.

Closing the infrastructure gap is critical for ensuring the long-term sustainability and optimal performance of the Town’s assets. It may require multiple strategies to achieve this, which are explained further in 12.2.7 Financial Strategies to Address the Gap.

The infrastructure needs and gap are further described below, broken down by rate supported and tax supported assets to reflect the main source of revenue for these asset categories to further understand how revenues need to be increased to meet the needs and close the overall infrastructure gap.

12.2.2 Rate Supported Infrastructure Needs and Gap

The Town water and wastewater asset categories are supported by user rates, and an overview of their current average annual budget, expenditures required to meet current LOS, and the proposed LOS as per infrastructure needs and the infrastructure gap is described in Figure 12-6 and Table 12-5.

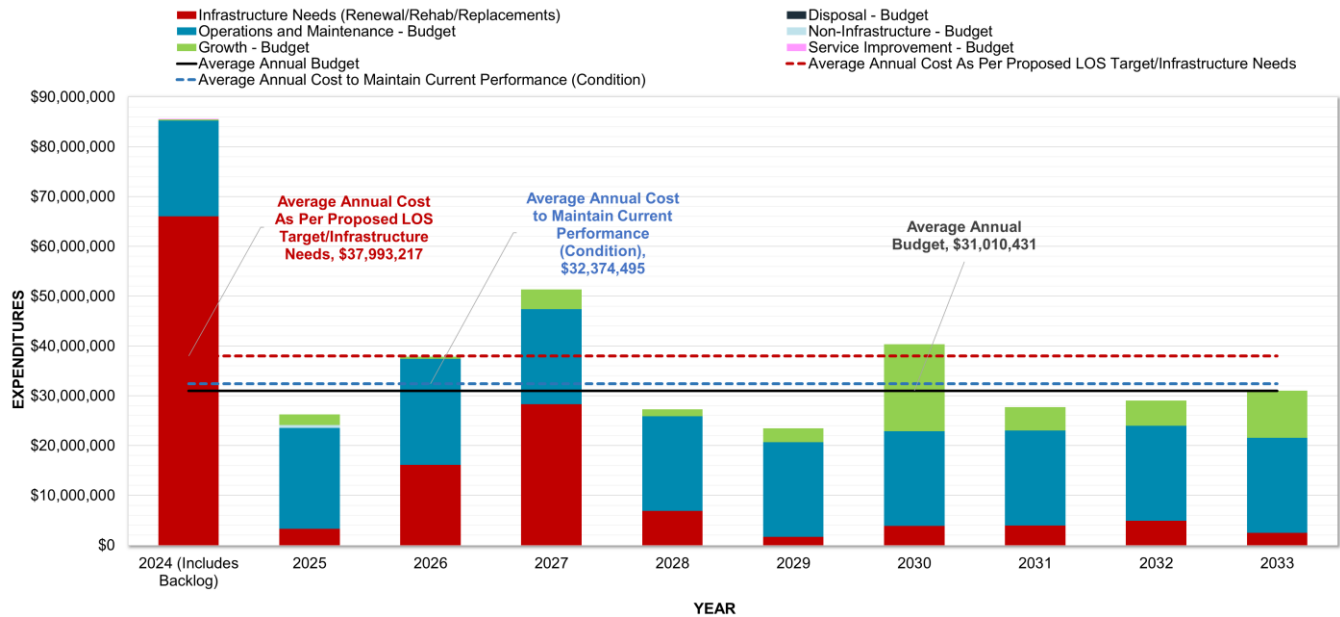


Figure 12-6. Rate Supported Assets (Water & Wastewater) Required Expenditures - Scenario Comparison

Table 12-5. Rate Supported Average Annual Expenditures and Infrastructure Gap

Lifecycle Activity	Average Annual Budget	Average Annual Cost to Maintain Current LOS	Average Annual Cost As Per Proposed LOS Target/ Infrastructure Needs
Disposal	\$0	\$0	\$0
Growth	\$4,768,267	\$4,768,267	\$4,768,267
Non-Infrastructure	\$62,500	\$62,500	\$62,500
Operations & Maintenance	\$19,412,503	\$19,412,503	\$19,412,503
Renewal, Rehabilitation & Replacement	\$6,756,161	\$8,120,226	\$13,738,948
Service Improvement	\$11,000	\$11,000	\$11,000
Total	\$31,010,431	\$32,374,495	\$37,993,217
Average Annual Spending Gap		\$1,364,064	\$6,982,787
Percentage Increase Required to Address Gap		4%	23%



The average annual funding gap for rate supported assets to meet the proposed LOS target as per infrastructure needs is broken down by asset category in Figure 12-7.

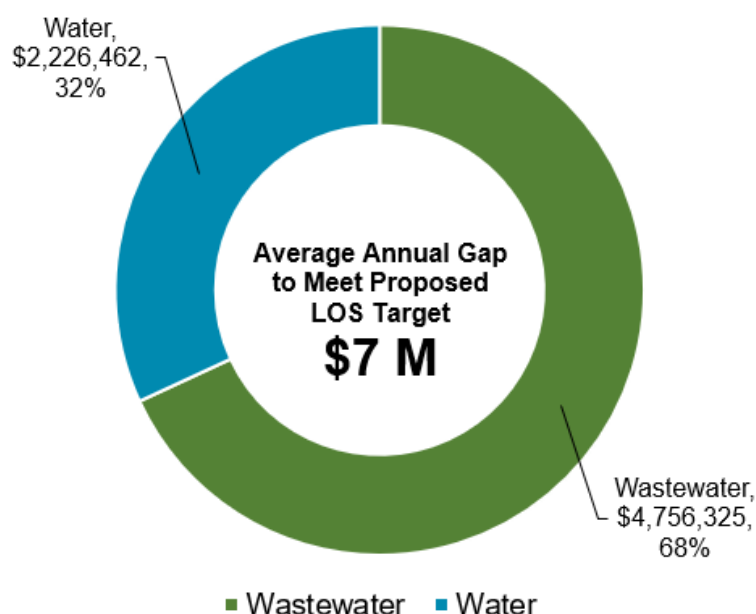


Figure 12-7. Annual Infrastructure Gap to Meet Proposed LOS for Rate Supported Assets by Asset Category

To further review the infrastructure gap of rate funded assets, Table 12-6 provides an overview of the 2024 AMP replacement value, the average gap to meet the proposed LOS, the gap as a percentage of replacement values, and the gap as a percentage of the 2024 water and wastewater (W/WW) budget.

The Town currently has a capital reserve policy, which has been leveraged to close the gap that was defined by the previous AMP. This policy states the optimal target annual contribution to be 2% of estimated replacement cost of the assets for water and sanitary sewer refurbishing, and 10% for dedicated water meter replacement. Based on this methodology, the previous optimal target can be found in Table 12-7, along with the updated 2024 optimal reserve contribution based on 2024 current replacement values, which have significantly increased since the previous AMP, beyond anticipated inflation rates.



Table 12-6. Rate Supported Asset Overview of Gaps and Considerations to Close the Gap

Asset Category	Total Replacement Value	Average Annual Budget for Rehab/Replacement Activities	Average Annual Need for Proposed LOS (Rehab/Replacement Activities)	Average Annual Gap for Proposed LOS	Gap As Percentage of Replacement Value	Gap as Percentage of Total 2024 W/WW Budget
Wastewater	\$392,336,423	\$3,971,787	\$8,728,111	\$4,756,325	1%	20%
Water	\$371,712,898	\$2,784,375	\$5,010,837	\$2,226,462	1%	10%
Total	\$764,049,321	\$6,756,162	\$13,738,948	\$6,982,787	1%	30%

Table 12-7. Rate Supported Reserve Overview

Asset Category	2024 Reserve Balance (less 2024 Capital Program)	2024 Reserve Contribution	Annual Optimal Reserve Contribution (as per Capital Reserve Policy)	Updated Annual Optimal Reserve Contribution (2024 AMP Replacement Values)	Optimal Reserve Contribution Shortage
Wastewater	\$2,758,660	\$2,097,348	\$2,040,000	\$7,846,728	(\$5,806,728)
Water	\$4,039,897	\$2,623,981	\$2,420,000	\$8,449,249	(\$6,029,249)
Total	\$6,798,557	\$4,721,329	\$4,460,000	\$16,295,977	(\$11,835,977)



It is recommended that the Town update the replacement values used to determine the optimal annual reserve contribution to be reflective of current replacement values established within this plan. The Town has increased reserve contributions based on inflation, to go above established target optimal contributions, but still experiencing a shortfall based on the large increase to the cost to replace water and wastewater assets since the previous AMP. Based on the Town's current policy, and the optimal annual reserve contribution, the Town should be contributing approximately \$12M more annually to reserves, if using the updated replacement values provided in this AMP. This increase to reserves would assist the Town in closing the gap currently being faced by the Town for water and wastewater assets to meet proposed LOS, and meet future needs not identified in this plan.

Further to the recommendations to increase reserve contributions, it is recommended that the Town continue to explore and consider the additional financial strategies outlined in 12.2.7 Financial Strategies to Address the Gap, which outlines both financial and non-financial strategies that can be leveraged to close the gap for rate supported assets. The Town's current project to implement a maintenance management system will further enhance the Town's knowledge of its assets and will provide improved forecasts once fully mature.

Particularly for the wastewater assets, there is potential for less costly interventions, that would decrease the infrastructure gap for these assets, including spot repairs and relining, where appropriate. These are required to be reviewed on a per asset basis to determine the options available for wastewater assets, and at this time are not able to be forecast for the purposes of this AMP.

12.2.3 Tax Supported Infrastructure Needs and Gap

Tax supported assets in the Town include Bridges and Culverts, Roads, Stormwater, Digital Services, Emergency Services, Facilities, Fleet and Parks and Cemeteries. An overview of their current average annual budget, expenditures required to meet current LOS, and the proposed LOS as per infrastructure needs and the infrastructure gap is described in Figure 12-8 and Table 12-8.

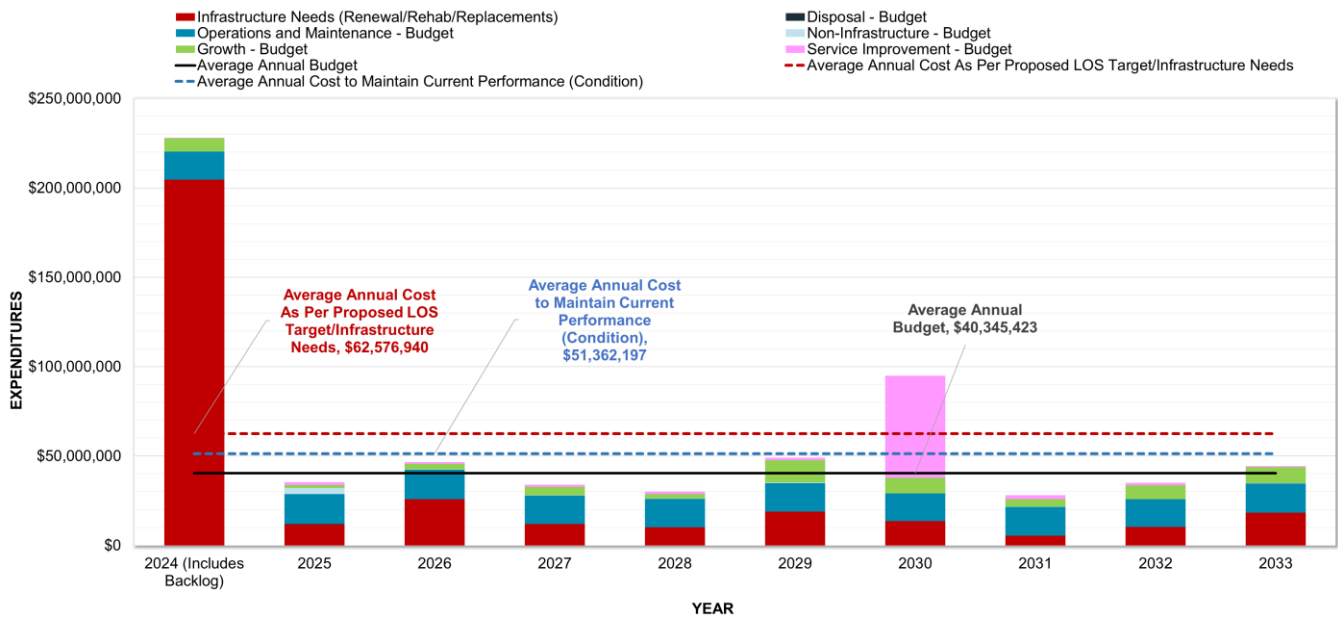


Figure 12-8. Tax Supported Required Expenditures - Scenario Comparison

Table 12-8. Tax Supported Average Annual Expenditures and Infrastructure Gap

Lifecycle Activity	Average Annual Budget	Average Annual Cost to Maintain Current LOS	Average Annual Cost as Per Proposed LOS Target/ Infrastructure Needs
Disposal	\$15,000	\$15,000	\$15,000
Growth	\$6,139,328	\$6,139,328	\$6,139,328
Non-Infrastructure	\$458,600	\$458,600	\$458,600
Operations & Maintenance	\$16,031,126	\$16,031,126	\$16,031,126
Renewal, Rehabilitation & Replacement	\$10,821,020	\$21,837,794	\$33,052,537
Service Improvement	\$6,880,350	\$6,880,350	\$6,880,350
Total	\$40,345,423	\$51,362,197	\$62,576,940
Average Annual Spending Gap		\$11,016,774	\$22,231,517
Percentage Increase Required to Address Gap		27%	55%

The average annual funding gap for tax supported assets to meet the proposed LOS target as per infrastructure needs is broken down by asset category in Figure 12-9.

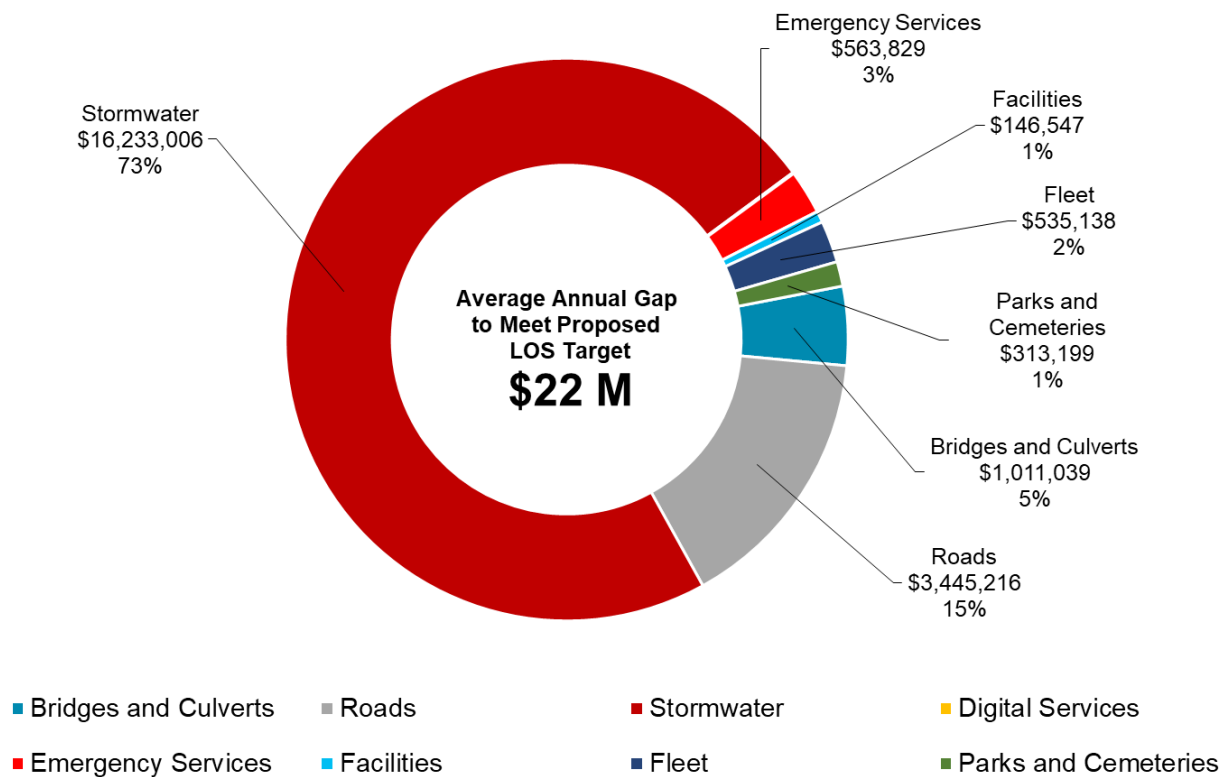


Figure 12-9. Annual Infrastructure Gap to Meet Proposed LOS for Tax Supported Assets by Asset Category

To further review the infrastructure gap of rate funded assets, Table 12-9 provides an overview of the 2024 AMP replacement value, the average gap to meet the proposed LOS, and the gap as a percentage of the replacement value, and the 2024 Budget.

The Town currently has a capital reserve policy, which has been leveraged to close the gap that was defined by the previous AMP. This policy states the optimal target annual contribution to be 2% of estimated replacement cost of the assets for water and sanitary sewer refurbishing, and 10% for dedicated water meter replacement. Based on this methodology, the previous optimal target can be found in Table 12-10, along with the updated 2024 optimal reserve contribution based on 2024 current replacement values, which have significantly increased since the previous AMP, beyond anticipated inflation rates.

Stormwater represents the largest gap for tax supported assets. There is potential for less costly interventions for this asset category, that would decrease the infrastructure gap which include spot repairs and relining, where appropriate. These are required to be reviewed on a per asset basis to determine the options available for wastewater assets, and at this time are not able to be forecast for the purposes of this AMP.



Table 12-9. Tax Supported Asset Overview of Gaps and Considerations to Close the Gap

Asset Category	Total Replacement Value	Average Annual Budget for Rehab/ Replacement Activities	Average Annual Need for Proposed LOS (Rehab/ Replacement Activities)	Average Annual Gap for Proposed LOS	Gap As Percentage of Replacement Value	Gap as Percentage of Total 2024 Levy Budget
Bridges and Culverts	\$62,232,400	\$1,100,275	\$2,111,314	\$1,011,039	2%	2%
Roads	\$536,947,986	\$3,895,529	\$7,340,745	\$3,445,216	1%	8%
Stormwater	\$401,462,862	\$2,157,136	\$18,390,143	\$16,233,006	4%	36%
Digital Services*	\$1,593,777	\$170,353	\$153,895	No Gap	No Gap	0%
Emergency Services	\$13,996,590	\$555,200	\$1,119,029	\$563,829	4%	1%
Facilities	\$214,221,386	\$1,093,500	\$1,240,047	\$146,547	0%	0%
Fleet	\$13,300,576	\$630,000	\$1,165,138	\$535,138	4%	1%
Parks and Cemeteries	\$36,570,375	\$1,219,027	\$1,532,227	\$313,199	1%	1%
Total	\$1,280,325,952	\$10,821,020	\$33,052,538	\$22,231,516	14%	49%

**Table 12-10. Tax Supported Assets Reserve Overview**

Asset Category	2024 Reserve Balance (less 2024 Capital Program)	2024 Reserve Contribution	Optimal Reserve Contribution (as per Capital Reserve Policy)	Updated Annual Optimal Reserve Contribution (2024 AMP Replacement Values)	Optimal Reserve Contribution Shortage
Bridges and Culverts	(\$30,232)	\$575,260	\$290,000	\$1,244,648	(\$954,648)
Roads	(\$2,646,906)	\$4,062,961	\$6,000,000	\$10,738,960	(\$4,738,960)
Stormwater	(\$1,804,806)	\$2,092,572	\$2,020,000	\$8,029,257	(\$6,009,257)
Digital Services*	\$489,243	\$320,217	\$200,000	\$318,755	(\$118,755)
Emergency Services	\$1,234,077	\$587,513	\$580,000	\$1,399,659	(\$819,659)
Facilities	\$536,037	\$1,244,090	\$1,798,800	\$6,748,523	(\$4,949,723)
Fleet	\$919,937	\$546,672	\$427,000	\$1,330,058	(\$903,058)
Parks and Cemeteries	\$1,658,369	\$900,255	\$685,000	\$1,828,519	(1,143,519)
Total	\$355,719	\$10,329,540	\$12,000,800	\$31,638,379	(\$19,637,579)



Currently the Town has a target optimal annual reserve contribution of 2%-10% of the estimated replacement cost for the various tax supported assets. It is recommended that the Town update the replacement values used to determine the optimal annual reserve contribution to be reflective of current replacement values established within this plan. Based on the Town's current policy, and the optimal annual reserve contribution, the Town should be contributing approximately \$19M more annually to reserves, if using the updated replacement values provided in this AMP. With this approach, the gap would be lowered from \$22M to less than \$3M. This remaining gap could then be addressed by leveraging multiple strategies recommended, including non-financial, and financial strategies, which are outlined below in Section 12.2.7. It is also recommended that dedicated reserves for parks and natural assets be established. The Town currently has a reserve for Parklands which is funded by cash payments in lieu of the conveyance of land under a plan of subdivision.

The gap was determined based on the best information available at the time of the development of the AMP. It is recommended that the Town further review the non-financial strategies, including to review estimated service lives, LOS targets, and lifecycle strategies prior to implementing any financial strategies to close the gap.

12.2.4 Proposed Levels of Service Achievability

The Town has set proposed levels of service to meet the infrastructure needs of the assets based on lifecycle management strategies developed by subject matter experts and based on best practices. To accomplish these targets, the Town will need to establish multiple strategies to address the gaps identified above. The targets are achievable if immediate actions are taken to address the shortfall in funding, as well as to analyze other options to close the infrastructure gap through lifecycle management strategies and levels of service.

To achieve the targets set out in this plan, the Town will have to complete further renewal, rehabilitation, and replacement activities, as identified within the chapters of this plan. These activities represent the Town's best alternative to meet proposed LOS, and avoid the risks associated with asset ownership.

12.2.5 Risk Associated with Lifecycle Strategies and Levels of Service

Following the lifecycle strategies and activities outlined in this AMP are the Town's best way to avoid risk. Ignoring the infrastructure gap, and not completing lifecycle activities and strategies to meet proposed LOS as outlined in this AMP can lead to a range of negative consequences, both immediate and long-term. These risks and their consequences at a high level include:



Deterioration of Infrastructure and Asset Failure: Without proper investments for renewal, rehabilitation and replacement activities, infrastructure assets will deteriorate over time, leading to increased breakdowns, service disruptions, and potentially safety hazards.

Decreased Operational Efficiency: Without proper lifecycle management strategies, infrastructure may become inefficient, leading to increased downtime, delays, and reduced productivity.

Increased Costs: Delaying infrastructure investments leads to higher costs in the long run. Deferred maintenance and rehabilitations can result in more extensive reactive maintenance, or the need for premature asset replacements, which are significantly more expensive than timely maintenance and upgrades. Ultimately by not adequately keeping assets in a good state of repair leads to higher lifecycle cost.

Improper Forecasts: Many non-infrastructure activities such as master plans, and asset management planning, provide valuable insights into the infrastructure needs. If these activities are not completed, it can lead to inaccurate estimations for funding requirements and capacity requirements.

Service Disruptions: The deterioration of assets often leads to unplanned and unexpected disruptions to the services the community currently enjoys and relies on through asset failures.

Negative Impact to Quality of Life: Poor infrastructure affects the quality of life for residents, including issues like traffic congestion, inadequate public transportation, sewer backups, basement flooding, or lack of access to services. Assets in poor working order also increase the risk of potential health and safety impacts.

Environmental Impacts: Inefficient infrastructure can have adverse environmental impacts such as increased emissions from old facility or fleet assets, or sewage reaching the environment through leaks in pipes. This also increases the potential risk of not meeting regulatory requirements.

Regulatory Non-Compliance: Many of the assets, in particular Water and Transportation, are highly regulated assets that require assets to be properly maintained and reported on their compliance. Failure to meet regulatory requirements for infrastructure maintenance and safety can result in fines, penalties, legal actions, and possible loss of licenses or permits.

Loss of Public Trust and Confidence: Persistent neglect of infrastructure needs can erode public trust and undermine confidence in the ability of leaders to address pressing challenges.



Negative Economic Impact: Inadequate infrastructure can hinder economic growth because of inefficient and unreliable services to residents and businesses.

Safety Risks: Aging or poorly maintained infrastructure can pose safety hazards to users, workers, and the surrounding community, potentially leading to accidents, injuries, or even fatalities.

Addressing infrastructure needs requires proactive planning, investment, and ongoing maintenance to ensure the resilience and vitality of the community while mitigating the various risks outlined above.

12.2.6 Risk Management Strategies Associated with Infrastructure Gap

O.Reg. 588/17 requires that the Town identify how the risks of not undertaking lifecycle strategies, and meeting proposed LOS, will be managed. As discussed, there are risks associated with not completing lifecycle activities according to the strategies discussed throughout this plan. The Town can effectively manage the risks of not meeting infrastructure needs by implementing several strategies focused on improving maintenance, prioritizing high-risk assets, and enhancing overall asset management practices.

The Town currently handles the risks associated with not receiving the funding required to complete all infrastructure needs, and will continue to do so, in the following ways:

Maintenance Activities: The Town continually maintains assets to the best of their ability based on the funding available to attempt to prolong asset life where needed. Many assets are kept beyond suggested service lives, and where possible, maintained to keep them in working order until such time that funding is available for renewals and replacements.

Prioritizing Assets Based on Risk: Resources available are strategically assigned to higher risk and priority assets, based on staff expertise, ensuring limited budgets are used effectively to mitigate the most risk.

Technology and Data: Through the implementation of the work management system, Geographic Information Systems, and decision support tools available, the Town has leveraged technology to assist in making informed decisions and prioritizing asset renewals, rehabilitations, and replacements.

Asset Management Practices: The Town has continued to develop their asset management program and practices to enhance decision-making and provide valuable input into where funding dollars should be spent.

Regulatory and Compliance with Standards: The Town ensures compliance with all regulatory and safety standards to avoid risk.



By focusing on these strategies, the Town continues to mitigate risks associated with not completing lifecycle management strategies. While the Town continues to develop strategies to meet the funding gap, these strategies will continue to be implemented and enhanced to mitigate the risks associated with not meeting the proposed LOS.

12.2.7 Financial Strategies to Address the Gap

As the previous section demonstrates, there is a significant gap between the currently projected infrastructure needs and the current funding levels. To address this gap, the Town will need to explore options to increase funding, reduce the projected infrastructure costs or a combination of the two. Addressing the gap will require careful consideration and a combination of strategies, including non-financial and financial, some of which are outlined below. Many of the non-financial strategies are best practices in Asset Management, and these strategies are recommended to be explored prior to implementing any financial strategies.

Non-Financial Strategies

Advocacy: Advocating for increased funding support from senior levels of government and seeking partnerships with neighbouring municipalities to share resources and costs.

Community Engagement: Engaging with the community to communicate the importance of infrastructure investment and potentially garner support for additional funding measures. This will also be beneficial when evaluating target performance for LOS.

Asset Management Practices and Lifecycle Management Strategies: It is recommended that the Town review other options for lifecycle management strategies which will improve the condition of assets through less costly interventions where applicable. Particularly for the storm and wastewater assets, there are spot repair and relining options that will allow for the Town to close the gap at a lower cost. These options need to be further evaluated by the Town on a per asset basis.

Asset Prioritization: Identifying critical assets and focusing resources on maintaining those that are most essential for public safety and service delivery.

Efficiency Measures: Implementing measures to optimize asset management processes and reduce operational costs where possible.

Levels of Service Targets: The Town has set the levels of service targets to meet infrastructure needs. The Town will have the opportunity to evaluate these needs and targets to determine their achievability on an annual basis.

Long-Term Planning: Continue to develop long-term financial plans that allocate resources strategically over multiple budget cycles to address both immediate needs and reduce the



backlog over time. The Town has begun these efforts and is working on the implementation of maintenance management software as well as decision support tools to support these efforts.

Financial Strategies

Reserves & Reserve Funds: The Town currently has a capital reserve fund policy that has helped to ensure that the Town is leveraging the use of reserves to save up and create a buffer for years with high capital expenditures. These reserves are funded by sources such as taxes, user fees, grants, etc. The reserve policy outlines target optimal annual contributions based on a percentage of replacement values of specific asset categories ranging from 2-10%. It is recommended that the Town update the replacement values used to determine the optimal rates to be reflective of the updated replacement values outlined within this plan. The updated optimal reserve contributions can be found in 12.2.2 and 12.2.3.

Debt Financing: Consideration of debt financing for construction or acquisition of assets. This will increase the overall cost, as annual repayment includes interest. The municipality has constraints with the amount that it can borrow, but currently the Town has very limited debt.

Grant Funding: Continue to apply and search for opportunities for further grant funding. The Town currently receives Gas Tax and Ontario Community Infrastructure Fund (OCIF) funding, as well as other grants and funds as they are available.

Revenue Increase & Infrastructure Levy: Consider revenue increases to fund the infrastructure gap through incremental tax increases, as well as a dedicated Infrastructure Levy. Tax revenue increases required to meet the funding gap can be found in 12.2.3, although it is recommended that the Town review the information provided in this AMP to assess what other strategies can be utilized to close the infrastructure gap before committing to any financial strategies.

User Fees and Charges: Implementing or adjusting fees and charges for municipal services to address the gap in renewals and replacements for the systems. Rate increases required to meet the funding gap can be found 12.2.2, although it is recommended that the Town review the information provided in this AMP to assess what other strategies can be utilized to close the infrastructure gap before committing to any financial strategies.

Growth: Increasing density and new developments can provide additional revenue produced from taxes and rates, particularly if new growth is focused in areas where the costs to service the development are less than the additional revenues. The Town's Development Charge Study was recently updated (end of 2023), and it is assumed the updated rates and the forecasted DC reserve balances as a result of this study, will be incorporated appropriately into the Town's 10-year capital budget and forecast.



