AMP+ 2017

The 2017 Asset Management Plan for the

Town of Lakeshore

Developed as part of PSD's Asset Management Roadmap

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1.0 Executive Summary

Municipal infrastructure provides the foundation for the economic, social and environmental health and growth of a community. We rely on roads, bridges, water systems and parks everyday to facilitate the movement of goods and people, deliver clean drinking water and provide a high quality of life. Municipalities across Canada are responsible for ensuring that these critical services and vital infrastructure are accessible and reliable. Municipalities own and manage nearly 60% of all public infrastructure in the country. However, due to aging infrastructure and as a consequence of declining senior government grants, municipalities are struggling to meet desired levels of service. Developing a viable solution requires a strategic, innovative and sustainable solution.

As part of Public Sector Digest's (PSD) Asset Management Roadmap the Town of Lakeshore committed to taking the necessary steps towards developing a systemic, sustainable and intelligently-structured asset management program. This process involved the collaboration of PSD's industry-leading asset management team with municipal staff.

The steps of PSD's Asset Management Roadmap are as follows:

1. State of Maturity Report
2. Corporate Asset Management Policy
3. Data Collection & Analysis
4. Condition Assessment Protocols & Data Collection Specifications
5. Risk Model Development & Project Prioritization
6. Lifecycle Activity Model Development
7. Financial Strategies & Budget Scenarios
8. Level of Service Framework Development

This comprehensive asset management plan (AMP) is the ninth and final step, and serves as the culmination of all activities undertaken as part of the Roadmap. It is an indispensable guide to asset management planning and investment into the future. Asset management is critical to extracting the highest total value from public assets at the lowest lifecycle cost. This AMP outlines both the existing state of municipal infrastructure and the Town's financial capacity to sustain existing infrastructure into the future. Furthermore, it details the outcomes of each step of the Roadmap and provides recommendations for maintaining and continuing to develop the Town's asset management program.

Comprehensive asset data and information is the backbone of a strong and sustainable asset management program. PSD worked with Town staff to put in place processes and protocols for the collection and maintenance of asset data. By the end of the Roadmap, the Town achieved a data maturity rating of 68%. However, for core assets (road network, bridges & culverts, water network, wastewater network, stormwater network), the Town achieved an overall data maturity rating of 81%.

As analyzed in this asset management plan, the Town of Lakeshore's infrastructure portfolio comprises the following asset classes: road network, bridges & culverts, water network, wastewater network, stormwater network, buildings, machinery & equipment, land improvements and vehicles. The replacement cost of the Town's asset portfolio is estimated to be approximately $1.05 billion.

Based on 2017 replacement cost, and a combination of assessed and age-based condition data, over 83% of assets, with a valuation of $865 million, are in good to very good condition; 9% are in poor to very poor condition with a valuation of $98 million. 70% of the assets analyzed in this AMP have at least 10 years of useful life remaining. However, 16%, with a valuation of $166 million, remain in operation beyond their estimated useful life.

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

The Town's infrastructure backlog represents the investment needed today to meet previously deferred replacement needs and bring municipal assets to a state of good repair. Currently, the municipality has a combined infrastructure backlog of $26 million, with the road network and water network comprising 68%.

In order to reduce the infrastructure backlog and meet annual requirements to sustain the Town's assets, two sets of budget scenarios were developed: the end-of-life replacement scenario and the lifecycle activities scenario. The end-of-life replacement scenario is based on the assumption that assets are allowed to deteriorate until end-of-life at which point they are replaced or rehabilitated by the municipality. The lifecycle activities scenario is based on the assumption that the Town implements a lifecycle activity strategy – as developed with Town staff during PSD's Roadmap – in which the right activity is performed on the right asset at the right time to optimize asset lifecycle costs. The following table outlines the annual deficit/surplus projected for both budget scenarios:

Budget Scenario	Annual Requirement	Funding Available	Annual Deficit/Surplus
End-of-life Replacement	$26,854,000	$9,220,000	$17,634,000
Lifecycle Activities	$19,285,000	$9,220,000	$10,065,000

When both the rate-funded and tax-funded assets are combined, the difference in cost between the two budget scenarios represents an average annual savings of $7,569,000, or 43%. As a result, we recommend the Town implement a lifecycle activity strategy to realize these annual cost savings. The Town's annual capital requirement represent the amount of funding that the municipality should allocate annually to meet replacement needs as they arise, prevent infrastructure backlogs and achieve long-term sustainability. According to our recommendations, the municipality must allocate $19,285,000 annually for the assets covered in this AMP.

The following table outlines the recommended strategy to eliminate the Town's infrastructure deficit and achieve full funding based on the implementation of a lifecycle activity strategy:

Asset Type	Years Until Full Funding	Average Annual Tax/Rate Change
Tax-Funded (All)	20 years	1.2%
Rate Funded (Wastewater Network)	20 years	0.9%
Rate Funded (Water Network)	15 years	0%

Based on the implementation of a lifecycle activity strategy we recommend financial strategies for both tax-funded and rate-funded assets. For tax-funded assets, we recommend a 20-year plan to achieve full funding at an average annual tax increase of 1.2%.

For the Wastewater Network, we recommend a 20-year plan to achieve full funding achieved through the reallocation of debt, and an average annual rate increase of 0.9%

For the Water Network, we recommend a 15-year plan to achieve full funding achieved mainly through the reallocation of debt, and not by increasing rate revenues for capital purposes.

With the release of the updated Infrastructure for Jobs and Prosperity Act, 2015 (Bill 6), Ontario municipalities are responsible for implementing a wide range of asset management planning strategies and initiatives. With the completion of the Roadmap and the delivery of the AMP, the Town of Lakeshore is well-positioned to achieve regulatory compliance in advance of the timeline proposed by the Province.

2.0 Introduction & Context

2.1 What is asset management?

Canadian municipalities are responsible for managing and maintaining a broad range of infrastructure assets for the purpose of providing value and adequate services to their citizens. This includes: roads and bridges, to facilitate movement; water, sewer and stormwater systems to provide clean drinking water and dispose of waste or excessive rainfall; and buildings, facilities and parks to provide community and recreational spaces. The provision of these services requires a vast and costly network of infrastructure assets. Planning for the sustainability of these assets requires a systematic and comprehensive plan for maintaining, rehabilitating and replacing infrastructure at the lowest cost to the organization and its stakeholders.

Until recently, most public-sector organizations have taken an ad-hoc and informal approach to the management of infrastructure assets. Many organizations lacked a basic understanding of what they owned, where it was located, what it was worth and what condition it was in. As a result, there has been widespread mismanagement of municipal assets, often contributing to the rapid deterioration of critical infrastructure. Municipal asset management is comprised of a series of processes and practices designed to manage all assets effectively and sustainably.

The goal of a municipality engaged in asset management is to minimize the lifecycle costs of owning, operating, and maintaining assets, at an acceptable level of risk, while continuously delivering established levels of service for present and future customers. This encompasses the planning, design, construction, operation and maintenance of infrastructure used to provide municipal services. By implementing asset management processes, infrastructure needs can be prioritized over time, while ensuring timely investments to minimize repair and rehabilitation costs and maintain municipal assets now and into the future.

2.2 ISO 55000

The formal practice of asset management has developed over the past 30 years, first in the private sector, and more recently in the public sector. Over this period, key industry stakeholders came together to develop common definitions, concepts and best practices in asset management.

One of the earliest outputs of this collaboration was the *British Standards BSI PAS 55* – the Publicly Available Specification for the optimal management of physical assets. This document led to the publication of an international standard in January 2014 when the International Organization for Standardization (ISO) published *ISO 55000* on Asset Management.

This document provides the foundation for asset management best practices, and as such, is an invaluable guide to developing processes and procedures that support the good stewardship of municipal assets.

2.3 What are the benefits of asset management?

Implementing the key principles and best practices of asset management can lead to a significant overhaul of organizational processes, practices and procedures. Prior to implementing these changes an overview of the benefits of asset management is useful to understand why this organizational change is valuable and how it will improve outcomes for all stakeholders. **Table 1** outlines why an organization should engage in the development of a robust and sustainable asset management program.

Table 1 Benefits of Asset Management

Benefits of Asset Management
Good governance and increased accountability
Data-driven decision-making
Enhanced sustainability of infrastructure
Improved level of service and quality of life
Accurate forecasting of infrastructure replacement and enhancement needs
Compliance with federal and provincial regulations

2.4 What is an asset management plan?

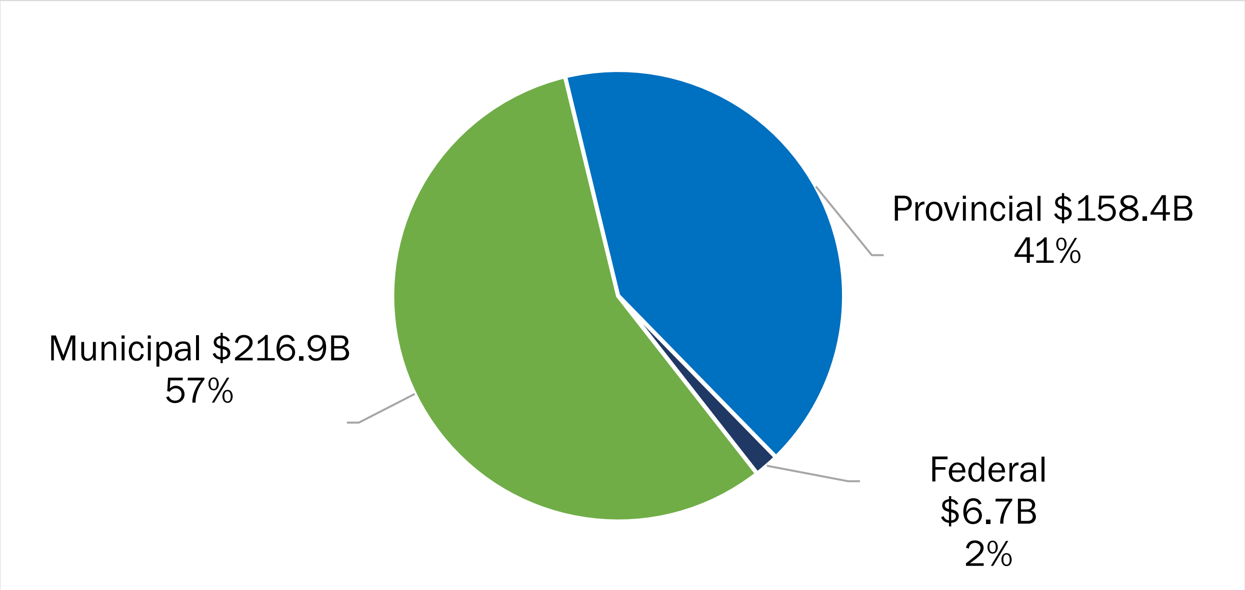
An asset management plan (AMP) is a strategic planning document that outlines key asset data and identifies the resources and funding required to meet organizational objectives. This AMP was developed to support the Town of Lakeshore's vision for its asset management practice and programs. It provides key asset data and information about the municipality's infrastructure portfolio, asset inventory and replacement costs. This document also includes a detailed analysis of this data to determine optimized asset management strategies, the current state of infrastructure, the municipality's capital investment framework, and financial strategies to achieve fiscal sustainability while reducing and eventually eliminating funding gaps.

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

2.5 Infrastructure Ownership in Canada

Across Canada, the municipal share of public infrastructure increased from 22% in 1955 to nearly 60% in 2013. The federal government's share of critical infrastructure stock, including roads, water and wastewater, declined by nearly 80% in value since 1963.

Figure 1 Municipal Share of Public Infrastructure



Ontario's municipalities own and manage more infrastructure assets in the province than both the provincial and federal government combined. The asset portfolios managed by Ontario's municipalities are also highly diverse. The Town of Lakeshore's capital asset portfolio, as analyzed in this AMP is valued at $1.05 billion using 2017 replacement costs. The municipality relies on these assets to provide residents, businesses, employees and visitors with safe access to important services, such as transportation, recreation, culture, economic development and much more. As such, it is critical that the municipality manage these assets optimally in order to produce the highest total value for taxpayers. This AMP will assist the municipality in the pursuit of judicious asset management of its capital assets.

2.6 Federal and Provincial Government Involvement

2.6.1 History of Asset Management in Canada

Deteriorating infrastructure and a widening infrastructure funding gap is a cause of concern, not simply for municipalities, but also for other levels of government. Over the last 10+ years a national and provincial framework has emerged to guide municipal asset management practices across the country. **Figure 2** outlines key events in the history of asset management in Canada and Ontario.

Figure 2 Brief History of Asset Management in Canada

(2001-2007) InfraGuide

- A partnership between the Federation of Canadian Municipalities, the National Research Council and Infrastructure Canada produced best practice reports and e-learning tools for sustainable municipal infrastructure
- In 2003 the National Guide to Sustainable Municipal Infrastructure: Innovations and Best Practices (InfraGuide) was published

(2009) PSAB 3150

- Public Sector Accounting Board Handbook: Section 3150 – Tangible Capital Assets was published establishing standards on how to account for and report tangible capital assets in government financial statements

(2012) Municipal Infrastructure Strategy and Building Together Guide

- Required municipalities requesting infrastructure funding to show how projects fit within their asset management plans
- The Building Together: Guide for Municipal Asset Management Plans was published to help municipalities develop their plan

(2014) Federal Gas Tax Agreement

- The Administrative Agreement on the Federal Gas Tax Fund was developed to provide terms and conditions for the distribution of the Gas Tax Fund to municipalities in Ontario
- Municipalities were required to develop and implement an Asset Management Plan, prior to December 31, 2016

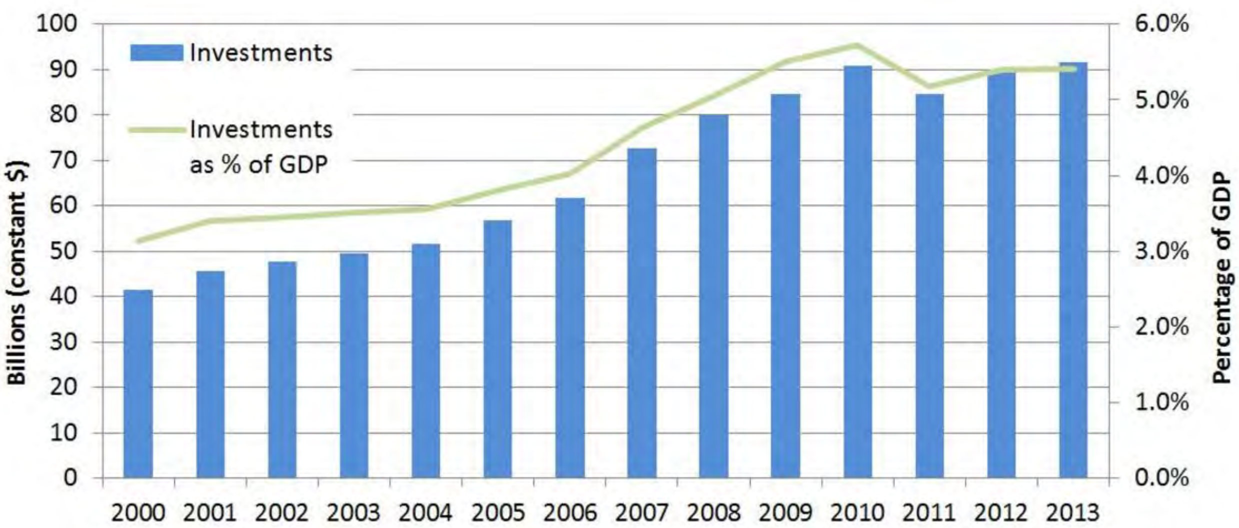
(2016) Infrastructure for Jobs and Prosperity Act - Ontario

- Provided the planning framework for the delivery of $130 billion of infrastructure projects across the province over the next 10 years
- Outlined requirements for municipal asset management plans across three phases completed by January 1, 2022

2.6.2 Grant Funding

In an effort to address the infrastructure deficit the last decade has seen a noticeable increase in grant funding available to municipalities for infrastructure and asset management capacity building activities. It is increasingly evident that municipalities need to be prepared to capitalize on these opportunities to ensure that deteriorating infrastructure is managed effectively and, emerging service growth demands are addressed. **Figure 3** depicts trends in Federal, Provincial and Municipal investments in infrastructure from 2000-2013:

Figure 3 Federal, Provincial and Municipal Investments in Infrastructure



2.6.3 Current Grant Funding Opportunities (Ontario)

Federal Gas Tax Fund

The Federal Gas Tax Fund is a permanent source of funding provided up front, twice-a-year, to provinces and territories, who in turn distribute this funding to their municipalities to support local infrastructure priorities. Every year the Gas Tax Fund provides over $2 billion and supports approximately 2,500 projects in communities across Canada. The 2014 Administrative Agreement defined the roles and responsibilities of Ontario municipalities hoping to receive this source of funding. Within this agreement, there is a requirement that each municipality develops and implements an AMP. Additionally, they must demonstrate that their AMP is being used to guide infrastructure planning and investment activities.

2014 New Building Canada Fund

The 2014 New Building Canada Fund is a $14-billion fund to support projects of national, regional and local significance that promote economic growth, job creation and productivity. There are two major components:

- The $4-billion National Infrastructure Component (NIC) which provides funding for projects of national significance, with a focus on projects that have broad public benefits, and that contribute to long-term economic growth and prosperity.
- The $10-billion Provincial-Territorial Infrastructure Component (PTIC) which supports infrastructure projects of national, regional and local significance that contribute to economic growth, a clean environment, and stronger communities.

Municipal Asset Management Program (MAMP)
The Municipal Asset Management Plan (MAMP) delivered by the Federation of Canadian Municipalities is a five-year, $50-million program designed to help Canadian municipalities make informed infrastructure investment decisions based on sound asset management practices. The program offers grant funding as well as training and capacity-building activities to increase skills within municipalities and local governments to sustainably maintain their assets now and into the future.

- Deadline: 2021-2022
- Funding Available: Up to 80% of total eligible projects, to a maximum of $50,000

Municipalities for Climate Innovation Program (MCIP)
The Municipalities for Climate Innovation Program (MCIP) delivered by the Federation for Canadian Municipalities, is a five-year, $75 million program that provides funding, training and resources to help Canadian municipalities adapt to the impacts of climate change and reduce greenhouse gas emissions.

- Deadline: 2021-2022
- Funding Available: Varies by project type – up to $1 million for capital projects or $175,000 for climate change plans or studies

Ontario Community Infrastructure Fund (OCIF)
The Ontario Community Infrastructure Fund (OCIF) provides steady, long-term funding for small, rural and northern communities to develop and renew their infrastructure. The total fund is increasing from $100 million per year to $300 million per year by 2018-19. Similar to the Federal Gas Tax Fund, the province is continuing to seek alignment between the provision of OCIF funding and municipal asset management planning practices.

2.6.4 Emerging Regulatory Framework (Ontario)

Recently, the Ontario Government has moved from *incentivizing* proper asset management planning – through the provision of resources like the *Building Together Guide* and asset management capacity building funding – to *regulating* proper asset management planning. Asset management has evolved from what began as an accounting exercise via PSAB 3150 to a holistic informed approach to infrastructure management.

Recognizing the progress that has been made to date, the Ontario Government passed the Infrastructure for Jobs and Prosperity Act (Bill 6) in 2015, launching the process of regulating asset management planning at the local level. As with any effort to regulate, it was important to the province to standardize planning processes while taking into consideration the differences in capacity and asset management maturity across municipalities. Bill 6 consultations took place over the summer months of 2016, with the province collecting feedback on its proposed regulation from municipalities of all shapes and sizes.

In June 2017, the province released its draft Bill 6 regulation. AMP requirements are broken into three phases. The requirements of each of the proposed phases are listed in **Table 2**.

Table 2 Three Phases of Bill 6 Requirements

	Completion Date	Requirements
Phase 1	January 1, 2020	**(Core Infrastructure Assets)** 1. Current Levels of Service 2. Inventory Analysis 3. Estimated Costs to Sustain Current Levels of Service 4. **Population over 25,000:** Estimated Costs to Service Growth
Phase 2	January 1, 2021	1. Same Requirements as Phase 1 expanded to all infrastructure assets
Phase 3	January 1, 2022	1. Proposed Levels of Service 2. Updated Inventory Analysis 3. Lifecycle Management Strategy 4. Financial Strategy 5. Addressing Shortfalls 6. **Population over 25,000:** Financial Strategy to Service Growth 7. **Population over 25,000:** Risk Analysis

2.6.5 Alignment with Provincial Regulation (Bill 6)

For many municipalities, especially small and mid-sized communities, achieving compliance with the regulatory requirements will be a major challenge without additional resources and staff capacity. As part of PSD's Roadmap, the Town will be well-positioned to achieve regulatory compliance in advance of the proposed timeline for completion.