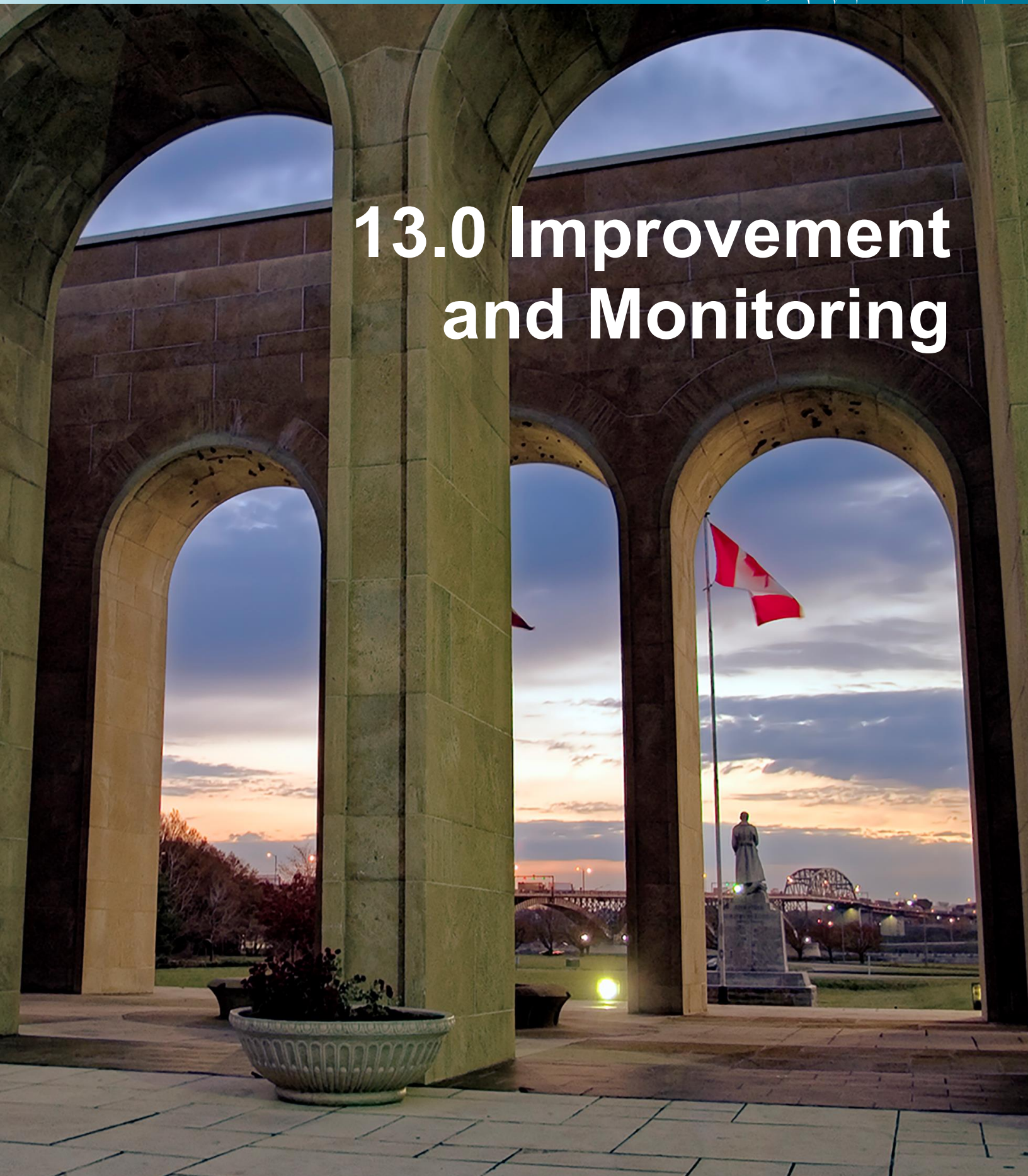
Divestitures: The Town may need to sell assets, providing revenue from the proceeds, as well as reducing operating and maintenance costs. This option is not possible with many asset types (such as linear infrastructure like watermain).

By adopting a combination of strategies, the Town can better address the infrastructure gap, improve service delivery, and enhance the quality of life for residents while ensuring fiscal sustainability and responsible stewardship of public resources.

The Town plans to take the information provided within this plan to further develop a financial plan to address the infrastructure gap.



13.0 Improvement and Monitoring





13 Improvement and Monitoring Plan

Asset management is inherently about continual improvement. This philosophy ensures that infrastructure and other assets are maintained and upgraded efficiently to meet current and proposed levels of service. The Town has taken a proactive approach to asset management, recognizing the importance of continually improving its forecasting and planning processes and leveraging new technologies to make better decisions about asset investments.

This improvement plan provides an overview of O.Reg. 588/17 compliance, improvements made since the previous 2019 plan, and opportunities for further improvements.

13.1 O.Reg. 588/17 Compliance

The requirements and compliance of O.Reg. 588/17 of this plan can be found below in Table 13-1. Upon endorsement of this plan by the Town's executive lead, and upon approval by resolution of Town council, the Town will be fully compliant with the regulation requirements for 2024 and 2025 Asset Management Plans.

Following the 2025 requirement deadline, the Town will be required to provide an update to Town Council on the progress in implementing this asset management plan on an annual basis.

The Town's Strategic Asset Management Policy, developed in 2019, is due to be reviewed and updated, if necessary, by 2024 to be in line with the regulation.

Table 13-1. O.Reg. 588/17 Compliance Overview

Section	Regulation Requirement	Compliant Check
4.	Every municipality shall prepare its first strategic asset management policy by July 1, 2019, and shall review and, if necessary, update it at least every five years.	Review and update due by 2024
5.(1)	Every municipality shall prepare an asset management plan in respect of its core municipal infrastructure assets by July 1, 2022, and in respect of all of its other municipal infrastructure assets by July 1, 2024.	Yes
5. (2)	A municipality's asset management plan must include the following:	



Section	Regulation Requirement	Compliant Check
5. (2) 1.	For each asset category, the current levels of service being provided, determined in accordance with the following qualitative descriptions and technical metrics and based on data from at most the two calendar years prior to the year in which all information required under this section is included in the asset management plan	Yes
5. (2) 1. i.	With respect to core municipal infrastructure assets, the qualitative descriptions set out in Column 2 and the technical metrics set out in Column 3 of Table 1, 2, 3, 4 or 5, as the case may be.	Yes
5. (2) 1. ii.	With respect to all other municipal infrastructure assets, the qualitative descriptions and technical metrics established by the municipality.	Yes
5. (2) 2.	The current performance of each asset category, determined in accordance with the performance measures established by the municipality, such as those that would measure energy usage and operating efficiency, and based on data from at most two calendar years prior to the year in which all information required under this section is included in the asset management plan	Yes
5.(2) 3.	For each asset category,	Yes
5.(2) 3. i.	A summary of the assets in the category,	Yes
5.(2) 3. ii.	The replacement cost of the assets in the category,	Yes
5.(2) 3. iii.	The average age of the assets in the category, determined by assessing the average age of the components of the assets,	Yes
5.(2) 3. iv.	The information available on the condition of the assets in the category, and	Yes



Section	Regulation Requirement	Compliant Check
5.(2) 3. v.	A description of the municipality's approach to assessing the condition of the assets in the category, based on recognized and generally accepted good engineering practices where appropriate.	Yes
5.(2) 4.	For each asset category, the lifecycle activities that would need to be undertaken to maintain the current levels of service as described in paragraph 1 for each of the 10 years following the year for which the current levels of service under paragraph 1 are determined and the costs of providing those activities based on an assessment of the following:	Yes
5.(2) 4. i.	The full lifecycle of the assets	Yes
5.(2) 4. ii.	The options for which lifecycle activities could potentially be undertaken to maintain the current levels of service.	Yes
5.(2) 4. iii.	The risks associated with the options referred to in subparagraph ii.	Yes
5.(2) 4. iv.	The lifecycle activities referred to in subparagraph ii that can be undertaken for the lowest cost to maintain the current levels of service.	Yes
5.(2) 5.	For municipalities with a population of less than 25,000, as reported by Statistics Canada in the most recent official census, the following:	N/A
5.(2) 5. i.	A description of assumptions regarding future changes in population or economic activity.	N/A
5.(2) 5. ii.	How the assumptions referred to in subparagraph i relate to the information required by paragraph 4.	N/A



Section	Regulation Requirement	Compliant Check
5.(2) 6.	For municipalities with a population of 25,000 or more, as reported by Statistics Canada in the most recent official census, the following:	Yes
5.(2) 6. i.	With respect to municipalities in the Greater Golden Horseshoe growth plan area, if the population and employment forecasts for the municipality are set out in Schedule 3 or 7 to the 2017 Growth Plan, those forecasts.	N/A
5.(2) 6. ii.	With respect to lower-tier municipalities in the Greater Golden Horseshoe growth plan area, if the population and employment forecasts for the municipality are not set out in Schedule 7 to the 2017 Growth Plan, the portion of the forecasts allocated to the lower-tier municipality in the official plan of the upper-tier municipality of which it is a part.	Yes
5.(2) 6. iii.	With respect to upper-tier municipalities or single-tier municipalities outside of the Greater Golden Horseshoe growth plan area, the population and employment forecasts for the municipality that are set out in its official plan.	N/A
5.(2) 6. iv.	With respect to lower-tier municipalities outside of the Greater Golden Horseshoe growth plan area, the population and employment forecasts for the lower-tier municipality that are set out in the official plan of the upper-tier municipality of which it is a part.	N/A
5.(2) 6. v.	If, with respect to any municipality referred to in subparagraph iii or iv, the population and employment forecasts for the municipality cannot be determined as set out in those subparagraphs, a description of assumptions regarding future changes in population or economic activity.	N/A



Section	Regulation Requirement	Compliant Check
5.(2) 6. vi.	For each of the 10 years following the year for which the current levels of service under paragraph 1 are determined, the estimated capital expenditures and significant operating costs related to the lifecycle activities required to maintain the current levels of service in order to accommodate projected increases in demand caused by growth, including estimated capital expenditures and significant operating costs related to new construction or to upgrading of existing municipal infrastructure assets.	Yes
5. (3)	Every asset management plan must indicate how all background information and reports upon which the information required by paragraph 3 of subsection (2) is based will be made available to the public.	Yes
5. (4)	In this section, “2017 Growth Plan” means the Growth Plan for the Greater Golden Horseshoe, 2017 that was approved under subsection 7 (6) of the Places to Grow Act, 2005 on May 16, 2017 and came into effect on July 1, 2017; (“Plan de croissance de 2017”) “Greater Golden Horseshoe growth plan area” means the area designated by section 2 of Ontario Regulation 416/05 (Growth Plan Areas) made under the Places to Grow Act, 2005	
6. (1)	Asset management plans, proposed levels of service Subject to subsection (2), by July 1, 2024 (2025), every asset management plan prepared under section 5 must include the following additional information:	Yes



Section	Regulation Requirement	Compliant Check
6. (1) 1.	For each asset category, the levels of service that the municipality proposes to provide for each of the 10 years following the year in which all information required under section 5 and this section is included in the asset management plan, determined in accordance with the following qualitative descriptions and technical metrics:	Yes
6. (1) 1. i.	With respect to core municipal infrastructure assets, the qualitative descriptions set out in Column 2 and the technical metrics set out in Column 3 of Table 1, 2, 3, 4 or 5, as the case may be.	Yes
6. (1) 1. ii.	With respect to all other municipal infrastructure assets, the qualitative descriptions and technical metrics established by the municipality.	Yes
6. (1) 2.	An explanation of why the proposed levels of service under paragraph 1 are appropriate for the municipality, based on an assessment of the following:	Yes
6. (1) 2. i.	The options for the proposed levels of service and the risks associated with those options to the long-term sustainability of the municipality.	Yes
6. (1) 2. ii.	How the proposed levels of service differ from the current levels of service set out under paragraph 1 of subsection 5 (2).	Yes
6. (1) 2. iii.	Whether the proposed levels of service are achievable.	Yes
6. (1) 2. iv.	The municipality's ability to afford the proposed levels of service.	Yes



Section	Regulation Requirement	Compliant Check
6. (1) 3.	The proposed performance of each asset category for each year of the 10-year period referred to in paragraph 1, determined in accordance with the performance measures established by the municipality, such as those that would measure energy usage and operating efficiency.	Yes
6. (1) 4.	A lifecycle management and financial strategy that sets out the following information with respect to the assets in each asset category for the 10-year period referred to in paragraph 1:	Yes
6. (1) 4. i.	An identification of the lifecycle activities that would need to be undertaken to provide the proposed levels of service described in paragraph 1, based on an assessment of the following:	Yes
6. (1) 4. i. A.	The full lifecycle of the assets.	Yes
6. (1) 4. i. B.	The options for which lifecycle activities could potentially be undertaken to achieve the proposed levels of service.	Yes
6. (1) 4. i. C.	The risks associated with the options referred to in sub-subparagraph B.	Yes
6. (1) 4. i. D.	The lifecycle activities referred to in sub-subparagraph B that can be undertaken for the lowest cost to achieve the proposed levels of service.	Yes
6. (1) 4. ii.	An estimate of the annual costs for each of the 10 years of undertaking the lifecycle activities identified in subparagraph i, separated into capital expenditures and significant operating costs.	Yes
6. (1) 4. iii.	An identification of the annual funding projected to be available to undertake lifecycle activities and an explanation of the options examined by the municipality to maximize the funding projected to be available.	Yes



Section	Regulation Requirement	Compliant Check
6. (1) 4. iv.	If, based on the funding projected to be available, the municipality identifies a funding shortfall for the lifecycle activities identified in subparagraph i,	Yes
6. (1) 4. iv. A.	An identification of the lifecycle activities, whether set out in subparagraph i or otherwise, that the municipality will undertake, and	Yes
6. (1) 4. iv. B.	If applicable, an explanation of how the municipality will manage the risks associated with not undertaking any of the lifecycle activities identified in subparagraph i.	Yes
6. (1) 5.	For municipalities with a population of less than 25,000, as reported by Statistics Canada in the most recent official census, a discussion of how the assumptions regarding future changes in population and economic activity, set out in subparagraph 5 i of subsection 5 (2), informed the preparation of the lifecycle management and financial strategy referred to in paragraph 4 of this subsection.	N/A
6. (1) 6.	For municipalities with a population of 25,000 or more, as reported by Statistics Canada in the most recent official census,	Yes
6. (1) 6. i.	The estimated capital expenditures and significant operating costs to achieve the proposed levels of service as described in paragraph 1 in order to accommodate projected increases in demand caused by population and employment growth, as set out in the forecasts or assumptions referred to in paragraph 6 of subsection 5 (2), including estimated capital expenditures and significant operating costs related to new construction or to upgrading of existing municipal infrastructure assets,	Yes
6. (1) 6. ii.	The funding projected to be available, by source, as a result of increased population and economic activity, and	Yes



Section	Regulation Requirement	Compliant Check
6. (1) 6. iii.	An overview of the risks associated with implementation of the asset management plan and any actions that would be proposed in response to those risks.	Yes
6. (1) 7.	An explanation of any other key assumptions underlying the plan that have not previously been explained.	Yes
6. (2)	With respect to an asset management plan prepared under section 5 on or before July 1, 2021, if the additional information required under this section is not included before July 1, 2023, the municipality shall, before including the additional information, update the current levels of service set out under paragraph 1 of subsection 5 (2) and the current performance measures set out under paragraph 2 of subsection 5 (2) based on data from the two most recent calendar years.	Yes
7. (1)	Every municipality shall review and update its asset management plan at least five years after the year in which the plan is completed under section 6 and at least every five years thereafter.	N/A until after 2025 AMP deadline
7. (2)	The updated asset management plan must comply with the requirements set out under paragraphs 1, 2 and 3 and subparagraphs 5 i and 6 i, ii, iii, iv and v of subsection 5 (2), subsection 5 (3) and paragraphs 1 to 7 of subsection 6 (1).	N/A until after 2025 AMP deadline
8	Every asset management plan prepared under section 5 or 6, or updated under section 7, must be,	Yes
8.(a)	Endorsed by the executive lead of the municipality; and	Yes, upon endorsement of executive lead



Section	Regulation Requirement	Compliant Check
8.(b)	Approved by a resolution passed by the municipal council.	Yes, upon approved resolution passed by municipal council
9. (1)	Every municipal council shall conduct an annual review of its asset management progress on or before July 1 in each year, starting the year after the municipality's asset management plan is completed under section 6.	N/A until after 2025
9. (2)	The annual review must address,	N/A until after 2025
9. (2) (a)	The municipality's progress in implementing its asset management plan;	N/A until after 2025
9. (2) (b)	Any factors impeding the municipality's ability to implement its asset management plan; and	N/A until after 2025
9. (2) (c)	A strategy to address the factors described in clause (b).	N/A until after 2025
10.	Every municipality shall post its current strategic asset management policy and asset management plan on a website that is available to the public and shall provide a copy of the policy and plan to any person who requests it.	Yes

13.2 Improvements Since 2019 AMP

The Town has continued to mature their asset management program by addressing many of the recommendations that were provided in the 2019 Asset Management Plan. The status of these improvements can be found in Table 13-2.



Table 13-2. 2019 AMP Recommendation Update

2019 AMP Recommendation	Status
AMP Data Management Plan	
Business Process/Workflow Development	Complete/Ongoing
Outline Roles & Responsibilities	Complete/Ongoing
Data Management and Business Process Improvement Plan	
Document Existing Data Sources, Authors, Contributors, and Consumers	Complete
Document Existing and Future Functional Needs	Complete
Defining Gaps, Consolidation, and Rightsizing Opportunities	Complete/Ongoing
Definition Data Intake Standards	
Development/Population of Centralized Asset Data Register	In Progress
Define Amalgamate Requirements, and Develop Software Functional Specifications	Complete
Software Recommendations	
Corporate Maintenance Management Work Order System	In Progress
Corporate Decision Support System (DSS)	In Progress
Non-Proprietary Tangible Capital Asset Reporting System and Templates	In Progress
Core Requirements for Additional Systems	In Progress
AMP Recommendations	
Data Collection to Support Future AMPs	Ongoing
Collecting Data to Operationalize LOS Frameworks: • Annual Update to Financial Analysis • Ongoing Asset Management Analysis • Customer Relationship Management System (CRM) • Work Management System • Customer Satisfaction Survey • Field Survey • Internal Service Level Agreement • Stormwater Master Plan • Stormwater Hydraulic Model Update	Ongoing
Staffing Requirements	
1 FTE Asset Management Professional	Complete
Asset Management Analyst	Complete



The Town is currently working on implementing the Asset and Work Order Management System (AWOMS), which includes a decision support tool, and an assets module (to house tangible capital assets). As this system is implemented, the Town will be updating and adjusting current business processes in terms of asset management as well as data management.

13.3 Opportunities for Improvement

At the time of development of this plan, the Town was still in the process of implementing many of the tools that will inherently address many of the recommendations for improvement provided in the individual asset chapters, as well as below. The opportunities for improvement for the Town include the following:

On-Going Tasks

Asset Registers & Data Gaps: Throughout the development of this AMP, many data gaps were filled to provide more accurate forecasting for Town assets. It is recommended to review the registers developed for this plan and ensure Town asset registers are updated with the appropriate information. The Town is currently working on the implementation of a consolidated asset register for work management and asset management reporting, which will be able to leverage this information.

Update Condition Assessments and Integration to AWOMS: The Town is continually working on updating condition information available for assets, including roads, sanitary and storm systems, and have planned for the update of facility building condition assessments. It is recommended to continue these efforts, and ensure the information is linked to the appropriate expert systems and asset registers to allow for easy data collection and asset management reporting. The updated BCAs should be continually maintained to track work completed that have been recommended in the reports.

Implementation of New Technology: The Town is in the process of implementing new systems to enhance the asset management program within the Town. The corporate work management system and the decision support tools available will vastly improve data management processes, as well as the information available to the organization on the lifecycle management activities for all assets. As the Town goes through this major shift, processes and procedures will be required to be updated to reflect the new state of data and asset management. The Town can begin to plan for how the information in these systems will be leveraged to improve asset management investment decisions.

Update Tangible Capital Asset Register: The Town is currently working on updating the asset register being developed for AWOMS and the Tangible Capital Asset Reporting register to reconcile the two registers and ensure they are in line.



Enhance Lifecycle Management Strategies: As new information becomes available and the systems are implemented, it is recommended that the Town review, update and enhance the lifecycle management strategies developed for the purposes of this plan. These should be updated in the AWOMS and decision support tools being implemented by the Town to ensure repeatable and consistent asset management reporting.

Continue to Review Current Replacement Values and Service Lives: Although many efforts were made to refine the current replacement values and service lives for the purposes of this AMP, it is recommended that these continue to be reviewed and evaluated based on current contracts and any other sources of information. This information is integral to accurate forecasting in the future and should be reviewed and updated on an annual basis to reflect changes in market conditions.

Future Tasks

Asset Failure Definition: To further refine asset management planning, reporting and analysis, it is recommended that the Town make efforts to review the data compiled for this plan, and to further analyze and define what is considered asset failure. This will allow for more enhanced and accurate asset planning and forecasting, which will allow staff to further prioritize replacement and rehabilitations.

An example of this is, if a fleet vehicle is not yet beyond its estimated service life but is increasingly expensive to maintain as a result of unplanned maintenance requirements, the Town may wish to plan for this asset's replacement earlier than anticipated (it could also happen that the Town wishes to keep an asset that is still in very good condition beyond its service life). Defining what these definitions are based on the data that is currently available, and will be available, in the maintenance management system will further narrow down asset expenditure requirements and provide more accurate forecasts.

Development of Defined Condition Assessment Programs: It is recommended that the Town document defined condition assessment programs for the assets, to determine appropriate frequencies of updated data collection. This will optimize the level of effort for data collection, as well as provide consistent, and continually updated data for asset management planning purposes. Specifically for the specific asset categories within this AMP, the following are recommended:

Sanitary/Storm CCTV: Develop a program for condition assessments that takes various factors into account to prioritize and determine the frequency of inspections required for pipes. This will allow newer/good condition pipes to be inspected on a less frequent basis, while older pipes, with known issues will be targeted for more frequent inspections to provide updated information to the Town. This will allow for efficient and optimal spending on non-



infrastructure activities (the condition assessments), as well as to ensure accurate information is available to determine where to focus rehabilitation and replacement efforts.

Roads: Establish a set frequency to collect pavement condition index data. This is typically done every 3-5 years. As the Town will be leveraging their maintenance management system, and also have a decisions support tool for their roads, which allows for updated information based on rehabilitation efforts, it is recommended that the Town will only need to collect PCI data every 5 years.

Facilities: Building condition assessment information should be updated at least every 5 years, ideally being completed prior to the AMP update.

Update Tangible Capital Asset Policy: It is recommended that the Town review their Tangible Capital Asset Policy and make required adjustments to be in line with asset management planning and industry standards. It is recommended the Town review the Policy to take into consideration the maturity and expansion of the asset management program and asset information.

Annual Update on AMP Progress & Levels of Service: It is recommended that through the Annual Update on AMP Progress required by O.Reg. 588/17, that the Town use this opportunity to do an annual update to the LOS metrics developed for this plan. This will allow for an annual review in implementing the LOS and progress on reaching the proposed LOS, as well as allow for public and Council engagement and to clearly document the LOS as well as the performance. As the Town matures their AM program, and the technologies in place, these LOS metrics can be expanded upon and used as a communication tool for future budget and capital planning.

Integration of AM and Budget Process: To further mature the AM program within the Town, as well as to improve ease of AM reporting in the future, it is recommended that the Town establish processes to integrate AM into the budget process. This can be accomplished by assigning asset categories and the lifecycle management activity categories to capital and operating budgets. This will provide more clarity and tie expenditures to asset lifecycle costs to provide more accurate forecasts and plans in the future.

It is also recommended to tie budgets to LOS to continue the communication with Council and the public about the necessity of appropriate funding to meet current and proposed LOS. Without adequate funding, the LOS being provided will need to be decreased, potentially increasing the risks, as outlined in section to the Town. Achieving the proposed LOS is the Town's best chance to provide services at the lowest possible cost, and with the least amount of risk.



Asset Risk Management Strategy: It is recommended that the Town develop a formalized asset risk management strategy. Risk is inherently considered when planning for asset rehabilitations and replacements for each asset category, but currently not formalized across the organization. A formalized asset risk management strategy will assist the Town in making decisions across the organization to further prioritize asset needs.

Include Natural Assets into the Town's Asset Register: An AMP was completed for the Town's natural asset (Appendix A), it is recommended to include the information developed for this plan in the Town's asset register.

Develop AM Goals and Projects based on Asset Management Maturity

Assessment/Readiness Scale: The Town should assess the status of the AM program through a maturity assessment or readiness scale and develop a road map to document and prioritize projects to enhance AM within the organization.



Appendix A: Natural Assets Asset Management Plan

STATE OF INFRASTRUCTURE REPORT

Natural Assets in the Town of Fort Erie



2024

Acknowledgement

This report was prepared by Green Analytics in collaboration with the Niagara Peninsula Conservation Authority (NPCA) and with the support of staff from the Town of Fort Erie.



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Executive Summary

This State of Infrastructure Report for the Town of Fort Erie provides an evaluation of the municipality's natural assets and their capacity to deliver services. This report offers insights into the registry, condition, risks, level of services, ecosystem service valuations, and replacement costs associated with Fort Erie's natural assets, which include various land covers such as forests, wetlands, and water bodies. This information will help the Town of Fort Erie meet its asset management planning requirements for green infrastructure under Ontario Regulation 588/17.

Key findings:

- **Natural Asset Inventory:** The Town of Fort Erie's assets on town owned and managed lands is comprised of three asset classes: agriculture assets, which span 171.19 hectares or 26.16% of the total area of assets; natural assets, which cover 373.18 hectares or 57.41% of the asset area; and enhanced assets, which cover 110.05 hectares or 16.82% of the total area of assets. The natural asset category includes various asset types such as aquatic areas, forests, hedgerows, meadow, shoreline, and wetland, with wetlands being the largest component at 33.51%.
- **Condition Assessment:** The condition assessment revealed that the Town of Fort Erie's natural assets, including forests, wetlands, and waterbodies, are predominantly in good or fair condition, with 94% classified within these categories. Wetlands are generally in good condition, while forest and aquatic areas are often in fair condition. Additionally, 77.62% of urban trees are in good condition.
- **Risk Assessment:** The risk assessment identified several threats to the integrity and functionality of the natural assets. Key risks include invasive species, erosion, and climate-induced changes such as increased flooding and extreme weather events. The majority of Town of Fort Erie's natural assets face a moderate risk (91.8%) from potential hazards, with a small percent facing high (6.4%) or very high risk (1.0%). Shorelines mostly exhibit very high risk levels. Wetlands, meadows, and aquatic environment have a significant portion under moderate risks.
- **Levels of Service:** The levels of service analysis identified key performance metrics for service delivery from natural assets including metrics for stormwater management, air quality improvement, and recreational spaces.
- **Asset Replacement:** the replacement cost analysis underscores the financial investment required to restore natural assets speaking to the need for conservation and effective management to ensure continued service delivery from assets over time. The overall and per unit replacement costs for natural assets (including urban trees) owned and managed by the town were estimated to exceed \$115 million.
- **Ecosystem Services Values:** A valuation of some of the ecosystem services provided by Fort Erie's natural assets illustrate their contribution to the wellbeing of local citizens. The analysis quantified benefits such as carbon sequestration, water regulation, and habitat provision. The estimated annual value of services provided by natural assets owned by the Town of Fort Erie ranges from \$5.6 to \$6.5 million.

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1 Introduction

Municipalities across Canada provide services to local citizens through use of constructed assets. This includes, for example, stormwater management dykes, erosion control structures and drinking water infrastructure. The 2019 Canadian Infrastructure Report Card found the country's infrastructure at risk with a considerable amount in poor or very poor condition. The state of Canada's infrastructure poses a financial challenge to municipalities.

The term "municipal natural assets" refers to the stock of natural resources or ecosystems that is relied upon, managed, or could be managed by a municipality, regional district, or other form of local government for the sustainable provision of one or more local government services. Natural assets provide a cost-effective, resilient, alternative or compliment to some constructed infrastructure. For instance, wetlands provide flood control functions, urban forests reduce temperatures, and green spaces improve air quality. If natural assets are not managed properly, however, their value can depreciate and their ability to provide services diminish.

Despite their ability to deliver services and ease some of the infrastructure burden for local governments, the adoption of natural asset management is not widespread in Canada. A key factor contributing to this limitation is the lack of information and data pertaining to natural assets and the services they provide. To overcome this limitation, there is a need to undertake natural asset management that parallels the approach used for constructed assets. This includes the creation of a natural asset inventory that quantifies the natural assets within municipal boundaries and assesses their risks and condition. By conceptualizing nature as an asset, we can codify, measure, and track the ways in which we depend on nature. The outcomes of doing so include reduced risks, enhanced services, increased climate resilience and climate change mitigation.

This report contains the results of an assessment of the Town of Fort Erie's natural assets. The information contained herein will support the Town of Fort Erie in addressing some of the requirements related to asset management planning as per Ontario Regulation 588/17 (Asset Management Planning for Municipal Infrastructure) under the *Infrastructure for Jobs and Prosperity Act*. Figure 1-1 depicts the components of natural asset management that were undertaken for the Town of Fort Erie. The primary focus of the analysis was on Town owned or managed lands. To support this objective in some cases consideration was first given to natural areas across the Town's municipal jurisdiction and then scaled to Town owned or managed land as necessary. In the sections that follow, the results of these tasks are presented. The report is organized as follows:

- Section 1 provides the **natural asset inventory** describing the range of assets located in Fort Erie and how they are organized into an asset registry.
- Section 2 contains the approach and results of the **natural asset condition assessment**.
- Section 3 describes the approach and results of the **natural asset risk assessment**.
- Section 4 provides the natural asset related **levels of service** metrics.
- Section 5 houses **replacement costs** for the natural assets.
- A series of appendices provide additional details on the approaches employed for the tasks above as well as **estimated values for the ecosystem services** provided by the Town's natural assets.



Figure 1-1. Overview of the natural asset management planning tasks within the scope of this report.

2 Asset Inventory

This section provides an overview of the approach and outputs associated with establishing an inventory of assets for the Town of Fort Erie. Figure 2-1 demonstrates the range of assets that may be managed by a local government including different types of green and grey infrastructure. The figure also demonstrates the relationships between terms commonly used when referring to green infrastructure (GI). The figure distinguishes between three sub-types of GI, namely natural assets, enhanced assets, and engineered assets, with examples of each. This classification structure was used to inform the asset inventory structure for the Town of Fort Erie, which is focused on natural and enhanced assets. The figure also shows how these different assets align with other commonly used terms such as low impact development (LID) and nature-based solutions (NbS).

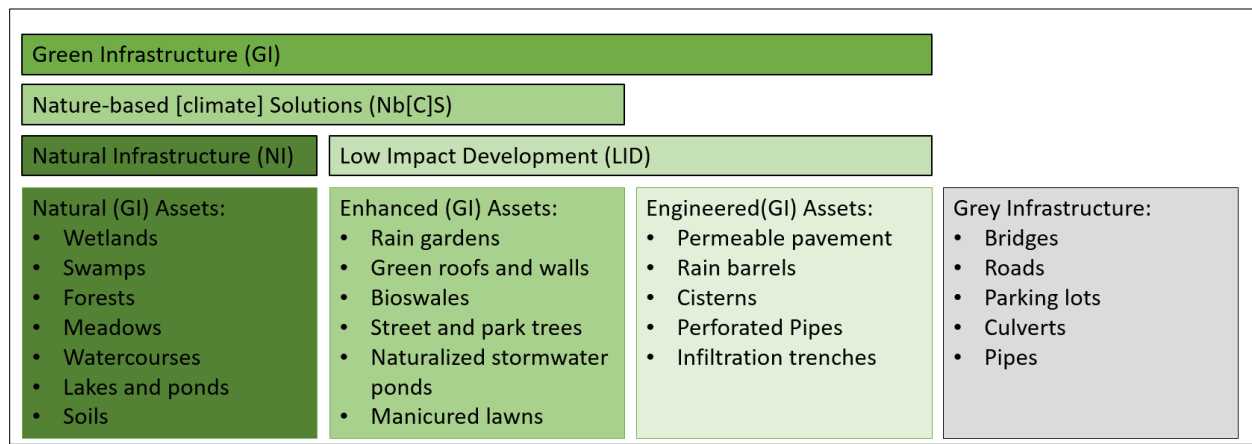


Figure 2-1. Defining natural assets.