Minto

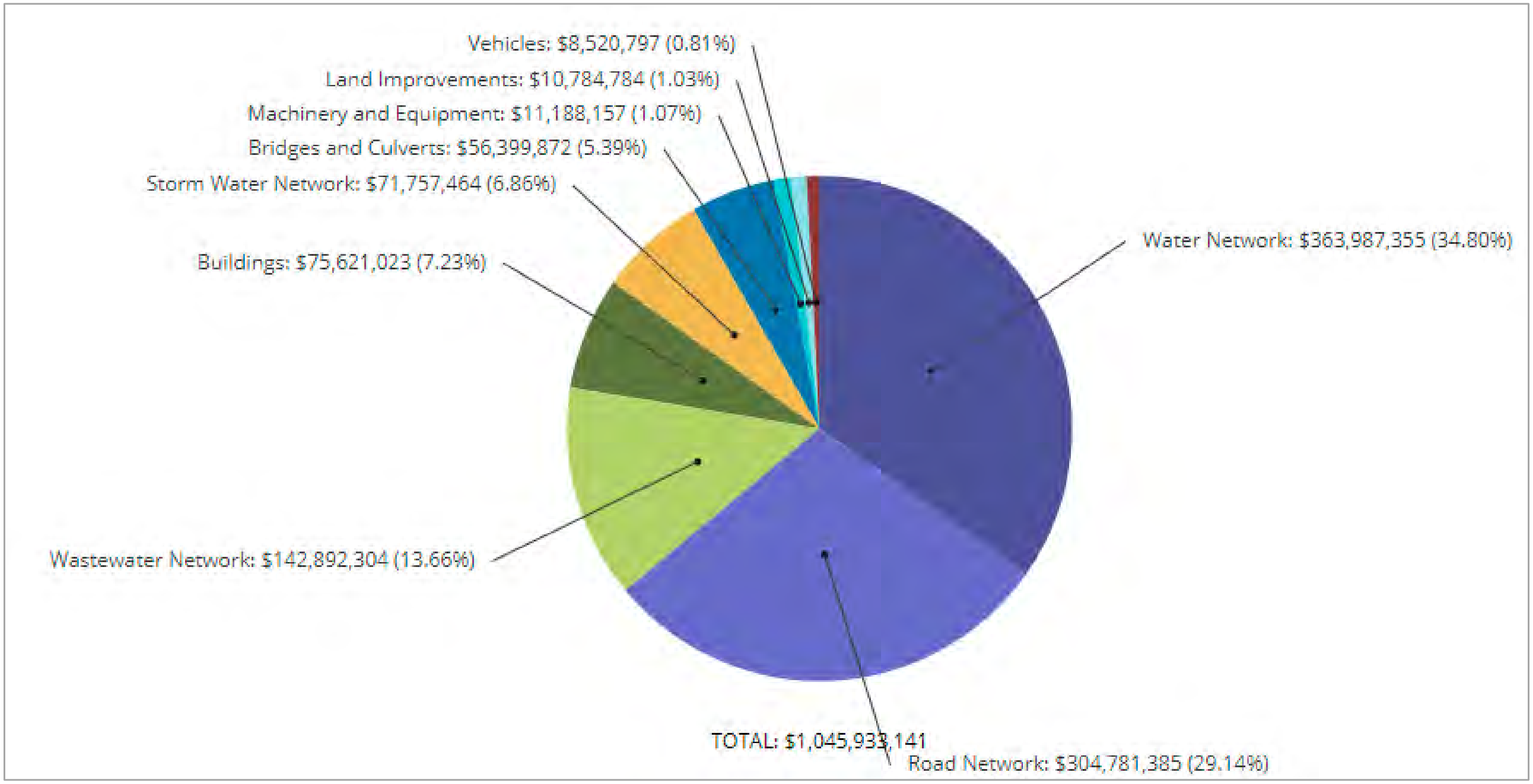
3.0 Asset Portfolio Overview

In this section, we aggregate technical and financial data across all asset classes analyzed in this AMP, and summarize the state of the infrastructure using key asset-level and financial indicators. These indicators will provide a high-level picture of the assets that the municipality owns, historical trends in infrastructure investment and the condition and estimated useful life remaining for the municipality's assets. This data will be used as a starting point to conduct more detailed analyses on individual asset classes.

3.1 Asset Valuation – All Asset Classes

The asset classes analyzed in this AMP for the municipality had a total 2016 asset valuation of $1.05 billion, of which the water network comprised 35%, followed by the road network at 29%. Note that road bases, which are part of the road network, are included solely to represent the total value of assets owned by the municipality.

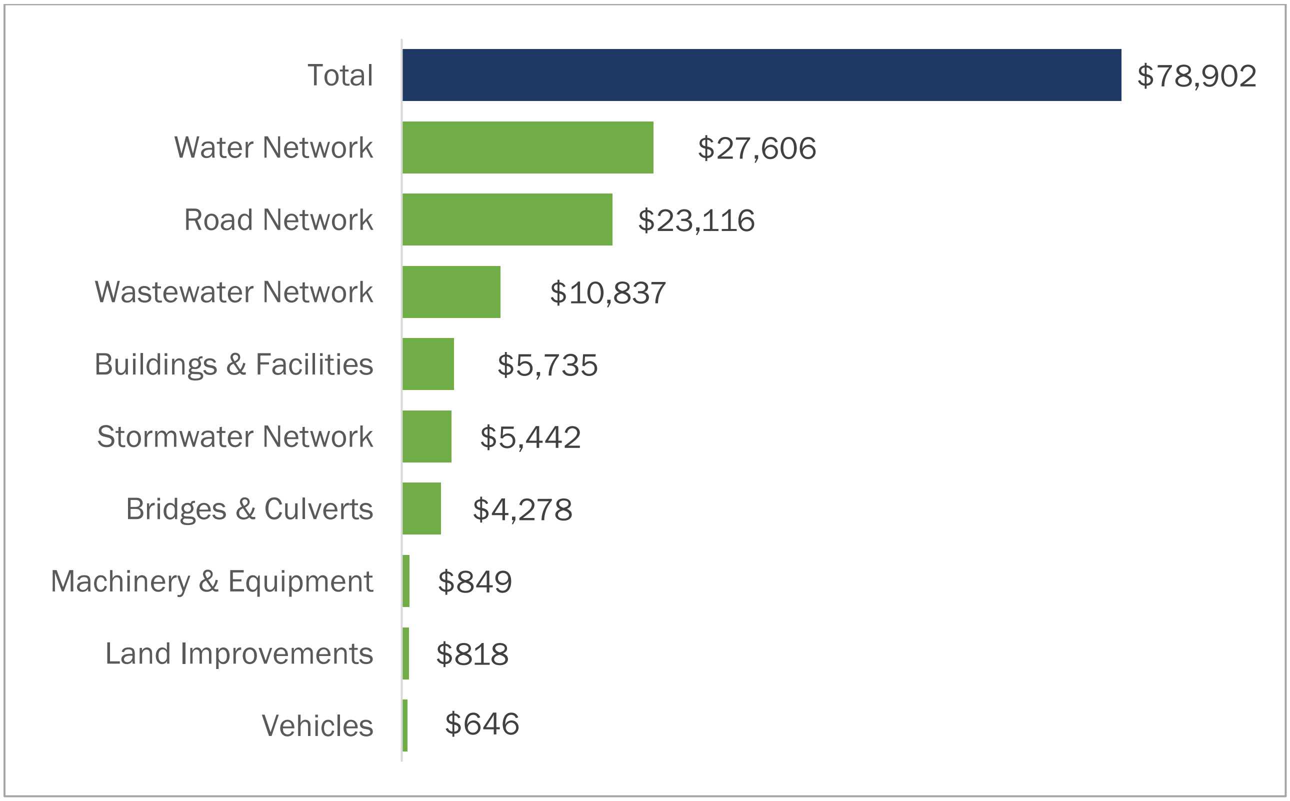
Figure 4 Asset Replacement Value - All Asset Classes



3.2 Household Asset Ownership

The ownership per household totals $78,902 based on 13,185 households. The water network comprises the greatest share of household ownership totalling $27,503, and the road network comprises the second largest share of ownership totalling $23,075. These two asset classes alone account for 64% of total household ownership.

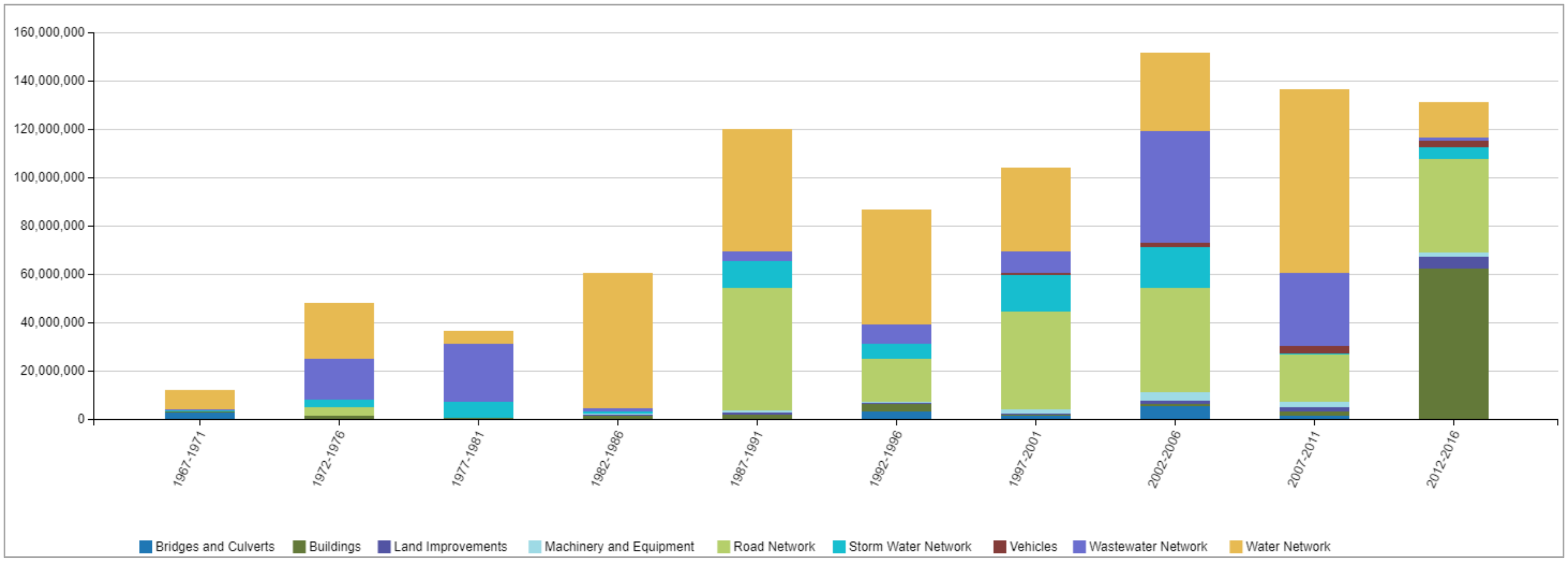
Figure 5 Household Asset Ownership (All Assets)



3.3 Historical Investment in Infrastructure

In conjunction with condition data, two other measurements can augment staff understanding of the state of infrastructure and impending and long-term infrastructure needs: installation year profile and useful life remaining. Using 2016 replacement costs, **Figure 6** illustrates the historical investments made in the asset classes analyzed in this AMP since 1967. Often, investment in critical infrastructure parallels population growth or other significant shifts in demographics; it can also fluctuate with provincial and federal stimulus programs. Note that this graph only includes the active asset inventory as of December 31, 2016.

Figure 6 Historical Investment in Infrastructure - All Asset Classes

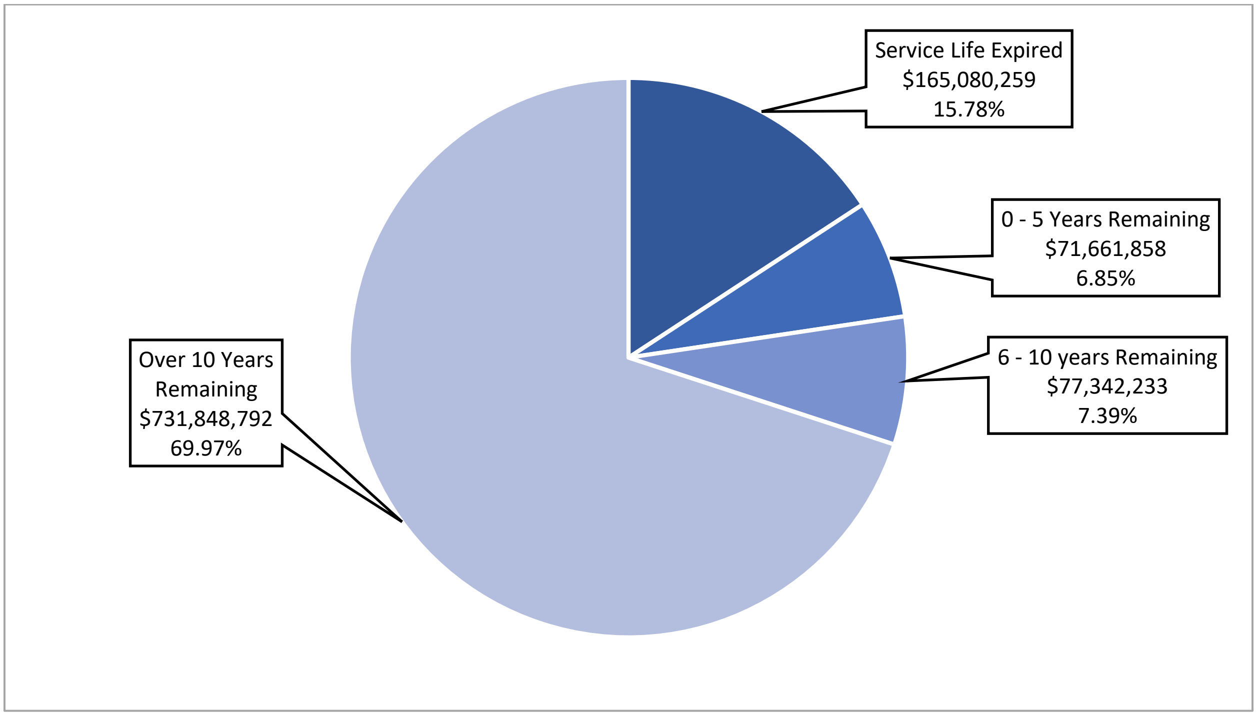


The municipality has invested in its infrastructure continuously over the decades. Investments saw substantial growth from 1987-1991 before declining in the mid-1990s. Since the early-2000s there has been steady investment in infrastructure.

3.4 Useful Life Consumption

While age is not a precise indicator of an asset's health, in the absence of assessed condition assessment data, it can serve as a high-level, meaningful approximation and help guide replacement needs and facilitate strategic budgeting. **Figure 7** shows the distribution of assets based on remaining useful life.

Figure 7 Remaining Useful Life - All Asset Classes

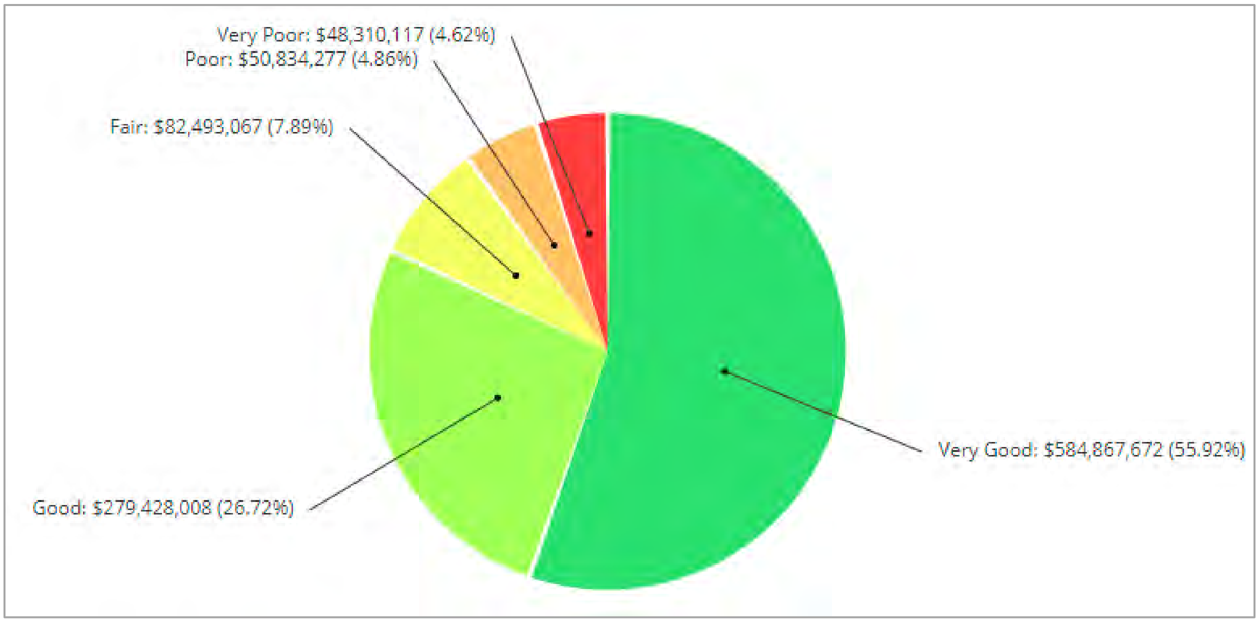


70% of the assets analyzed in this AMP – by replacement cost – have over 10 years of useful life remaining. However, nearly 16%, with a valuation of $165 million, remain in operation beyond their estimated useful life.

3.5 Overall Asset Condition

Based on 2017 replacement costs, and a combination of assessed and age-based condition data, 83% of all assets, with a valuation of $864 million, are in good to very good condition. However, 9% are in poor to very poor condition, with a valuation of $99 million.

Figure 8 Asset Condition – All Assets



3.6 Overall Asset Risk Profile

Traditionally, municipalities have prioritized capital projects according to a "worst-first" approach, in which the assets in the worst condition are the highest priority for rehabilitation or replacement. However, this approach fails to account for the fact that some assets are more important to the delivery of vital services and the provision of critical infrastructure than others. As a result, many assets that should be prioritized to prevent service disruption, are left to deteriorate. The risk matrix in **Figure 9** helps to prioritize capital projects based on both the probability and consequence of failure.