2.1 Inventory Approach

The asset inventory forms the foundation upon which all other asset management tasks are based. The inventory was created in GIS where relevant data was amalgamated to get a complete picture of the type, location, and extent of assets within the municipal boundary. For the purposes of this report, the term “assets” refers to the three asset types contained within the inventory:

1. **Natural assets**, which are comprised of natural features as detailed in Table 2-1.
2. **Enhanced assets**, which are comprised of semi-natural features that are more actively manicured and maintained as detailed in Table 2-1.
3. **Agricultural assets**, which were included to provide a complete picture of non-built landcovers within the municipal boundary. These assets are not included in the state of infrastructure assessment of municipally owned and managed assets.

As is demonstrated in Table 2-1, the asset types included in the inventory are delineated at three levels according to an asset hierarchy. At **Level 1**, an asset is defined as a continuous area of land cover regardless of the land cover type. Level 1 corresponds to the asset types identified above - natural, enhanced and agriculture assets. At **Level 2**, an asset is defined as a continuous area of the same land cover type. At Level 2, for example, natural assets are differentiated as forest, water, and wetland assets. At **Level 3**, differentiation is made within the types of assets at Level 2. At Level 3, for example, forest assets are

defined by their species composition. A range of spatial data sources were used to establish the inventory. Appendix A provides complete list of data sources used to define the location and extent of each level of the natural, enhanced and agriculture assets.

Table 2-1 Asset hierarchy.

Level 1	Level 2	Level 3
Natural Assets	Forest	Coniferous Forest
		Coniferous Woodland
		Deciduous Forest
		Deciduous Thicket
		Deciduous Woodland
		Mixed Forest
		Mixed Woodland
		Treed Agriculture
	Hedgerow	Deciduous Hedgerow
		Mixed Hedgerow
	Meadow	Mixed Meadow
	Aquatic	Mixed Ponds
		Open Aquatic
		Open Water
		Open Water (Varied Type)
	Shoreline	Open Shoreline
	Wetland	Deciduous Swamp
		Floating-leaved Shallow Aquatic
		Marsh (Unknown Type)
		Meadow Marsh
		Mixed Swamp
		Shallow Marsh
		Submerged Shallow Aquatic
		Thicket Swamp
	Watercourse	River
		Unclassified
Enhanced Assets	Built-up Pervious	Cemetery
		Mixed Grasses
		Mixed Pervious
		Parks
	Golf	
	Urban Trees	Adjacent to Road
		Boulevard
		Island
		Open Space Tree
		Park
		Walkway
		Other / Not Applicable
	SWM Pond	
Agriculture Assets	Agriculture	

Figure 2-2 and Figure 2-3 show the location and extent of assets within the Town of Fort Erie’s municipal boundary at Level 1 and Level 2, respectively. As demonstrated in the maps, the geospatial data used to create the Town of Fort Erie’s asset inventory allowed for the delineation of assets across the whole municipal jurisdiction. From an asset management perspective, the assets of greatest interest to the Town of Fort Erie, however, are those that they currently own or have the responsibility to manage. When establishing the state of assets, it is ideal to not only distinguish assets within the municipal boundary from those that are owned and managed by the municipality, but also to be able to distinguish owned assets from managed assets. Given the nature of some managed assets, the management activities and the services that they deliver are likely to differ from assets that are municipally owned. For example, the assets that are managed by the Town of Fort Erie are largely roadside easements. These assets undoubtedly provide some services to the town, including for example stormwater management, but the suite of services provided will differ from other natural assets, which deliver multiple services including recreation, aesthetic appreciation, air quality improvements and urban heat reduction. In addition to differences in service delivery, the management actions applicable to roadside easements will differ from those applied to larger natural areas comprised of multiple natural asset types. The data layer used to establish the Town of Fort Erie owned and managed assets, which are depicted in Figures 2-2 and 2-3 as the transparent red areas labelled as “Town of Fort Erie Parcel Boundaries,” did not allow for a distinction between the lands owned and those managed by the Town. While the available data provides a good starting point for establishing a baseline understanding of the assets over which the Town of Fort Erie has management influence, it is recommended that in the future the Town establish a dataset that distinguishes between ownership and management responsibilities.

The remainder of this report is focused on the assets located within the “Town of Fort Erie Parcel Boundary.”

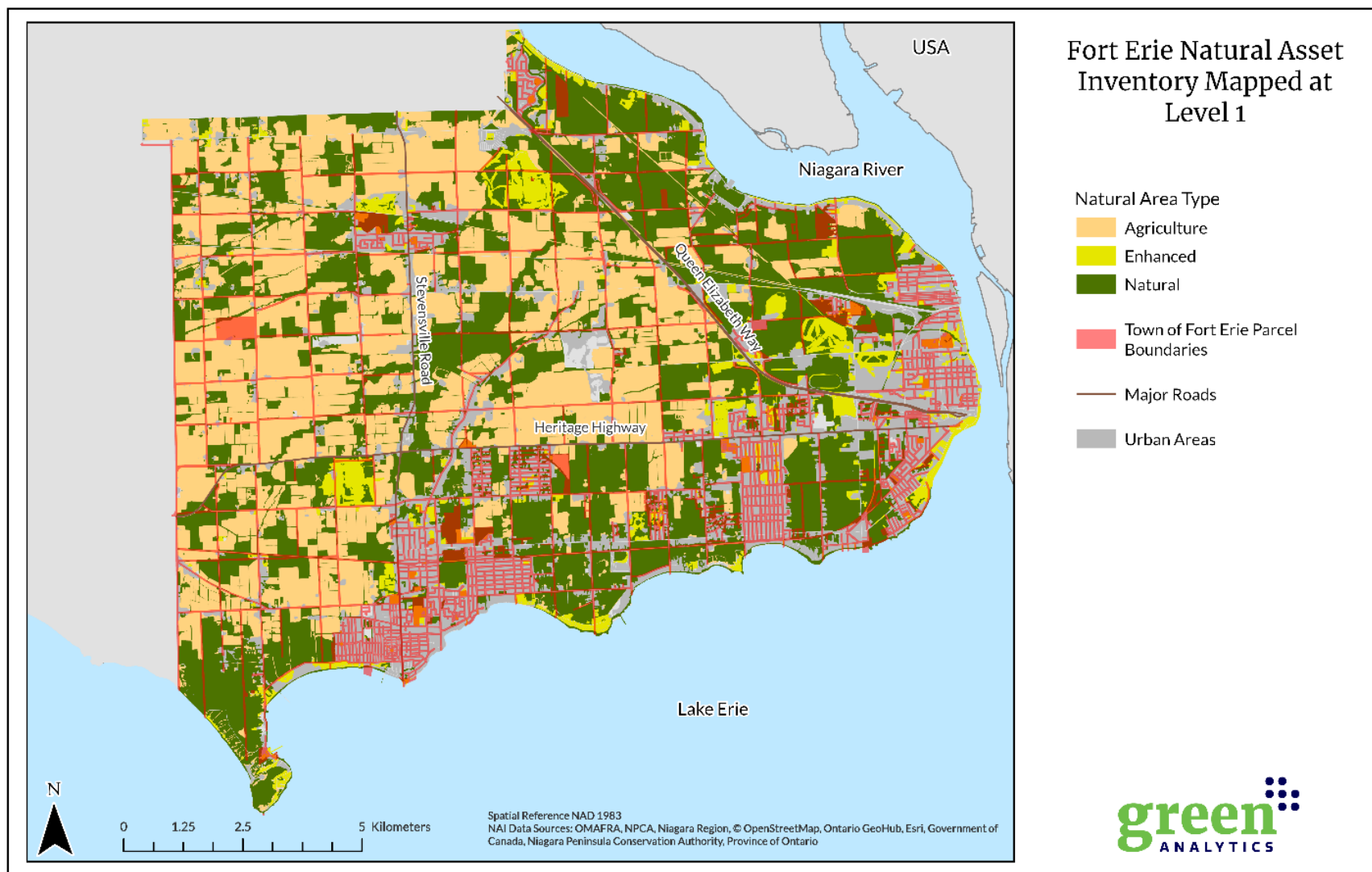


Figure 2-2. Map of the Town of Fort Erie's asset inventory by asset type at Level 1.

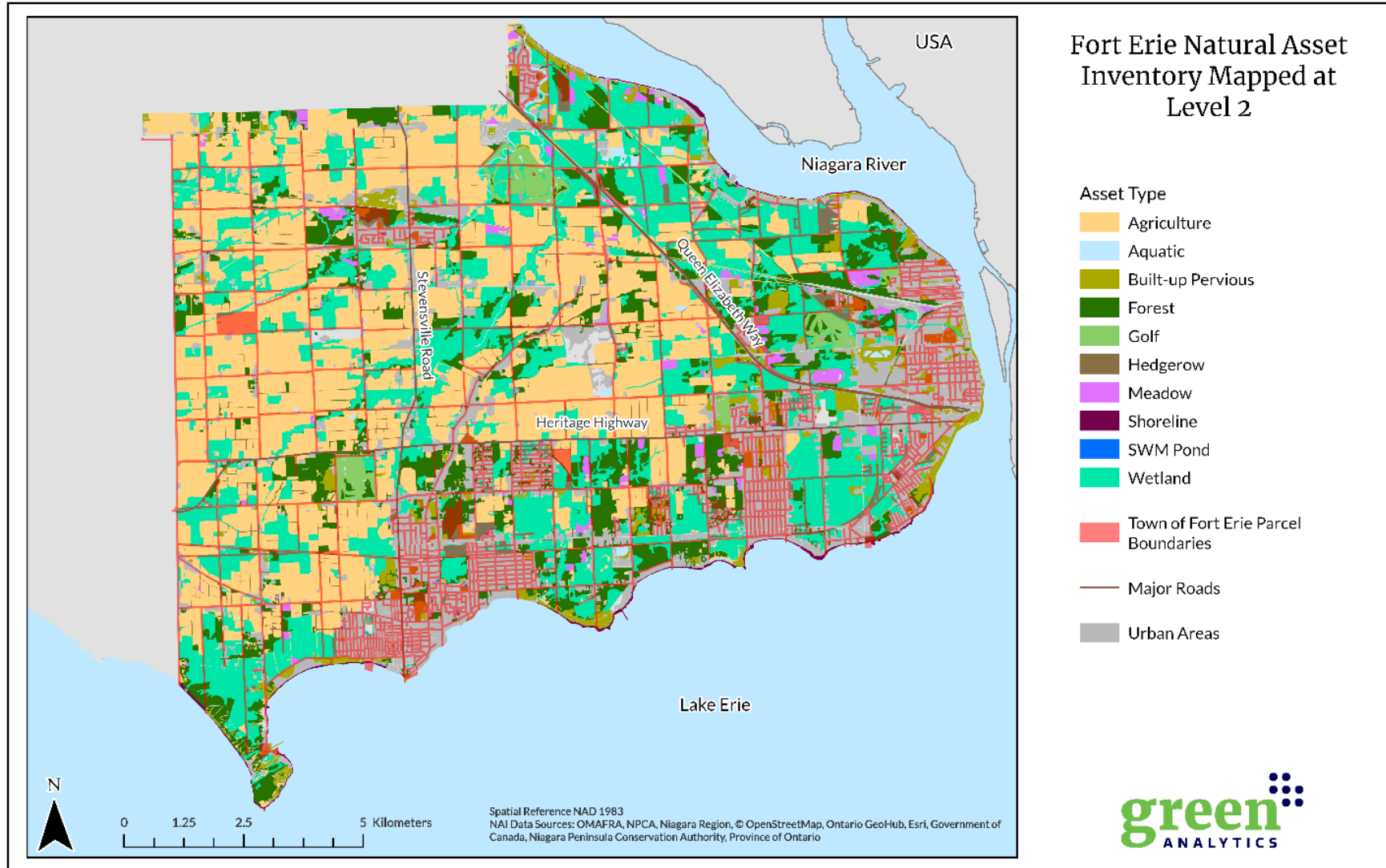


Figure 2-3. Map of the Town of Fort Erie’s asset inventory categorized by asset type at Level 2.

2.2 Summary of Inventory Outputs

The remainder of this section provides outputs derived from the Town of Fort Erie's asset inventory. Table 2-2 has area values for Fort Erie's spatially oriented assets at Level 1 and Level 2 (watercourses, measured in length, and urban trees, measured by count, are presented in subsequent tables). Overall, 57% of the assets on Town owned and managed lands are natural assets, which are largely either wetlands (33.7%) or forest (18.6%). Most enhanced assets are built-up pervious assets, which represent the Town's parks and manicured greenspaces.

Table 2-2. Level 1 and Level 2 area breakdowns of inventory for Town of Fort Erie owned or managed land.

Asset Class (Level 1)	Asset Type (Level 2)	Total Area (ha)	Percent (%)
Natural Assets			
	Aquatic	7.23	1.10
	Forest	121.20	18.52
	Hedgerow	20.86	3.19
	Meadow	3.93	0.60
	Shoreline	3.20	0.49
	Wetland	219.29	33.51
Natural Assets Total		373.18	57.41
Enhanced Assets			
	Built-up Pervious	96.97	14.82
	Golf	7.02	1.07
	SWM Pond ¹	6.06	0.93
Enhanced Assets Total		110.05	16.82
Agriculture Assets			
	Agriculture	171.19	26.16
All Assets Total		654.42	100.00

As noted in Table 2-1, watercourses are classified as a natural asset. However, within the asset inventory and spatial database, they are represented as line features. Because of this they are summarized separately based on length of watercourse (Table 2-3). In total, 26.8 km of watercourses within the Town's jurisdiction cross through Town owned or managed properties.

Table 2-3. Breakdown of watercourses.

Watercourse	Length (km)
River	10.9
Unclassified	15.9
Total	26.8

¹ Note that SWM Pond facilities are stored in a separate spatial dataset. As a result, the total area listed in this Table is not the same as the total area in asset inventory spatial dataset.

Urban trees are enhanced assets owned by the Town of Fort Erie and are represented in the spatial database as points. Table 2-4 summarizes the number of trees in the inventory by softscape type. The inventory includes 14,710 trees, the vast majority of which (12,466) are in boulevard locations.

Table 2-4. Breakdown of Fort Erie's urban tree inventory.

Urban Tree Softscape	Count
Adjacent to Road	9
Boulevard	12,466
Island	68
Open Space Tree	54
Park	2,073
Walkway	37
Other / Not Applicable	3
Total	14,710

Stormwater management (SWM) facilities were also included in the inventory as an enhanced asset. However, it should be noted that stormwater management facilities (and their associated stormwater function and maintenance implications) are already accounted for in Fort Erie's corporate asset management plan. While it is important not to double count assets, SWM assets are included in the current inventory to highlight that these enhanced assets have the potential to provide services other than stormwater management. To the extent that areas surrounding a SWM pond is (or could be) naturalized, other important service provision relevant to enhanced assets may exist (e.g. recreation or habitat provision). This is a point of further consideration for the Town as it advances the integration of natural and enhanced assets with other asset management plans. Since the "Stormwater Management Facilities" data exists and is currently managed as its own spatial data file, it was decided to maintain this data separation to avoid confusion and data duplication. However, this data was summarized and included in the asset hierarchy for the reasons noted above. These facilities are designated as wet ponds, dry ponds and wetland ponds as outlined in Table 2-5, accounting for roughly 6 ha in total area.

Table 2-5. Breakdown of SWM pond type by natural asset area.

Pond Type	Asset Area (ha)
Dry	0.79
Wet	4.04
Wetland	1.24
Total	6.06

3 Condition Assessment

The objective of a natural asset condition assessment is to assess at a high-level, an asset’s ability to provide services, which are valued by municipalities and communities (e.g., air pollution reduction, storm water regulation, carbon sequestration, nature-based recreation, etc.). The assumption underlying the natural asset condition assessment is that an asset that is assessed as being in “good” condition from an ecological perspective, is anticipated to provide a “good” level of service.

This section of the report describes the results of a desktop condition assessment that was applied to the Town of Fort Erie’s natural assets. While the desktop analysis that was undertaken is grounded in landscape ecology metrics, it is recommended that field-based verification of the condition of natural assets be completed over time to support and improve natural asset condition monitoring.

The primary focus of this condition assessment was on the natural assets (it excludes enhanced and agricultural assets) under Town ownership. The urban tree inventory included condition data, which is also summarized in this section of the report.

3.1 Overview of the Condition Assessment Framework

The process used for the condition assessment in this project aligns with that outlined in the Canada-wide standards and specifications for natural asset inventories (Figure 3-1) (CSA 2022).

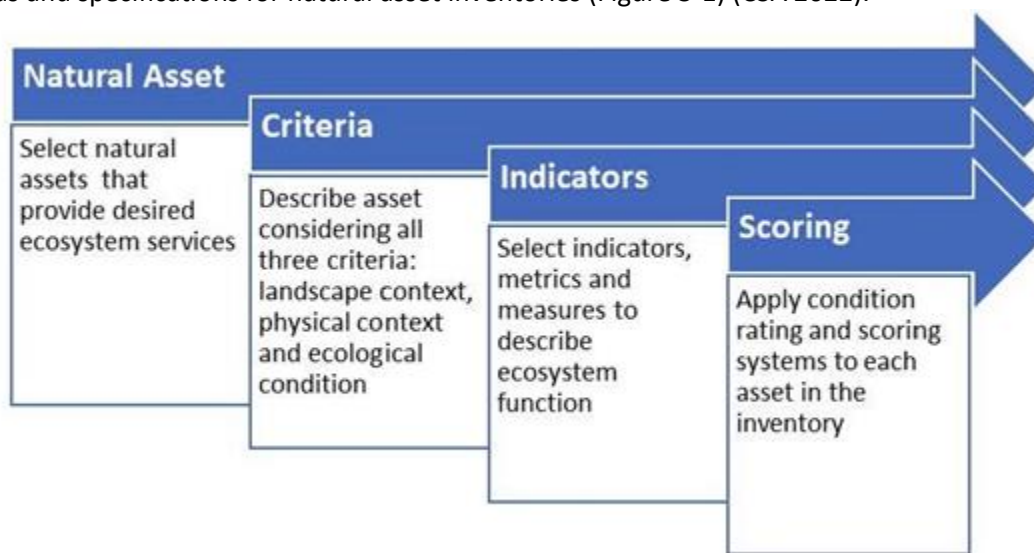


Figure 3-1. The natural asset condition assessment process (Source: CSA 2022).

The condition indicators employed in the current assessment are listed below, categorized into two criteria (i.e., landscape context, physical context) to align with the CSA standard for natural asset inventories.

CRITERIA FOR PHYSICAL CONTEXT:

1. Interior Habitat
2. Natural Area Patch Shape
3. Road Density
4. Natural Asset Proximity to Watercourses

5. Forest Proximity to other Natural Assets
6. Wetland Proximity to other Natural Assets

CRITERIA FOR LANDSCAPE CONTEXT:

1. Extent of Adjacent Complementary Land Uses
2. Percent of Forest Cover within Watersheds
3. Percent of Wetland Cover within Watersheds

Each of the indicators above are described in detail in Appendix C. Note that given data limitations, suitable indicator/s for the Ecological Condition criteria were not found for the Town of Fort Erie. Future data collection focused on species diversity, invasive species or habitat quality would help respond to this gap.

3.2 Summary of Condition Assessment Results

Taking into consideration in equal weights the nine condition indicators identified above (and described in Appendix C), an overall condition rating was established for the Town of Fort Erie's natural assets. As is shown in Table 3-1, the majority of Fort Erie's natural assets rate good with almost 94% of Fort Erie's natural assets rated as either good or fair.

Table 3-1. Area of natural assets by overall condition rating.

Overall Condition Rating	Fort Erie Owned/Managed Assets (ha)	Percent (%)
Very Good	0	0
Good	188.82	50.60
Fair	162.18	43.46
Poor	22.20	5.95
Very Poor	0	0
Total	373.19	100

It is useful to consider the condition of assets by type. To that end, Figure 3-2 shows the condition results by asset type. The vast majority of forest assets (82%) rate fair as do the aquatic assets. The wetland assets largely (84%) rate good with a substantial area rating fair (16%).

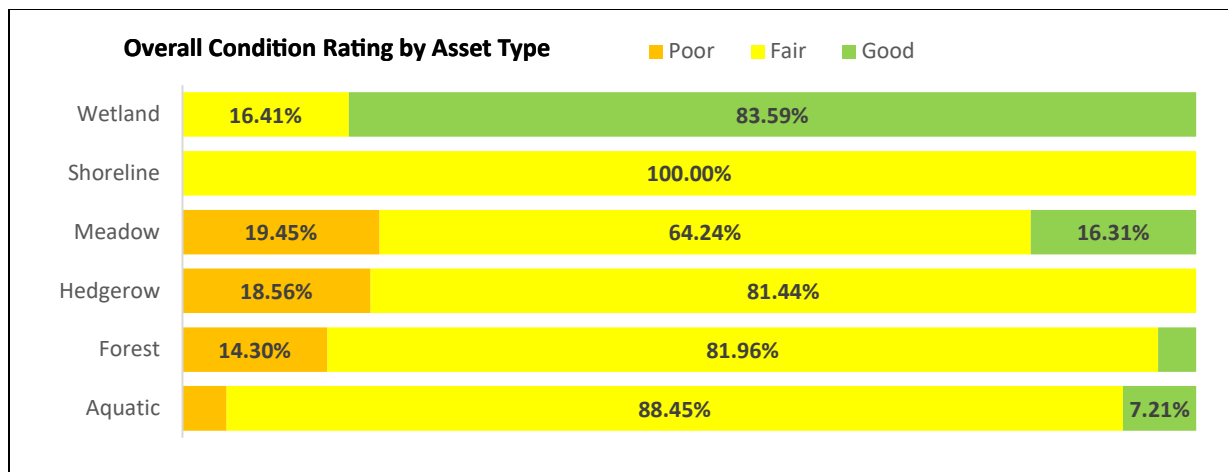


Figure 3-2. Condition Breakdown by asset type for all natural assets in Fort Erie.

Fort Erie's urban tree inventory contains tree health ratings based on visual signs of physical damage, disease, structural problems, and crown dieback for each individual tree in the inventory. Table 3-2 and Figure 3-3 demonstrates the number of urban trees and the percent of the tree inventory by tree health rating. The vast majority of Fort Erie's urban trees are in good condition. Note that in contrast to the condition assessment for natural assets where very good is the highest rating, good is the highest rating available for urban trees according to the prescribed assessment.

Table 3-2. Breakdown of Fort Erie's urban tree inventory by health rating.

Tree Health Rating	Number of Trees
Good	11,418
Fair	2,500
Poor	608
Dead	169
No Data	15
Total	14,710

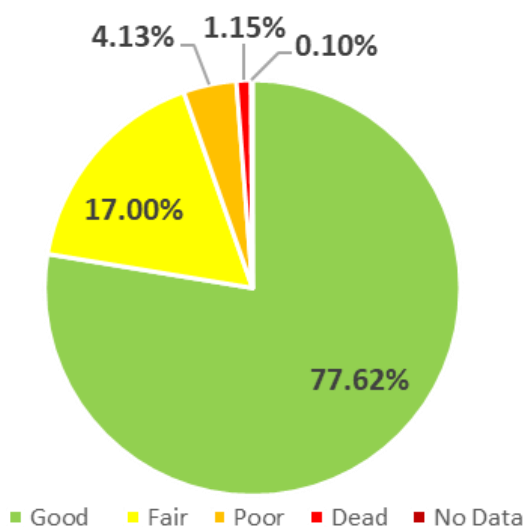


Figure 3-4. Percent distribution of urban tree inventory conditions

4 Risk Assessment

The goal of conducting a natural asset risk assessment is to systematically identify and prioritize potential hazards based on their impact and likelihood. These hazards, if not properly managed, could adversely affect a community's natural assets. For the Town of Fort Erie, a hazards-based risk assessment process was undertaken. The process involved the following steps:

1. Identify the range of applicable hazards
2. Rank hazards for relative impact
3. Rank hazards for relative likelihood
4. Calculate a risk score for each hazard
5. Allocate risk scores to relevant natural assets

This risk assessment was conducted through a facilitated workshop involving the Town of Fort Erie, Niagara Peninsula Conservation Authority, and Green Analytics. Subject matter experts discussed and confirmed a list of relevant hazards. For each hazard, participants then discussed and agreed upon impact and likelihood scores. The results of this exercise are described in the sections below.

4.1 Identify the Range of Hazards

The first step of the risk assessment involved identifying the various hazards that have the potential to adversely affect the natural assets owned and managed by the Town of Fort Erie. To that end, the following hazards were identified:

- Invasive species
- Pests and disease
- During construction impacts
- Unauthorized edge encroachments / disturbances
- Flooding
- Erosion – Shoreline
- Extreme wind – Trees
- Ice storm / freezing rain – Trees, forest
- Extreme Heat and Drought – Trees
- Contamination / Pollution
- Fire
- Poor management practices
- Sedimentation – Wetlands, watercourse, open water
- Sedimentation – Storm ponds

4.2 Rank Hazards for Relative Impact

Once the spectrum of hazards that negatively impact natural assets was established, the next step was to systematically rank the hazards according to their relative impact. Table 4-1 was used to guide the articulation of impact scores for the relevant hazards. The scores range from 1 (Very Low) to 5 (Very High). Workshop participants considered the financial, socio-economic and environmental impact of the hazard to assign an impact score for each.

Table 4-1. Description of relative impact ratings for hazards.

Scale	Impact	Financial	Socio-economic	Environmental
5	Very High	Cost of remediation exceeds annual budget > 100 times	Permanent loss of related services	Potential to cause long term damage to the condition of the natural assets
4	High			
3	Moderate	Cost of remediation exceeds annual budget > 10 times	Temporary loss of related services	Potential to cause short term repairable damage to the condition of the natural asset over a large area
2	Low			
1	Very Low	Cost of remediation falls within annual budget	Little to no effect on related services	Potential to cause non-lasting damage to natural assets

Table 4-2 demonstrates the impact ratings assigned to each hazard during the workshop with Fort Erie subject matter experts.

Table 4-2. Results of Fort Erie risk impact ratings by workshop attendees.

Potential Hazards / Issue to Natural Assets	Risk Impact Rating
Invasive species	4
Pests and disease	4
During construction impacts	3.5
Unauthorized edge encroachments/disturbances	2
Flooding	2
Erosion - Shoreline	4
Extreme wind – trees	3
Ice storms / freezing rain - Tree, forest	2
Contamination / Pollution	4
Fire	4
Sedimentation - wetlands, watercourse, open water	3.5
Sedimentation - storm ponds	2

4.3 Rank Hazards for Relative Likelihood

The next step in the risk assessment process involved allocating a likelihood rating to each identified hazard. In this regard, Table 4-3 provided guidance to workshop participants. “Rare” hazards occur every 50 years or less, with an annual probability of $\leq 2\%$, while at the other end of the spectrum, “Almost certain” hazards are those occurring annually or more frequently, with a $\geq 50\%$ probability. This information informed the articulation of likelihood ratings for each of the relevant hazards.

Table 4-3. Description of likelihood ratings for hazards.

Likelihood ranking	Description	Annual probability	Return period
Rare (1)	Likely to occur every 50 years or less	≤2%	1:50 or less
Unlikely (2)	Likely to occur between once every 21 years and once every 50 years	2 to < 5%	1:21 to 1:50
Possible (3)	Likely to occur between once every 5 years and once every 20 years	5 to < 20%	1:5 to 1:20
Likely (4)	Likely to occur between once every 2 years and once every 5 years	20 to < 50%	1:2 to 1:5
Almost certain (5)	Likely to occur annually or several times per year	≥ 50%	1:1 or more

Table 4-4 demonstrates the likelihood ratings assigned to each hazard during the workshop with Fort Erie subject matter experts.

Table 4-4. Results of Fort Erie risk likelihood ratings by workshop attendees.

Potential Hazards / Issue to Natural Assets	Risk Likelihood Rating
Invasive species	4
Pests and disease	3.5
During construction impacts	4
Unauthorized edge encroachments/disturbances	3
Flooding	3
Erosion - Shoreline	4.5
Extreme wind – trees	3
Ice storms / freezing rain - Tree, forest	3
Contamination / Pollution	4
Fire	1
Sedimentation - wetlands, watercourse, open water	3
Sedimentation - storm ponds	2.5

4.4 Calculate Risk Scores

The next step in the risk assessment process was to calculate risk scores for each hazard. Risk scores are calculated by multiplying the likelihood rating by the impact rating. For example:

$$RiskScore_{hazard\ i} = ImpactRating_{hazard\ i} * LikelihoodRating_{hazard\ i}$$

Table 4-5 presents the outcomes of step 4 in the risk assessment process. For invasive species, for example, the group assigned an impact rating of 4 and a likelihood rating of 4. Consequently, the total risk score for invasive species is calculated as 16 (4 * 4).

Table 4-5. Results of Fort Erie risk impact and likelihood ratings as well as overall risk score by hazard.

Potential Hazards / Issue to Natural Assets	Risk Impact Rating	Risk Likelihood Rating	Risk Score
Invasive species	4	4	16
Pests and disease	4	3.5	14
During construction impacts	3.5	4	14
Unauthorized edge encroachments/disturbances	2	3	6
Flooding	2	3	6
Erosion - Shoreline	4	4.5	18
Extreme wind – trees	3	3	9
Ice storms / freezing rain - Tree, forest	2	3	6
Contamination / Pollution	4	4	16
Fire	4	1	4
Sedimentation - wetlands, watercourse, open water	3.5	3	10.5
Sedimentation - storm ponds	2	2.5	5

4.5 Allocate Risk Scores to Natural Assets

With the risk scores established for each hazard, the next step was to determine which natural assets are most likely to be impacted by those hazards. This was done by first identifying the type of natural asset that will be subject to the particular risk (Table 4-6).

Table 4-6. Applicability of hazards to natural assets by asset type.

Potential Hazards to Natural Assets	Forest / Woodlands	Wetlands	Meadow	Aquatic	Hedgerows	Shoreline
Invasive species	Y	Y	Y	Y	Y	
Pests and disease	Y				Y	
During construction impacts	Y	Y	Y		Y	
Unauthorized edge encroachments/disturbances	Y	Y	Y			
Flooding	Y	Y	Y	Y	Y	
Erosion - Shoreline						Y
Extreme wind - trees	Y				Y	
Ice storms / freezing rain - Tree, forest	Y				Y	
Contamination / Pollution	Y	Y	Y	Y	Y	
Fire	Y	Y	Y			
Sedimentation - wetlands, watercourse, open water		Y		Y		
Sedimentation - storm ponds		Y		Y		

Of the asset types applicable to the hazards, assets were then selected based on spatial distribution assumptions (Table 4-7). For example, while a broad range of asset types have the potential to be subject to encroachment, those that are located within 20 metres of private properties will ultimately be subject to this risk. The allocation assumptions allow for the combined risk scores (Table 4-5) to be assigned to specific natural assets within the inventory. This exercise resulted in the 12 hazards having a unique field in the asset inventory registering the associated risk score.

Table 4-7. Hazard spatial distribution assumptions.

Potential Hazards to Natural Assets	Spatial Distribution Assumptions
Invasive species	N/A
Pests and disease	N/A
During construction impacts	Any asset that intersects development zoning areas
Unauthorized edge encroachments/disturbances	Directly abutting, or within 5 m of any residential land use
Flooding	Assets within flood zone
Erosion - Shoreline	Assets within hazard zone
Extreme wind - trees	N/A
Ice storms / freezing rain - Tree, forest	N/A
Contamination / Pollution	Within 30 m of industrial land use
Fire	N/A
Sedimentation - wetlands, watercourse, open water	N/A
Sedimentation - storm ponds	N/A

The final step in the hazards-based risk assessment process was to combine the risk scores into a single overall risk score for each asset. This is achieved by summing the individual hazard risk scores together.

4.6 Risk Assessment Results

Table 4-8 shows the area of Fort Erie assets within each risk category. As is evident, the vast majority of Fort Erie's assets face moderate risk of being negatively impacted by hazards.

Table 4-8. Extent of Fort Erie-owned and managed assets by overall risk score ranges.

Risk Category	Fort Erie Owned/Managed Assets (ha)	Percentage (%)
Very Low	0.06	0.0
Low	3.27	0.9
Moderate	342.45	91.8
High	23.78	6.4
Very High	3.64	1.0
Total	373.19	100

It is useful to consider the risk to assets by type. To that end Figure 4-1 displays the risk breakdown by asset type within Fort Erie according to their overall risk score. Most of the assets face a moderate level of overall risk, with relatively few areas being low or very high in terms of vulnerability. The very high risk rating applied to the shoreline assets is the result of potential impact of erosion to these assets.

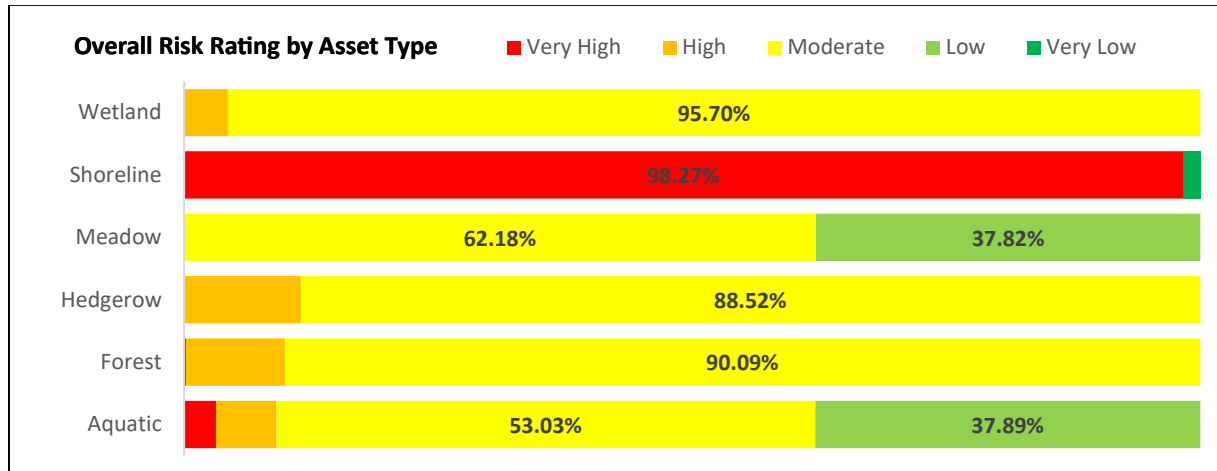


Figure 4-1. Risk breakdown by asset types

5 Levels of Service

Using the levels of service (LOS) concept that is part of the asset management process aids local governments in evaluating the performance and value of natural assets. Figure 5-1 depicts the framework that guides the articulation of LOS for municipal governments. Using this framework, municipalities identify three levels of LOS - Corporate, Customer, and Technical. The Corporate LOS reflects the strategic objectives or long-term goals of the local government. Concurrently, the Customer LOS acts as a performance metric, outlining the range of services that the community can expect, setting clear and achievable standards for public service. Lastly, the Technical LOS specifies the operational requirements of infrastructure, crucial for the local government to deliver services efficiently and effectively. Collectively, these LOS ensure that operational activities meet efficiency standards and align with and support the strategic objectives of the local government.

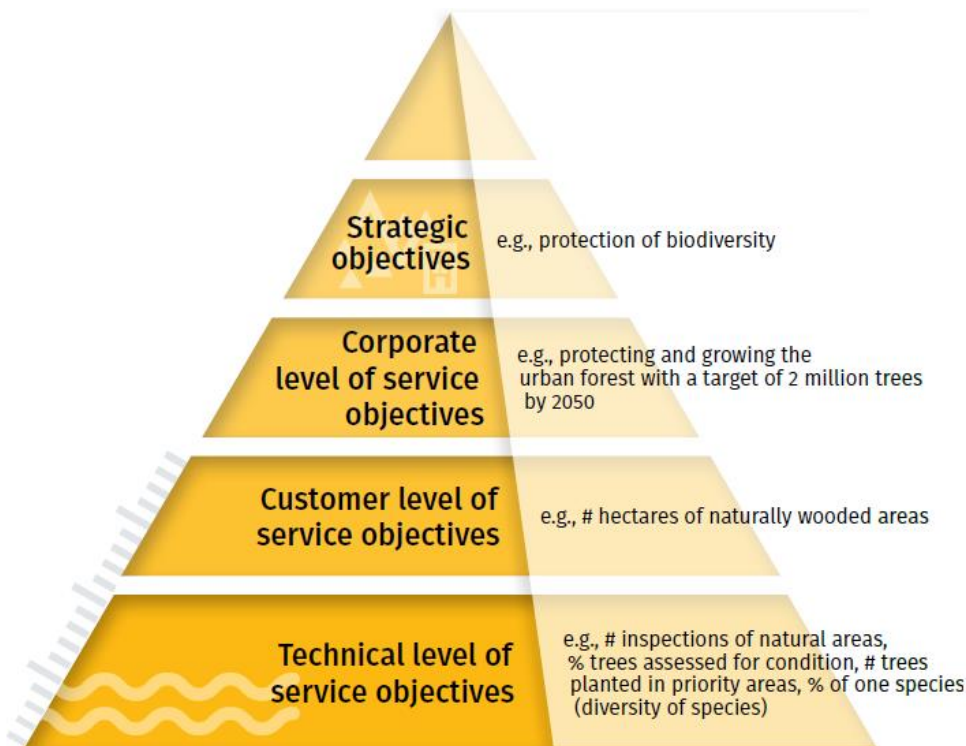


Figure 5-1. Graphic describing the different types and examples of levels of service from ‘developing levels of service for natural assets: a guidebook for local government’ (Municipal Natural Assets Initiative 2022).

Customer and Technical LOS are assigned to one of the service value attribute categories shown in Figure 5-2.

Capacity & Use	Function	Quality & Reliability
•Customer LOS: Services have enough capacity and are accessible to everyone. •Technical LOS: Assets of sufficient capacity are available, convenient, and accessible. These LOS inform asset growth and management decisions.	•Customer LOS: Services meet customer needs while limiting health, safety, security, natural & other impacts. •Technical LOS: Assets comply with regulations, perform their intended function and are safe, secure and sustainable. These LOS inform renewal and restoration management decisions.	•Customer LOS: Services are reliable and responsive to customers •Technical LOS: Assets are in adequate condition, are maintained as required and respond to customer needs These LOS inform operations and maintenance management decisions.

Figure 5-2. Customer and technical LOS service value attributes.

The Town of Fort Erie has undertaken a strategic initiative to enhance the management of its municipal natural resources through the implementation of several key policy documents. These documents were instrumental in shaping the framework for identifying LOS in the context of natural asset management. The pertinent documentation includes:

- *Town of Fort Erie Asset Management Plan 2019:* This plan lays the foundational groundwork for effective asset management, providing a comprehensive approach to maintaining and enhancing the town's physical assets.
- *Town of Fort Erie Corporate Strategic Plan 2023 – 2026:* This strategic plan outlines the broader corporate objectives and strategies for the specified period, offering a vision for the town's development trajectory and resource allocation.
- *Town of Fort Erie Official Plan Consolidated Version 2021:* This document provides a detailed blueprint for land use and development, encompassing aspects of natural resource management.

An in-depth analysis of the aforementioned documents was undertaken to identify objectives relevant to the management of natural assets. This review process is critical for the development of a robust set of corporate, customer, and technical LOS that align with the Town of Fort Erie's strategic priorities. It's important to note that, although these documents encompass a wide array of goals and objectives, this analysis was focused solely on those elements that are directly related to natural asset management.

Preliminary LOS for the Town of Fort Erie are provided in the sections that follow. The LOS tables below contain numerous proposed LOS for consideration by the Town of Fort Erie. The LOS are intended to be a starting point in the identification of LOS for the Town. Indeed, the expectation is not that the town immediately track all of these performance metrics. The tracking of performance can evolve over time. First, Town staff should carefully review and assess the proposed LOS to ensure they properly capture and reflect the intention of the corporate strategic objectives. Second, a prioritization of the metrics may be useful. To that end, they can be grouped into three categories: metrics for which data is already available and can be tracked immediately; metrics that can be tracked with minimal additional effort and are thus suitable for tracking in the short-term; and metrics that will require substantial additional effort and can

thus be considered for tracking in the longer term. Once a sub-set of priority LOS has been identified, the next step will be for the Town of Fort Erie to establish their current performance for each of the metrics.

5.1 Quality of Life and Community Well-being

The Fort Erie Corporate Strategic Plan 2023 – 2026, in conjunction with the Fort Erie Official Plan, has established clear objectives aimed at enhancing the quality of life and overall well-being of the community. These objectives primarily focus on the development and implementation of a comprehensive plan that encompasses parks, recreation areas, trails, beaches, open spaces, and natural areas. This plan is designed to provide the necessary infrastructure, programming, and services that cater to the evolving needs of the community as it grows and changes. To effectively monitor and evaluate the Town of Fort Erie's performance in achieving these objectives, specific LOS measures can be employed. These measures serve as benchmarks or indicators to help in assessing how well the town is managing and improving aspects related to quality of life and community well-being. Table 5-1, as referenced, presents a selection of possible LOS measures for the Town of Fort Erie to consider.

Table 5-1. Preliminary quality of life and community well-being objectives and related LOS.

Corporate LOS objectives	Performance Measures (Customer and Technical LOS)	Service Value Attribute
Implement a comprehensive plan for parks, recreation, trails, beaches, open space and natural areas that provides for infrastructure, programming and services that meets the need of the growing community	% increases in # hectare of natural areas	Function
	% increase in # of native species	Quality & Reliability
	% satisfied with urban parks and open space	Quality & Reliability
	% of population using parks and open space	Capacity & Use
	% residents living less than 500 meters from a park of at least 0.5 ha	Capacity & Use
	% satisfied with park amenities	Quality & Reliability
	# hectares greenspace within a 10-minute walk of residents by neighborhood	Quality & Reliability
	% neighborhood identified as vulnerable meeting tree canopy target	Capacity & Use
	# parks meeting accessibility standards and guidelines	Function

5.2 Environment, Natural Heritage and Climate Change Resiliency

Similarly, the Fort Erie Corporate Strategic Plan for 2023 – 2026, along with the Fort Erie Official Plan, outline a series of objectives focused on environmental sustainability, the preservation of natural heritage, and enhancing resilience to climate change. Among these objectives are key initiatives such as the preservation and enhancement of natural heritage, the development and execution of a comprehensive climate change resilience plan, and the strengthening of shoreline protection and resilience. To facilitate tracking of progress in these areas, detailed objectives and corresponding potential LOS performance measures are presented in Table 5-2.

Table 5-2. Environment, natural heritage and climate change resiliency objectives and related LOS measures.

Corporate LOS objectives	Performance Measures (Customer and Technical LOS)	Service Value Attribute
To preserve and enhance natural heritage	# hectares of natural area (i.e., wetland) protected through partnerships with private landowners	Function
	% increase in # of native species	Quality & Reliability
To ensure urban development is attractive and appropriately considers the protection of natural heritage features and functions from the site specific to watershed levels	% increases in # hectare of natural areas	Function
	% natural areas with invasive species	Function
	# naturalization projects implemented annually	Function
	Diversity of age class of maintained street trees	Function
To secure and preserve waterfront, natural heritage and natural areas through public stewardship and acquisition	Increases in the # hectares natural areas acquired to be protected	Function
	# of stewardship programs in place to protect natural areas	Capacity & Use
To manage wildlife interactions through an increased educational component and development of a strategy to recognize and protect Natural Heritage Corridors	The increases in the # of education programs being held	Capacity & Use
	% of residents aware of how nature-based solutions build resilience to climate change	Capacity & Use
	# of stewardship programs in place supporting nature-based solutions to climate change	Capacity & Use
To create, adopt and implement a Climate Change Plan and Policy Framework that incorporates adaptation, resiliency and mitigation strategies	# of climate resilient trees being planted by the city (pest resistant, drought tolerant, wind resistant)	Quality
	# of stewardship programs created aiming to improve climate resiliency after the implementation of climate change plan	Capacity & Use
To improve resilience of and response to shoreline protection, stormwater management, drainage and flood control through infrastructure investment and maintenance	% of wetlands, stream channels, forests restored to support drainage	Function
	Number of known shoreline erosion concerns	Function
	# residents affected by flooding	Function
	# residents affected by drought	Function
To ensure the preservation of Lake Erie, the Niagara River and their shorelines as major environmental resources, consistent with the recreational potential and the needs of the resident and tourist population	Up-to-date flood mapping completed, with climate scenarios incorporated	Function
	% users satisfied with shoreline and lake preservation	Quality
	Frequency of inspections to identify service needs	Quality
To recognize the importance of the Niagara River		
To encourage early recognition and regulation of existing and potentially incompatible uses resulting from adverse environmental effects, including sound, vibration and gas odour	# of complaints regarding adverse environmental effects such as sound, vibration and gas odour	Function
	# of program or initiatives implemented to mitigate the adverse environmental effects	Quality
	Frequency of inspections to identify service needs	Quality

6 Asset Replacement Costs

Replacement cost is a widely recognized method in asset management serving as a key indicator for determining the value of an asset. Replacement costs reflect expenses associated with replacing an existing asset with a new one of equivalent functionality and capacity (TRCA 2022). Such expenses encompass the purchase price of the asset and additional costs including site preparation, initial delivery and assembly, as well as expenses associated with initial maintenance and monitoring activities.

Replacement cost values for natural assets owned and managed by Fort Erie were obtained from Beacon Environmental (2020). The costs employed in this analysis encompass expenses related to planning, creation, and inspection and maintenance. The replacement cost for forests was applied to coniferous forest, coniferous woodland, deciduous forest, and mixed forest assets within the Fort Erie asset inventory. The replacement cost for meadows was applied to cultural meadow assets within the Fort Erie asset inventory. The replacement cost for marshes was applied to marsh, meadow marsh, and shallow marsh assets within the Fort Erie asset inventory. The replacement cost for thicket swamps was applied to all swamp assets, including deciduous swamp, thicket swamps, and coniferous swamp assets within the Fort Erie asset inventory. Replacement costs for trees are measured at \$2,160 per tree to capture costs associated with planting and various follow-up maintenance actions over 2 to 3 years to ensure survival, plus an additional \$2,500 per tree for the removal and stumping of the old tree being replaced. As per Tables 6-1 and 6-2, the total replacement cost for Fort Erie owned and managed assets is estimated to surpass \$115 million.

Table 6-1. Per unit replacement cost and total replacement cost for natural asset owned and managed by the Town of Fort Erie.

Asset Type	Per Unit Replacement Cost (\$/ha) ²	Asset Area (ha)	Percent Area (%)	Total Estimated Replacement Cost (million \$)
Forest* ³	\$214,959	112.61	33.2	\$24.2
Meadow	\$184,635	3.93	1.2	\$0.73
Shoreline	\$214,959	3.20	0.9	\$0.69
Wetland - Swamps	\$82,775	207.89	61.3	\$17.21
Wetland - Marsh	\$385,113	11.37	3.4	\$4.38
Total		339.01	100	\$47.21

² The per unit natural asset replacement costs mentioned are adapted from Beacon Environmental 2020.

³ Excludes treed agriculture.

Table 6-2. Per unit replacement cost and total replacement cost for urban trees owned and managed by the Town of Fort Erie.

Urban Tree Softscape	Per Unit Replacement Cost (\$/tree)	Count	Total Estimated Replacement Cost (million \$)
Adjacent to Road	\$4,660	9	\$0.04
Boulevard	\$4,660	12,466	\$58.09
Island	\$4,660	68	\$0.31
Open Space Tree	\$4,660	54	\$0.25
Park	\$4,660	2,073	\$9.66
Walkway	\$4,660	37	\$0.17
Other/Not Applicable	\$4,660	3	\$0.01
Total		14,710	\$68.55

6.1 Value of Ecosystem Services

To add perspective to the replacement costs and demonstrate the importance of Fort Erie's natural assets, a valuation of some of the ecosystem services provided by the natural assets within Fort Erie's municipal boundary was undertaken. Ecosystem services represent the benefits that nature provides to humans. The importance of ecosystem services lies in their fundamental role in supporting all life on Earth. They contribute to our well-being and economic health by providing clean air and water, food, materials for shelter and clothing, natural resources for economic development.

The analysis quantified the value of benefits derived from natural assets including carbon sequestration, air quality regulation, stormwater regulation, habitat preservation, regulation of extreme heat, contribution to crop productivity and aesthetic appreciation.

Considering the natural assets located within the municipal boundary of the Town of Fort Erie, the value of these services was estimated to be between \$27.9 and \$46.9 million per year. Focusing on the natural assets owned or managed by the Town of Fort Erie, the estimated service value is between \$5.6 and \$6.5 million per year. Appendix C provides a detailed overview of the approaches employed to establish these values.

7 Conclusion

This State of Infrastructure Report for the Town of Fort Erie provides an evaluation of the municipality's natural assets and their capacity to deliver services. The assessment includes a condition assessment, risk assessment, preliminary LOS indicators, and replacement costs for natural assets owned and managed by the Town of Fort Erie. The key findings from the assessment include:

- **Asset Inventory:** The asset inventory, comprised of natural, enhanced and agriculture assets, defines the type, location and extent of assets located within Fort Erie's municipal boundary. The asset inventory provides the foundation upon which other asset management tasks are based. As is demonstrated in the asset inventory, within the Town of Fort Erie:
 - Agriculture assets span 171.19 hectares or 26.16% of the total area of assets.
 - Natural assets cover 373.18 ha or 57.41% of the asset area.
 - Enhanced assets (excluding urban trees) cover 110.05 hectares or 16.82% of the total area of assets.
 - There are 26.8 km of watercourses classified as natural assets in Town of Fort Erie, with rivers making up 10.9 km and unclassified watercourses accounting for 15.9 km.
 - There are 14,710 urban trees in Town of Fort Erie, primarily located on boulevards (12,466 trees), with others dispersed across parks, walkways, islands, open spaces, and adjacent to roads.
 - Stormwater management ponds are included as enhanced assets in Fort Erie's inventory to recognize their potential for providing additional services like recreation or habitat. These facilities cover a total area of 6.06 ha and are categorized into dry, wet, and wetland ponds.
- **Condition Assessment:** The condition assessment revealed that the Town of Fort Erie's natural assets, including forests, wetlands, and waterbodies, are predominantly in good or very good condition.
 - The majority of Town of Fort Erie's natural assets are rated as good or fair, with 94% of the assets falling into these categories.
 - Specific findings indicate that wetlands generally rate good, while forests and aquatic assets often rate fair.
 - The urban tree inventory shows most trees in the Town of Fort Erie are in good condition, with over 77% rated good and smaller proportions listed as fair or poor.
- **Risk Assessment:** The risk assessment identified several threats to the integrity and functionality of the natural assets. Key risks include invasive species, erosion, and climate-induced changes such as increased flooding and extreme weather events.
 - The risk assessment highlights that approximately 93% of the town-owned and managed natural assets, spanning over 375 hectares, are categorized under moderate or lower risk levels.
- **Levels of Service:** The levels of service analysis identified preliminary performance metrics for service delivery from natural assets including metrics for stormwater management, air quality improvement, and recreational spaces.

- **Asset Replacement:** the replacement cost analysis underscores the financial investment required to restore natural assets speaking to the need for conservation and effective management to ensure continued service delivery from assets over time.
 - Based on the per unit restoration costs provided by Beacon Environmental in 2020, the total replacement cost for the natural assets (including urban trees) owned and managed by the Town of Fort Erie is estimated to surpass \$115 million.
- **Ecosystem Services Values:** A valuation of some of the ecosystem service provided by Fort Erie's natural assets illustrates their contribution to the wellbeing of local citizens. The analysis quantified benefits such as carbon sequestration, water regulation, and habitat provision.
 - The estimated annual value of services provided by natural assets owned and managed by the Town of Fort Erie ranges from \$5.6 to \$6.5 million .

The assessment of natural assets aligns with the strategic goal of enhancing environmental sustainability and community resilience. By understanding the extent, condition, and value of these assets, the Town of Fort Erie can make informed decisions that support long-term planning and conservation efforts. The information contained herein, in part, will be used to support the Town in meeting its asset management planning requirement (i.e., green infrastructure condition assessment and valuation) as specified in O. Reg. 588/17. In addition to the material contained in this report, to meet the 2024 O. Reg 588/17 deadline, the Town of Fort Erie will need to establish current performance levels for priority LOS as well as lifecycle activities to maintain current LOS for the next 10 years. The cost of those activities will need to be considered along with the risks to the assets. The risk assessment presented in this report can inform that analysis. By July 1, 2025, the town will need to update this work to include proposed LOS.

In addition to activities related to O. Reg. 588/17 compliance, the following recommendations will guide the Town of Fort Erie in advancing natural asset management in the future:

- Update mapping to distinguish between town owned and town managed lands. Such a distinction will allow the Town to better identify the services provided by the different asset types and tailor management activities to suit such service delivery.
- Consider establishing an integrated database management strategy to ensure key data inputs that will be updated and refined from time to time will link together. As part of the current project, a baseline inventory was developed that includes natural, enhanced, and agricultural assets. Additional supporting datasets include an urban tree inventory, stormwater management facilities inventory, and a watercourse inventory. An integrated data management strategy will help make any future updates and revisions to the inventory more efficient.
- Expand the desktop condition assessment to include an indicator related to ecological condition. This may require data collection related to species composition, habitat quality and/or invasive species. The desktop condition assessment provides a relatively simple way to monitor asset condition over time on a regular and ongoing basis.
- Establish and apply a field-based condition assessment checklist/field form to directly assess the condition of the Town's natural assets efficiently and effectively at regular intervals over time. This will provide a stronger understanding of the condition of the assets and their ability to deliver services in the face of relevant hazards. The desktop condition assessment can continue to be

employed between field assessment intervals and can be verified and adjusted to better reflect the findings from the field-based assessment.

- Review and scope the preliminary LOS presented in this report to ensure they can reasonably be tracked over time. To that end, it may be useful to prioritize the metrics according to what can be tracked with existing data, what can be tracked in the short-term with little additional effort and what can be tracked in the long-term with substantially more effort.
- Collect user data on recreation activities within the Town of Fort Erie's natural assets to inform LOS performance and ecosystem service valuation estimates.

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9 Appendix A: Summary of Data Sources Used to Establish the Natural Asset Inventory

Table 9-1. Inventory data sources.

Descriptive Name	Source	Purpose
Fort Erie Town Owned Parcels	Fort Erie	Establish defined study area for natural asset registry.
National Road Network (NRN) Road Dataset and National Railway Network (NRWN)	Government of Canada	Used to delineate road and railway land cover from inventory.
Building Footprints	Niagara Region	Used to distinguish and remove buildings from other land cover.
OSM Traffic	Open Street Map	Used to identify and remove parking areas in the inventory area.
2K Scale Water	NPCA	Used to supplement the ecological land classification (ELC) data to capture additional water assets.
10 Hydrography	NPCA	Used to identify locations of streams and other smaller watercourses.
Contemporary Mapping of Watercourses	NPCA	Used to identify ponds in agricultural areas and remove bridges and artificial structures near water from the inventory.
SWM Facilities	Fort Erie	Used to subdivide areas by stormwater management facility locations and to classify areas as stormwater.
Ecological Land Classification (ELC)	NPCA	Used as the main source of landcover data for natural areas in Fort Erie.
Fort Erie (FE) Parks and Open Spaces	Fort Erie	Used to reclassify areas to built-up pervious within Fort Erie.
Open Street Map POIS, and Land Use data	Open Street Map	Used to supplement Built Up Pervious and Golf Course Categories
SOLRIS V3	Ontario GeoHub	Used to locate excavation areas to reclassify them as non-natural due to issues with ESRI data in identifying these features.
Built-up Area	Ontario GeoHub	Used to capture smaller urban green spaces labelled as built-up pervious and to fill in non-natural landcover, and to identify harder to classify impervious areas as non-natural. Non-natural features required to perform adjacent land use condition assessment.
Ontario Landcover Compilation	Ontario GeoHub	Used as one source of landcover data for the base landcover layer in the original Niagara region project, one of the inputs for the Built-up Pervious category.
ESRI 2022 Land Cover Data	ESRI	Used as one of the basemap areas to account for land cover across the study area.
Watershed Planning Areas	NPCA	Watershed boundaries used to subdivide assets.
Subwatersheds	NPCA	Subwatershed boundaries used to subdivide assets.

Descriptive Name	Source	Purpose
Municipal Boundary	NPCA	Used to subdivide areas by municipality each asset is located in.
NPCA Conservation Areas	NPCA	Used to subdivide asset boundaries based on conservation areas in the study area.
Greenbelt Boundaries	Province of Ontario	Boundaries of Greenbelt used to subdivide asset boundaries.
Protected Area Boundaries	Province of Ontario	Provincially protected area boundaries used to subdivide assets.
Fort Erie Zoning	Fort Erie	Zoning boundaries used to subdivide assets within Fort Erie.
Fort Erie Minister Zoning	Fort Erie	Minister zoning boundaries within Fort Erie, used to subdivide assets by these boundaries.

10 Appendix B: Condition Methods

This appendix contains details on the condition assessment approach. The condition indicators were applied to only to natural assets identified in Table 2-1. The other land assets (built-up pervious and agricultural land) are included in the inventory to provide a complete picture of the land-based assets within the Town of Fort Erie, and to recognize their important contribution to community services such as stormwater management and recreation. However, the condition of agricultural lands from an asset management perspective has limited relevance since those lands are largely managed by private landowners, for town-owned agriculture lands, the management practices employed will differ significantly from those used for natural assets. For built-up pervious assets, condition ratings can be useful from a management perspective. However, such ratings require input from field staff on each individual property which is beyond the scope of this project.

10.1 Interior Habitat

INDICATOR: The relative size of contiguous natural asset areas with larger patches that have more interior area considered higher quality than the smaller patches.

RATIONALE: The objective of this indicator is to create a proxy for condition, based on the relative size of contiguous patches of natural assets. In general, larger blocks of habitat (whether they be meadow, forest, and/or wetland) tend to support a greater diversity of plants and wildlife, including habitat specialists that require, or benefit from, conditions only found somewhat removed from a non-natural land cover type (e.g., roads, residential, institutional, or commercial development). In an urbanized context, as the distance from the edge of a natural area to the interior of that area decreases, the penetration of noise and other human-related disturbances and encroachments, that can negatively impact certain species associated with those habitats increases (Environment Canada 2013). Given this context, and recognizing the landscape ecology principle, large “blocks” of habitat generally provide a greater range of better-quality habitats, a scoring system was developed as described below.

APPROACH: “Interior” habitat – at least in woodlands - is typically measured starting at 100 m inwards from the feature or “patch” edge (e.g., Environment Canada 2013). The first step was thus to establish the “patch” edge, which was defined at Level 2 (distinguishing between asset types).

SCORING: Ratings were allocated as follows:

- Very Good: An asset within a habitat patch with an interior area measured >200 m from the feature edge
- Good: An asset within a habitat patch with an interior area measured 150-200 m from the feature edge and not already captured as “excellent”
- Fair: An asset within a habitat patch with an interior area measured 100-149 m from the feature edge and not already captured as “excellent” or “good”
- Poor: An asset within a habitat patch with an interior area measured 50-99 m from the feature edge and not already captured as “excellent”, “good”, or “fair”
- Very Poor: Any asset with no interior area measured at <50 m from the feature edge

RESULTS: Table 10-1 summarizes the area of natural assets owned and managed by Fort Erie by condition rating.

Table 10-1. Area of natural assets by natural area patch rating.

Condition Rating	Fort Erie Owned/Managed Assets (ha)	Percent (%)
Very Good	64.71	17.34
Good	59.72	16.00
Fair	83.28	22.32
Poor	83.32	22.33
Very Poor	82.16	22.02
Total	373.19	100

10.2 Natural Area Patch Shape

INDICATOR: The shape of natural asset areas, with patches that are more round considered higher quality than smaller patches that are more linear.

RATIONALE: Many negative effects from human land uses occur at feature ‘edges’. Impacts at edges can include light and noise, access for invasive species, dumping, domestic animals and encroachment. Features with shapes that reduce the amount of edge are expected to have lower levels of potential edge effects. Given a certain size threshold, compact patch shapes should protect interior habitat against detrimental edge effects because these forms have low edge-to-interior ratios. Conversely, convoluted and elongated patches have high edge-to-interior ratios.

APPROACH: This analysis is performed at Level 2 To determine the compactness ratio on an asset, the following formula is utilized:

$$\text{sqrt (Area of patch / area of a circle with the same circumference (perimeter))}$$

The resulting values are calculated as a value between or equal to 0 and 1, where 1 has the lowest possible edge to interior (a circle) and scores decrease as edge increases.

SCORING: Condition Scores based on Compactness Ratio:

- Very Good: > 0.8 and =< 1.0
- Good: > 0.6 and =< 0.8
- Fair: > 0.4 and =< 0.6
- Poor: > 0.2 and =< 0.4
- Very Poor: =< 0.2

RESULTS: Table 10-2 shows the condition rating breakdown. Most natural assets (78%) ranked fair for poor due to the long, narrow, or winding shape of the assets.

Table 10-2. Condition breakdown of patch shape result.

Condition Rating	Fort Erie Owned/Managed Assets (ha)	Percent (%)
Very Good	7.52	2.02
Good	43.99	11.79
Fair	108.31	29.02
Poor	182.19	48.82
Very Poor	31.18	8.35
Total	373.19	100

10.3 Road Density

INDICATOR: Density of roads within 120 m of the terrestrial natural assets with higher road density ranking less favorably.

RATIONALE: Roads both adjacent to and within natural areas are known to cause negative impacts to natural features and their functions because they contribute directly to fragmentation, introduce noise and pollutants associated with vehicles, and provide vectors that facilitate human access to these features, which can result in additional encroachments and impacts (e.g., Environment Canada 2013, Government of Ontario 2010). The objective of this indicator is to capture the relative level of human use/activity occurring in the lands adjacent to terrestrial natural features (including wetlands) as reflected in road density.