Figure 9 Overall Asset Risk Profile

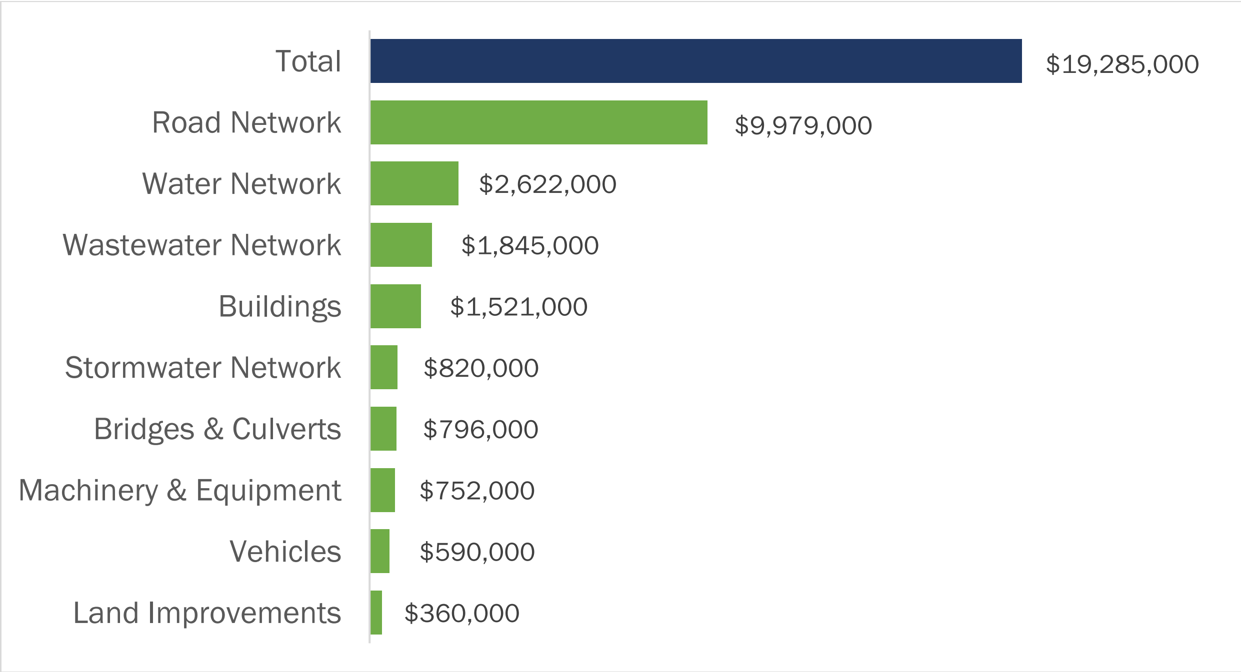
Out of the Town's entire asset portfolio 10% of assets – by replacement cost – fall into the 'High' to 'Very High' risk category, representing a total replacement value of $109,505,000.

4.0 Financial Overview

This section details key high-level financial indicators for the municipality's asset classes.

4.1 Annual Requirements

Figure 10 Annual Requirements by Asset Class (Lifecycle Activities Scenario)

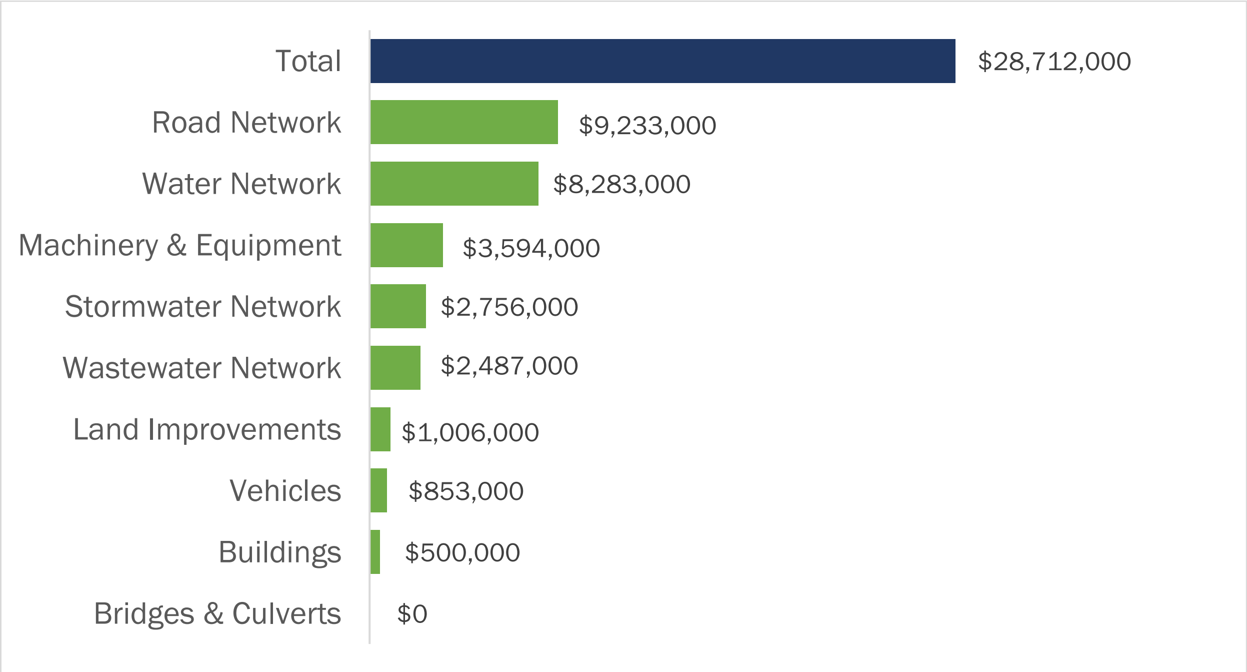


The annual requirements represent the amount the municipality should allocate annually to each of its asset classes to meet replacement needs as they arise, prevent infrastructure backlogs and achieve long-term sustainability. In total, the municipality must allocate approximately $19.3 million annually for the assets covered in this AMP.

This AMP contains two distinct financial strategies, as outlined in **Section 9.0**. The above figure depicts projected annual requirements according to the implementation of the lifecycle activities strategy. As part of PSD's Roadmap, the Town developed lifecycle activity strategies for core asset classes that outline how to extend the life of assets at the lowest cost by performing the right action to the right asset at the right time. This process is described in greater detail in **Section 7.6**.

4.2 Infrastructure Backlog

Figure 11 Infrastructure Backlog - All Asset Classes (Lifecycle Activities Scenario)



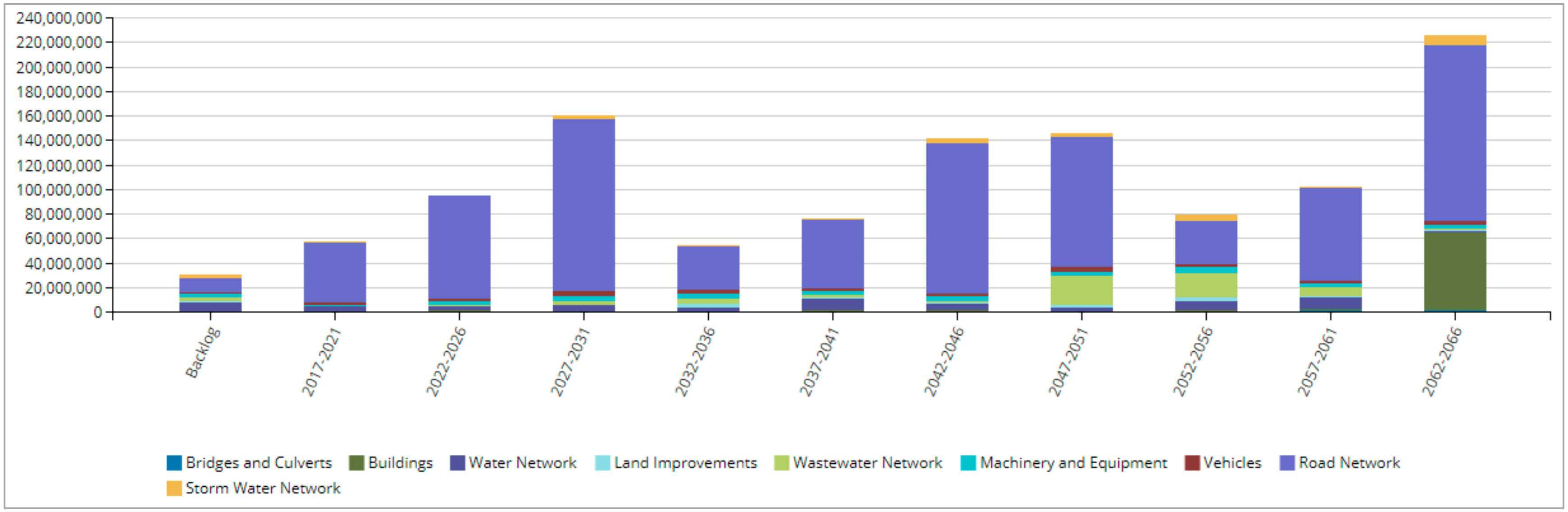
The municipality has a combined infrastructure backlog of $28.7 million, with the Road Network and Water Network comprising 61%. The backlog represents the investment needed today to meet previously deferred replacement needs. In the absence of assessed data, the backlog represents the value of assets still in operation beyond their estimated useful life.

4.3 Asset Replacement Requirements

In this section, we illustrate the aggregate short-, medium-, and long-term infrastructure spending requirements for the municipality's asset classes. The backlog is the total investment in infrastructure that was deferred over previous years or decades. In the absence of observed data, the backlog represents the value of assets that remain in operation beyond their useful life. This AMP contains two distinct financial strategies, as outlined in **Section 9.0**. The following figures depict projected annual requirements for both strategies: end-of-life replacement and lifecycle activities strategy.

4.3.1 End-of-Life Replacement Requirements

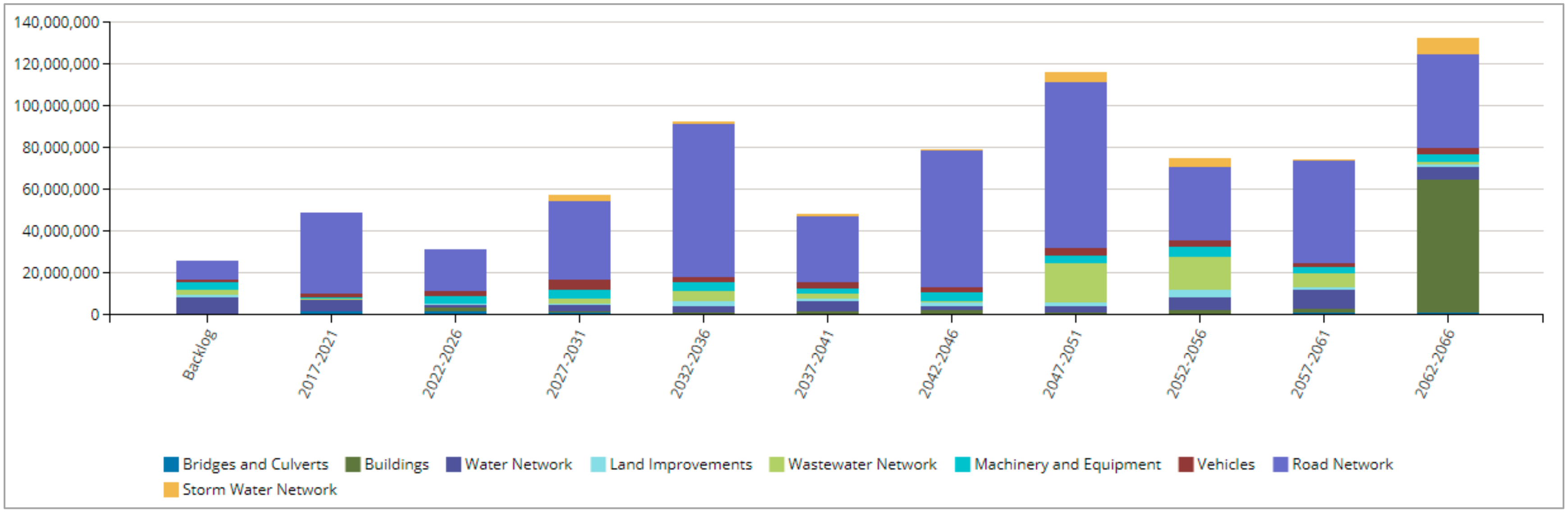
Figure 12 Replacement Profile - All Asset Classes – End-of-Life Replacement



Assuming end-of-life replacement only for all assets, the municipality has a combined backlog of $30.7 million, of which the road network comprises $11 million. The municipality's aggregate annual requirements total $26.8 million. At this funding level, the municipality would be allocating sufficient funds on an annual basis to meet the replacement needs for its various asset classes as they arise without the need for deferring projects and accruing annual infrastructure deficits.

4.3.2 Lifecycle Activities Replacement Requirements

Figure 13 Replacement Profile - All Asset Classes - Lifecycle Activities



Based on the implementation of a lifecycle activity strategy as described in **Section 7.6**, the municipality has a combined backlog of $26 million, of which the road network comprises $11.2 million. The municipality's aggregate annual requirements total $19.3 million. At this funding level, the municipality would be allocating sufficient funds on an annual basis to meet the replacement needs for its various asset classes as they arise without the need for deferring projects and accruing annual infrastructure deficits.

5.0 Data and Methodology

The municipality's dataset for the asset classes analyzed in this AMP are maintained in PSD's CityWide® Tangible Assets module. This dataset includes key asset attributes and PSAB 3150 data, such as historical costs, in-service dates, field inspection data, asset health, and replacement costs.

5.1 Condition Data

Assets deteriorate in condition over time. Municipalities generally implement a straight-line amortization approach to model the deterioration of their capital assets and use age-based data to estimate an asset's remaining useful life. However, this approach is often a poor representation of an asset's actual condition and rate of deterioration. In the absence of condition data and customized deterioration curves, age-based estimates can be a useful approximation of when future field intervention activities and investment is required.

As available, actual field condition data was used to make recommendations more meaningful and representative of the municipality's state of infrastructure. The value of condition data cannot be overstated as it provides a more accurate representation of the state of infrastructure than does age alone.

As part of PSD's Roadmap, the Town was encouraged to collect condition data for as many asset classes and components as possible. Town staff were provided with condition assessment protocols to ensure the consistent and uniform collection of data in addition to data gathering templates to store all assessed data for upload to the main asset inventory. This phase of the Roadmap is discussed in greater detail in Section 7.4.

5.1.1 Source of Condition Data by Asset Class

Table 3 provides an overview of the source of condition data for major components within each asset class. The Data Maturity Rating is calculated as follows:

- Segments with only age-based condition receive a baseline rating of 50%
- Segments with a mixture of age-based and assessed condition are calculated using the following formula:
  - $\mathbf{0.5} + (\%\ \boldsymbol{of\ assets\ with\ assessed\ condition}\ \times \mathbf{0.5}) \times \mathbf{100}$

Note: Capturing assessed condition is far more critical for major asset classes (roads, bridges, water, sewer, storm etc.) than for minor asset classes (fleet, machinery & equipment, IT etc.). For the purposes of the Roadmap, the municipality focused on collecting condition data for only major asset classes. In the future, the municipality may wish to perform more detailed condition assessments on minor asset categories.

Table 3 Source of Condition Data – All Asset Classes

Asset Class	Segment	Source of Condition Data	Data Maturity Rating
Road Network	Paved	95% Assessed	91%
	Gravel	96% Assessed	97%
Bridges & Culverts	Bridges	100% Assessed	100%
	Culverts	33% Assessed	67%
Water Network	All	Age-based	50%
Wastewater Network	All	Age-based	50%
Stormwater Network	All	Age-based	50%
Buildings	All	Age-based	50%
Machinery & Equipment	All	Age-based	50%
Land Improvements	All	Age-based	50%
Vehicles	All	Age-based	50%
	Data Maturity Rating:		64%

5.2 Asset Attribute Data

While asset condition data is perhaps the most important piece of data to collect, additional asset data is required to support asset management strategy development and decision-making. Asset attribute data provides greater context and clarity to the state of an asset and allows for the development of robust risk and lifecycle management strategies to prioritize projects and ultimately extend the life of assets.

Table 4 lists the asset attributes that PSD recommends collecting for major asset classes and the percentage of data available in the CityWide database for each attribute. This only includes core asset categories.

Table 4 Asset Attribute Data – Major Asset Classes

Asset Class	Asset Attribute	% Completion in CityWide Database
Road Network	Surface Width (m)	0%
	Length (m)	100%
	Road Class	100%
	Surface Material	100%
	Road Type	100%
Water Network	Length (m)	100%
	Pipe Diameter (mm)	100%
	Material	100%
Wastewater Network	Length (m)	100%
	Material	100%
	Pipe Diameter (mm)	100%
Stormwater Network	Length (m)	100%
	Pipe Diameter (mm)	99%
	Material	99%
	Data Maturity Rating:	93%

5.3 Financial Data

In this AMP, the average annual requirement is the amount, based on current replacement costs, that the Town should set aside annually so that assets can be replaced upon reaching the end of their lifecycle.

To determine current funding capacity, all existing sources of funding are identified and combined to enumerate the total available funding. These figures are then assessed against the average annual requirements, and are used to calculate the annual funding shortfall and additional financial strategies.

In addition to the annual shortfall, the majority of municipalities face significant infrastructure backlogs. The infrastructure backlog is the accrued financial investment needed in the short-term to bring the assets to a state of good repair. This amount is identified for each asset class.

As part of the Roadmap, two sets of financial projections are produced. The first is based on end-of-life replacement of assets. The second set of financial projections is calculated based on the implementation of the lifecycle activity management strategies developed as part of the Roadmap, in collaboration with Town staff. A more detailed description of these two strategies can be found in **Section 9.2.**

5.3.1 Replacement Costs

Developing an asset investment strategy requires an estimation of the cost to replace assets that have reached the end of their service life. The replacement cost considers the replacement of an asset with a similar, but not necessarily identical, asset available in the current marketplace.

There are a range of methods to determine asset replacement costs – some more accurate and reliable than others.

- **Cost/Unit** – Industry standard cost
- **User-Defined Cost** – Cost is based on user-defined data
- **CPI/NRBCPI** – Historical cost is inflated based on Consumer Price Index tables
- **Flat Rate Inflation** – Historical cost is inflated by the same percentage each year up to the current year

5.3.2 Source of Replacement Cost by Asset Class

Table 5 provides an overview of the source of replacement costs for major components within each asset class.

The Data Maturity Rating is based on a ranking of each replacement cost source based on accuracy and reliability. Where there are multiple replacement cost sources for an asset class, the Data Maturity Rating is a weighted average according to the following weighted ratings:

- Cost/Unit – A (100%)
- User-Defined Cost – B (75%)
- CPI/NRBCPI – C (50%)
- Flat Rate Inflation – D (25%)

Table 5 Source of Replacement Cost - All Asset Classes

Asset Class	Segment	Replacement Cost Source	Data Maturity Rating
Road Network	Paved Roads	80%: Cost/Unit 20%: User-Defined Cost	95%
Bridges & Culverts	Bridges	User-Defined Cost	75%
	Culverts	CPI	50%
Water Network	Watermains	Cost/Unit	100%
Wastewater Network	Sanitary Sewer Mains	Cost/Unit	100%
Stormwater Network	Storm Sewer Mains	99%: Cost/Unit 1%: CPI Tables	100%
Buildings	All	CPI	50%
Machinery & Equipment	All	89%: CPI 11%: User-Defined Cost	53%
Land Improvements	All	86%: CPI 14%: User-Defined Cost	54%
Vehicles	All	CPI	50%
	Data Maturity Rating:		**73%**

5.3.3 Determining Annual Requirements

Determining future investment needs of infrastructure requires the use of long-term financial projection. Calculating the annual requirement is achieved by dividing the replacement cost of an asset by its estimated useful life. Based on the available data there are two approaches to calculating annual requirements. The first is based on the assumption that an asset will simply be replaced at its end-of-life. The second is based on the assumption that lifecycle activities will be undertaken strategically to extend the life of an asset. The calculations for these two approaches are as follows:

$$Annual\ Requirement\ (End\ of\ Life) = \frac{Replacement\ Cost}{Estimated\ Useful\ Life\ (EUL)}$$

$$Annual\ Requirement\ (Lifecycle\ Activities) = \frac{(Replacement\ Cost + Lifecycle\ Activity\ Cost)}{Lifecycle\ Estimated\ Useful\ Life\ (EUL)}$$

While the cost of lifecycle activities adds to the total cost of maintaining and rehabilitating an asset, by doing the right thing to the right asset at the right time, an asset's estimated useful life would be extended, decreasing the annual requirement and saving the municipality money.

Note: This AMP will only factor in the cost of lifecycle activities for major asset classes (roads, bridges, water, sewer, storm).

5.4 Data Maturity Rating

In the initial stage of the Roadmap, PSD performed a gap analysis on the state of the Town's asset inventory. This analysis provided a detailed look at the available data in the CityWide® database and allowed PSD to make strategic recommendations concerning the data that should be collected to enable advanced analysis and stronger asset management decision-making. While ideally an organization's asset inventory should be complete with all inventory and attribute data, this is can be an incredibly resource-intensive and time-consuming process. Data collection is one of the most important phases in the Roadmap and should be an area of focus moving forward in maintaining the Town's asset management program.