APPROACH: To develop locally appropriate road density ranges aligned with the five condition score ratings (i.e., very good, good, fair, poor, and very poor) the range of local road densities were assessed alongside research completed by DeCatanzaro and Chow-Fraser (2010). DeCatanzaro and Chow-Fraser (2010) demonstrate that for 77 marsh sites along the coast of Lakes Erie, Ontario, and Huron that the water quality index (WQI) and wetland macrophyte index (WMI) scores were highly negatively correlated with surrounding road densities. Their results show the highest road density was 102 m/ha (or 10.2 km/km²). Given the correlation to condition indices noted above, it was assumed that 10 km/km² would be the threshold for very poor. Similarly, their lowest road density estimates for Lake Ontario 7.16 m/ha (or 0.72 km/km²) was assumed to be the threshold between good and very good. Drawing on an assessment of the distribution of road densities associated with natural assets within the inventory, the other categories thresholds were assumed as outlined below.

SCORING: Road density was assessed within 120 m of the natural assets mapped at Level 1. Rankings were assigned as per the following:

- 0 to 0.7 km/km² = Very good
- 0.8 to 2.9 km/km² = Good
- 3 to 6.9 km/km² = Fair
- 7 to 10 km/km² = Poor
- > 10 km/km² = Very poor

RESULTS: As shown in Table 10-3, most natural assets were rated as fair. The distribution of rankings can

be attributed to the relatively dense road network within the Town.

Table 10-3. Condition breakdown by road density.

Condition Rating	Fort Erie Owned/Managed Assets (ha)	Percent (%)
Very Good	2.40	0.64
Good	22.62	6.06
Fair	233.41	62.54
Poor	76.79	20.58
Very Poor	37.96	10.17
Total	373.19	100

10.4 Natural Asset Proximity to Watercourses

INDICATOR: Distance between each asset and the nearest watercourse with assets in closer proximity rating higher than those further away.

RATIONALE: In addition to a natural assets size (interior habitat) and shape, its location in relation to other natural assets within a given area also influences the types of ecological functions it can provide. Proximity of a terrestrial natural asset to a watercourse network, or having a hydrologic feature within a terrestrial asset, is generally considered positive. Environment Canada's habitat guidelines for southern Ontario (Environment Canada 2013) and the Province's Natural Heritage Reference Manual (MNRF 2010) ascribe ecological significance to terrestrial habitats that contain or are close to hydrological features such as wetlands that occur within floodplains (which are associated with watercourses), woodlands with wetlands and/or watercourses within them, and grassland/meadow habitats adjacent or close to riparian and/or wetland habitats. Areas adjacent or near watercourses are also an indicator of improved connectivity. Specific distances / thresholds cited in these documents as heightening feature functions are as follows:

- Naturalized riparian habitat within at least 30 m of a watercourse edge (i.e., top of bank) (EC 2013), and
- Woodlands within 50 m of a watercourse (MNRF 2010).

In addition, 120 m is the standard distance used for considering adjacency to an identified natural asset in terms of the lands within which negative impacts to an asset may occur.

APPROACH: The closest distance between watercourse lines along with all flowing water natural assets, those associated with rivers and Level 3 assets was measured.

SCORING: Ratings were allocated as follows:

- Very Good: Asset directly intersects watercourse
- Good: Asset is within 30 m of a watercourse but does not directly intersect it
- Fair: Asset is within 30 – 120 m of a watercourse
- Poor: Asset is within 120 – 240 m of a watercourse
- Very Poor: Asset is greater than 240 m away from a watercourse

RESULTS: Table 10-4 demonstrates the area of assets across the various condition ratings for proximity to watercourses. While very good is the most common rating, most of the assets fall below this threshold, and there is a sizeable portion of the assets rated poor and very poor.

Table 10-4. Area of natural assets by proximity to watercourse rating.

Condition Rating	Fort Erie Owned/Managed Assets (ha)	Percent (%)
Very Good	177.64	47.60
Good	35.85	9.61
Fair	51.10	13.69
Poor	45.10	12.09
Very Poor	63.51	17.02
Total	373.19	100

10.5 Forest Proximity to Other Natural Assets

INDICATOR: A measure of the proximity of Level 2 forest assets to other Level 2 forest or wetland assets with assets in closer proximity rating higher than those further away.

RATIONALE: According to research by Environment Canada (2013):

- For forest birds, research has found that habitats near other natural areas support more species than isolated habitats of the same size, and that some species with large home ranges may use several patches instead of one large area.
- In landscapes with relatively low forest cover overall, species diversity and survivorship increase when the remaining habitat patches are larger and more clumped or aggregated.
- Based on the limited available science, the isolation between forest patches for forest birds generally occurs at about five kilometres, but for amphibians at between one and two kilometres. For forest plants, some level of immediate proximity is required.

APPROACH: Each Level 2 forest asset was buffered by the condition rating thresholds noted below and the appropriate rating was applied based on the closest buffer where another Level 2 forest or wetland asset was found.

SCORING: Based on the research noted by Environment Canada (2013) and the associated proximities, condition ratings were assigned as follows:

- Very good: Level 2 forest assets < 1 km from any other Level 2 forest or wetland asset
- Good: Level 2 forest assets within 1 to 2 km of any other Level 2 forest or wetland asset
- Fair: Level 2 forest assets within 2 to 3 km of any other Level 2 forest or wetland asset
- Poor: Level 2 forest assets within 3 to 5 km of any other Level 2 forest or wetland asset
- Very poor: Level 2 forest are > 5 km from any other Level 2 forest or wetland asset

RESULTS: Table 10-5 demonstrates the area of assets that rated very good according to this indicator. There are no assets owned or managed by Fort Erie that are more than 1 km from a forest or wetland asset.

Table 10-5. Area of natural assets by forest proximity rating.

Condition Rating	Fort Erie Owned/Managed Assets (ha)	Percent (%)
Very Good	121.20	100
Good	0	0
Fair	0	0
Poor	0	0
Very Poor	0	0
Total	121.20	100

10.6 Wetland Proximity to Other Natural Assets

INDICATOR: A measure of the proximity of Level 2 wetland assets to other Level 2 wetland or forest assets with assets in closer proximity rating higher than those further away.

RATIONALE: According to research documented by Environment Canada (2013):

- Fragmentation of wetland habitats degrades their functions by reducing habitat for species that are less tolerant of disturbances, that require more contiguous habitat, or both.
- Some of these negative impacts of fragmentation can be offset, at least for some species, by maintaining concentrations of natural habitat fragments in close proximity.
- The importance of adjacent natural areas, as well as proximity between patches of wetland, has been recognized for several wildlife species.
- Proximity distances range depending on the species from less than 500 m for turtles and spotted salamanders to as large as 3 km for birds.

APPROACH: Each Level 2 wetland asset was buffered by the condition rating thresholds noted below and the appropriate rating was applied based on the closest buffer where another Level 2 forest or wetland asset is found.

SCORING: Based on the research noted by Environment Canada (2013) and the associated proximities, condition ratings are:

- Very good: Level 2 wetland assets < 0.5 km from any other Level 2 forest or wetland asset
- Good: Level 2 wetland assets within 0.5 to 1 km of any other Level 2 forest or wetland asset
- Fair: Level 2 wetland assets within 1 to 2 km of any other Level 2 forest or wetland asset
- Poor: Level 2 wetland assets within 2 to 3 km of any other Level 2 forest or wetland asset
- Very poor: Level 2 wetlands are > 3 km from any other Level 2 forest or wetland asset

RESULTS: Table 10-6 demonstrates the area breakdown of wetlands for the wetland proximity indicator. All wetlands owned or managed by Fort Erie ranked very good for this indicator meaning that all of Fort Erie's wetlands are located within 0.5 km of another forest or wetland asset, including those outside the Fort Erie parcels.

Table 10-6. Area of natural assets by proximity to wetland proximity rating.

Condition Rating	Fort Erie Owned/Managed Assets (ha)	Percent (%)
Very Good	219.29	100
Good	0	0
Fair	0	0
Poor	0	0
Very Poor	0	0
Total	219.29	100

10.7 Extent of Adjacent Complementary Land Uses

INDICATOR: The extent of complementary land uses within 120 m of an asset with more permeable adjacent lands resulting in a more favorable rating.

RATIONALE: How and the extent to which a given natural area is influenced by drainage in the adjacent landscape varies depending on factors such as local topography and soils, where the feature “sits” in the landscape (e.g., upland versus lowland) and the size and nature of the feature itself. However, it is well-established that the condition of a terrestrial natural feature (including wetlands) in an urban context tends to be negatively impacted when more of the surrounding land uses are impervious (i.e., paved, concrete or buildings) as this tends to alter pre-existing drainage and infiltration pathways, which can cause a natural area to receive more, or less, drainage than prior to being in the urban context. Urban runoff also typically carries a host of sediments and contaminants, and when such runoff is directed to natural areas and not properly treated, it can also negatively impact the feature and its functions.

Increases in the extent of impervious surfaces within a given watershed or catchment area are generally known to have negative impacts to natural features in that watershed or catchment area, particularly for features downstream of the impervious areas, resulting in a push towards planning that limits impervious surfaces and incorporates low impact development measures that facilitate local infiltration (e.g., Government of Ontario 2006, Government of Ontario 2018). Environment Canada’s (2013) guidance for streams/watercourses in urbanized watersheds in southern Ontario states that *“impairment in stream water quality and quantity is highly likely above 10% impervious land cover and can often begin before this threshold is reached. In urban systems that are already degraded, a second threshold is likely reached at the 25 to 30% level”*.

However, land cover types with extensive pervious surfaces that are not “natural” *per se* but occur in the lands adjacent to natural areas, such as manicured parks/open spaces and agricultural lands, are recognized as potentially supporting the functions of nearby natural areas in some regards by providing one or more of the following:

- Permeable surfaces (and therefore potentially supporting hydrologic regimes),
- Temporary or permanent vegetation (e.g., isolated or small groupings of trees/landscaped areas, agricultural crops), and/or
- Intervening lands between natural areas and built areas that are used less frequently and/or less intensively by people.

For example, a school ground between a wooded area and a high-density residential area is generally considered preferable to having the high-density residential area directly abutting the natural area.

APPROACH: A 120 m buffer (exclusive of asset area) was drawn around each natural asset at Level 2 of the inventory. The extent of landcover associated with complementary land uses and natural assets was estimated in hectares within each buffer. Areas of complementary uses include Agriculture, Built-up Pervious, and Golf Course land cover. These areas have vegetated cover but are not natural in the true sense of the definition. The area of the 120 m buffer was estimated in hectares (excluding the area of the asset itself from counting towards this estimate), and the percentage of each buffer that consists of these natural area/complementary land uses was estimated. A ranking was then applied to each buffer and linked to the relevant natural assets.

SCORING: A ranking was assigned to each asset based on the percentage of complementary land uses with the 120m buffer as follows:

- Very Good: 51 to 100% complementary land uses
- Good: 31% to 50% complementary land uses
- Fair: 16% to 30% complementary land uses
- Poor: 1% to 15% complementary land uses
- Very Poor: 0% complementary land uses

RESULTS: Table 10-7 demonstrates the area of assets within each condition rating for adjacent complementary land uses. As is shown in the table, most of Fort Erie's assets rank very good or good for this indicator.

Table 10-7. Area of natural assets by adjacent complementary land use rating.

Condition Rating	Fort Erie Owned/Managed Assets (ha)	Percent (%)
Very Good	277.21	74.28
Good	66.79	17.90
Fair	19.77	5.30
Poor	8.70	2.33
Very Poor	0.71	0.19
Total	373.19	100

10.8 Percent of Forest Cover within Watersheds

INDICATOR: Percentage of watersheds covered by forest with higher forest cover ranking more favorably.

RATIONALE: According to Environment Canada (2013) research, it is recommended that between 30-50% of watersheds be forested. The greater the percent of forest cover the greater the conservation and habitat quality of the watershed. From a management perspective, any forest asset within a watershed with a high degree of forest cover will generally require less management intervention.

APPROACH: Watershed boundaries were overlayed on the natural asset inventory. The total area of all forest assets was estimated and compared against the total watershed area to establish the percent of forest cover within the watershed. All individual forest assets within the watershed were allocated the same condition rating based on the scoring thresholds noted below.

SCORING: The area of forest assets within each watershed area was estimated as a percentage of the watershed's area. Watersheds, and by extension the forest assets within them, were rated as follows:

- Very Good: watersheds with > 50% forest cover
- Good: watersheds with 41 to 50% forest cover
- Fair: watersheds with 31 to 40% forest cover
- Poor: watersheds with 16 to 30% forest cover
- Very poor: watersheds with <16% forest cover

RESULTS: For this indicator the entirety of the forest assets rank very poor meaning that the forest cover within the watersheds was less than 16%.

Table 10-8. Area of natural assets by forest cover rating.

Condition Rating	Fort Erie Owned/Managed Assets (ha)	Percent (%)
Very Good	0	0
Good	0	0
Fair	0	0
Poor	0	0
Very Poor	121.20	100
Total	121.20	100

10.9 Percent of Wetland Cover within Watersheds

INDICATOR: Percentage of watersheds covered by wetland with higher wetland cover ranking more favorably.

RATIONALE: According to Environment Canada (2013) the guideline for percent of wetland cover within a watershed is described as: At a minimum, the greater of (a) 10% of each major watershed and 6% of each subwatershed, or (b) 40% of the historic watershed wetland coverage, should be protected and restored.

APPROACH: Watershed boundaries were overlayed on the natural asset inventory. The total area of all wetland assets was estimated and compared against the total watershed area to establish the percent of wetland cover within the watershed. All individual wetland assets within the watershed were allocated the same condition rating based on the scoring thresholds noted below.

SCORING: The area of wetland assets within each watershed was estimated as a percentage of the watershed's area. Watersheds, and by extension the wetland assets within them, were rated as follows:

- Very Good: watersheds with > 10% wetland cover
- Good: watersheds with 7 to 10% wetland cover
- Fair: watersheds with 5 to 7% wetland cover
- Poor: watersheds with 3 to 5% wetland cover
- Very poor: watersheds with <3% wetland cover

RESULTS: Table 10-9 demonstrates the area of assets across the condition ratings for this indicator. All wetland assets ranked very good for this indicator meaning that the relevant watersheds had at least 10% wetland cover.

Table 10-9. Area of natural assets by wetland cover rating.

Condition Rating	Fort Erie Owned/Managed Assets (ha)	Percent (%)
Very Good	219.29	100
Good	0	0
Fair	0	0
Poor	0	0
Very Poor	0	0
Total	219.29	100

11 Appendix C: Ecosystem Services for Valuation of Natural Assets in Fort Erie

This appendix provides an overview of the ecosystem services provided by natural assets within the Town of Fort Erie. The valuation results were calculated based on **all** natural assets within the Town's jurisdiction, and where possible values were also scaled to generate estimates of the values provided specifically from natural assets owned or managed by the Town.

Ecosystem services represent the benefits that nature provides to humans. The importance of ecosystem services lies in their fundamental role in supporting all life on Earth. They contribute to our well-being and economic health by providing clean air and water, food, materials for shelter and clothing, natural resources for economic development. Additionally, these services play a crucial role in reducing environmental risks and regulating natural cycles in ways that sustain life (WWF Living Planet Report, 2016). Figure 11-1 depicts numerous ecosystem services categorized by the common themes of provisioning, regulating, supporting and cultural. The ecosystems services summarized in Figure 11-1 align closely with the classification used by the Millennium Ecosystem Assessment Framework which helped standardize the way we understand and assess ecosystem services.

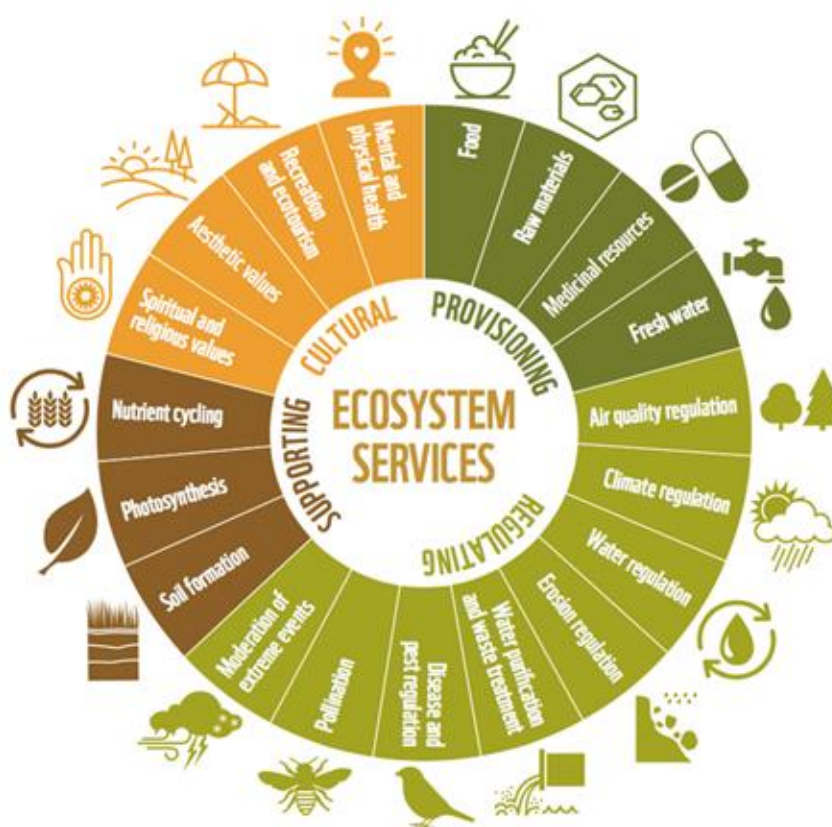


Figure 11-1. Ecosystem services diagram (Source: WWF Living Planet Report 2016).

From the range of services identified in the figure above, Green Analytics identified those most amenable to valuation for Fort Erie. Valued services include the provision of recreational opportunities, carbon

sequestration, air quality regulation, stormwater regulation, habitat preservation, regulation of extreme heat and contribution to crop productivity.

The approaches employed varied by service type but, at a high-level, were based on existing norms and standards. In this regard, the valuation of the ecosystem services focused on the value of the *final* services provided to those who *benefit* from the services. This concept is demonstrated in the Cascade Model (Figure 11-2). As can be seen in the figure, natural assets have biophysical structures that provide functions which result in final services and benefits. Humans benefit from these biologically-driven services, and these can be valued.

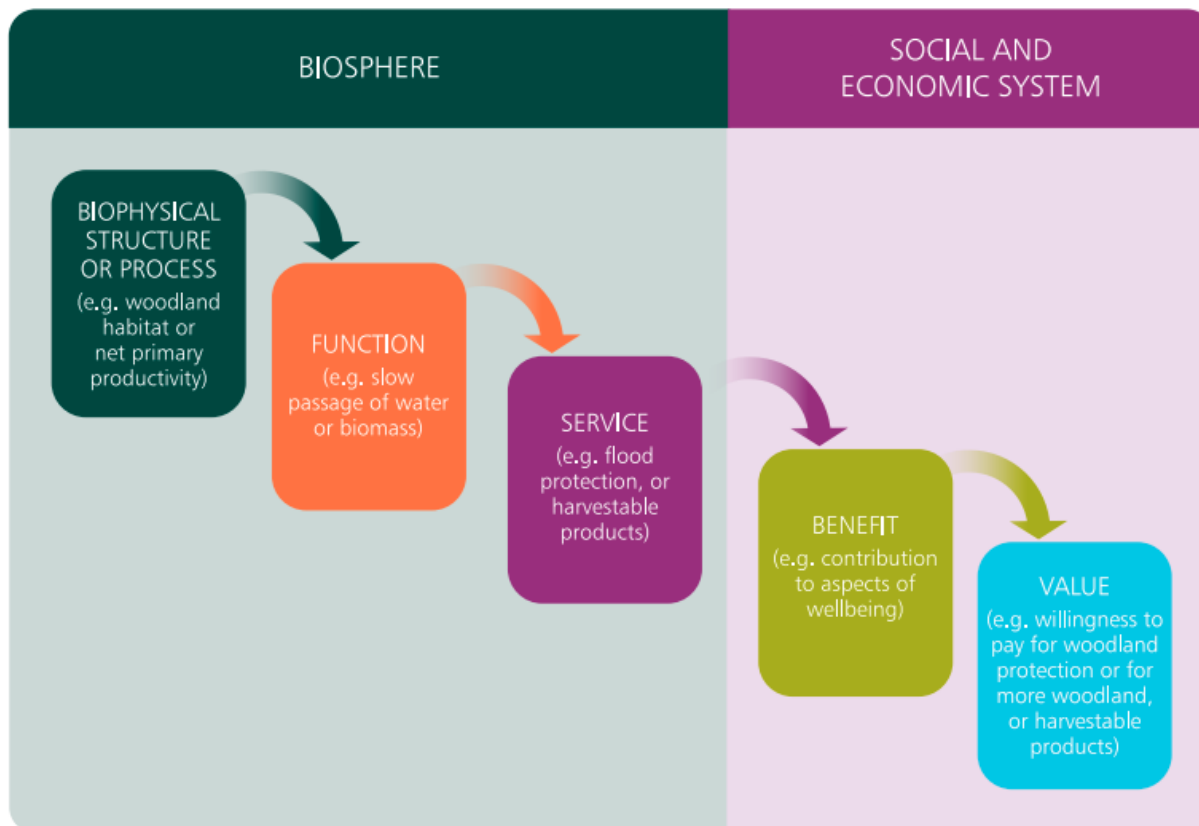


Figure 11-2. The cascade model depicts the framework used to value services from natural assets.

Willingness to pay (WTP) is the common convention used to establish values for ecosystem services. To establish WTP, economists employ stated preference, revealed preference, or benefits transfer approaches. For this analysis, the benefits transfer approach that was applied varied depending on the service provided. The simplest approach is to apply a dollar per hectare transfer from one location to another. In the case of valuing recreation, a dollar per unit approach was more appropriate. For example, the value of recreation was estimated by applying a dollar per recreation user to the number of recreation users for a given set or sub-set of natural assets such as trails. Benefits functions were used for services like the value of air quality regulation where the distance between natural assets and population were considered.

Table 11-1 summarizes the ecosystem services that were the focus of the valuation for the Town of Fort Erie. In each case the focus of the valuation is identified.

Table 11-1. Ecosystem services valued as well as the focus of the valuation exercise.

Ecosystem Service	Focus of the Valuation
Carbon Sequestration	Avoided atmospheric carbon concentrations
Air Quality Regulation	Avoided health care and other costs derived from air pollution
Stormwater Regulation	Avoided stormwater management infrastructure costs
Habitat Preservation	Value people place on knowing habitat (and associated biodiversity) is preserved
Extreme Heat Regulation	Avoided health impacts associated with extreme heat provided by proximity to natural areas
Contribution to Crop Productivity	Crop productivity due to presence of wild pollinators
Aesthetic Appreciation	Value of aesthetic appreciation due to presence of natural assets

11.1 The Value of Carbon Sequestration

Two approaches were used to estimate a total value for carbon sequestration, depending on the type of natural assets; one approach was used for the forested assets and another method was used for the non-forested assets.

To attribute carbon sequestration values to forested assets in the Town of Fort Erie, the Carbon Budget Model of the Canadian Forest Service, v3 (CBM-CFS3) was used.⁴ This model requires inputs for forested asset in terms of growth rates, ages, and species compositions. Forest characteristics embedded in the natural asset inventory were used (i.e., “ELC_Class”, “FRI Stocking Class”, and “FRI Age”). The CBM-CFS3 model estimates tonnes of C per hectare per year sequestration rates as well as tonnes of C per hectare for each forested asset. The CBM-CFS3 model works well for forested areas. However, it is not well suited to individual urban trees. As a result, the carbon sequestration service provided by urban tree inventory was not accounted for in this analysis. Future analysis could employ suitable tools, such as i-Tree, to model carbon sequestration for street and park trees.⁵

For non-forested asset classes, Green Analytics drew on a literature review to assign sequestration rates. Non-forested asset types were cross-referenced with a database of average sequestration rates by land cover type. Over 30 peer-reviewed papers informed the employed carbon sequestration rates. Using this approach, each non-forested natural asset class gets its own estimated carbon sequestration rate. Table 11-2 displays the carbon sequestration rates that were used for the natural asset classes within the Town of Fort Erie. As noted above, forest and hedgerow carbon sequestration was determined using the CBM-CFS3 and vary by age of the asset. For these assets, mean sequestration rates are provided in Table 11-2 as a reference.

⁴ <https://natural-resources.canada.ca/climate-change/climate-change-impacts-forests/carbon-accounting/carbon-budget-model/13107>

⁵ <https://www.itreetools.org/>

Table 11-2. Average carbon sequestration rate assumptions

ELC Class	Asset Type	Tonnes CO ₂ e / ha / yr
Deciduous Swamp	Wetland	17.34
Mixed Swamp	Wetland	17.34
Floating-leaved Shallow Aquatic	Wetland	7.85
Thicket Swamp	Wetland	7.41
Deciduous Forest	Forest	7.08
Deciduous Hedgerows	Hedgerow	6.97
Golf	Golf	6.34
Marsh (Unknown Type)	Wetland	5.83
Meadow Marsh	Wetland	5.83
Shallow Marsh	Wetland	5.83
Submerged Shallow Aquatic	Wetland	5.79
Coniferous Woodland	Forest	5.17
Coniferous Forest	Forest	4.88
Coniferous Hedgerows	Hedgerow	4.80
Deciduous Woodland	Forest	4.29
Treed Shoreline	Shoreline	3.96
Mixed Forest	Forest	3.67
Mixed Woodland	Forest	2.86
Deciduous Thicket	Forest	2.86
Mixed Thicket	Forest	2.86
Mixed Hedgerows	Hedgerow	2.86
Treed Agriculture	Forest	2.86
Mixed Meadow	Meadow	1.76
Mixed Pervious	Built-up Pervious	1.76
Build-up Pervious	Built-up Pervious	1.76
Graminoid Meadow	Meadow	1.76
Mixed Grasses	Built-up Pervious	1.76
Agriculture Crop Defined	Agriculture Crop Defined	1.14
Open Agriculture	Agriculture	1.14
Mixed Pervious Surfaces (UAD)	Built-up Pervious	1.14
Agriculture and Undifferentiated Rural Land Use	Agriculture and Undifferentiated Rural Land Use	1.14
Cemetery	Built-up Pervious	1.10
Open Shoreline	Shoreline	NA
Open Water	Aquatic	NA
Open Water (Varied Type)	Aquatic	NA
Open Aquatic	Aquatic	NA
SWM Pond	Aquatic	NA

ELC Class	Asset Type	Tonnes CO ₂ e / ha / yr
Mixed Ponds	Aquatic	NA
Water (ESRI)	Aquatic	NA

For purposes of estimating the carbon sequestration rates of the natural assets within Fort Erie, the team used ‘tonnes of carbon dioxide equivalent’ (tCO₂e) per year as the primary unit of calculation. Carbon dioxide equivalent describes the global warming potential of various other greenhouse gasses relative to carbon dioxide. In this analysis, only the carbon dioxide was considered as there were no significant sources of methane or nitrous oxide, emissions which are considerably stronger global warming gasses, from the natural assets themselves. It is convention to report carbon dioxide emissions in carbon dioxide equivalent.

To assign a monetary value to the carbon sequestration from the natural assets within Fort Erie two prices of carbon were used. The first carbon price was the “National social cost of carbon” (SCC) for Canada. The second price was the “Minimum National Carbon Pollution Price”.

The SCC is defined as:

“The SCC ... estimates include damages from a variety of climate change impacts, including, but not limited to, changes in net agricultural productivity, human health effects, property damage from increased flood risk, disruption of energy systems, and the value of ecosystem services. Given that climate change damages are a function of the cumulative stock of GHG emissions, the SCC estimates increase over time as GHG emissions accumulate in the atmosphere. The SCC price increases over time because: a) there are larger incremental damages from future emissions as physical and economic systems become more stressed from greater climatic change, and b) income grows over time, meaning future impacts affect more wealth, and as income grows there is a higher willingness to pay to avoid economic damages.⁶”

The value of the SCC used in this analysis was \$291 /t CO₂e in 2023 Canadian dollars.

The second carbon price corresponds to the Minimum National Carbon Pollution Price of \$65 /t CO₂e⁷ also in 2023 dollars. The Minimum National Carbon Pollution Price is defined as follows:

“The Government of Canada published the Pan-Canadian Approach to Pricing Carbon Pollution (the federal ‘benchmark’) on October 3, 2016, which established Canada’s approach to carbon pricing for the 2018-2022 period. It set out the principles on which the pan-Canadian approach to pricing carbon pollution is based, and established minimum national stringency criteria that all systems must meet to ensure they are comparable and effective.

It also indicated that the federal carbon pollution pricing system (the ‘backstop’) would be applied in provinces and territories that request it or that do not implement a system that meets the benchmark. The federal backstop is an explicit price-based system composed of two parts, a fuel

⁶ <https://www.canada.ca/en/environment-climate-change/services/climate-change/science-research-data/social-cost-ghg.html#toc0>

⁷ <https://www.gazette.gc.ca/rp-pr/p2/2023/2023-07-05/html/sor-dors129-eng.html>

charge and an output-based pricing system for large industry. Where the federal backstop system is applied, all carbon pricing proceeds are returned to the jurisdiction of origin.”

The assets providing carbon sequestration value are shown in Figure 11-3. The most valuable assets in terms of carbon sequestration were forests and treed wetlands (e.g. swamps). This is driven in part by the relative rates of carbon sequestration, but also because these assets are the most prevalent assets within the Town.

The value of carbon sequestration within the geographic boundaries of the Town of Fort Erie was estimated at between \$5 million and \$23 million in 2023 dollars depending on which price of carbon was used. Within the Town-owned and managed assets, the value of carbon sequestration ranged from \$0.3 million to \$1.2 million.