The Data Maturity Rating compares the state of the Town's asset inventory at the beginning of the Roadmap to the state of inventory achieved by the end of the Roadmap. **Table 6** breaks down the Town's Overall Data Maturity Rating by asset class and the following data types:

- **Assessed Condition** – percentage of assets with assessed condition data available in CityWide database
- **Attributes** – percentage of recommended asset attribute data available in CityWide database
- **Replacement Cost** – The average of the data maturity rating assigned in **Table 5** based on the replacement cost source used in CityWide

Table 6 Data Maturity Rating

Asset Class	Assessed Condition	Attributes	Replacement Cost	Rating
Road Network	79%	80%	95%	**85%**
Bridges & Culverts	82%	-	63%	**73%**
Water Network	50%	100%	100%	**83%**
Wastewater Network	50%	100%	100%	**83%**
Stormwater Network	50%	99%	100%	**83%**
Buildings	50%	-	50%	**50%**
Machinery & Equipment	50%	-	53%	**52%**
Land Improvements	50%	-	54%	**52%**
Vehicles	50%	-	50%	**50%**
	Overall Data Maturity Rating:			**68%**
	Overall Data Maturity Rating – Core Assets Only:			**81%**

After the completion of the Roadmap, the Town achieved an overall data maturity rating of 68%. However, for core assets (road network, bridges & culverts, water network, wastewater network, stormwater network), the Town achieved an overall data maturity rating of 81%. In order to increase or sustain a high-level of data maturity, the Town should put in place strategies and practices to facilitate continuous data collection and database maintenance. These strategies will be discussed in greater detail in **Section 7.3**.

5.5 Limitations and Assumptions

Several limitations continue to persist as municipalities advance their asset management practices:

- As available, we use field condition assessment data to illustrate the state of infrastructure and develop the requisite financial strategies. However, in the absence of observed data, we rely on the age of assets and their estimated useful life to estimate their physical condition.

- A second limitation is the use of inflation measures, for example using CPI/NRBCPI to inflate historical costs in the absence of actual replacement costs. While a reasonable approximation, the use of such multipliers may not be reflective of market prices and may over- or understate the value of a municipality's infrastructure portfolio and the resulting capital requirements.

- Our calculations and recommendations will reflect the best available data at the time this AMP was developed.

- The focus of this plan is restricted to capital expenditures and does not capture O&M (operating and maintenance) expenditures on infrastructure.

6.0 State of Local Infrastructure

The state of local infrastructure includes the full inventory, condition ratings, useful life consumption data and the backlog and upcoming infrastructure needs for each asset class. As available, assessed condition data was used to inform the discussion and recommendations; in the absence of such information, age-based data was used as the next best alternative.

6.1 Road Network

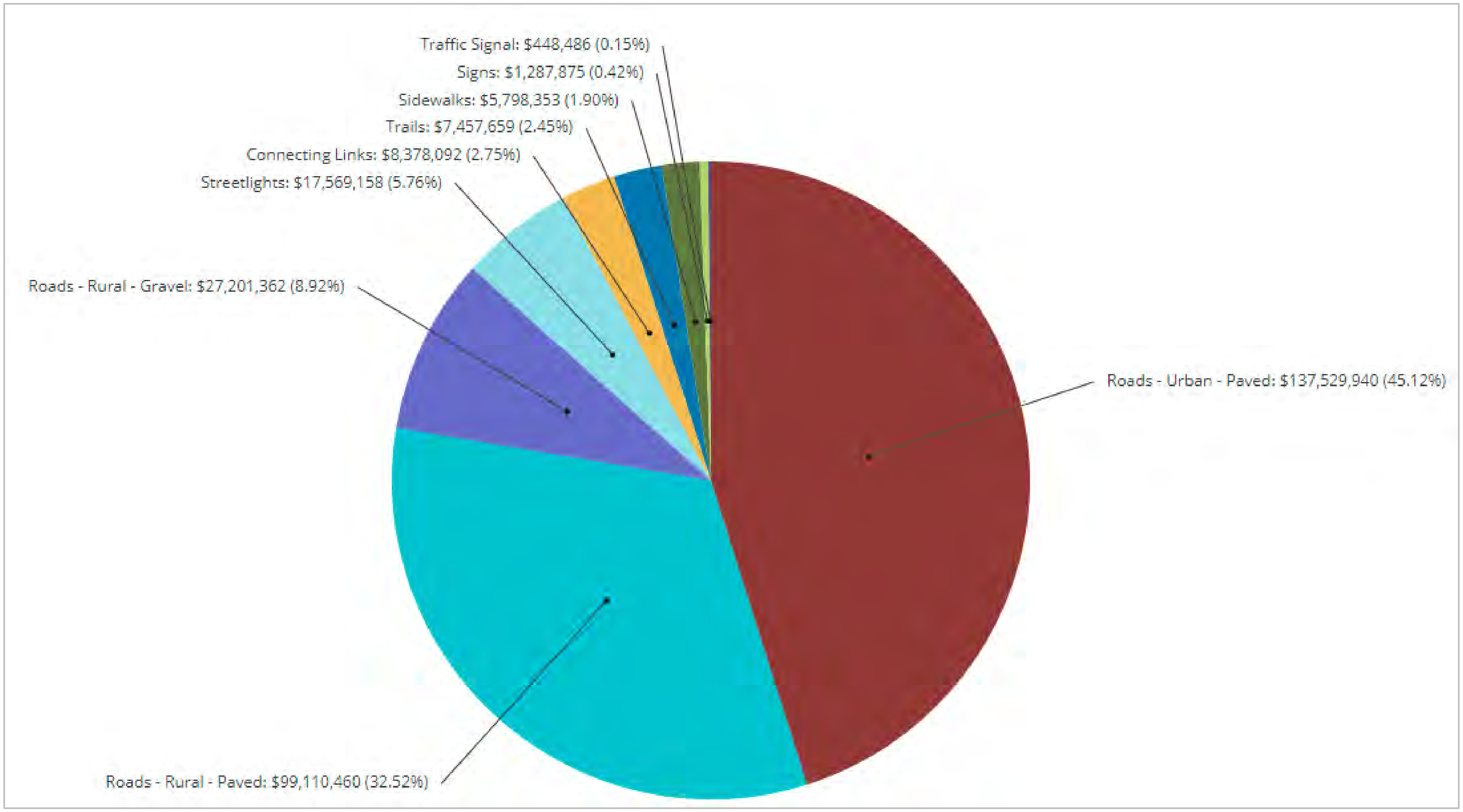
6.1.1 Asset Portfolio: Quantity, Useful Life and Replacement Cost

Table 7 illustrates key asset attributes for the municipality's road network, including quantities of various assets, their useful life, their replacement cost, and the valuation method by which the replacement costs were derived. In total, the municipality's roads assets are valued at $305 million based on 2017 replacement costs. The useful life indicated for the asset types below was assigned by the municipality and obtained from the municipality's accounting data as maintained in the CityWide® Tangible Asset module.

Table 7 Key Asset Attributes - Road Network

Asset Type	Asset Component	Quantity	Useful Life (Years)	2017 Unit Replacement Cost	2017 Overall Replacement Cost
Road Network	Roads - Rural - Gravel	124,776.89 m	12 - 100	$218.00/m	$27,201,362
	Roads - Rural - Paved (LCB, ICB)	198,038.13 m	12	NRBCPI (Toronto)	$39,446,256
	Roads - Rural - Paved (HCB)	66,234.12 m	20	$850 - $973/m	$59,664,204
	Roads - Urban - Paved (LCB, ICB)	14,670.03 m	12	NRBCPI (Toronto)	$2,723,312
	Roads - Urban - Paved (HCB)	118,782.87 m	20	$997 - $1,470/m	$134,806,628
	Connecting Links	6,451.10 m	20	$891 - $1,470,00/m	$8,378,092
	Sidewalks	105,387.26 m^2	15 - 30	NRBCPI (Toronto)	$5,798,353
	Signs	3,781 units	20	$341/unit	$1,287,875
	Streetlights	3,380 units	24 - 100	NRBCPI (Toronto)	$17,569,158
	Traffic Signal	6 units	10 - 25	NRBCPI (Toronto)	$448,486
	Trails	131,590.58 m^2	14 - 50	$57/m2	$7,457,659
				Total:	**$304,781,385**

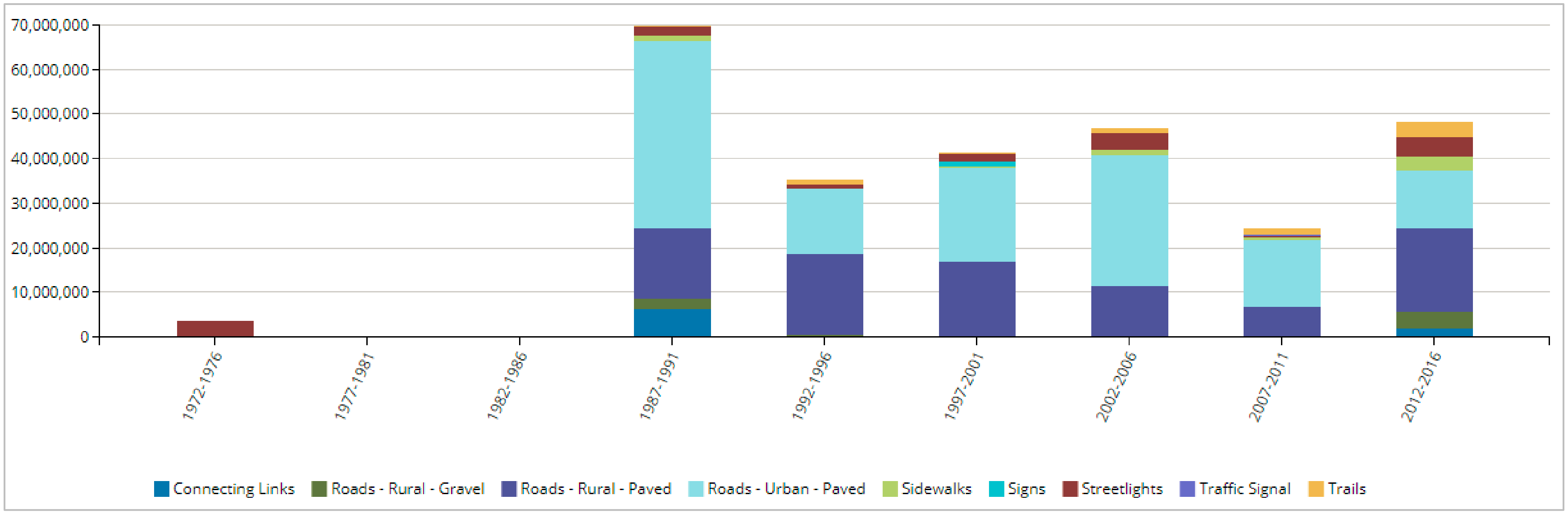
Figure 14 Asset Valuation - Road Network



6.1.2 Historical Investment

Figure 15 shows the municipality's historical investments in its road network since 1972. While assessed condition data will provide superior accuracy in estimating replacement needs and should be incorporated into strategic plans, in the absence of such information, understanding past expenditure patterns and current useful life consumption levels can inform the forecasting and planning of infrastructure needs and in the development of a capital program. Note that this graph only includes the active asset inventory as of December 31, 2016.

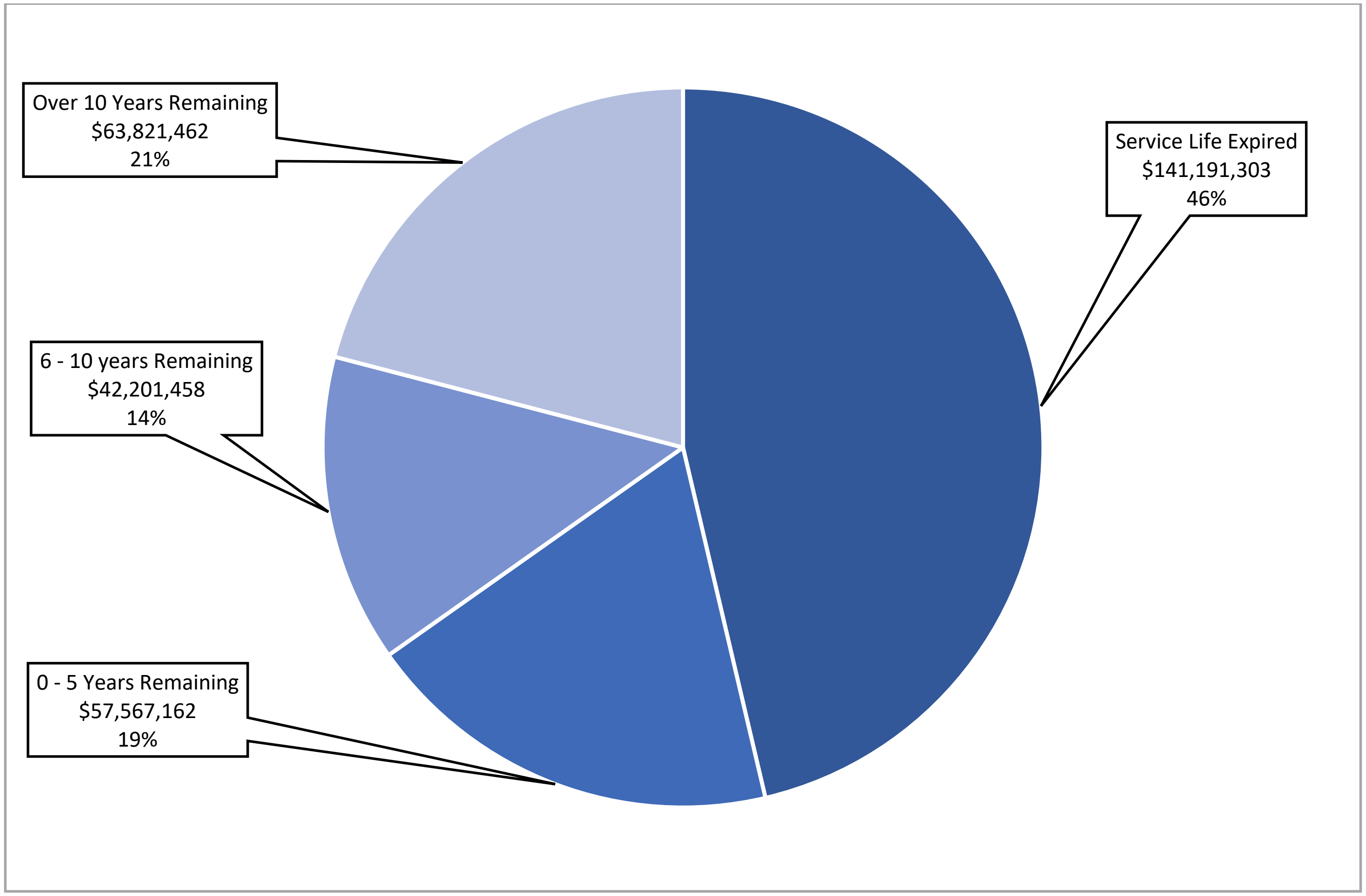
Figure 15 Historical Investment - Road Network



6.1.3 Useful Life Consumption

In conjunction with historical spending patterns and assessed condition data, understanding the consumption rate of assets based on industry established useful life standards provides a more complete profile of the state of a community's infrastructure. **Figure 16** illustrates the useful life consumption levels as of 2016 for the Town's road network.

Figure 16 Useful Life Consumption - Road Network

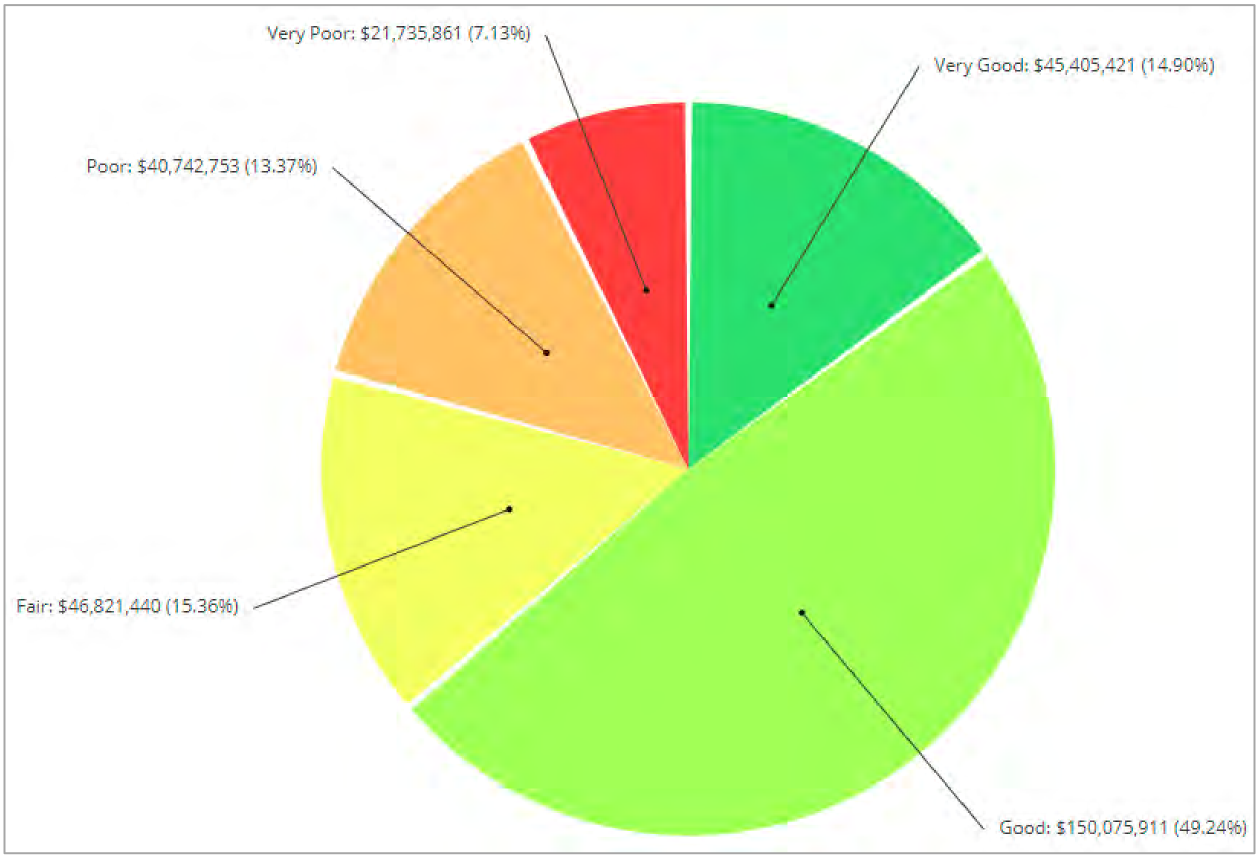


While 21% of the Town's road network has at least 10 years of useful life remaining, 46%, with a valuation of $141 million, remain in operation beyond their useful life.

6.1.4 Current Asset Condition

Using replacement cost, in this section we summarize the condition of the Town's road network as of 2016. By default, we rely on observed field data as provided by the Town. In the absence of such information, age-based data is used as a proxy. The Town has provided condition data for 96% of its road surface assets while the remaining road network assets rely on age-based data.

Figure 17 Asset Condition - Road Network



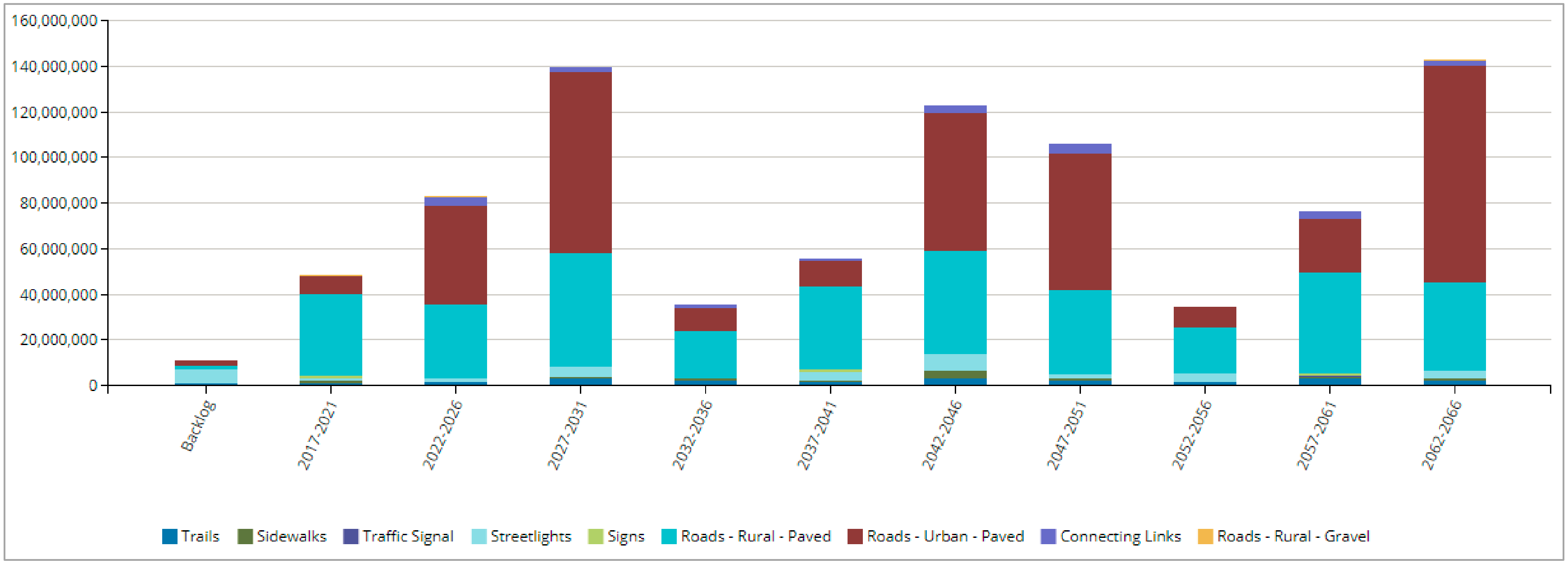
Based on a combination of assessed and age-based condition data, 64% of assets, with a valuation of $195 million are in good to very good condition; 21% are in poor to very poor condition with a valuation of $62 million.

6.1.5 Forecasting Replacement Needs

In this section, we illustrate the short-, medium-, and long-term infrastructure spending requirements based on two scenarios – end-of-life replacement and with lifecycle activities – for the Town's road network assets. The backlog is the aggregate investment in infrastructure that was deferred over previous years or decades. In the absence of observed data, the backlog represents the value of assets that remain in operation beyond their useful life.

6.1.6 Replacement Needs (End-of-Life Replacement)

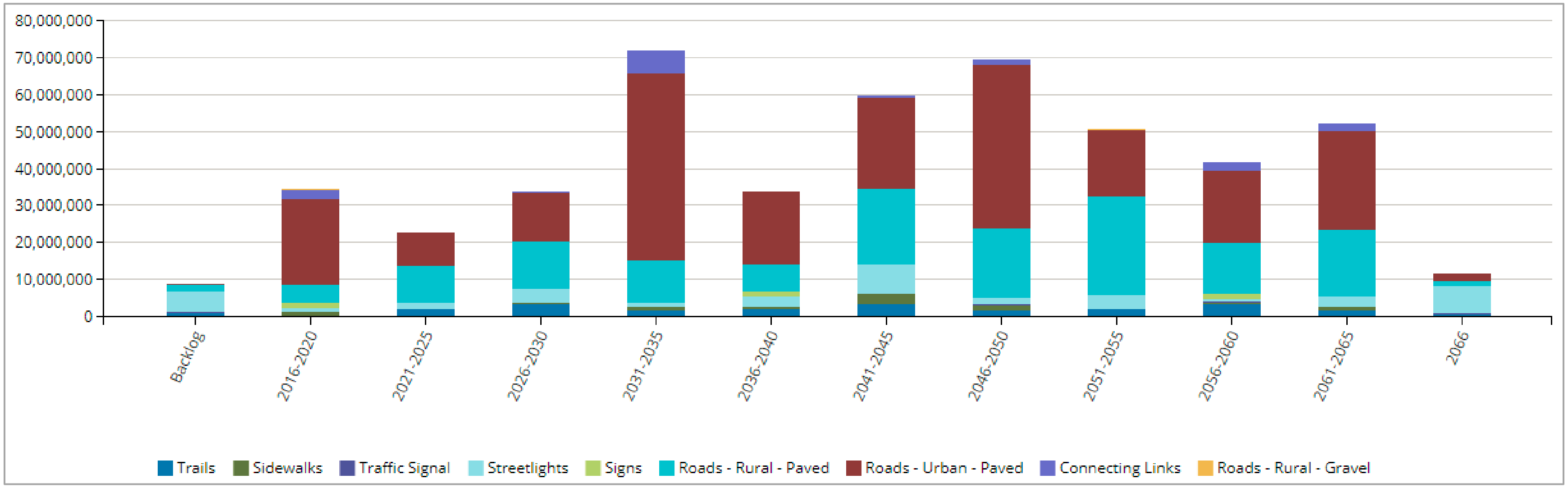
Figure 18 Forecasting Replacement Needs - Road Network (End-of-Life Replacement)



A combination of assessed and age-based condition data shows a backlog of $11 million. The Town's average annual requirements for its road network (replacement only) total $15,400,000. At this funding level, the Town would be allocating sufficient funds on an annual basis to meet replacement needs as they arise without the need for deferring projects and accruing annual infrastructure deficits.

6.1.7 Replacement Needs (Lifecycle Activities)

Figure 19 Forecasting Replacement Needs - Road Network (Lifecycle Activities)



Based on the implementation of a lifecycle activity strategy as described in **Section 7.6.**, the municipality has a backlog of $9.2 million. The municipality's average annual requirements total $9,979,000. At this funding level, the municipality would be allocating sufficient funds on an annual basis to meet the replacement needs for its various asset classes as they arise without the need for deferring projects and accruing annual infrastructure deficits.

6.1.8 Recommendations

- Assessed and aged-based condition data indicates a backlog of $9.3 million. The Town should continue its condition assessments of road surfaces, and expand the program to incorporate all assets in order to more precisely estimate its actual financial requirements and field needs. See **Section 7.4** for more information.

- The data collected through condition assessment programs should be integrated into a risk management framework which will guide prioritization of the backlog as well as short, medium, and long-term replacement needs. As additional attribute data is collected, the municipality should consider expanding the scope of risk parameters included in the risk management framework. See **Section 7.5**, for more information.

- Road network key performance indicators should be established and tracked annually in accordance with the levels of service framework in **Section 8.3**.

- The municipality is underfunding its long-term requirements on an annual basis. See **Section 9.0** for a detailed financial strategy designed to achieve long-term funding requirements.

6.2 Bridges and Culverts

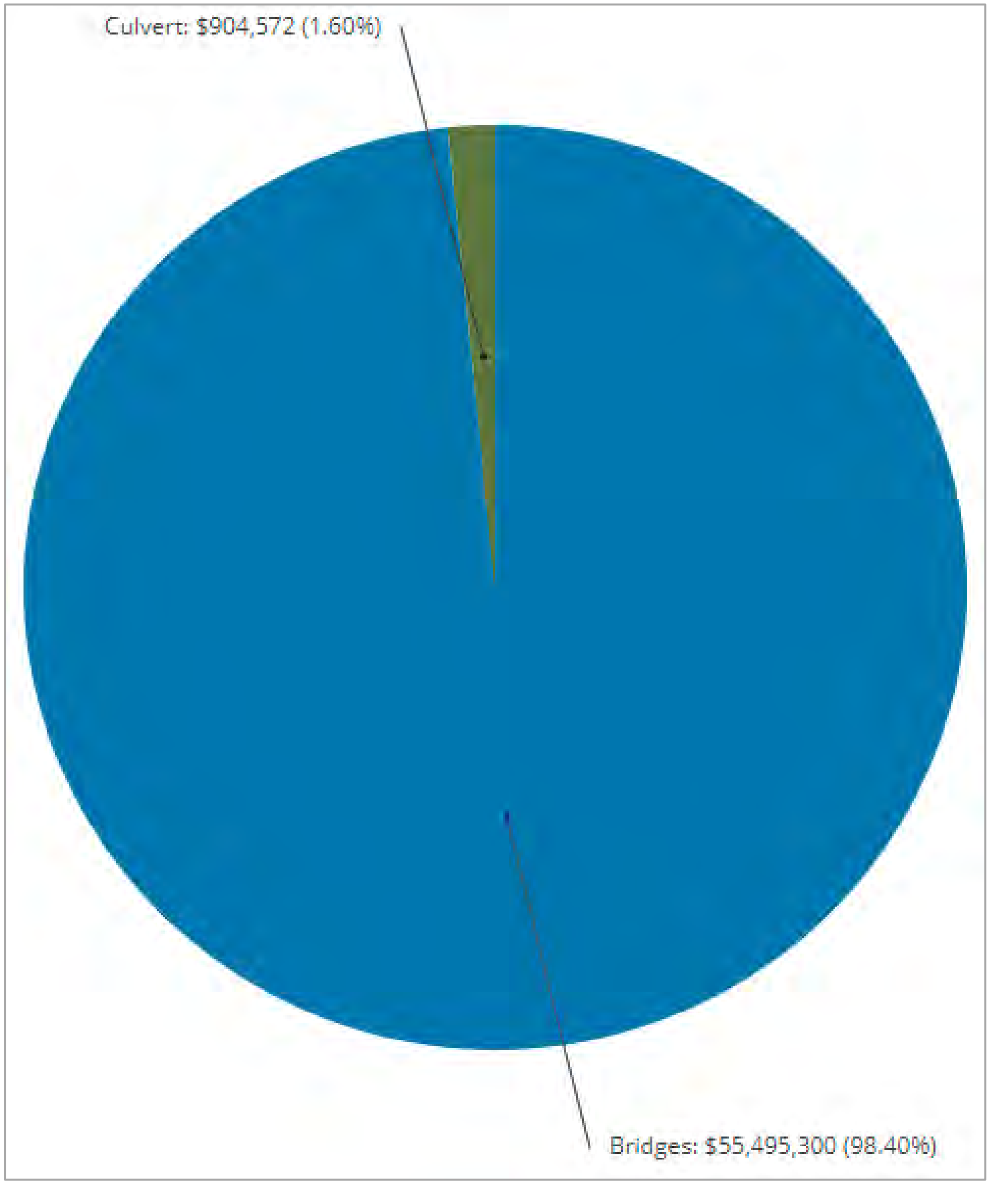
6.2.1 Asset Portfolio: Quantity, Useful Life and Replacement Cost

Table 8 illustrates key asset attributes for the Town's bridges & culverts, including quantities of various assets, their useful life, their replacement cost, and the valuation method by which the replacement costs were derived. In total, the Town's bridges & culverts assets are valued at $56 million based on 2017 replacement costs. The useful life indicated for each asset type below was assigned by the municipality.

Table 8 Asset Valuation - Bridges & Culverts

Asset Type	Asset Component	Quantity	Useful Life (Years)	2017 Unit Replacement Cost	2017 Overall Replacement Cost
Bridges & Culverts	Bridges	110 structures	50, 75	$39,300 - $3,274,000 / structure	$55,495,300
	Culverts	6 structures	50, 75	NRBCPI (Toronto)	$904,572
				Total:	**$56,399,872**

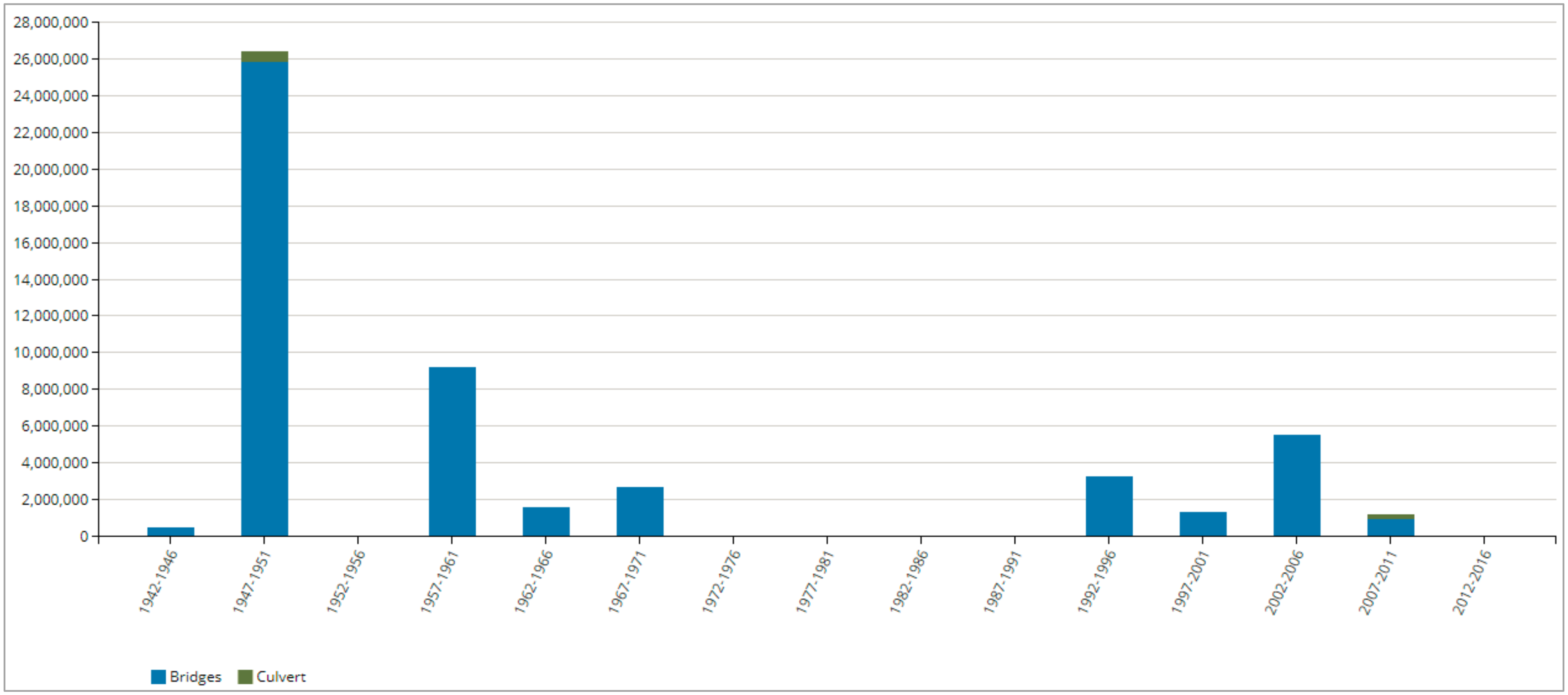
Figure 20 Asset Valuation - Bridges & Culverts



6.2.2 Historical Investment

Figure 21 shows the municipality's historical investments in its bridges & culverts since 1942. While assessed condition data will provide superior accuracy in estimating replacement needs and should be incorporated into strategic plans, in the absence of such information, understanding past expenditure patterns and current useful life consumption levels can inform the forecasting and planning of infrastructure needs and in the development of a capital program. Note that this graph only includes the active asset inventory as of December 31, 2016.

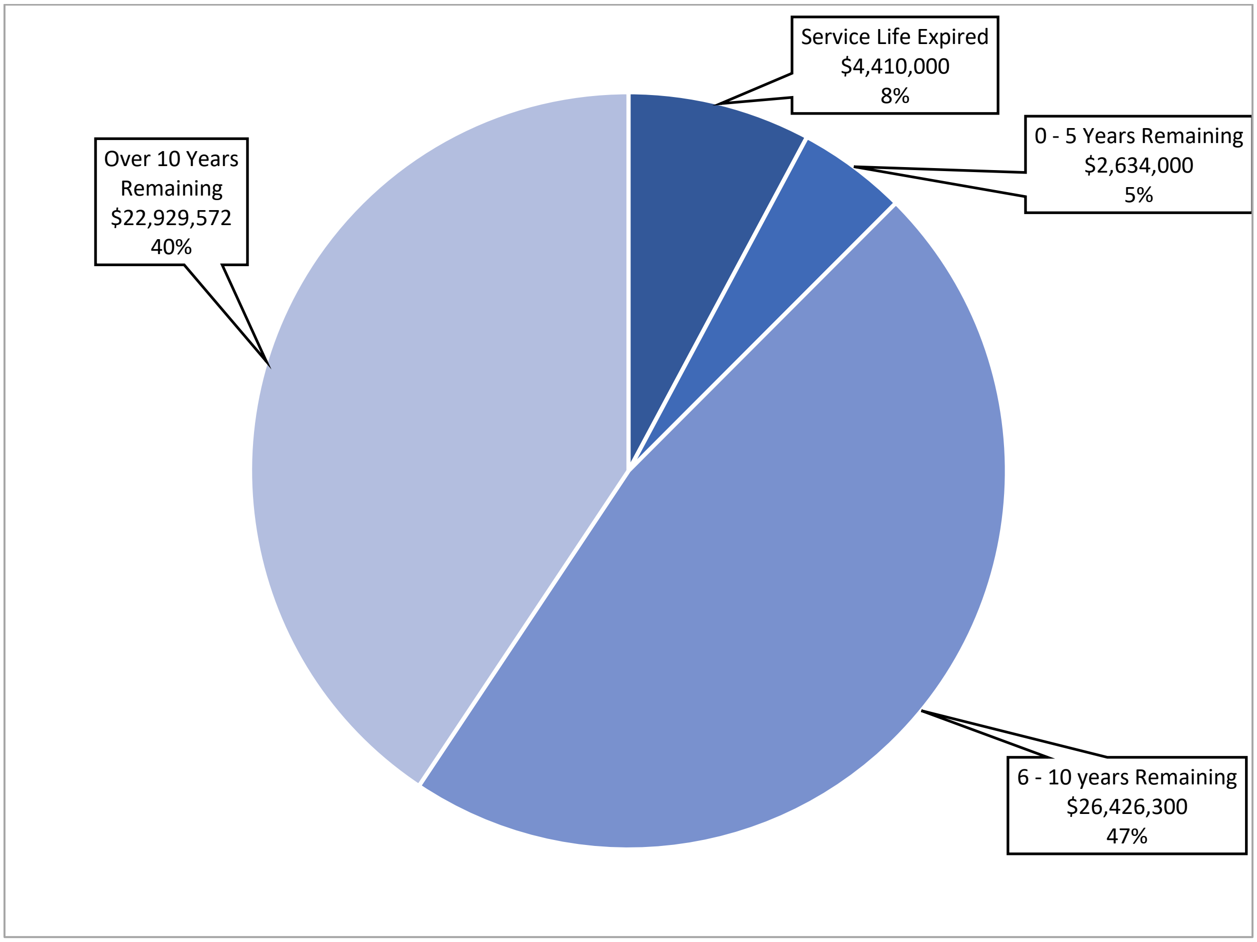
Figure 21 Historical Investment - Bridges & Culverts



6.2.3 Useful Life Consumption

In conjunction with historical spending patterns and assessed condition data, understanding the consumption rate of assets based on industry established useful life standards provides a more complete profile of the state of a community's infrastructure. **Figure 22** illustrates the useful life consumption levels as of 2016 for the Town's bridges & culverts.