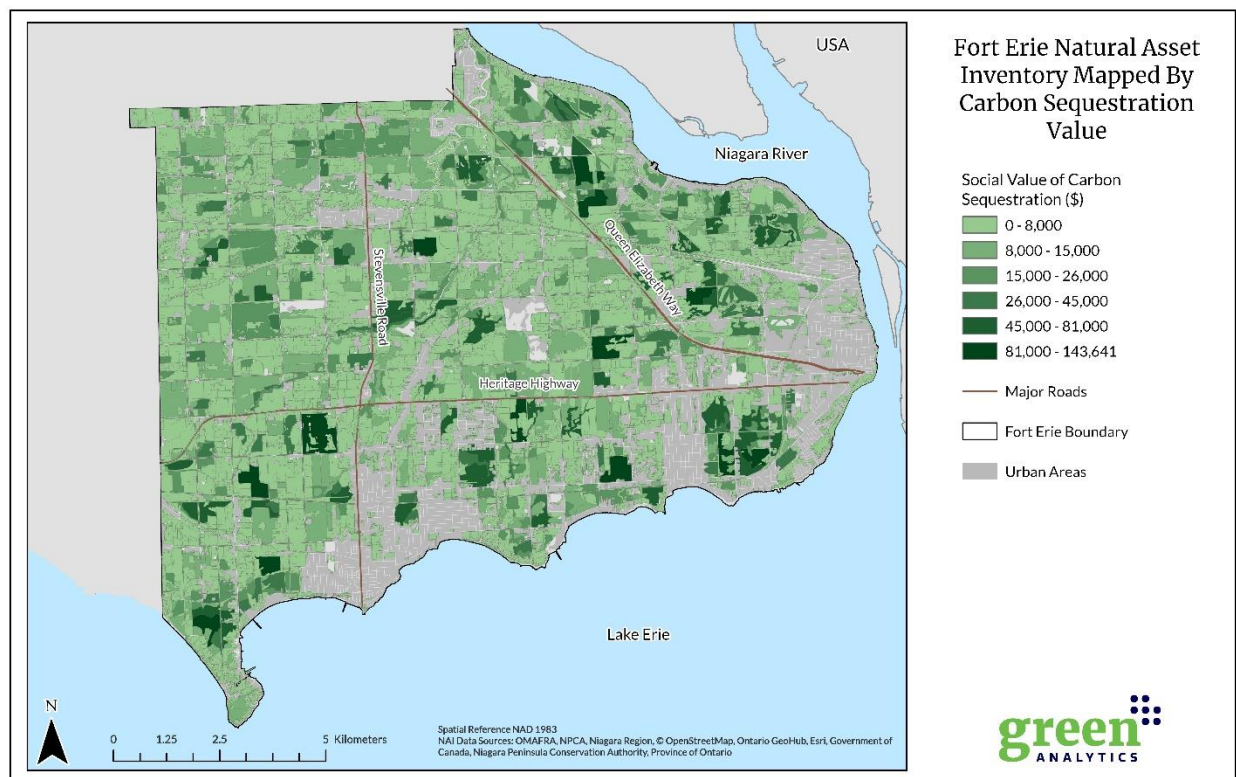


Figure 11-3. Distribution of carbon sequestration values for natural assets within the Town of Fort Erie.

11.2 The Value of Air Quality Regulation

The value of air quality regulation provided by the natural assets within the Town of Fort Erie was based on an estimate of the avoided health care costs associated with peoples’ exposure to air pollutants. The specific air pollutants considered in this analysis were nitrogen dioxide, ozone, sulfur dioxide and fine particulate matter smaller than 2.5 microns in size.

Nitrogen dioxide, abbreviated NO₂, at elevated levels in the atmosphere can cause damage to peoples' respiratory tracts and increase vulnerability to respiratory infections⁸ In Canada, this has direct implications for the cost of providing health care, as well as lost productivity due to illness. Ozone, abbreviated O₃, has similar effects on people as NO₂. People with asthma, or other respiratory conditions, suffer when exposed to areas with higher-than-normal concentrations of O₃. Fine particulate matter smaller than 2.5 microns in size, abbreviated PM2.5, has a similar effect on people as ozone and nitrogen dioxide, though it appears more severe than NO₂ and O₃. Exposure to elevated levels of PM2.5 has been linked to premature death in people with prior heart or lung diseases.⁹ Sulfur dioxide, abbreviated SO₂, in high concentrations can cause multiple significant impacts on both people and plants. At high enough concentrations, SO₂ can contribute to acid rain.

To estimate the value of air quality regulation from the Town of Fort Erie's natural assets, regression equations developed by Nowak et al. (2014) were used and populated with statistics from the Town of Fort Erie's natural assets. These regression equations account for the population density of the Town of Fort Erie, based on the 2021 national census, to estimate the avoided health care costs according to the number of people exposed to the surrounding air quality. Nowak et al. (2014) built upon previous studies and produced well referenced estimates of the value of pollutant removal by natural assets for each of the noted pollutants (NO₂, O₃, PM2.5, SO₂). The focus of their study was on the leaf area index (the overall extent of tree foliage) of the forested assets and their ability to regulate the pollutants. This resulted in specific regression equations which were used to estimate the value of air quality regulation based on population and density of forested area (forest area and population density acting as the independent variables within the regression equations). Green Analytics deemed these equations applicable to be used as the basis for calculating the value of air quality regulation by natural assets. Table 11-3 summarizes the key equations from Nowak et al. (2014) used for these estimates.

Table 11-3. Nowak et al. (2014) equations and assumptions used in the current analysis.

Pollutant	Kg removed per ha of tree cover	Value function y = dollars per tonne x = people per km ²
NO ₂	5.5	$y = 0.7298 + 0.6264x$ ($r^2 = 0.91$)
O ₃	54.9	$y = 9.4667 + 3.5089x$ ($r^2 = 0.86$)
PM2.5	2.7	$y = 428.0011 + 121.7864x$ ($r^2 = 0.83$)
SO ₂	3.5	$y = 0.1442 + 0.1493x$ ($r^2 = 0.86$)

To determine the value of natural assets providing air quality regulation for NO₂ each hectare of forested assets was assumed to remove 5.5 kg of NO₂ from the surrounding air each year, as outlined in Nowak et al. (2014). The total dollar per tonne of NO₂ was then determined by the equation $y = 0.7208 + 0.6264x$ where x equalled the population density of the Town of Fort Erie in km². The dollar per tonne value was multiplied by the number of tonnes of NO₂ removed (calculated from the area of forested assets) to give the total value of NO₂ regulation. These calculations were repeated for each of the other three pollutants. Like carbon sequestration, these values were only applied to forested areas and the values do not include

⁸ <https://www.qld.gov.au/environment/management/monitoring/air/air-pollution/pollutants/nitrogen-oxides>

⁹ <https://ww2.arb.ca.gov/resources/inhalable-particulate-matter-and-health>

the contribution provided by the urban tree inventory. These values could be accounted for in the future drawing on tools such as i-Tree.

The total value of air quality regulation by the 2,061 hectares of natural assets within the Town of Fort Erie, in 2023 dollars, was \$297,705 per year, while air quality within the 142 hectares of Town-owned and managed assets had an estimated yearly value of \$20,512. Figure 11-4 shows the distribution of air quality regulation values across all natural assets within the Town of Fort Erie.

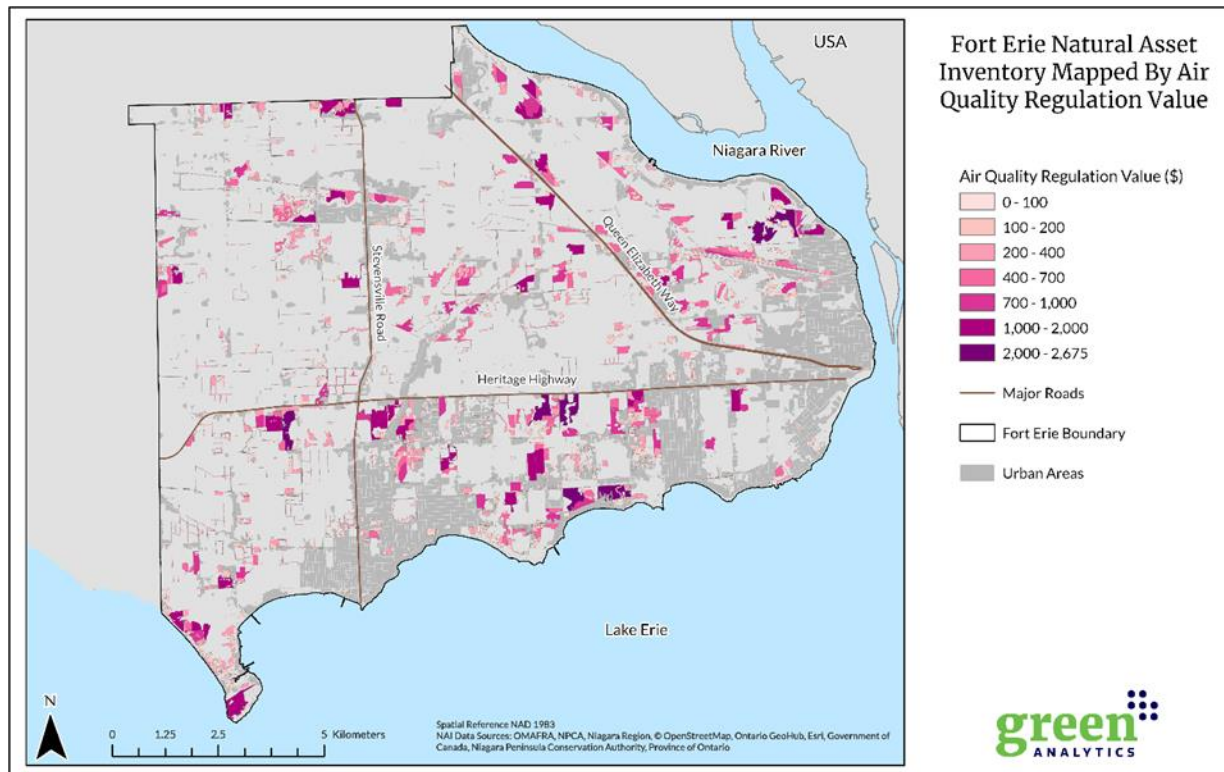


Figure 11-4. Distribution of air quality regulation values for natural assets within the Town of Fort Erie.

11.3 The Value of Stormwater Regulation

The value of stormwater regulation was derived on the ability of natural assets to control and absorb water during low frequency heavy rain events. Building off Saini et al. (2018) from the Peel Pilot Study, forests, grasslands, and wetlands were assigned a value per hectare based on their ability to abate stormwater.

Trees and forests reduce stormwater runoff by capturing and storing rainfall in the canopy and releasing water into the atmosphere through evapotranspiration. Additionally, tree roots and leaf litter create soil conditions that promote the infiltration of rainwater into the soil. This helps to replenish the groundwater supply and maintain stream flow during dry periods. The presence of trees also helps to slow down and temporarily store runoff, which further promotes infiltration, and decreases flooding and erosion downstream (Saini et al. 2018).

“Open green spaces” are spaces partially or completely covered with grass, trees, shrubs, or other vegetation. They can include parks, community gardens, and open fields. Such spaces provide pervious

surfaces in otherwise urbanized catchments and stormwater draining to these spaces has a chance to be filtered and infiltrated before reaching receiving streams (Saini et al. 2018).

Wetlands receive stormwater from upland sources and hold large volumes of water in situ before slowly releasing it to streams, lakes, and rivers. They act as an important buffer system to stormwater regulation and help improve nearby water quality.

Applying the values per asset class to the area of assets within Fort Erie resulted in about \$10 million per year in value for stormwater management. Areas within Fort Erie owned and managed parcels amount to \$0.929 million per year in stormwater management services (Table 11-4).

Table 11-4. Value of stormwater regulation based off natural asset types updated to 2023 Canadian dollars.

Asset Type	\$ / ha / Year	All Assets	Town of Fort Erie Owned/Managed Assets		
		Area (ha)	\$ / Year	Area (ha)	\$ / Year
Forests and Hedgerows	\$2,062	2,061	\$4,249,782	142	\$292,804
Open Green Spaces	\$740	210	\$155,400	4	\$2,960
Wetlands	\$1,445	4,046	\$5,846,470	219	\$316,455
Total	N/A	6,317	\$10,251,652	365	\$928,674

11.4 The Value of Habitat Preservation

Brander and Koetse (2011) estimate the value people place on urban open spaces where urban open spaces are defined as urban parks, forests, green spaces, undeveloped lands, and agriculture lands.¹⁰ The authors use regression analysis to articulate a mathematical function that can be used to estimate the value of open spaces in other jurisdictions. Their results can be used to estimate the value of the area of open space by substituting information on the parameter values for a specific site. It was within this context that the regression equation was applied to the natural assets within the Town of Fort Erie. The key independent variables that feed into the equations are area of open spaces, gross domestic product per capita, and population density. To apply the regression equation to Fort Erie's natural assets, these variables were populated with Fort Erie-specific data. The result is an estimate of the value of open spaces measured in dollars per hectare, which can be applied to the hectares of open space located within the Town of Fort Erie and owned or managed by the municipality (Table 11-5).

¹⁰ Brander, Luke and Mark Koetse. (2011). The value of urban open space: Meta-analyses of contingent valuation and hedonic pricing results. *Journal of Environmental Management*, 92, 2763-2773.

Table 11-5. Area of natural assets that provide habitat.

Asset Type – ELC Class	Within Fort Erie Area (ha)	Town Owned/Managed Area (ha)
Agriculture Crop Defined ¹¹	4,758	91
Wetland	4,046	219
Forest	1,910	121
Agriculture and Undifferentiated Rural Land Use	707	80
Meadow	210	4
Hedgerow	150	21
Shoreline	69	3
Total Area	11,850	540

There are 11,850 hectares of natural assets within the Town of Fort Erie that may provide suitable habitat and contribute to local biodiversity. A value of \$443 per ha, in 2023 Canadian dollars,¹² was applied to the area of assets supporting habitat resulting in a total value of habitat preservation of \$5.2 million per year within the Town of Fort Erie. Scaling this value, natural assets owned and managed by the Town of Fort Erie yielded a value of habitat preservation value of \$238,939 per year.

11.5 The Value of Regulation of Extreme Heat Events

The value associated with the regulation of extreme summertime heat events was estimated as the reduction in human mortality in natural asset adjacent residential neighbourhoods stemming from the anticipated reduction in maximum daily air temperatures attributed to assets. A with-without approach was used to estimate mortality due to extreme heat given the current distribution of natural assets and the anticipated change in this mortality after removing the natural assets' influence on air cooling. The economic value of the resulting estimated change in mortality serves as the value of the regulation of extreme heat events associated with the parks.

In general, the approach relied on data from Kroeger et al. (2018) to estimate the cooling influence of natural assets in °C on the summer air temperature of park adjacent residential neighbourhoods (summer corresponds with the months of June, July, and August).¹³ Changes in air temperatures were linked to changes in population mortality in the Town of Fort Erie using a relationship estimated for Ontario from Chen et al. (2016). As part of Chen et al. (2016), other factors that can influence population mortality are

¹¹ "Agriculture Crop Defined" represents areas within the Town of Fort Erie's boundaries for which agricultural crop information was provided. This differs from the "Agriculture and Undifferentiated Rural Land Use" category for which there was no specific agricultural crop information.

¹² The source value was in 2003 US dollars, which required conversion to the 2003 Canadian dollars, then adjusted to the 2023 Canadian dollars. To do this the Statistics Canada Consumer Price Index data tables were used, average yearly values were calculated for "All Items" with the Geography selected as Ontario for years 2003 and 2023. This resulted in an adjustment factor, a 'deflator', to which the 2003 value was multiplied.

¹³ Kroeger et al. (2018) focus their analysis on treed areas but the data they sourced to estimate the relationship between tree cover and temperature was gathered from studies assessing the influence of multiple cover types on air temperatures. Their approach and relationships were applied, therefore, to non-treed assets.

controlled for to estimate the relative impact solely from air temperature changes. The estimated change in mortality was valued using the value of a statistical life. Details are outlined in the following steps:

1. The cooling influence of natural assets depends on their size, with larger assets cooling the air more than smaller assets. Following Kroeger et al. (2018) GIS was used to first group contiguous assets together to create larger asset conglomerations. The resulting asset areas were then divided into four size classes depending on their park width distance (PWD), which is measured as the square root of their area (Table 11-6). Each size class yields a different level of maximum daily air temperature reduction within and beyond the asset area which Kroeger et al. (2018) refers to as the park cooling intensity (PCI). The intensity of a park's influence on reducing air temperatures is highest within its boundaries and declines with distance from its edge (Figure 11-5).

Table 11-6. Asset Size Classes and Associated Air Cooling Intensity Within and Beyond the Asset.

Size Class	PWD (m)	PCI (°C)	Level of Cooling Intensity Beyond Asset Edge (m)		
			High	Medium	Low
1	<30	1.055	0 to 30	None	None
2	30 to <90	2.143	0 to 30	30< to 40	40< to 50
3	90 to <270	2.445	0 to 50	50< to 80	80< to 160
4	>=270	3.283	0 to 150	150< to 250	250< to 500

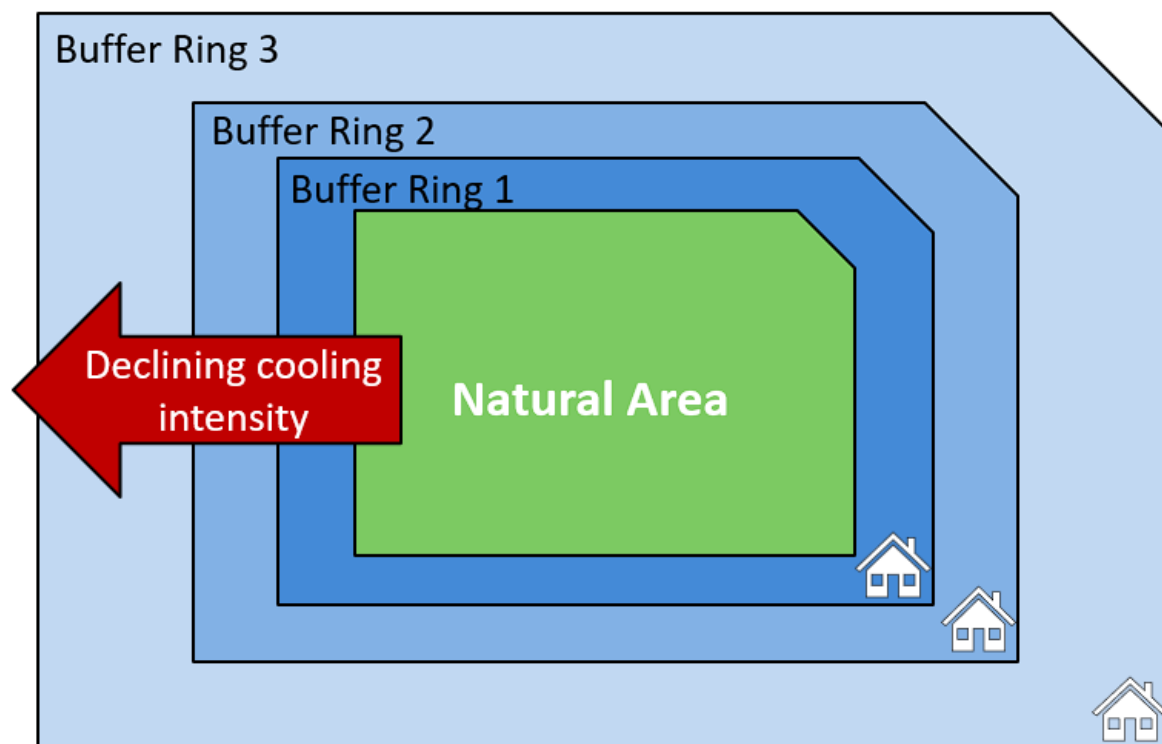


Figure 11-5. Air Cooling in Natural Assets and Asset-Adjacent Areas.

2. The air cooling that extends beyond the edge of the natural assets is most important for this analysis as this area intersects with neighbourhoods where people live. The distance beyond the

asset's edge as well as the intensity of this cooling — which Kroeger et al. (2018) categorize as high, medium, or low — both depend on the asset's area (Table 11-7 and Figure 11-5). As such, using GIS, the contiguous groups of assets were buffered with three rings of varying widths and distance from the asset edges to represent the areas experiencing the different levels of air cooling. Cooling from the smallest assets (size class 1) is only experienced in the high intensity buffer and does not extend beyond 30 m from the asset's edge. Kroeger et al. (2018) estimate the reduction in maximum daily air temperatures experienced beyond the edge as the percentage of the PCI remaining in each buffer which can be converted to degrees Celsius (Table 11-7).

Table 11-7. Air Cooling Intensity Experienced in Each Buffer Beyond the Asset's Edge.

Size Class	Remaining PCI in Percent			Remaining PCI in °C		
	High	Medium	Low	High	Medium	Low
1	39%	None	None	0.411	None	None
2	49%	27%	20%	1.050	0.579	0.429
3	59%	40%	26%	1.443	0.978	0.636
4	59%	40%	26%	1.937	1.313	0.854

- The next step involved estimating the population of residential areas overlapping with each asset's buffer rings. To do so GIS was used to intersect each buffer ring with 2021 Census of Population dissemination areas (DA) to determine the area of overlap between the buffer rings and DAs. The area of these DAs was first clipped of non-residential features using primarily residential or mixed use zoning, derived from provided zoning data for Fort Erie such that they better represent where people actually live in the Town of Fort Erie. The population density for each clipped DA was then calculated and then applied to the area of each buffer ring intersecting with the clipped DAs in order to estimate population residing in each asset's buffer ring (and thus the residents experiencing the different levels of summertime air temperature cooling). The total population forecast to experience some park-related air cooling at their place of residence is 22,930.
- It was then necessary to estimate the influence of the park-related air temperature cooling on mortality in these neighbouring residential populations. The current annual non-accidental mortality in park adjacent residential populations was first estimated. This involved multiplying the estimated population in the buffer rings by the average annual mortality rate from non-accidental causes for the years 2013 to 2022 in Ontario which was 689.9 per 100,000 people (Statistics Canada 2023a).¹⁴ This yields total annual estimated non-accidental mortality for the population of all three buffers of all natural assets of 158.2 per year. However, since this analysis is focused on summertime air temperatures data from Statistics Canada (2023b) on the monthly distribution of deaths from all causes for Ontario averaged from 2013 to 2022 was used to estimate mortality for the months of June, July, and August (this distribution was assumed to reflect that of non-accidental deaths). On average 23.2% of deaths occurred during these months yielding an estimate of total summertime mortality of 36.7.

¹⁴ Causes thought less likely to be linked to air temperatures including homicides, suicides, deaths due to medical or surgical care, and those from unknown causes were not included when estimating the non-accidental mortality rate. Non-accidental deaths included in the analysis account for 93% of deaths that comprise the average annual mortality rate.

It is assumed that this mortality already incorporates the influence of the existing park assets on air cooling and thus deaths related to extreme heat. Therefore, the analysis estimated how removing the influence of the park assets on air cooling calculated in the prior steps might increase non-accidental mortality in the adjacent residential populations using data from Chen et al. (2016). They related maximum daily summertime (June, July, and August) air temperature in °C to percent change in non-accidental mortality for residents of Ontario, finding that with every 5 °C increase in maximum temperatures this mortality increased by 2.2 percent daily (or 0.44 % for every °C). We use this relationship to estimate the increase in non-accidental mortality in the residential populations of each of the assets' buffers associated with removing the park-related air cooling measured earlier. It was forecasted that removing this cooling yields an increase in non-accidental mortality of 0.24 individuals per year which is the reduction in mortality attributable to the network of assets.

It is likely that many residents influenced by the cooling of natural assets live in homes with air conditioning and can take refuge from high air temperatures inside their houses. The estimated population can therefore be adjusted to account for air conditioning penetration. Statistics Canada (2023c) estimates that 91% and 84% of homes in the St. Catharines-Niagara Census Metropolitan Area and Ontario, respectively, had some form of air conditioning in 2021 (the latest year available). While estimates could be adjusted using these penetration rates this would likely result in too large a change. Since Chen et al. (2016) used population mortality data it is likely that their findings already incorporate the influence of some level of air conditioning on summertime temperature-related mortality in Ontario; this level increased between 1996 and 2010 the time during which their mortality data was collected (Statistics Canada 2023c). It is possible that heat related deaths have declined as a result, making some adjustment necessary, although at the same time any reduction in heat-related deaths is potentially already incorporated into the contemporary non-accidental death rate for Ontario offsetting the need for adjustment.

Within this context attempts were made to adjust for differences in air conditioning. Determining the proper adjustment to apply to the analysis is difficult given that the available data for Ontario only covers the years 2003, 2007, and 2009 of Chen et al.'s (2016) period of study (Natural Resources Canada Office of Energy Efficiency 2006, 2010; Sawicz 2011).^{15, 16} Thus, American data on air conditioner penetration from the Middle Atlantic (Northeast) and East North Central (Midwest) census sub-regions, bordering Ontario, from the years 1997, 2001, and 2005 was used to estimate air conditioner use in Ontario for these years (USEIA, n.d.). These estimates were used, in combination with the data for Ontario, to estimate an average household penetration rate during the 1996 to 2010 period. It was estimated that the average annual air conditioner penetration rate over this period was 70% which is only 0.83 times the penetration rate for Ontario in 2021 (84%). Further, and key for the current analysis, the share of households in the province with no air conditioning dropped from an average of around 30% during Chen et al.'s (2016) period

¹⁵ There are other instances of the Survey of Household Energy Use in the 1990s but this data is mostly not accessible and the summary report for the 1997 survey does not clearly break out air conditioner use for Ontario (Natural Resources Canada Office of Energy Efficiency 2000).

¹⁶ Since Chen et al.'s (2016) study use provincial-level data adjustments for air conditioner penetration use data for all of Ontario.

of study to 16% in 2021. Adjusting the earlier estimate of mortality, 0.24 deaths per year, for the reduction in the share of households with no air conditioning by multiplying by 0.54 yields a reduction in mortality of 0.13 deaths per year.

5. The final step was to assign a monetary value to the estimated change in mortality. To do this the value of a statistical life of \$6.5 million (2007 CAD [\$9.24 million 2023 CAD]) per deceased individual from the Treasury Board Secretariat of Canada's (2022) Cost-Benefit Analysis Guide for Regulatory Proposals was used.

The total value of extreme heat reduction associated with the Town of Fort Erie's network of natural assets differs depending on the treatment of changes in air conditioner use. Without accounting for changes in air conditioner penetration, the estimated value is \$2.2 million per year (2023 CAD). Accounting for air conditioner penetration changes yields a value of \$1.2 million per year (2023 CAD). The spatial distribution of these values is shown in Figure 11-6. Given the nature of this quantification, it is not possible to assign an accurate value estimate to the assets owned and managed by Fort Erie. The Town of Fort Erie assets are part of larger areas that collectively contribute to the derived value.

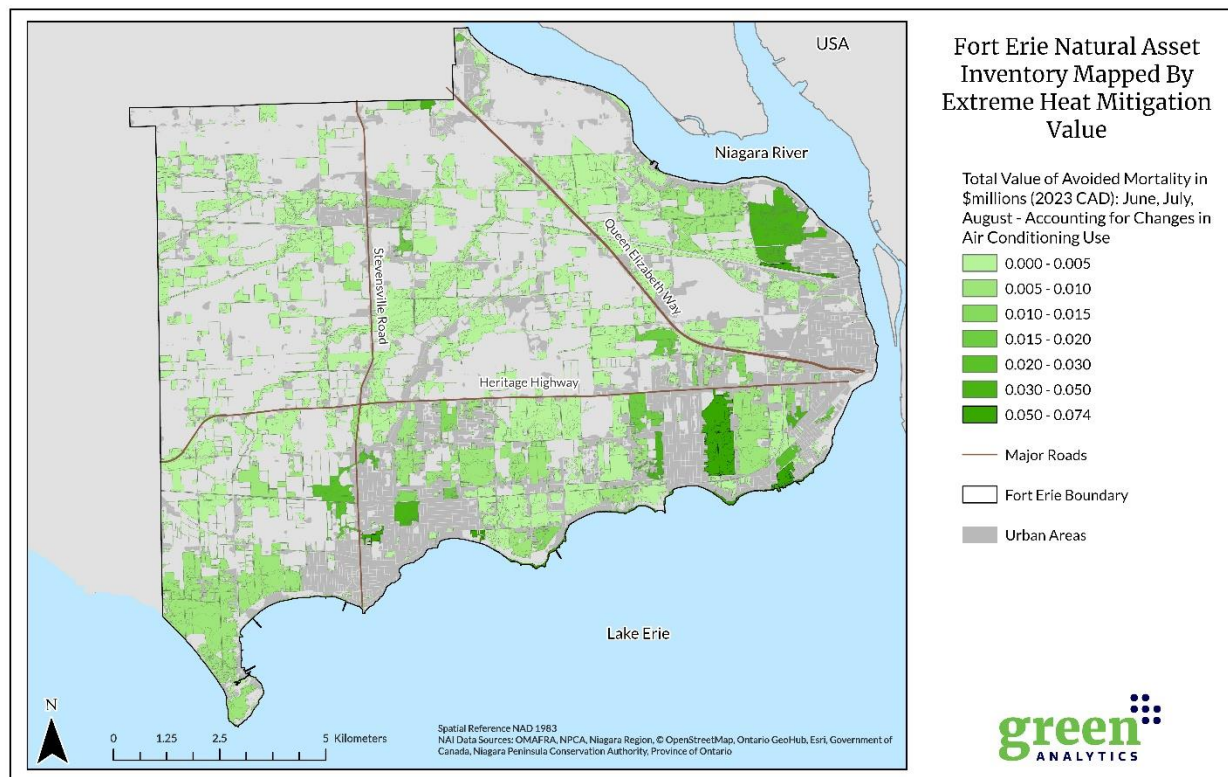


Figure 11-6. Distribution of extreme heat regulation values provided by natural assets within the Town of Fort Erie, accounting for air condition access.

11.6 The Contribution to Crop Productivity (Wild Pollination)

Wild pollinators, such as honeybees, stingless bees, bumble bees, solitary bees, wasps, hover flies, beetles, thrips, and some bird species (Klein et al. 2006) contribute to the success of agricultural production by

pollinating agricultural crops. Not all crops found within the Town of Fort Erie require wild pollination, some crops such as corn and winter wheat rely on wind to pollinate. To estimate the contribution of wild pollinators to crop productivity, agricultural assets within the Town were buffered by an assumed pollinator foraging range of 1,500 m (AAFC 2014). The crop types were reviewed to determine those that were dependent on wild pollination and allocated a pollination impact rating based on significant research done, over the years, by Aizen et al. (2009, 2019) and Klein et al. (2006, 2007). Table 11-8 describes the assumptions used to value the impact of wild pollinators on crop production. Klein et al. (2007) found that there were 5 broad classes of pollinator impact as shown in Table 11-8.

Table 11-8. Crop pollinator dependence classification.

Crop Dependency	Lower	Midpoint	Upper
None	0%	0%	0%
Little	0%	5%	10%
Modest	10%	25%	40%
High	40%	65%	90%
Essential	90%	95%	100%

For example, apple crops have a high dependency (between 40%-90%) on wild pollinators (Aizen et al. 2019, Klein et al., 2007), meaning that in absence of wild pollinators, between 40% and 90% of the apple crops would be lost (Aizen et al. 2009). It should be noted, however, that producers of highly dependent crops will use domesticated honeybees to support the needed pollination services. While this still represents an important ecosystem service, the domesticated portion of the value would not apply to the natural assets providing pollinator habitat. Therefore, the values presented here should be interpreted with caution as the total value is not necessarily entirely dependent on natural areas providing pollinator habitat. Regardless, landscapes with more wild pollinators and associated habitat will provide a stronger support service to surrounding crops.

To infer the value of wild pollinators on pollinator-dependent crops, the midpoint impact percentage from Table 11-8 was applied to the yearly harvest values for each crop type. For example, if apple crops were estimated at \$100,000 per year, then a 65% impact would reduce the value of the apple crops to \$35,000, and thus the value of the wild pollinators would be assumed to equal the value of the lost crops or \$65,000 in this example.

To estimate the contribution of the natural assets within the municipal boundary of Fort Erie to crop productivity, each natural asset within the Town of Fort Erie was buffered by the assumed pollinator foraging range of 1,500 m (AAFC 2014). The area of crop types within the pollinator foraging range of each asset was then established (Table 11-9). The crops were scoped to those that are dependent on wild pollination and allocated a pollination impact rating based on Aizen et al. (2019) and Klien et al. (2007). Not all crops were dependent on wild pollinators. Table 11-9 below displays the assumptions used to value wild pollinator's impact on crops in the Town of Fort Erie.

Table 11-9. Crop types and area in Fort Erie.

Crop Type	Area (ha)	Town Owned/Managed Area (ha)	Dependence
Corn	402	2.3	None
Oats	2	0	None
Other vegetables	1	0	Little/Essential
Pasture/forages	622	4.9	N/A
Rye	24	0.1	None
Soybeans	3,576	59.1	Modest
Winter wheat	131	24.5	None
Total Crop Area	4,758	90.8	

The only crop types assumed dependent on wild pollination within the Town of Fort Erie are soybeans and other vegetables. Other vegetables are a general category used in the spatial data to capture other unknown vegetable crops. For this assessment they were assumed to be a mix of dry onions, peppers, beans, and cabbages. Dependence assumptions are summarized in Table 11-10.

Table 11-10. Fort Erie crops and assumed dependence to pollinators.

Crop Type	Pollinator Dependence Level	Lower Yield Impact	Mid-point Yield Impact	Upper Yield Impact
Soybeans	Modest	10%	25%	240%
Other vegetables	Little/Essential	0%	50%	100%

Agriculture production, yield and price statistics¹⁷ were then used to establish average Ontario crop production values.¹⁸ Average production values (\$/ha) for each crop noted in Table 11-10 were established based on a 5-year average for 2019 to 2023. Total crop values were approximated by multiplying the average production value by the area of each crop within the wild pollinator foraging radius to establish a total crop value influenced by pollinators. Finally, the pollination yield impacts mid-point factor was applied to each crop's production value to establish the contribution to crop productivity provided by wild pollinators. Taking average yields and prices for soybean crops, where 25% of crop loss would exist in the absence of the natural assets, the value was \$1.6 million per year associated with pollinators. The value of this service from town-owned and managed assets was estimated at \$26,000 per year.

11.7 The Value of Aesthetic Appreciation

Estimating the value of aesthetic appreciation in the Town of Fort Erie was based on a study by Mazzotta et al. (2014) which assessed the value of low impact development practices in residential areas. The objective of the study was to assign a monetary value to aesthetic benefits and the influence of open space (which was defined as grassed, forested, wetlands, or riparian buffers by Mazzotta et al. (2014)) on the

¹⁷ Statistics were sourced from the Ontario Data Catalogue, <https://data.ontario.ca/dataset/aggregated-dry-onion-production-and-yields/resource/40ab82b0-f1fa-48e4-bc8c-4d5f55104e86>

¹⁸ <https://www.ontario.ca/page/horticultural-crop-statistics>

sale prices of nearby houses in residential areas using a hedonic function estimated from a meta-analysis review of the literature.¹⁹ Specifically, the function relates the percent change in home sales prices relative to the percentage of 0 to 250 m and 250-500 m buffers of open space surrounding each house, in addition to other variables accounting for characteristics of the open space and neighbourhood. This function was used to assign a monetary value to the aesthetic benefits stemming from Fort Erie's network of natural assets.

First, the approach involved using GIS to build a dataset of residential building footprints, focusing on single-family dwellings to align with Mazzotta et al. (2014) which were each then buffered with 0 m to 250 m and 250 m to 500 m buffer rings. The area of natural assets within these buffers was then calculated enabling an estimation of the percentage of each buffer covered with natural assets (Figure 11-7). The value of homes in Fort Erie was then estimated by averaging historical sale prices²⁰ and then applying coefficients from Mazzotta et al.'s (2014) meta-function to estimate how natural asset coverage in the two buffer rings influences home values. Since this process yielded a onetime value for each home — and not an annual value — the annual rental-equivalent was subsequently calculated following Mazzotta et al. (2014). Detailed steps follow.

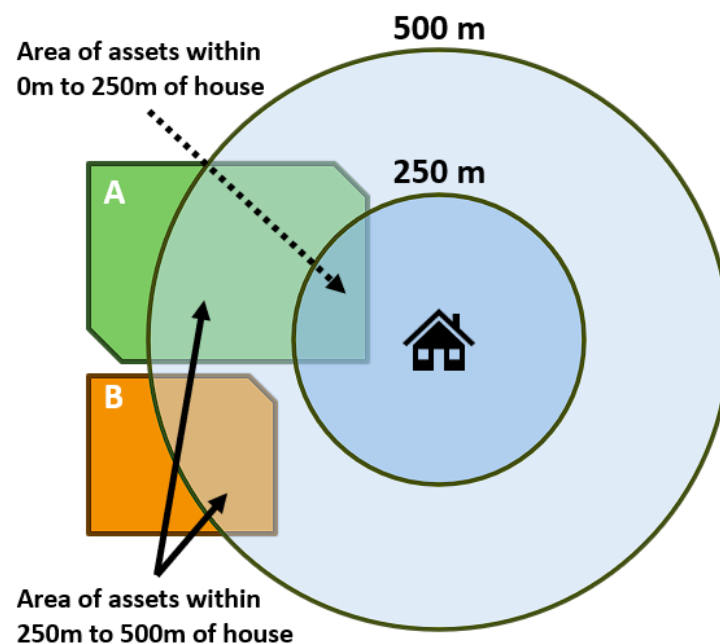


Figure 11-7. Visual description of the determination of natural assets within 0, 250 and 500 meters of houses within the Town of Fort Erie.

¹⁹ Mazzotta et al. (2014) omitted certain types of hedonic studies from their meta-analysis such as those focused on agricultural lands, golf courses, water features, and very large parks or forests.

²⁰ This was determined using 2019 to 2023 sales used data from [Monthly Stats | Niagara Association of REALTORS®](https://www.niagararealtor.ca/real-estate/market-reports/monthly-stats/) ([niagararealtor.ca](https://www.niagararealtor.ca/))

1. To estimate the extent of natural assets surrounding houses in Fort Erie, a GIS dataset representing residential building footprints was developed. Since the focus was detached single-family residential dwellings, to best align with Mazzotta et al. (2014), footprints in lower density neighbourhoods represented by Fort Erie's zoning were selected. In addition, the original building footprint data included separate footprints for outbuildings, such as garages or sheds, associated with a home. As such a sample of outbuilding footprints were selected by scanning satellite imagery from which a distribution of outbuilding areas was used to inform a cutoff value for classifying footprints as actual homes or related outbuildings (footprints with an area below this cutoff were considered to be outbuildings); all suspected outbuildings were deleted from the footprint data. Despite these efforts, it is likely that the data contains footprints for other types of homes, such as townhomes.

Each footprint in the assembled spatial residential building data was then buffered with 0 m to 250 m and 250 m to 500 m buffer rings using GIS. These buffers were then intersected with the spatial natural asset data to estimate the area of each buffer covered with natural assets from which the percentage of each buffer ring covered in assets was calculated.

2. The value of low-density residential homes in Fort Erie was estimated using historical data on benchmark home sales prices for the years 2019 through 2023 obtained from the Niagara Association of Realtors (n.d.). Although the benchmark price is not perfect since it is an index representing the value of a composite home with certain characteristics (e.g., 3 bedrooms, 2 bathrooms, 1276 square feet of aboveground living area, etc.), it was the only sales data available for Fort Erie. The resulting annual sales weighted average home price used in the analysis was \$538,339 (2023 CAD).
3. The influence of the extent of natural assets on home values was then estimated using coefficients from Mazzotta et al.'s (2014) meta-function. These coefficients measure the percent change in property values given the percentage of the buffer rings covered in natural assets. Mazzotta et al. (2014) estimated separate coefficients for the two buffers which were apply to the percentage natural asset cover calculated for the 0 m to 250 m and 250 m to 500 m buffer rings around each home. The estimated percent change in home prices was then multiplied by the average home prices estimated earlier yielding the onetime estimate of the value for each home footprint. These were then summed across all homes yielding one-time estimates of: \$205 million for assets in the 0 m to 250 m buffer; \$283 million in the 250 m to 500 m buffer; and \$488 million across both buffers (\$2023 CAD).
4. These one-time estimates were changed into annualized rental-equivalent values following Mazzotta et al. (2014) by multiplying them by the discount rate (assumed to be 3%, matching the social discount rate recommended by the Treasury Board Secretariat of Canada (2022)).

The total value of aesthetic appreciation in the Town of Fort Erie was estimated at \$14.6 million per year and the value of Town-owned and managed assets was \$2.8 million per year (\$2023 CAD). The physical distribution of the value is displayed in Figure 11-8.

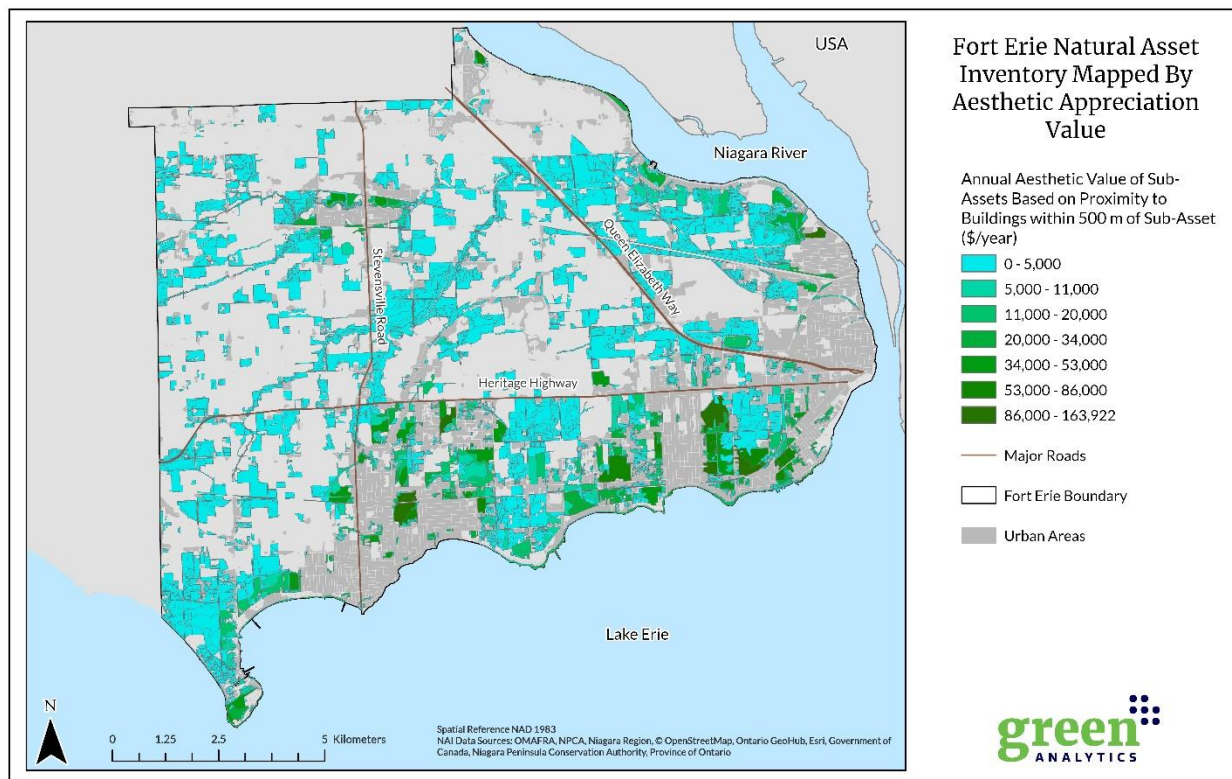


Figure 11-8. Distribution of aesthetic appreciation values provided by natural assets within the Town of Fort Erie.

11.8 Ecosystem Service Summary

The total value of the services provided by all natural assets within the Town of Fort Erie was estimated to be between \$27.9 and \$46.9 million per year. After scaling these values to town-owned and managed natural assets, the estimated value ranges from \$5.6 to \$6.5 million per year, as shown in Figure 11-9.



Figure 11-9. Total annual ecosystem service value of Fort Erie owned and managed assets.

This estimate should be considered a conservative estimate as only a portion of the ecosystem services provided by natural assets were assessed. A notable service missing which humans derive significant benefit from is recreation. Fort Erie has diverse opportunities for recreation experiences with an extensive trail network, kilometers of beachfronts, and several parks such as Mather, Shagbark Nature Trail, and Waverly Beach parks. There are at least 20 km of trails within the Town of Fort Erie²¹ and several popular beaches including Crystal Beach, Waterfront Park, Windmill Point, Stonemill Beach, Waverly Beach and the Fort Erie Beach. Beaches are a major draw for tourism but there are also several forested areas, parks, and other activities for which the natural assets within the Town of Fort Erie provide. Lack of data on the number of people engaging in various recreation activities within the Town of Fort Erie's natural assets limited the ability to establish a value for recreation services. This is a data gap that can be addressed in the future. With data on the number and type of nature-based recreation users in Fort Erie, establishing a value for this service would be relatively straightforward.

²¹ Personal communication, Sean Hutton, February 5, 2024.



Appendix B: Strategic Asset Management Policy

Asset Management Policy

- May 6, 2019 -



The Corporation of
The Town of Fort Erie

Strategic Asset Management Policy

1.0 Article 1 - Application and Administration

Strategic municipal asset management involves the challenge of planning and investing in core municipal infrastructure assets while ensuring sound stewardship of public resources and delivering valued customer services.

The purpose of this Asset Management Policy is to affirm the Town of Fort Erie's commitments in asset management through defined principles and processes and to ensure alignment and integration of asset management into our strategic planning processes. This policy is established to embed asset management principles into ongoing capital, operations, and maintenance activities, through the Asset Management Plan (AMP).

This policy provides a foundation to help identify and prioritize investments in existing and future infrastructure assets to ensure each investment is strong, safe, efficient, effective, and capable of supporting the quality of life desired in our community.

This policy applies to assets owned by the Town of Fort Erie including:

1. Core municipal infrastructure assets:
 - Roads (including all road assets in the right-of-way)
 - Bridges
 - Culverts
 - Drinking water distribution
 - Sanitary sewage collection, and
 - Storm water management.
2. Facilities Assets.

In the future, this policy will be expanded to include all infrastructure assets.

These policy requirements apply to all departments with responsibilities in the planning, maintaining or operating the municipal infrastructure assets listed above.

2.0 Article 2 - Definitions

For this policy, the following terms are defined:

“Asset” means a resource with economic value that a municipality controls with the expectation that it will provide a future benefit. An asset is specifically defined as property, equipment, vehicles, tools or other resources with a purchase value at or above the Capital Asset Threshold. Specifically, an Infrastructure Asset means the physical structures and associated facilities that form the foundation of development, and by or through which a public service is provided.

“Asset Management” means the coordinated activity of an organization to realize value from assets (AM).

Strategic Asset Management Policy

“Asset Management Plan” (AMP) means a plan developed for the management of infrastructure assets, in compliance with the Strategic Asset Management Plan from O.Reg.588/17, that combines multi-disciplinary management techniques (including technical and financial) over the life cycle of the asset in the most cost-effective manner to provide a specific level of service. This typically includes plans to Invest, design, construct, acquire, operate, maintain, renew, replace and decommission assets.

“Capital Asset Threshold” means the threshold at or above which a resource is considered an asset, the value of a municipal infrastructure asset at or above which a municipality will capitalize the value of it and below which it will expense the value of it. For the Town of Fort Erie, the capital asset threshold is defined in the Capital Asset Policy. However, items below the defined threshold may be included in the Asset Management Plan, based on risk or criticality, under the authority of the Director of Infrastructure Services or Director of Corporate Services.

“Core municipal infrastructure asset” means any municipal infrastructure asset that is a,

- water asset that relates to the distribution of drinking water,
- wastewater asset that relates to the collection of wastewater, including any wastewater asset that from time to time manages storm water,
- storm water management asset that relates to the collection, transmission, treatment, retention, infiltration, control or disposal of storm water,
- road, including all assets in the right-of-way, or
- bridge or culvert.

“O.Reg.588/17” means Ontario Regulation 588/17 under the Infrastructure for Jobs and Prosperity Act 2015, as amended. Principles are set out in this regulation by the provincial government to regulate asset management planning for municipalities.

“Public” means residents and businesses in the Town of Fort Erie, and other interested parties.

“Road” means all road assets within the right-of-way, which may include sidewalks, curb, streetlights, boulevard, median, or other related assets.

3.0 Article 3 – Roles and Responsibilities

A robust Asset Management Plan includes a clear structure of parties with responsibilities in asset management at the Town of Fort Erie.

Asset Management Coordinator is responsible for guiding procedures to ensure that AM information (such as condition assessment information, GIS attributes and construction data) required to make informed decisions is current and in a form that is usable, that software used in AM processes is relevant and that the requirements of O.

Strategic Asset Management Policy

Reg. 588/17 such as reporting requirements and AMP updates are being met by the Town. The AM Coordinator will be responsible for operating any software acquired to assist the Town in undertaking its tasks.

Council is responsible for ensuring resources are provided to staff to ensure the Asset Management Policy and Plan are established and maintained. Council has the authority to approve this policy and municipal budgets, Committee has the authority to recommend policy, budgets and the Asset Management Plan and Policy to Council. Council also has the authority to make or override asset management decisions, in adherence with this policy.

CAO is overall responsible for implementing the Asset Management Policy and Plan. The CAO is responsible for endorsing the Asset Management Policy, assigning authorities and resources to administrative staff to ensure the Asset Management Plan is in place and the Asset Management Policy is executed. The CAO has the authority to execute the duties defined above and has the authority to make or override asset management decisions or recommendations from Senior Management or from the Asset Management Lead, in adherence with this policy.

Executive Lead at the Town of Fort Erie is the **Asset Management Lead**, a role filled by the Director of Infrastructure Services. The Asset Management Lead is responsible for ensuring Asset Management Policy and Plan is relevant, suitable, adequate, reviewed and updated as required. The Asset Management Lead also has the authority to make or override asset management decisions made by Managers within Infrastructure Services, in adherence with this policy.

The **Director of Corporate Services** is responsible for working with the Asset Management Lead and AMP outcomes, to ensure the financial budgets and long term financial plan is aligned with the asset forecasts and Levels of Service. The Director of Corporate Services is also responsible for financial reporting on assets and maintaining the financing and revenue strategy in alignment with the Asset Management Plan, Budget and Reserve Policies. In collaboration, the Director of Corporate Services, CAO and Director of Infrastructure Services have the authority to make asset management decisions in adherence with this policy, particularly when meeting financial policy, in accordance with the capital process flow chart, is challenged.

Managers are responsible for making asset recommendations related to the assigned portfolio, in adherence with this policy, and executing plans once approved and reporting on results once executed.

Members of the Public can stay informed, access information and provide feedback related to the AMP. The public may access information that provides a basis to decision making in the AMP under privacy and disclosure legislation.

The general structure is shown in Figure 1 below, with corresponding responsibilities and authorities further described in the AMP.

Strategic Asset Management Policy

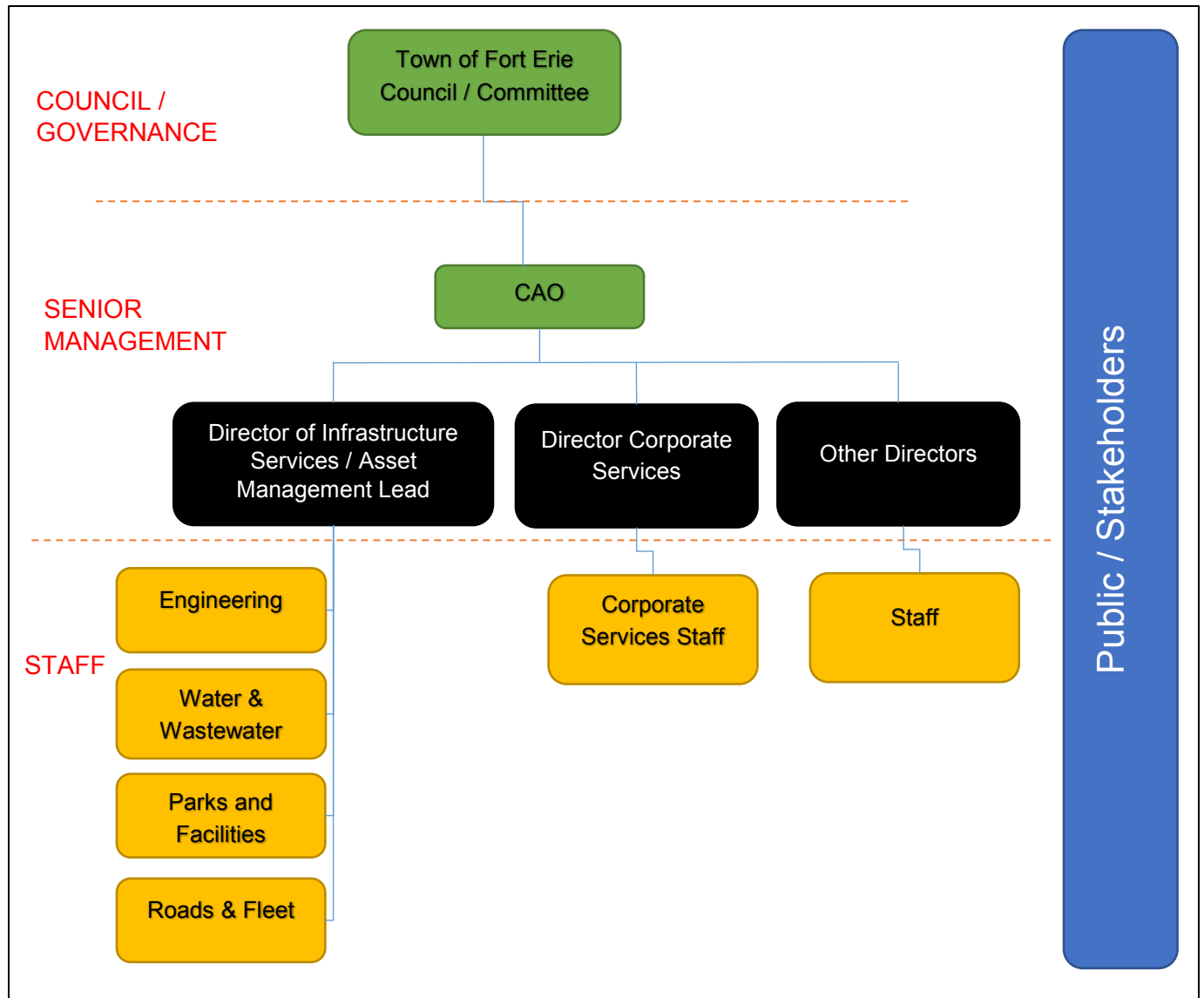


Figure 1: Overall governance Structure for Asset Management at the Town of Fort Erie.

4.0 Article 4 - Commitments

In our asset management planning, the Town of Fort Erie is committed to the following:

1. **Committing the resources to achieve sound stewardship of public resources** while maintaining the delivery of valued customer services at specified levels and upholding long term affordability.
2. **Consider public safety, risk tolerance and the Town's Strategic Plan**, under the Asset Management Plan and the principles defined in this Policy, when deciding to acquire, construct, maintain, rehabilitate, replace or dispose of core assets.

Strategic Asset Management Policy

3. **Manage infrastructure assets with an integrated, not segregated, business approach** that delivers desired service results, and planning and investing in infrastructure within the context of our greater system, rather than examining assets in isolation.
4. **Enable residents, businesses and other interested parties** to provide input in asset management planning.
5. **Consider the impacts of climate change in asset planning and investment, and:**
 - a. Identify the vulnerabilities of our assets caused by climate change,
 - b. Consider the costs and means to address those vulnerabilities,
 - c. Consider adaptation opportunities that may be undertaken to manage the vulnerabilities,
 - d. Consider mitigation approaches to limit the magnitude or rate of long-term climate change (such as greenhouse gas emission reduction objectives), and
 - e. Consider disaster planning and contingency funding.
6. **Coordinate planning** for asset management with Port Colborne, Welland, Niagara Falls, the Niagara Parks Commission, Ministry of Transportation of Ontario, the Region of Niagara and other local partners where assets connect or are related.

This Asset Management Policy conforms to prescribed requirements from Ontario Regulation 588.

5.0 Article 5 - Principles

Embracing the principles below, the Town of Fort Erie's Asset Management Plan provides a framework for decision-making, based on a defined level of service, when we invest, design, construct, acquire, operate, maintain, renew, replace or decommission assets.

In our asset management planning, the Town of Fort Erie will strive to follow the principles listed below.

Health, Safety and the Environment

1. Ensure health & safety of workers is protected, including those involved in the construction and maintenance of assets.
2. Consider resilience to the effects of climate change in the design of infrastructure.
3. Minimize the impact of infrastructure on the environment.

Strategic Asset Management Policy

4. Respect and help maintain ecological and bio-diversity.
5. Endeavour to make use of acceptable recycled aggregates.

Prioritization and Value

6. Ensure we continue to provide our public services in Roads, Water, Wastewater, Storm, Bridges, Culverts and Facilities, at or above defined levels of service.
7. Identify and respect defined infrastructure priorities, based on risk and criticality. A clearly defined hierarchy for infrastructure priorities is a necessary foundation for an effective asset management plan, as priorities should inform investment decisions. Priorities are further described in the AMP.
8. Take a Long-term view in making asset decisions, especially considering the municipal life cycle of assets from acquisition to disposal. The Town strives to choose practices, interventions and operations that aim at reducing the lifecycle cost of asset ownership, while satisfying agreed levels of service, basing decisions on a balance of service levels, risks, and costs.
9. Factor information with implications for infrastructure planning into infrastructure investment decisions.
10. The Town will choose practices, interventions and operations that aim at reducing the lifecycle cost of asset ownership, while satisfying agreed levels of service. Decisions are based on balancing service levels, risks, and costs.

Connection and Communication

11. Align with all relevant Town of Fort Erie financial or asset plans prepared under applicable financial budgeting policies and legislation.
12. Practice asset management transparently, and under the law:
 - Base decisions on evidence and information that is made available to the public, and
 - Share information with implications for infrastructure planning with other public sector entities.
13. Be mindful of and align with the Strategic Plan, other Town policies and other plans and strategies in effect. A description of connected plans is provided in further detail in the AMP.

Community and the People

14. Promote economic competitiveness, productivity, job creation and training opportunities.
15. Promote accessibility for persons with disabilities.

Strategic Asset Management Policy

16. Promote community benefits, being the supplementary social and economic benefits arising from an infrastructure project that should improve community well-being.
17. Foster innovation by creating opportunities to make use of proven technologies, practices and services.

6.0 Article 6 - Other Provisions

Plans, Budgets and Forecasts

To fulfil Policy commitments, a process is in place at the Town of Fort Erie for using the AMP when developing municipal budgets and long-term forecasting related to assets, with special consideration to align to the Town of Fort Erie Water and Wastewater Service Area Financial Plans and master plans. This process is further described in the AMP.

Continual Improvement

The AMP must be continually improved, not just from nonconformities or weaknesses, but also making improvements in what the Town already excels in, by continually improving the asset management planning approach, incorporating new practices and principles. A process is in place to improve, adapt and tweak asset management processes, which includes responsibilities to stay current in asset management, adopt new practices, monitor the effectiveness of the AMP, and make changes. This process is further described in the AMP.

Land-Use Planning Framework

A process is in place to ensure that the Asset Management Plan aligns with Ontario's land-use planning framework, including the Town of Fort Erie Official Plan, Development Charge By-Law, and other master plans as they may apply. This process is further described in the AMP.

Risk Management

Climate change introduces risk and vulnerabilities for core municipal infrastructure assets. To fulfill climate change commitments in this Policy and stay aware of these risks and vulnerabilities, the Risk Assessment process is in place. Risk Assessment is further described in the AMP.

Also, as noted in Definitions, items below the capitalization threshold may be included in the AMP. Occasionally, an item's value may be less than the defined capitalization threshold, but it has a functional value that introduces risk should the item's inventory, availability, condition or forecast not be considered and planned for. In that case, assets may be added using the Risk Assessment process that is defined in the AMP.

Strategic Asset Management Policy

Finally, infrastructure priorities are clearly identified in alignment with the Risk Management process. The process for identifying infrastructure priorities includes Risk Assessment, which is further described in the AMP.

Stakeholder Consultation

Stakeholder involvement is a commitment in this Policy and an important factor of a successful and relevant AMP. It is imperative that opportunities to provide input are consistently offered to residents and interested parties. Consultation and communication processes are described in the AMP.

Availability and Update

This policy shall be posted on the Town website and provided to anyone who requests it. It shall be reviewed and updated as required, as other infrastructure AMPs are completed, and no more than five years from the last revision date posted.

Asset Management Strategy

- May 6, 2019 -



The Corporation of
The Town of Fort Erie

Asset Management Strategy

DEFINITIONS

Asset: An item, thing or entity that has potential or actual value to an organization (ISO 55000, 2014). The value can be tangible (or intangible); financial (or non-financial) and includes consideration of risks and liabilities.

Asset Management Plan (AMP): Documented information that specifies the activities, resources and timescales required for asset-based services to achieve the organization's Asset Management (AM) objectives (ISO 55000, 2014).

Asset Management Policy: A high-level statement of an organization's principles and approach to asset management (IIMM, 2015).

Asset Management Strategy: Documented information that specifies how organizational objectives are to be converted into Asset Management objectives, the approach for developing AMPs and the role of the Asset Management System in supporting achievement of the Asset Management objectives (ISO 55000, 2014).

Infrastructure: Infrastructure means the physical structures and associated facilities that form the foundation of development, and by or through which a public service is provided to Ontarians, such as highways, bridges, bicycle paths, drinking water systems, as well as any other thing by or through which a public service is provided to Ontarians (Infrastructure for Jobs and Prosperity Act, 2015, S.O. 2015, c. 15).

Level of Service (LOS): Level of Service is a qualitative or quantitative description of a service that is being provided. Two types of Levels of Service generally exist: Customer (or Community) Levels of Service; and, Technical Levels of Service.

Useful Life (service life): An estimate of the duration of time that an asset is forecasted to be in service.

Asset Management Strategy

1 INTRODUCTION

This Asset Management (AM) Strategy is a foundational element of the Town of Fort Erie's AM system. AM at the Town of Fort Erie is comprised of a Council-endorsed AM Policy which conforms to prescribed requirements from Ontario Regulation 588/17, as amended, the AM Strategy and the AMP.

The AM Policy articulates the Town's commitments and principles that will be considered in corporate AM planning. It ensures alignment and integration of AM into strategic planning processes.

The purpose of the AM Strategy is to determine the specific approaches that the Town will enact to link infrastructure decisions to the Town's overall priority of effective, sustainable infrastructure. The AM Strategy will set out to achieve the commitments and principles of the AM Policy through a set of inter-related business processes necessary to produce an AMP. The Strategy defines how the Town's AM processes are developed and connected, in order to provide the means through which the objectives of the AM Policy will be achieved (Based on "*Building Together – Guide For Municipal Asset Management Plans*" – Government of Ontario). The activities and processes described provide the basic elements for sound management of assets throughout their service life.