Figure 22 Useful Life Consumption - Bridges & Culverts

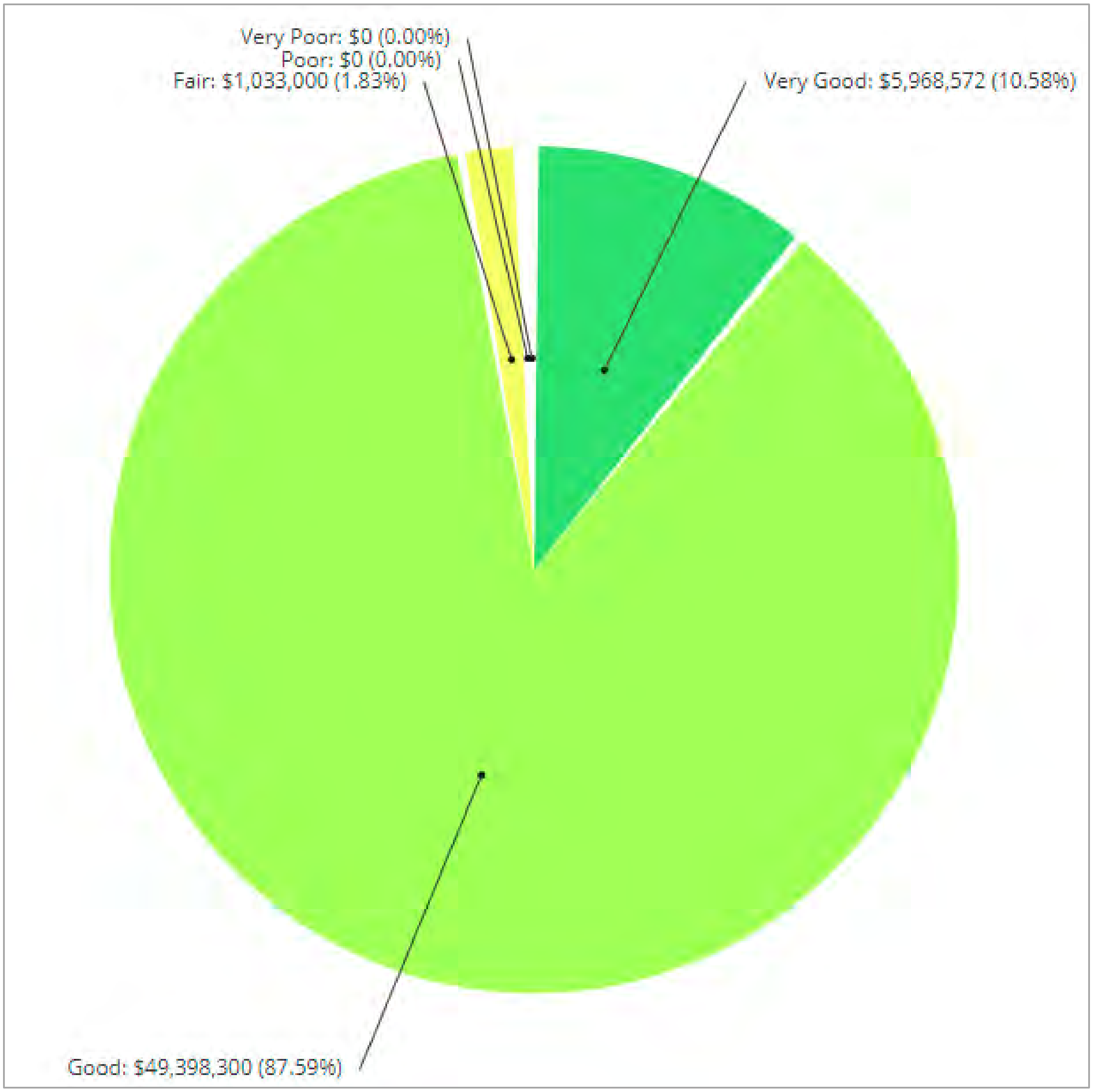


40% of assets have at least 10 years of useful life remaining while 8%, with a valuation of $4.4 million, remain in operation beyond their useful life.

6.2.4 Current Asset Condition

Using replacement cost, in this section we summarize the condition of the Town's bridges & culverts as of 2016. By default, we rely on observed field data adapted from OSIM inspections as provided by the Town. In the absence of such information, age-based data is used as a proxy. All bridge assets are based on assessed conditions and 60% of culvert assets are based on assessed condition.

Figure 23 Asset Condition - Bridges & Culverts



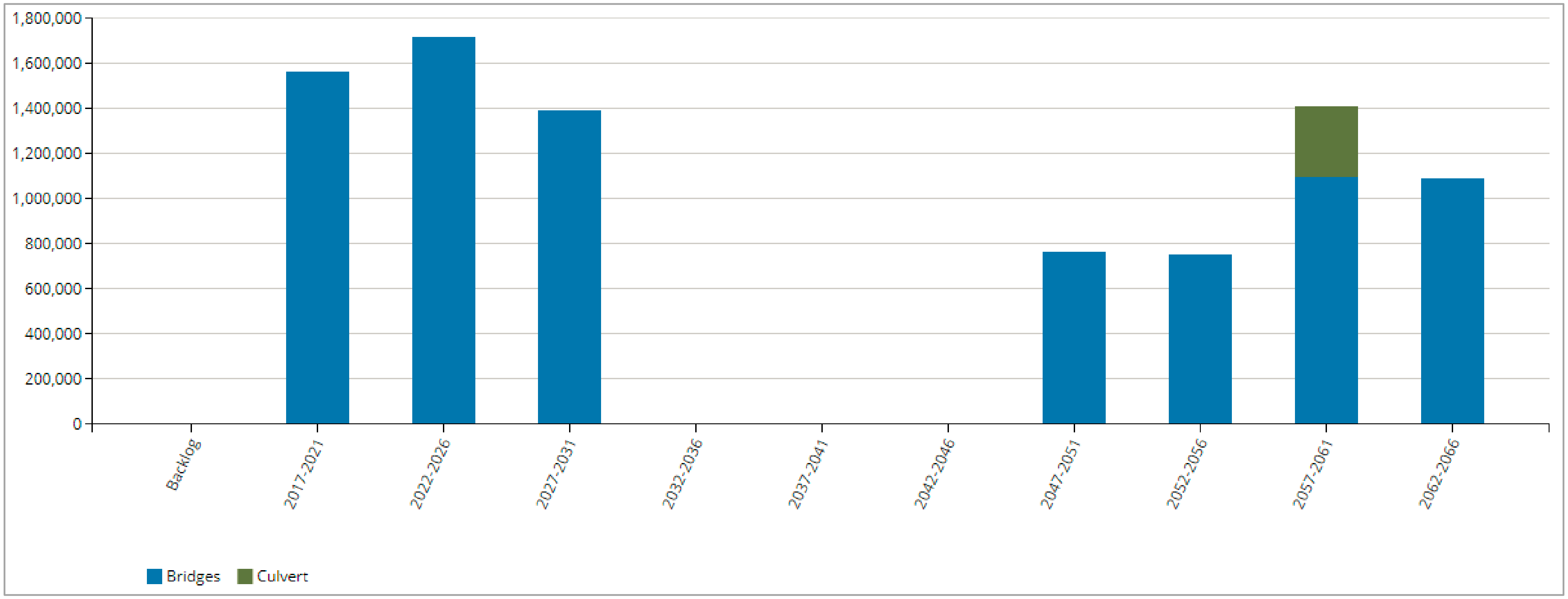
Primarily assessed data indicates that 98% of the Town's bridges & culverts are in good to very good condition.

6.2.5 Forecasting Replacement Needs

In this section, we illustrate the short-, medium-, and long-term infrastructure spending requirements for the Town's bridges and culverts based on the lifecycle activities suggested in the Town's most recent OSIM inspections. The backlog is the aggregate investment in infrastructure that was deferred over previous years or decades. In the absence of observed data, the backlog represents the value of assets that remain in operation beyond their useful life.

6.2.6 Replacement Needs (Lifecycle Activities)

Figure 24 Forecasting Replacement Needs - Bridges & Culverts



The Town's average annual requirements for its bridges & culverts – including lifecycle activities – totals $796,000. At this funding level, the Town would be allocating sufficient funds on an annual basis to meet replacement needs as they arise without the need for deferring projects and accruing annual infrastructure deficits.

6.2.7 Recommendations

- The Town should continue its condition assessments of all bridges in accordance with OSIM, and expand the program to incorporate all culverts in order to more precisely estimate its actual financial requirements and field needs. See **Section 7.4** for more information.

- The data collected through condition assessment programs should be integrated into a risk management framework which will guide prioritization of the backlog as well as short, medium, and long-term replacement needs. See **Section 7.5** for more information.

- Key performance indicators for all bridges and culverts should be established and tracked annually in accordance with the levels of service framework in **Section 8.3**.

- The municipality is underfunding its long-term requirements on an annual basis. See **Section 9.0** for a detailed financial strategy designed to achieve long-term funding requirements.

6.3 Water Network

6.3.1 Asset Portfolio: Quantity, Useful Life and Replacement Cost

Table 9 illustrates key asset attributes for the Town's water network, including quantities of various assets, their useful life, replacement costs, and the valuation method by which the replacement costs were derived. In total, the Town's water network assets are valued at $364 million based on 2017 replacement costs.

Table 9 Key Asset Attributes - Water Network

Asset Type	Asset Component	Quantity	Useful Life (Years)	2017 Unit Replacement Cost	2017 Overall Replacement Cost
Water Network	Water Generators	4 units	20, 40	CPI (ON)	$433,402
	Water Reservoir	1 unit	10	NRBCPI (Toronto)	$127,358
	Water Mains (25mm)	193.56m	40, 50, 100	$246/m	$47,616
	Water Mains (38mm)	13.32m	100	$282/m	$3,756
	Water Mains (50mm)	111,570.79m	40, 50, 75, 100	$308/m	$34,363,803
	Water Mains (75mm)	4.16m	50	$359/m	$1,493
	Water Mains (100mm)	96,403.21m	50, 75, 100	$461/m	$44,441,880
	Water Mains (150mm)	224,066.49m	50, 75, 100	$474/m	$106,207,516
	Water Mains (200mm)	85,924.37m	50, 75, 100	$454/m	$39,009,664
	Water Mains (250mm)	13,867.59m	50, 100	$563/m	$7,807,453
	Water Mains (300mm)	48,727.67m	50, 100	$744/m	$36,253,386
	Water Mains (350mm)	715.72/m	50	$1025/m	$733,613
	Water Mains (400mm)	18,196.78/m	50, 100	$1281/m	$23,310,075
	Water Mains (500mm)	962.51m	100	$1538/m	$1,480,340
	Water Mains (600mm)	3,755.25m	40, 100	$1794/m	$6,736,919
	Water Mains (1200mm)	1,080m	100	$822.19/m	$6,000,005
	Water Processing	13 units	10, 25, 40, 60	NRBCPI (Toronto)	$6,156,221
	Water Pumping Station	4 units	75	$50,000 - $115,500 / unit	$381,000
	Water Pumps	18 units	25	CPI (ON)	$783,819
	Water Towers	3 units	70	NRBCPI (Toronto)	$11,815,410
	Water Treatment Plant	4 units	75	NRBCPI (Toronto)	$37,319,398
	Water Vehicles	14 units	8, 10	CPI (ON)	$573,227
				Total:	**$363,987,354**

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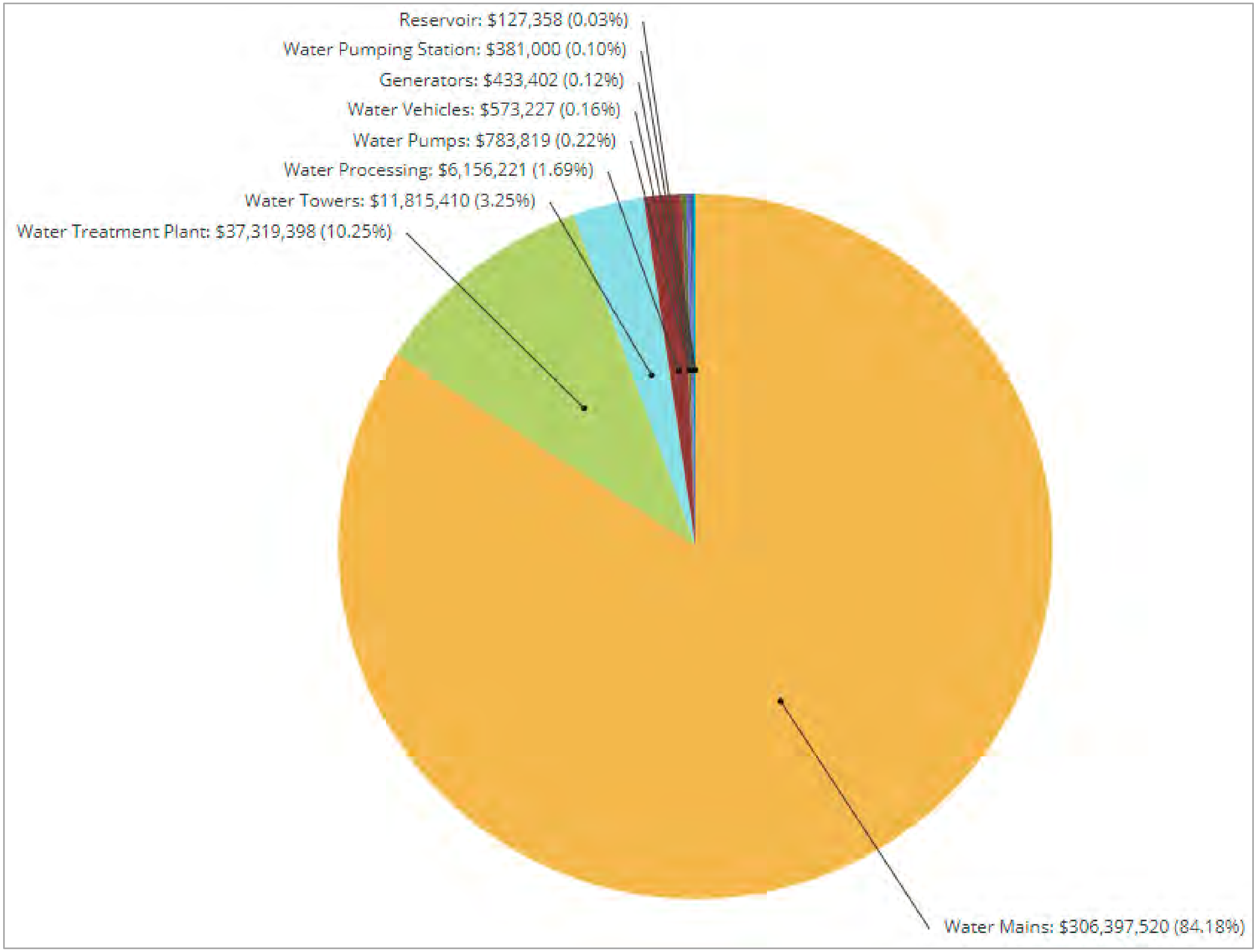
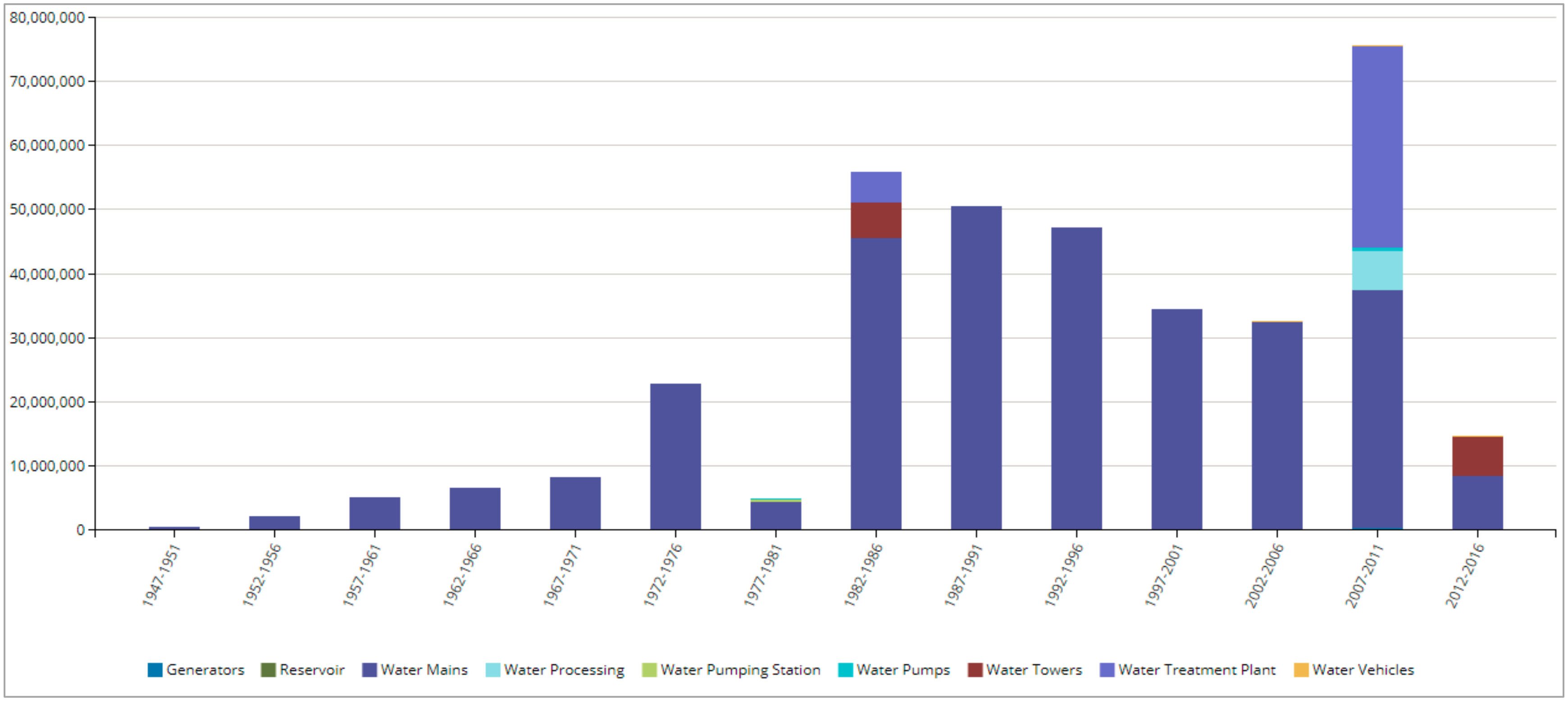
Figure 25 Asset Valuation - Water Network



6.3.2 Historical Investment

Figure 26 shows the Town's historical investments in its water network since 1947. While assessed condition data will provide superior accuracy in estimating replacement needs and should be incorporated into strategic plans, in the absence of such information, understanding past expenditure patterns and current useful life consumption levels can inform the forecasting and planning of infrastructure needs and in the development of a capital program. Note that this graph only includes the active asset inventory as of December 31, 2016.

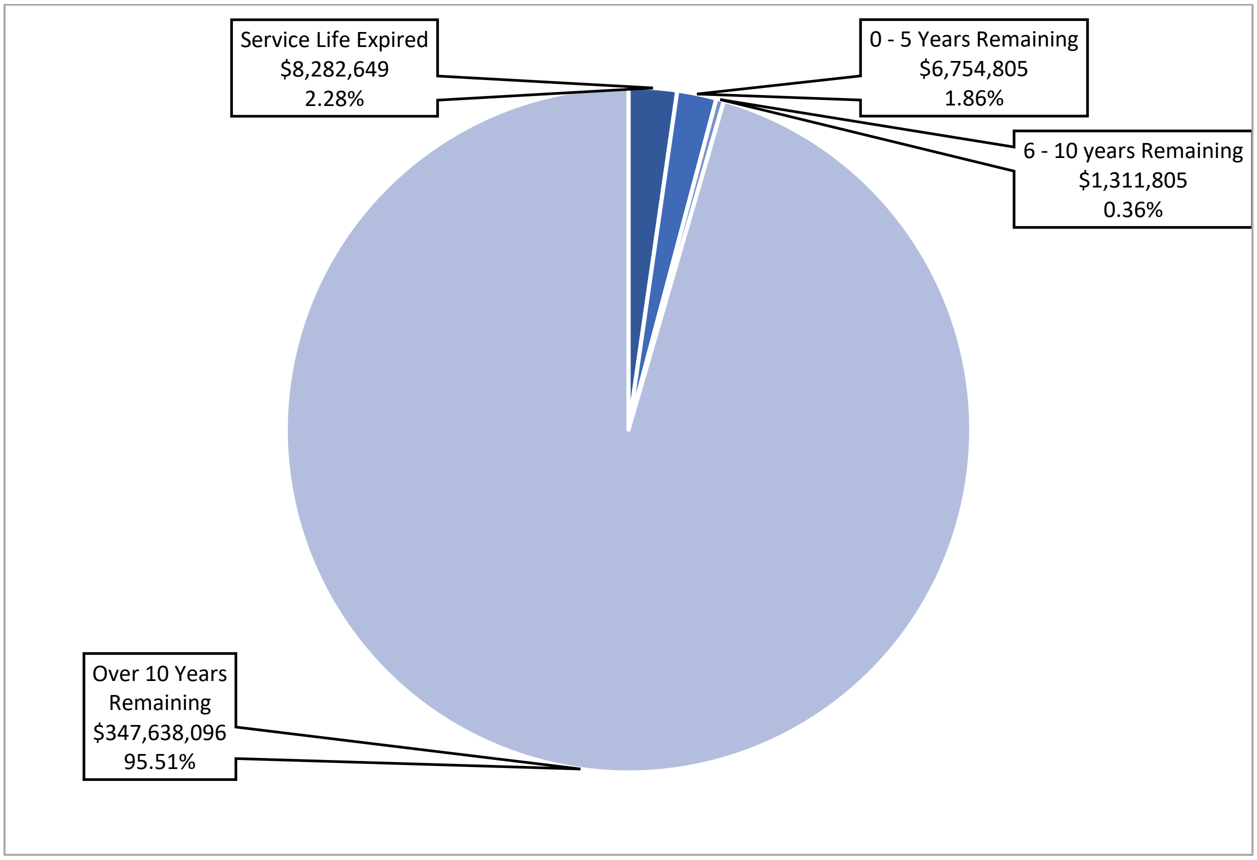
Figure 26 Historical Investment - Water Network



6.3.3 Useful Life Consumption

In conjunction with historical spending patterns and assessed condition data, understanding the consumption rate of assets based on industry established useful life standards provides a more complete profile of the state of a community's infrastructure. **Figure 27** illustrates the useful life consumption levels as of 2016 for the Town's water network.