The Strategy is comprised of the following sections:

- **Lifecycle Activities**
- **Expansion and Development Process**
- **Procurement Process**
- **Risk Management**
- **Climate Change Considerations**

2 LIFECYCLE ACTIVITIES

This section summarizes different lifecycle activities typically used by the Town to manage assets.

2.1 Non-Infrastructure Activities

Non-infrastructure solutions are actions or policies that are not capital in nature, which can result in the lowering of costs and can extend the life of an asset through optimized planning and management. The Town takes the following general non-infrastructure actions:

- The Town strives to integrate the planning of infrastructure renewal across asset categories and with neighbouring/connected municipalities. This allows for economies of scale. For example, the Town will design for road reconstruction to align with buried infrastructure replacements or combine Town cross culvert replacements with Regional road reconstruction.
- Demand management initiatives are sometimes used to optimize asset use and educate the public. For example, transportation master planning will include consideration of traffic planning with consideration of matching road asset class & suitability to traffic use.
- Studies, investigations and master plans are regularly carried out to ensure there is a thorough understanding of the asset performance and needs, to inform the asset management planning decisions.
- The Town shares assets across divisions, where practical, to reduce or control a growing asset portfolio and avoid unnecessary duplication of spending or effort. This may include sharing equipment (e.g. fleet vehicles), more efficient equipment access & storage, and coordinating construction projects.
- The Town has been using software technology to inform AM decisions for many years. These systems help to more efficiently manage and operate assets across an organization by helping to improve consistency, recording, reliability, and reducing duplication of data. Examples include:
 - *Financial Management System*: This system which is known as FMW is used to exercise financial control and accountability related to the Town's budget. In addition, Accpac is used to house a PSAB register to track costs/depreciation related to the Town's assets.
 - *Customer Relationship Management (CRM)*: IBM Notes is used by the Town to track staff and public customer complaints which can be used for measuring Levels of Service (LOS).
 - *Computerized Maintenance Management System (CMMS)*: The Town has recently selected and begun implementing a CMMS (Fiix) for several service categories.

Asset Management Strategy

- *Geographical Information System (GIS)*: This system is used to capture, store, manipulate, analyze, manage, and present spatial or geographical data. The locations of the Town's physical linear assets are inventoried within this system.
- *Bridge and Structures Management System*: This system (Asset Management Forecaster) is used to gather, store, and analyze data about the Town's bridge and structure assets. It also allows for forecasting future needs for this infrastructure.
- *Pavement Management System*: This system (Decision Optimization Technology) is used to gather, store, analyze and forecast data about the Town's roads. It also allows for forecasting future needs for this infrastructure.
- A performance forecasting tool has been developed for Roads, Water, Wastewater, Stormwater, Facility, and Bridge and Structure assets. This tool is used to forecast future infrastructure needs based on available data and compare different financial and Level of Service (LOS) scenarios. Where the Town already has forecasting tools in place, the Town will continue to use these systems.

2.2 Renewals and Rehabilitation Needs and Investment

Rehabilitation is done to restore an asset from its current condition to a better condition. Where appropriate, rehabilitation projects are recommended. Replacement is done when the asset has reached the end of its life and/or is no longer providing acceptable service. Upgrading is done when a like for like replacement of an asset will not meet current or anticipated future demands and service requirements.

Based on risk assessments and industry standards, general rehabilitation and renewal strategies for each asset category are established from target condition performance, which can vary based on asset type and risk.

Identification of renewal needs and investment is practiced through the development of comprehensive asset inventories and condition assessments, which are used to develop medium and long-term capital plans. Before capital approval, asset renewals and rehabilitation considerations are assessed and prioritized based on risk, which includes the following criteria:

- Asset condition, provided through Condition Assessment programs, with special focus on assets with high criticality.
- Impact of the deficiency or observed condition on current and future asset performance.
- Available options for maintenance and renewal work.
- Available infrastructure renewal and rehabilitation options are considered in the AMP assessment activities.

Asset Management Strategy

Asset renewal options for assets other than roads are not included in the Decision Support System, but it is anticipated these will be folded into that tool in the future.

2.2.1 ROADS & BRIDGES ASSETS – RENEWALS AND REHABILITATION

Roads can be either rehabilitated or replaced when road condition falls below the target for the particular road segment, defined in the AMP. The condition of a road segment is measured using a Pavement Condition Index (PCI), standardized by the American Society for Testing and Materials, which is a 100-point rating scale where a score of 100 is a road in excellent condition and a score of 0 is a road in very poor condition. The target condition for each road segment varies based on road classification - larger volume arterial and collector roads have a higher target PCI than lower volume local roads.

The Town's strategy is to replace roads in coordination with the replacement of other subsurface infrastructure (such as watermains) in urban areas when conditions of other assets merit replacement. Roads are typically rehabilitated (rather than replaced) when there is no other subsurface infrastructure that requires replacement. Other considerations such as the timing of proposed developments are also incorporated into the decisions to replace or rehabilitate a road.

Further, road renewal is guided by condition “windows” for which different renewal strategies can be applied. If a road condition falls below a target PCI defined in the AMP, then rehabilitation is no longer practical, and the road will require a full replacement.

Roads options include: crack sealing, overlay, mill and overlay, and full depth reconstruction for asphalt roads; and single surface treatment, double surface treatment (DST), pulverize and DST, and pulverized, emulsified reclaimed asphalt concrete (RAP) and DST for surface treated roads.

Sidewalks are rehabilitated when they fall below a target performance score in accordance with legislative standards and based on condition ratings (see AMP).

Walks and trails are rehabilitated when they fall below a target performance score (see AMP).

The bridges in the Town of Fort Erie are both bridge structures and large culverts. Bridges and large culverts are rehabilitated and/or replaced in accordance with the recommendations made by qualified professionals through regulated inspections and subsequent site investigations. Options for short and long-term treatments are provided by the external consultant.

Asset Management Strategy

2.2.2 WASTEWATER ASSETS – RENEWALS AND REHABILITATION

Wastewater sewers can be either rehabilitated or replaced. The Town's strategy is to replace wastewater sewers in poor or very poor condition (i.e. below a target performance condition defined in the AMP) in coordination with the replacement of the road surface and other subsurface infrastructure, such as watermains and storm sewers.

In striving to maintain sanitary sewers in fair condition or better, critical sanitary sewers are scheduled for rehabilitation or replacement as soon as anticipated to reach a poor condition. Less critical sanitary sewers are allowed to degrade further before rehabilitation or replacement is considered. Currently, the criticality of sewers is based on the size of the pipe as the consequence of failure is assumed to be greater for pipes with a larger diameter. However, as the Town collects more information and refines this analysis, more factors may be incorporated to define the criticality of sewer pipes.

The decision for timing when to rehabilitate poor or very poor condition wastewater sewers is based on a detailed review of the observations from camera inspections that help the Town's subject matter experts determine when rehabilitation is preferred over replacement. The location of a sewer may also affect decisions for timing, for example, under a newly resurfaced road, in easements, on high traffic roads, and within an area where open cuts may be too disruptive (e.g. business improvement areas).

2.2.3 WATER ASSETS – RENEWALS AND REHABILITATION

Watermains can be rehabilitated or replaced. Based on the master plan, a funding strategy has been devised to minimize watermain breaks (State of Good Repair strategy) and provide projections for the total number of breaks across the system over the next 50 years. The current strategy is to replace watermains that experience a high number of breaks or that have reached the end of their useful life.

In striving to maintain watermain at a fair condition or better, critical watermain is scheduled for replacement as soon as anticipated to reach a poor condition. Less critical watermain is allowed to degrade further before replacement is considered. Currently, the criticality of watermains is based on the size of the pipe as the consequence of failure is assumed to be greater for pipes with a larger diameter. However, as the Town collects more information and refines this analysis, more factors may be incorporated to define the criticality of watermains, including risk of freezing in shallow servicing areas.

The rehabilitation of watermains through the installation of a cured in place liner was investigated in 2018 but is not being considered further, as the cost was equal to the cost of replacement.

Watermain replacement currently drives many of the decisions for roads rehabilitation or replacement in urban areas.

Asset Management Strategy

2.2.4 STORM ASSETS – RENEWALS AND REHABILITATION

Stormwater management ponds are dredged on a routine basis to remove sediment and vegetation that has accumulated, restoring the full capability of the asset to provide its intended service to treat the quality and quantity control of stormwater runoff. The performance scores used for the stormwater management ponds are related to the time since the last dredging relative to the target dredging frequency, determined at the time of design. Ponds are rehabilitated (or dredged) when they fall below a condition performance score defined in the AMP or have reached their target dredging date.

Storm sewers can be either rehabilitated or replaced. The current strategy is to replace storm sewers in very poor condition in coordination with the replacement of the road surface and other subsurface infrastructure, such as watermain and/or wastewater sewers. Closed Circuit TV (CCTV) inspection of storm sewers has commenced and informs the strategy for storm rehabilitation or replacement.

In striving to maintain storm sewers in a fair condition or better, critical sewers are scheduled for rehabilitation or replacement when anticipated to reach a poor condition. Less critical sewers are allowed to degrade further before rehabilitation or replacement is considered. Currently, the criticality of sewers is based on the size of the pipe as the consequence of failure is assumed to be greater for pipes with a larger diameter. However, as the Town collects more information and refines this analysis more factors may be incorporated to define the criticality of sewer pipes, such as lowered risk due to preventative maintenance flushing programs.

A ditching program is being developed, which may include rehabilitation activities.

2.2.5 FACILITIES ASSETS – RENEWALS AND REHABILITATION

Facilities are typically rehabilitated through the replacement or refurbishment of individual components or groups of components. Each component has an industry accepted estimated service life that is combined with observations of the condition of each component during site investigations and a target condition for the respective component to project the required expenditures. Individual components are replaced when they fall below a condition performance score (defined in AMP).

2.3 Maintenance and Operations Needs and Investment

Incorporating planned maintenance solutions into the lifecycle management strategy ensures that these activities are funded at an appropriate level, enabling assets to reach their full service potential. Maintenance and operations needs and investment are assessed and prioritized based on criticality and reliability. Routine preventative maintenance activities are completed to ensure the preservation of existing assets.

Asset Management Strategy

Operational and maintenance requirements are considered when planning new infrastructure.

Asset operations and maintenance requirements and required resources are assessed and prioritized based on:

- Carrying out legislated operations and maintenance activities to ensure safety and environmental sustainability in accordance with the appropriate regulations.
- Conducting routine and preventative maintenance activities to ensure preservation of existing assets.
- Reference to current operations and maintenance (O&M) contracts, historical costs of the established operational tasks, and forecasted industry pricing to forecast future O&M costs.
- Assessing consequential operational and maintenance requirements of significant new infrastructure planned to be added to the asset portfolio, especially before the asset portfolio expansion is approved.

For consistency, the Town has established Maintenance Quality requirements and complies with Ontario Regulation 239/02, as amended, “Minimum Maintenance Standards For Municipal Highways”. These Town requirements include:

- Sidewalk Inspection and Maintenance
- Roads Winter Operation and Salt Management
- Road Patrol
- Ditch Maintenance
- Culvert Maintenance
- Catchbasin Maintenance
- Storm Sewer Maintenance
- Streetlight Maintenance
- Bridge Inspection and Maintenance
- Fence Maintenance
- Spills Response
- Drinking Water Quality Management System – Distribution System Maintenance
- Wastewater Maintenance
- Facility Maintenance, and
- Elevator Maintenance.

Climate change poses infrastructure vulnerabilities that may impact maintenance and operations requirements, of which staff and management regularly discuss and stay aware in maintenance planning activities. More information on climate change vulnerabilities can be found in **Section 5 – Climate Change Considerations**.

Contingency plans are operational plans that can improve recovery times and reduce impacts of failure, thus affecting criticality. These types of plans are included in the maintenance and operation of assets at the Town.

Asset Management Strategy

2.4 Disposal Activities

The Town strives for consistency in disposal activities, when an asset has reached the end of its useful life or is otherwise no longer needed by the Town. Assets are disposed of within 12 months of when the asset is taken out of service and every effort to trade-in, resell, or auction the asset is made when practical. When disposal is required, assets are sent to the appropriate facility for recycling where possible.

With facilities, tenders often include removal and disposal of existing assets when renewing and this captures any trade-in or scrap value (e.g. old HVAC units). Recycling requirements are also stipulated in tenders, when appropriate (e.g. this is required with old lighting to achieve Ontario Power Authority grant funding).

2.5 Do Nothing

Consideration of 'doing nothing' should always be considered as a lifecycle option, as this position can establish a baseline against which other options are compared. Sometimes risk levels or levels of service requirements offer 'do nothing' as a legitimate alternative worth consideration or comparison.

3 EXPANSION AND DEVELOPMENT PROCESS

The Town must continually plan activities required to extend services to previously unserved areas or expand services to meet growth demands, all in accordance with a financial strategy. Incorporating growth into the lifecycle management strategy ensures that the additional lifecycle costs associated with newly constructed or acquired assets and new services are accounted for in the long-term forecast.

3.1 Population Growth

The 2018 budget reported the 2017 population as 30,710, with a reported 15,569 households and 1.26% tax growth. Based on the Region's 2019 Development Charges Study, the population is expected to grow to a projected 37,003 by 2031, and 42,390 by 2041. These projections amount to approximately 1.4% average annual growth from now until 2041.

3.2 Asset Portfolio Growth

This level of population growth will place significant pressure on the capacity of existing infrastructure and creates demand for new infrastructure. The Town determines its recommended expansion program through master plans and development charge background studies, where projected needs are planned with consideration of capacity, impending regulatory changes, stakeholder demand, desired target levels of service, and availability of enabling technologies.

The following master plans and expansion-related studies are complete, underway or planned for the near future:

- Corporate Strategic Plan
- Town of Fort Erie Official Plan
- Niagara Region Transportation Master Plan (2016)
- Active Transportation Master Plan
- 2017 Fort Erie Facility Condition Assessment and Master Plan
- 2016 Fort Erie Water Master Plan
- Water Financial Plan
- 2019 Fort Erie Wastewater Master Plan Update and Pollution Control Plan Update Study
- Development Charge Background Study (2019)
- 2016 Regional Niagara Water and Wastewater Master Servicing Plan Update
- 2018 Road Needs Study
- Rural Ditching Master Plan
- Parks and Open Space Master Plan

3.3 Operational Expenditure Growth

Operational expenditure is the operations and maintenance cost of new assets. For example, for a new pedestrian streetlight in a subdivision streetscape, the cost of electricity, replacement bulbs, and graffiti removal all contribute to the consequential operational expenditure associated with that new asset, even though the streetlight was initially installed by a developer which then passed the streetlight to the Town through assumption.

For most assets, a good estimate of the consequential operational expenditure required to operate and maintain the new assets is the existing operations and maintenance cost multiplied by the growth factor.

Operational expenditure growth is considered in AM forecasting.

4 PROCUREMENT PROCESS

To ensure the most efficient allocation of resources, the Town strives to explore different delivery mechanisms, such as working with other municipalities to pool projects and resources, design-build or pooling capital projects for economies of scale.

Procurement methods help to ensure the most efficient allocation of resources when executing AM strategies such as maintenance and renewals works completed by external contractors and suppliers.

It is the aim of the Town that all goods and services are acquired in a fair and open manner that is efficient and accountable, in accordance with the Town's current Purchasing Bylaw which guides all procurement practices.

5 RISK MANAGEMENT

The Town strives to meet service levels and to manage risk while minimizing life cycle costs.

There are risks within many levels of AM, which are summarized in this section. Some risk management described is included as legislated, and some is described to ensure the AMP holistically describes how risk is managed at the Town of Fort Erie.

Risk events, such as an asset failure, are events which may compromise the delivery of the Town's Corporate Strategic objectives, impact public safety, or lead to financial loss.

5.1 Corporate Risk Assessment

The Ministry of Infrastructure Guide for Municipal Asset Plans identifies that risks associated with the strategy (i.e. ways the plan could fail to generate the expected service levels) and any actions that will be taken in response are to be identified.

Risk is inherent to this AM Strategy, as the AMP has the potential to fail to generate expected service levels. Risk events, such as an asset failure, are events which may compromise the delivery of the Town's strategic objectives.

- a. Overall risk-based decisions are made by those with assigned authority. Those responsible for overall authority to make or override asset decisions for the Town ensure public safety and Town's strategic objectives are considered overall when approving plans or modifications to the plans under the AM Policy.
- b. Should any catastrophic event occur, Town resources would be diverted/reallocated from the current plan as required. The AMP would be adjusted and updated accordingly.
- c. Risks to revenues may also affect AM planning. For example, should water and sewer revenue forecasts not occur as per the financial plan, some projects that are required to maintain the water and sewer infrastructure will need to be removed from the forecast through a prioritization process.
- d. Master planning exercises determine the overall funding allocation for each department/service category. The AMP must take the allocated overall department funding into account, but must also identify, through risk, any changes that may be required to funding streams. Master planning is further described in **Section 2 - Expansion and Development Process**. Should forecasted asset needs exceed allocated budgeted funding streams, adjustments to funding, levels of service and/or risk tolerance adjustments may be required and reflected in the AMP. Consideration of commitments and principles from the AM Policy is done at this level, when assessing the criticality of assets and prioritizing current and forecasted budgets.

Asset Management Strategy

5.2 Asset Risk Assessment

Risk is managed more specifically at the asset level to determine the risk criticality of assets and manage these risks. Managing risk is achieved by optimizing the timing and type of maintenance and renewal interventions. To provide guidance for asset maintenance and renewal decision-making, the Town's tolerance for risk arising from the deterioration and failure of assets has been defined based on an asset's criticality and likelihood of failure.

Asset criticality reflects the importance of an asset to the Town's delivery of services or, in technical terms, the potential consequences of the asset failing (and therefore failing to provide the required LOS). An asset's likelihood of failure reflects the probability of an asset failing, which will increase over time as assets age but can also be impacted by the type of asset and the conditions the asset is subjected to.

Based on risk assessment and industry standards, rehabilitation and replacement strategies for each asset category are established from target condition performance, which can vary based on asset type. Typically, assets considered higher risk will be replaced earlier in their lifecycle as they will not be allowed to degrade to a point where failure is possible, while lower risk assets will be allowed to degrade further before action is considered. How risk is defined will vary based on asset category and can be refined over time as more information is collected to consider different contributing factors.

Consideration of commitments and principles from the AM Policy is also done at this level when assessing criticality of assets and prioritizing current and forecasted budgets.

Risks specific to drinking water distribution are also managed directly through the Drinking Water Quality Management System in place at the Town.

5.3 Asset Registry

Less formal risk assessments are also carried out when considering the addition of an item below the capitalization threshold. If the risk of excluding the item in the AMP is significant, based on an assessment approved by the Director of Infrastructure Services or by the Director of Corporate Services, that asset is incorporated into the AMP.

6 CLIMATE CHANGE CONSIDERATIONS

The infrastructure vulnerabilities that may be caused by the impact of climate change must also be considered within the lifecycle strategy.

Vulnerabilities are assessed during risk assessment activities.

Options to address these vulnerabilities are three-fold:

- Increasing preventive maintenance activities where possible (e.g. more frequent re-application of rip rap for erosion prevention around large culverts)
- Adjusting levels of service (e.g. tolerating a lower road network PCI)
- Considering lifecycle activities that may be effective (e.g. lining watermain).

These options to address or adapt to the vulnerabilities are considered during many stages of asset decision-making - when reviewing levels of service, planning maintenance budgets and activities at the department level, and in business decisions related to rehabilitation options, procurement, non-infrastructure activities, and replacement options.

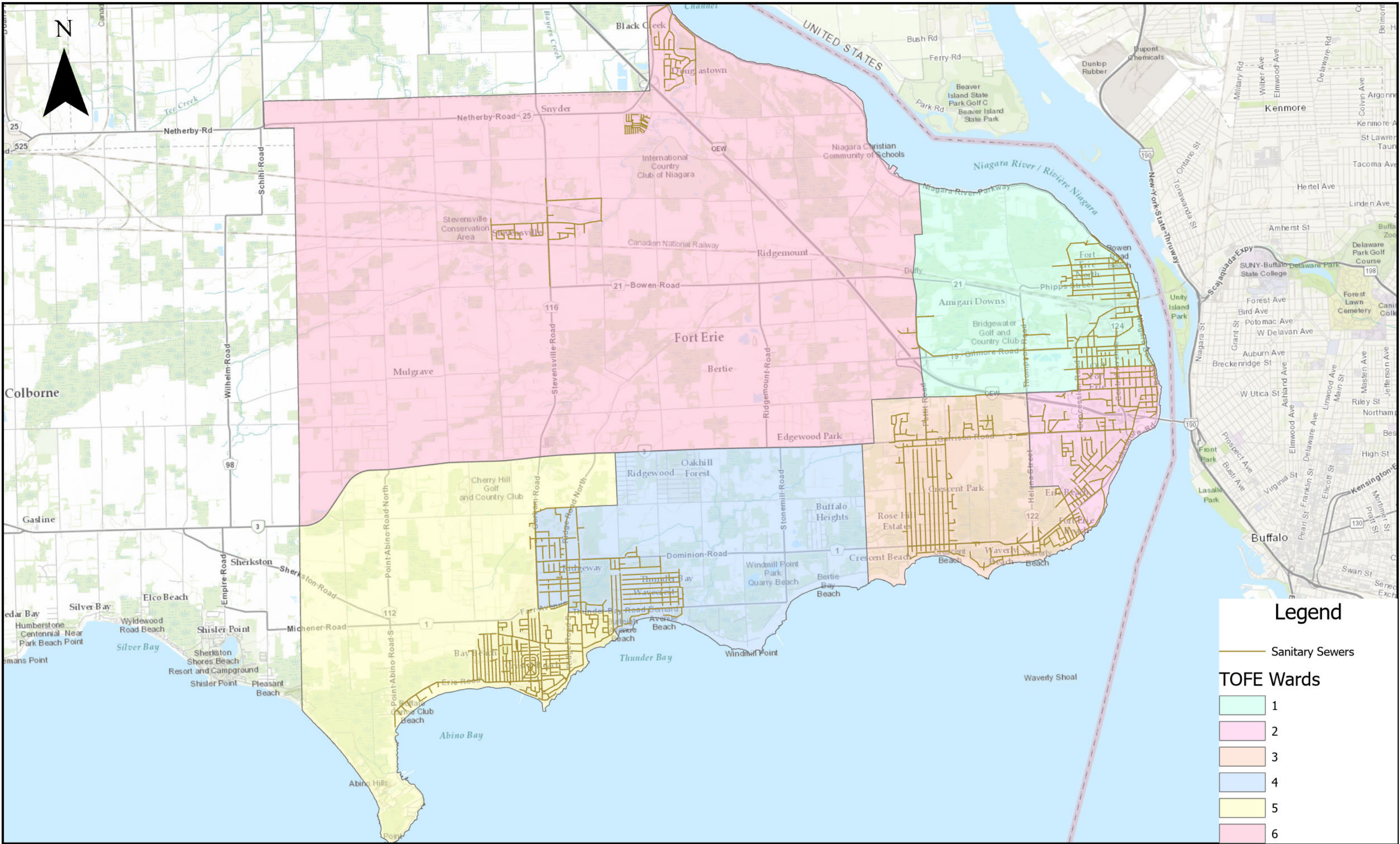
Costs that may arise from the identified vulnerabilities are considered during risk assessments when reviewing the potential impact and likelihood of asset failure.

Mitigation approaches are considered in the Corporate Strategic Plan and when considering options in infrastructure planning.

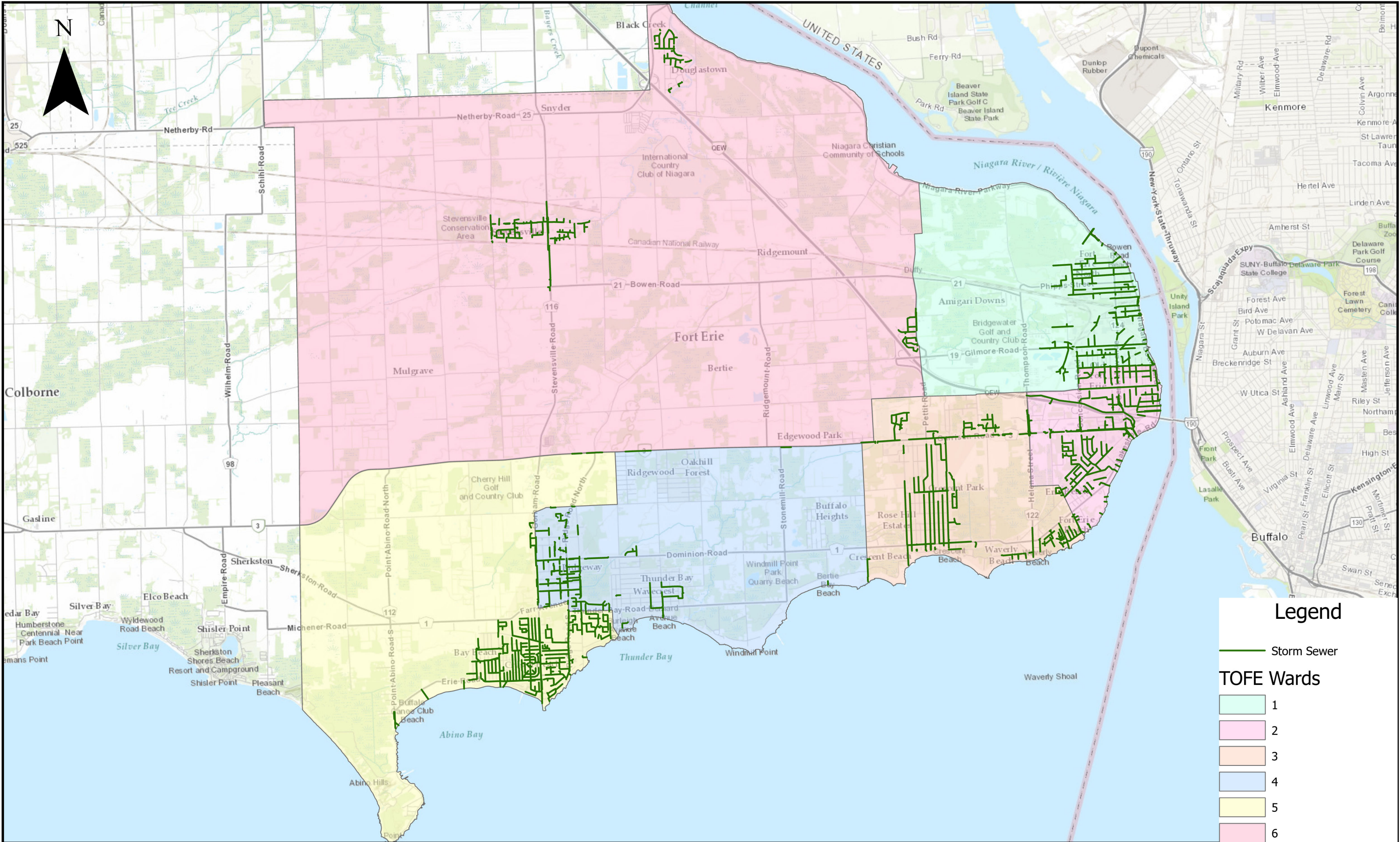
Disaster planning and contingency funding is managed through Infrastructure Services and the Fire Department, and projected asset demands or changes to the asset portfolio are reflected in the AMP as appropriate.



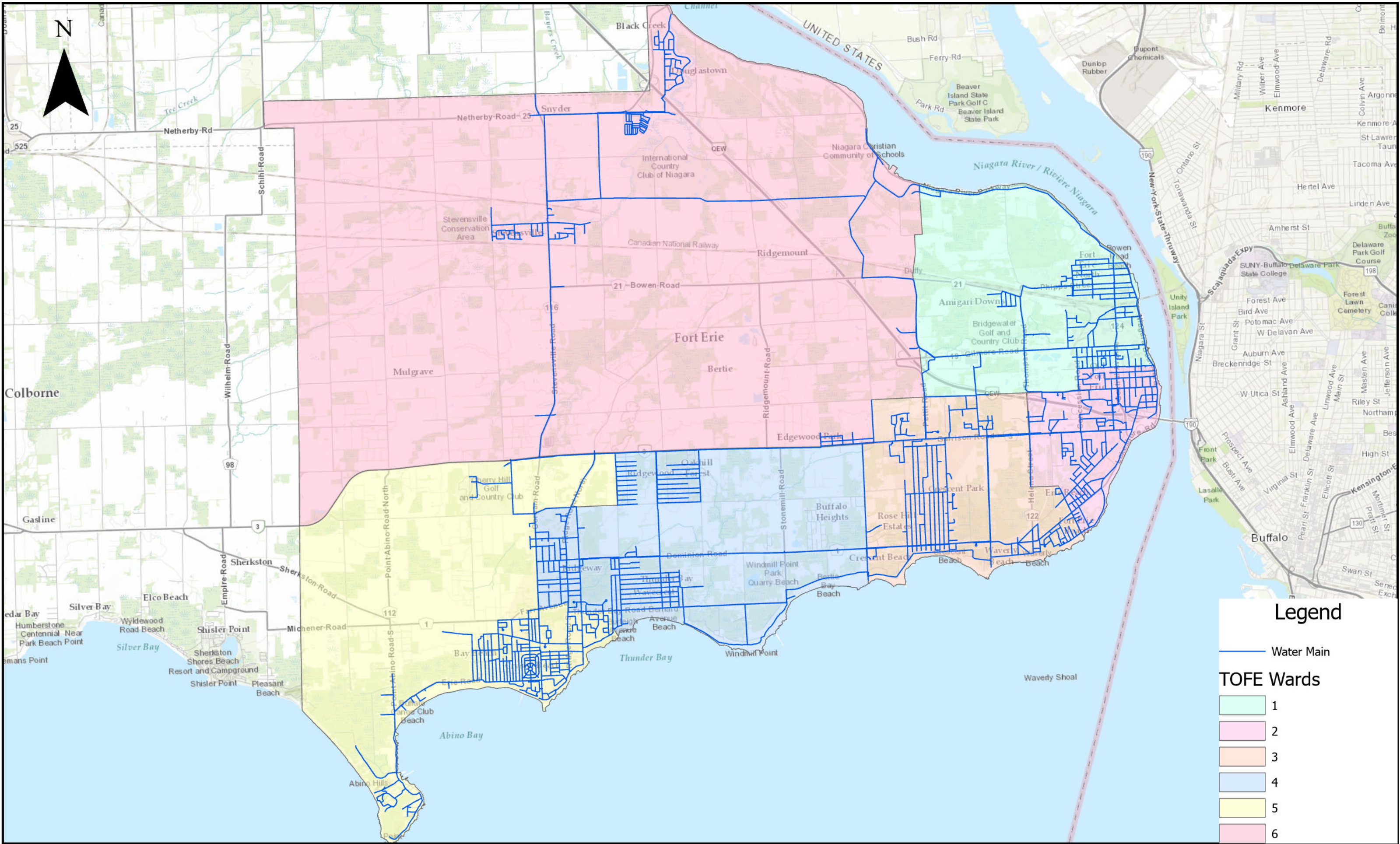
Appendix C: Levels of Service Maps



Town of Fort Erie - Sanitary Sewer



Town of Fort Erie - Storm Sewer



Town of Fort Erie - Water Mains