Figure 27 Useful Life Consumption - Water Network

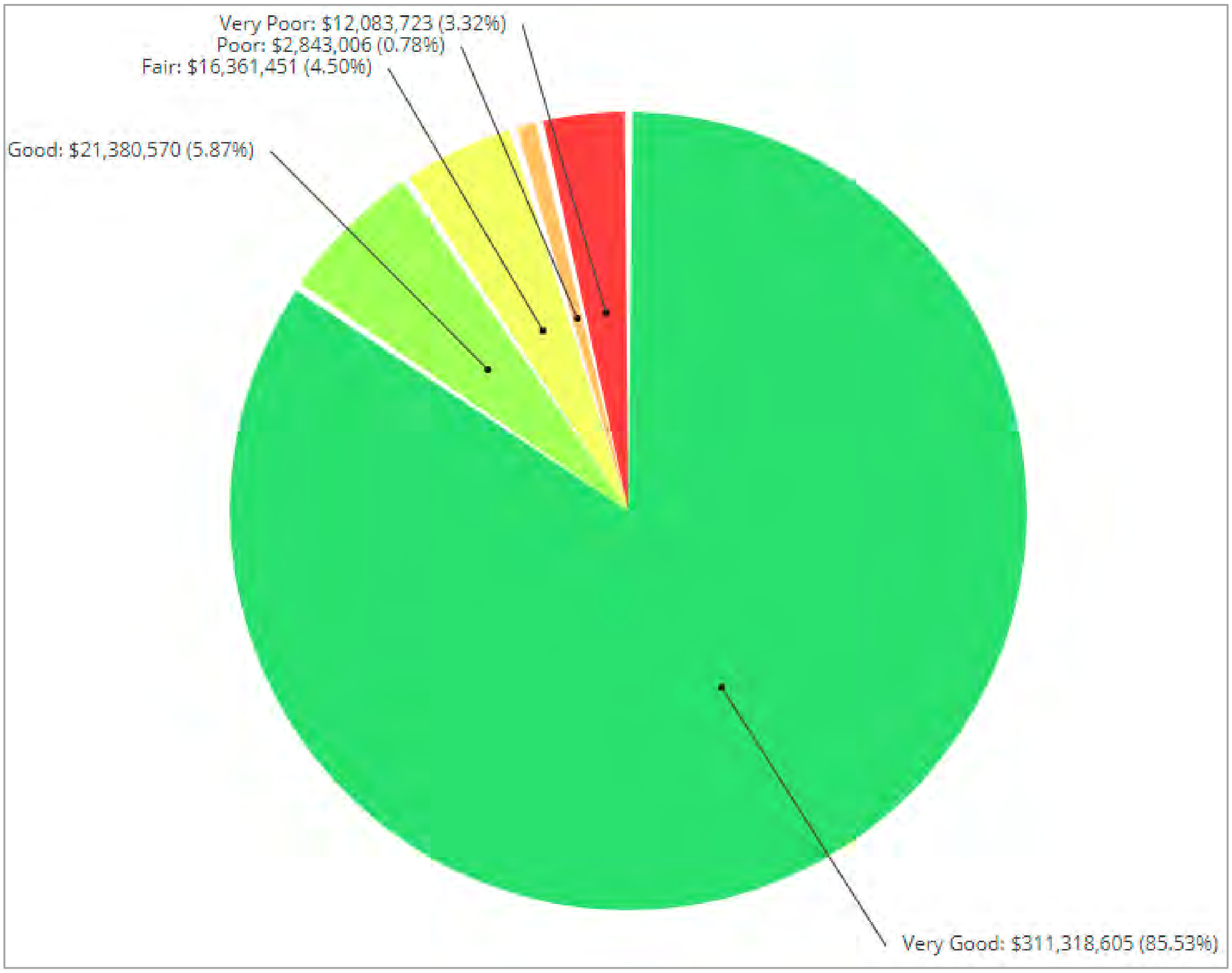


96% of all assets have at least 10 years of useful life remaining.

6.3.4 Current Asset Condition

Using replacement cost, in this section we summarize the condition of the Town's water network. By default, we rely on observed field data as provided by the Town. In the absence of such information, age-based data is used as a proxy. The Town has not provided condition data for all of its water assets.

Figure 28 Asset Condition - Water Network



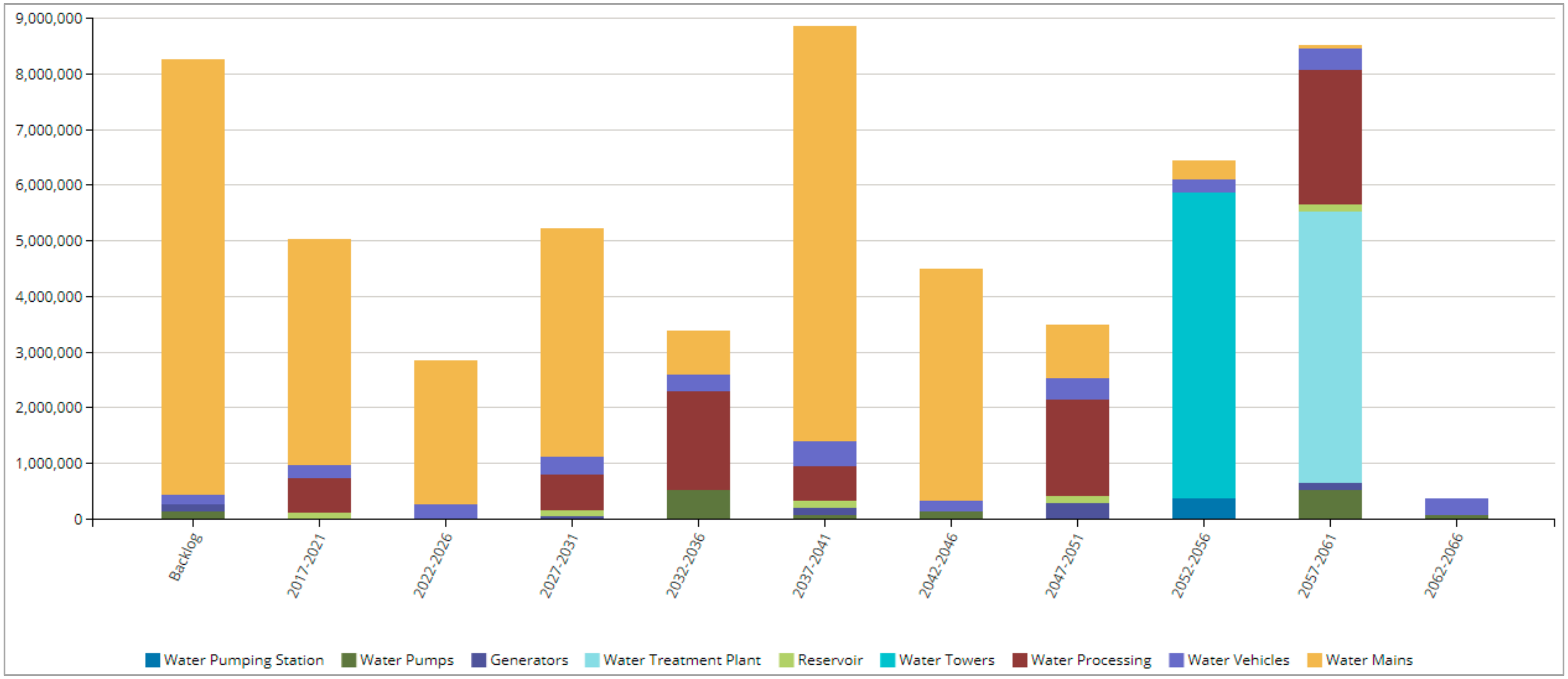
Based on age based data, 91% of assets are in good to very good condition while 4% of assets, with a valuation of $15 million, are in poor to very poor condition.

6.3.5 Forecasting Replacement Needs

In this section, we illustrate the short-, medium-, and long-term infrastructure spending requirements based on two scenarios – end-of-life replacement and with lifecycle activities – for the municipality's water network assets. The backlog is the aggregate investment in infrastructure that was deferred over previous years or decades. In the absence of observed data, the backlog represents the value of assets that remain in operation beyond their useful life.

6.3.6 Replacement Needs (End-of-Life Replacement)

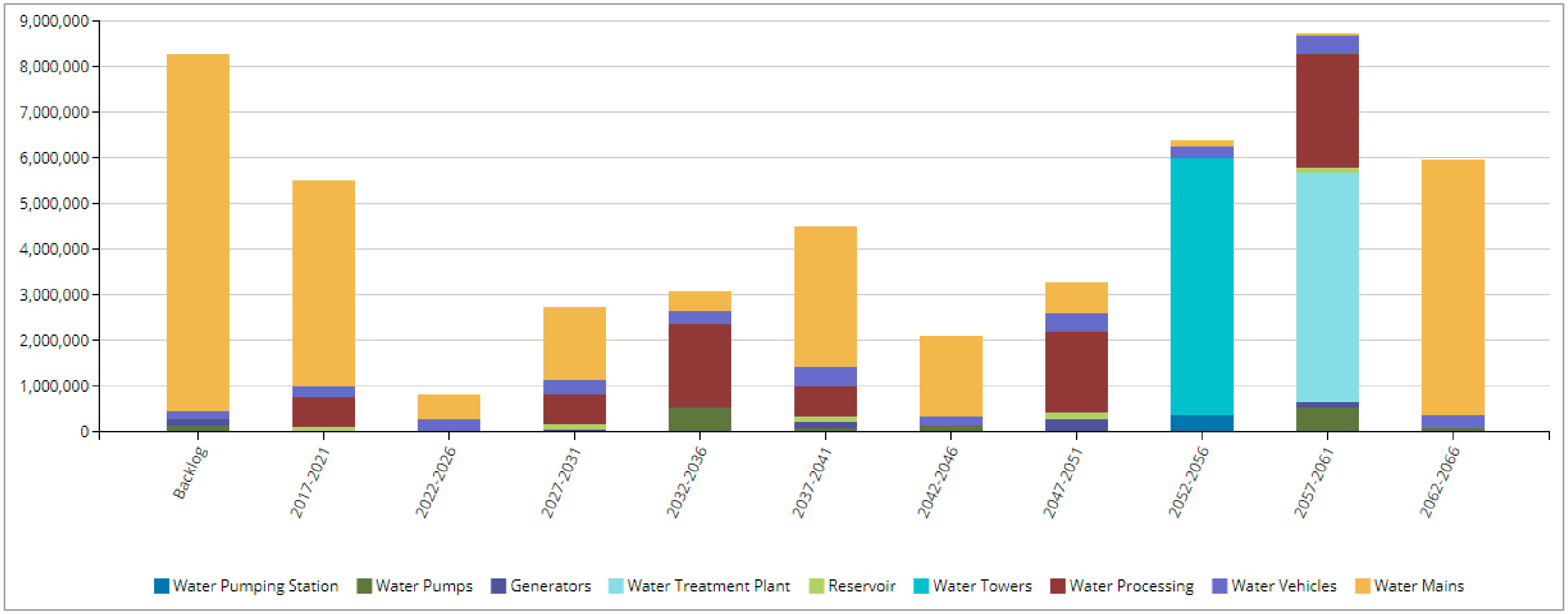
Figure 29 Forecasting Replacement Needs - Water Network (End-of-Life Replacement)



Based primarily on age-based condition data there is a backlog of $8.3 million. The Town's average annual requirements for its water network (replacement only) total $4,313,000. At this funding level, the Town would be allocating sufficient funds on an annual basis to meet replacement needs as they arise without the need for deferring projects and accruing annual infrastructure deficits.

6.3.7 Replacement Needs (Lifecycle Activities)

Figure 30 Forecasting Replacement Needs - Water Network (Lifecycle Activities)



Based on the implementation of a lifecycle activity strategy as described in **Section 7.6**, the municipality has a backlog of $8.3 million. The municipality's average annual requirements total $2,622,000. At this funding level, the municipality would be allocating sufficient funds on an annual basis to meet the replacement needs for its various asset classes as they arise without the need for deferring projects and accruing annual infrastructure deficits.

6.3.8 Recommendations

- Age-based condition data indicates a backlog of $8.2 million. The Town should consider conducting condition assessments to more precisely estimate its actual financial requirements and field needs. See **Section 7.4** for more information.

- The data collected through condition assessment programs should be integrated into a risk management framework which will guide prioritization of the backlog as well as short, medium, and long-term replacement needs. As additional attribute data is collected, the municipality should consider expanding the scope of risk parameters included in the risk management framework. See **Section 7.5** for more information.

- Key performance indicators for the Water Network should be established and tracked annually in accordance with the levels of service framework in **Section 8.3**.

- The municipality is underfunding its long-term requirements on an annual basis. See **Section 9.0** for a detailed financial strategy designed to achieve long-term funding requirements.

6.4 Wastewater Network

6.4.1 Asset Portfolio: Quantity, Useful Life and Replacement Cost

Table 10 illustrates key asset attributes for the Town's wastewater network portfolio, including quantities of various assets, their useful life, replacement costs, and the valuation method by which the replacement costs were derived. In total, the Town's sanitary assets are valued at $143 million based on 2017 replacement costs. The useful life indicated for each asset type below was assigned by the Town.

Table 10 Key Asset Attributes – Wastewater Network

Asset Type	Asset Component	Quantity	Useful Life (Years)	2017 Unit Replacement Cost	2017 Overall Replacement Cost
Wastewater Network	Sanitary Generators	5 units	20, 40	CPI (ON)	$349,451
	Sanitary Pumphouse	28 units	64, 75	NRBCPI (Toronto)	$6,287,601
	Sanitary Pumps	65 units	25	CPI (ON)	$1,140,067
	Sanitary Pumps Electrical	Pooled	30	CPI (ON)	$834,052
	Sanitary Sewer Mains (50mm)	537.10m	100	$385/m	$206,749
	Sanitary Sewer Mains (75mm)	1,458.30m	100	$449/m	$654,777
	Sanitary Sewer Mains (100mm)	3,959.86m	75, 100	$577/m	$2,284,839
	Sanitary Sewer Mains (150mm)	1,665.45m	100	$592/m	$982,274
	Sanitary Sewer Mains (200mm)	74,964.06m	75, 100	$394/m	$29,769,284
	Sanitary Sewer Mains (250mm)	38,900.11m	75, 100	$431/m	$16,765,947
	Sanitary Sewer Mains (300mm)	14,981.09m	75, 100	$471/m	$8,496,169
	Sanitary Sewer Mains (350mm)	768.08m	75	$492/m	$377,895
	Sanitary Sewer Mains (375mm)	3,584.19m	75, 100	$525/m	$1,881,700
	Sanitary Sewer Mains (400mm)	525.62m	75	$564/m	$296,450
	Sanitary Sewer Mains (450mm)	5,998.53m	75, 100	$625/m	$3,749,081
	Sanitary Sewer Mains (525mm)	705.71m	75	$718/m	$506,700
	Sanitary Sewer Mains (600mm)	3,010.34m	75	$810/m	$2,438,375
	Sanitary Sewer Mains (675mm)	2,200.37m	75	$902/m	$1,984,734
	Sanitary Sewer Mains (750mm)	4,281.75m	75	$995/m	$4,260,341
	Sanitary Sewer Mains (900mm)	5,648.82m	75	$1,179/m	$6,659,959

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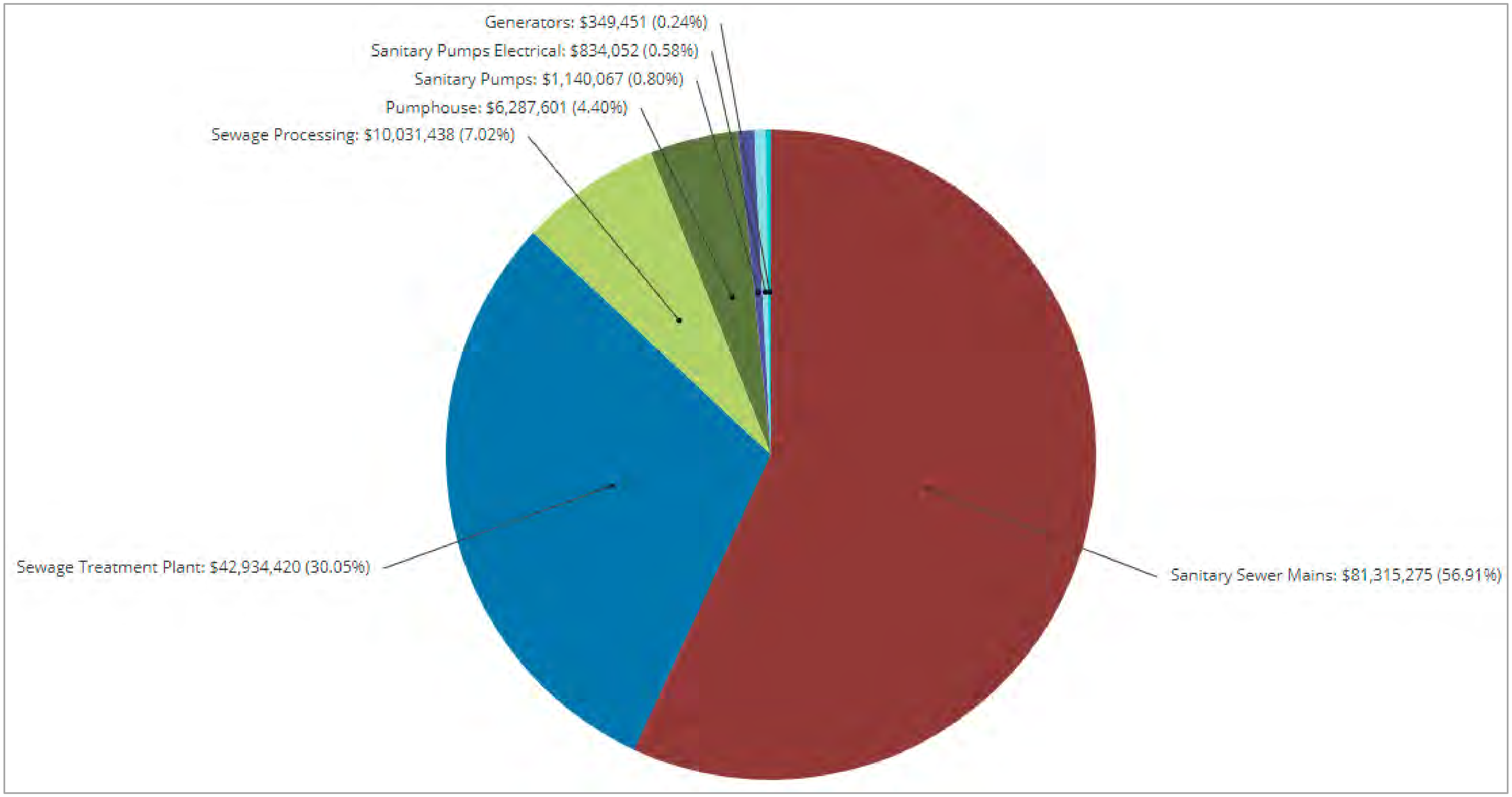
	Sewage Processing	12 units	10, 25, 40, 60	NRBCPI (Toronto)	$10,031,438
	Sewage Treatment Plant	9 units	45, 75	NRBCPI (Toronto)	$42,934,420
				Total:	**$142,892,303**

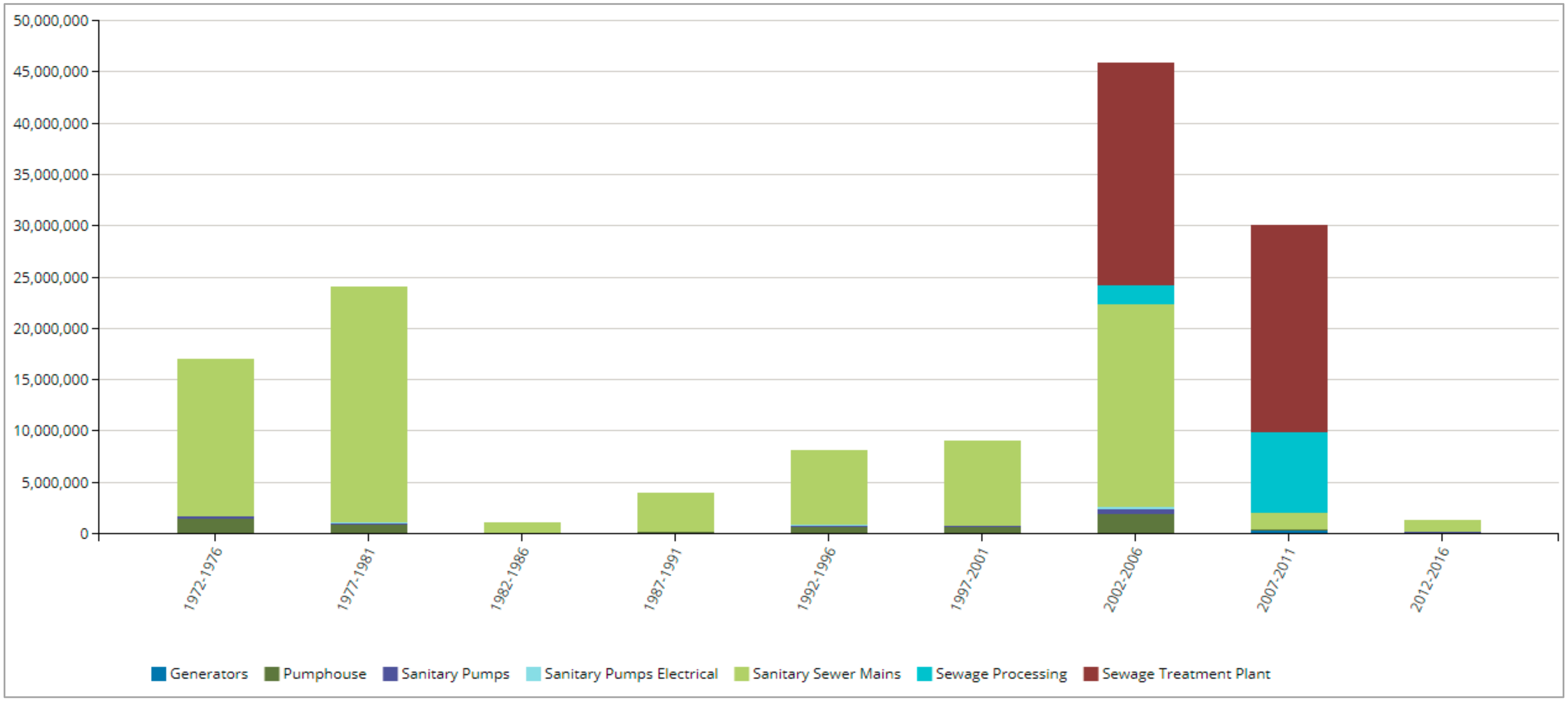
Figure 31 Asset Valuation – Wastewater Network



6.4.2 Historical Investment

Figure 32 shows the Town's historical investments in its wastewater network since 1972. While assessed condition data will provide superior accuracy in estimating replacement needs and should be incorporated into strategic plans, in the absence of such information, understanding past expenditure patterns and current useful life consumption levels can inform the forecasting and planning of infrastructure needs and in the development of a capital program. Note that this graph only includes the active asset inventory as of December 31, 2016.

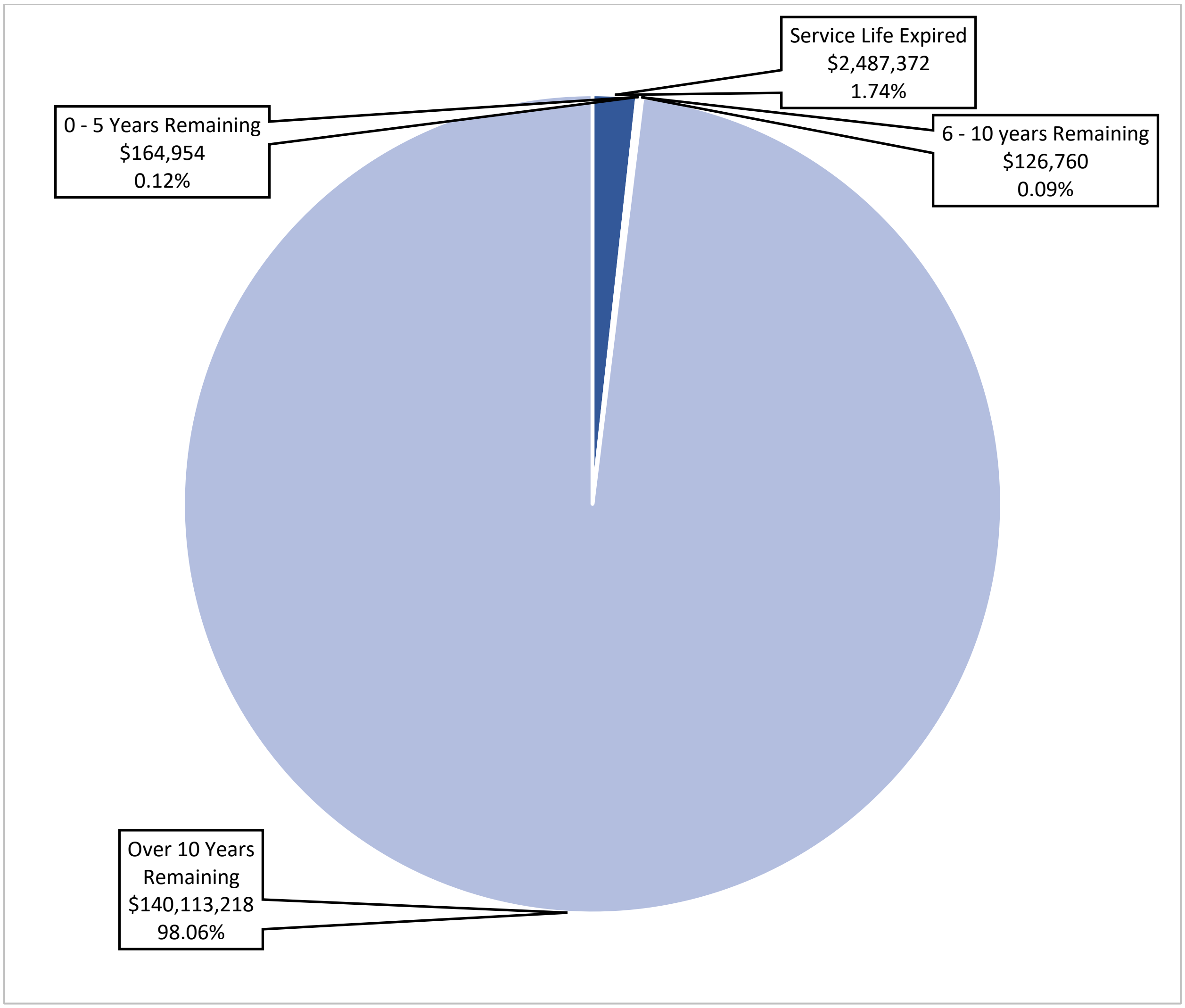
Figure 32 Historical Investment – Wastewater Network



6.4.3 Useful Life Consumption

In conjunction with historical spending patterns and assessed condition data, understanding the consumption rate of assets based on industry established useful life standards provides a more complete profile of the state of a community's infrastructure. **Figure 33** illustrates the useful life consumption levels as of 2016 for the Town's wastewater assets.

Figure 33 Useful Life Consumption – Wastewater Network

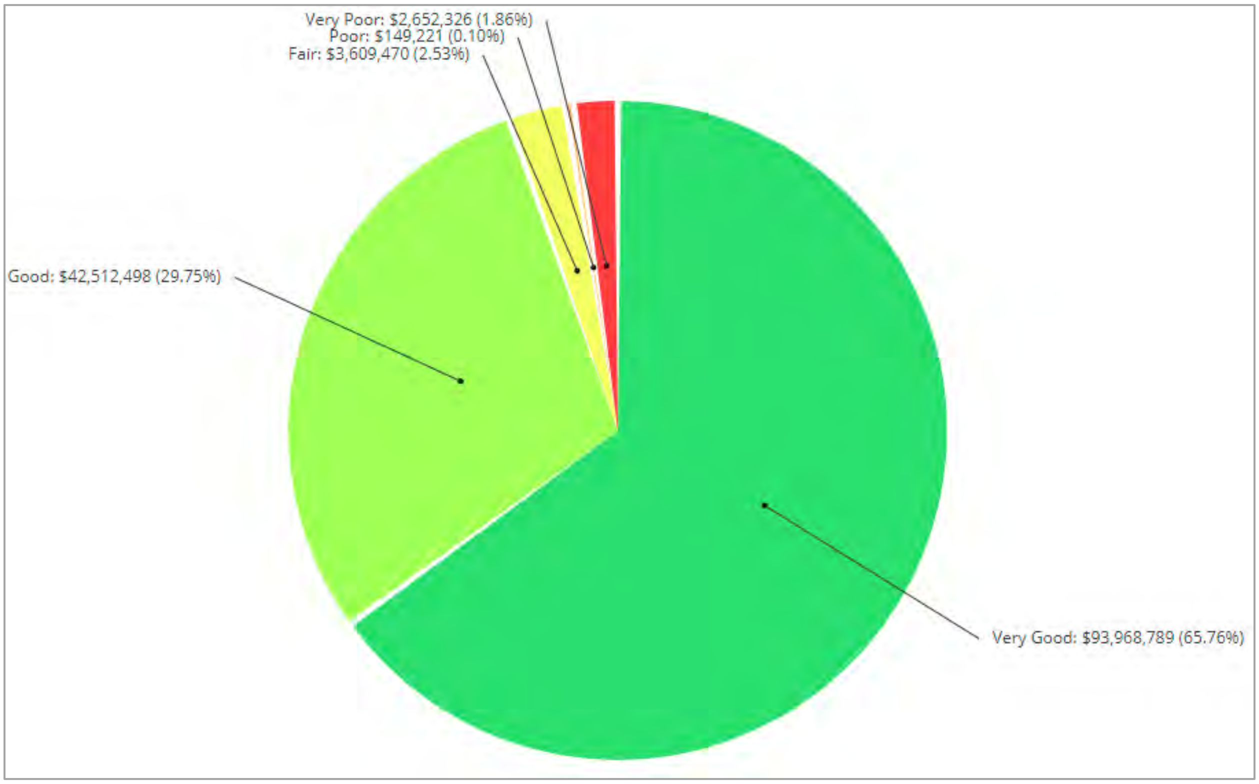


98% of assets have over 10 years of useful life remaining.

6.4.4 Current Asset Condition

Using replacement cost, in this section we summarize the condition of the Town's wastewater assets as of 2016. By default, we rely on observed field data as provided by the municipality. In the absence of such information, age-based data is used as a proxy. The Town has not provided condition data for its wastewater assets.

Figure 34 Asset Condition – Wastewater Network



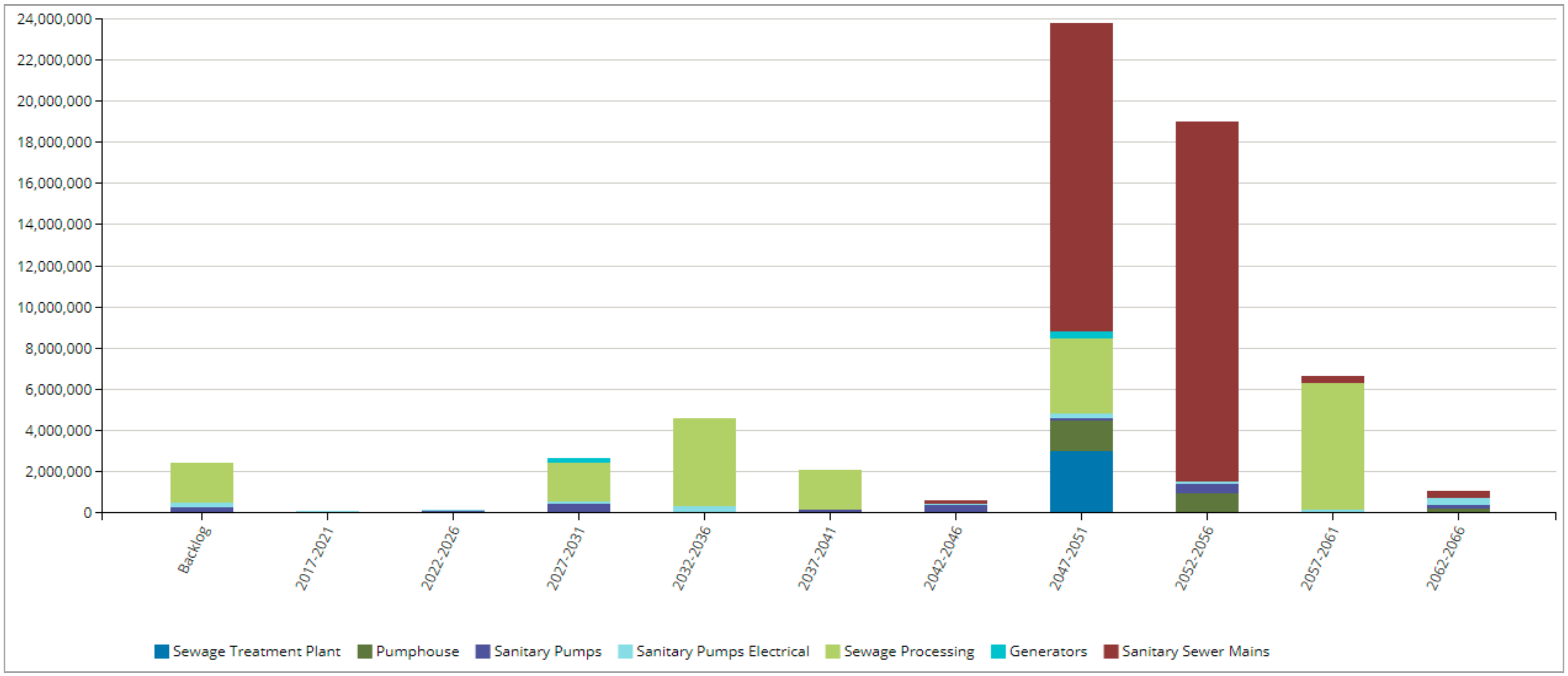
Age based data indicates that 96% of wastewater assets are in good to very good condition, while 2% of assets, with a valuation of $2.8 million, are in poor to very poor condition.

6.4.5 Forecasting Replacement Needs

In this section, we illustrate the short-, medium-, and long-term infrastructure spending requirements based on two scenarios – end-of-life replacement and with lifecycle activities – for the Town's wastewater assets. The backlog is the aggregate investment in infrastructure that was deferred over previous years or decades. In the absence of observed data, the backlog represents the value of assets that remain in operation beyond their useful life.

6.4.6 Replacement Needs (End-of-Life Replacement)

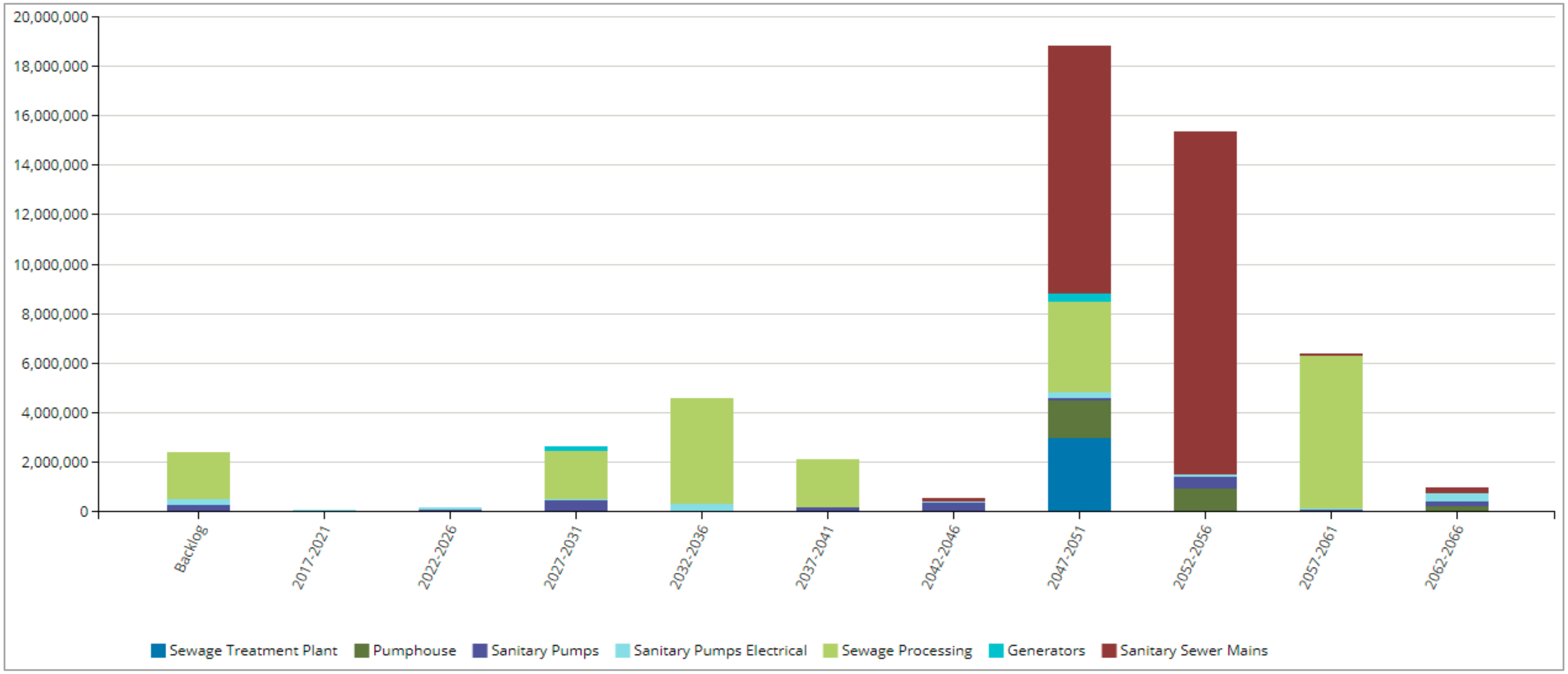
Figure 35 Forecasting Replacement Needs – Wastewater Network (End-of-Life Replacement)



Based primarily on age-based condition data there is a backlog of $2.5 million. The Town's average annual requirements for its wastewater network (replacement only) total $2,137,000. At this funding level, the Town would be allocating sufficient funds on an annual basis to meet replacement needs as they arise without the need for deferring projects and accruing annual infrastructure deficits.

6.4.7 Replacement Needs (Lifecycle Activities)

Figure 36 Forecasting Replacement Needs – Wastewater Network (Lifecycle Activities)



Based on the implementation of a lifecycle activity strategy as described in **Section 7.6.**, the municipality has a backlog of $2.5 million. The municipality's average annual requirements total $1,845,000. At this funding level, the municipality would be allocating sufficient funds on an annual basis to meet the replacement needs for its various asset classes as they arise without the need for deferring projects and accruing annual infrastructure deficits.

6.4.8 Recommendations

- Age-based condition data indicates a backlog of $2.4 million. The Town should consider conducting condition assessments on all assets to more precisely estimate its actual financial requirements and field needs. See **Section 7.4** for more information.

- The data collected through condition assessment programs should be integrated into a risk management framework which will guide prioritization of the backlog as well as short, medium, and long-term replacement needs. As additional attribute data is collected, the municipality should consider expanding the scope of risk parameters included in the risk management framework. See **Section 7.5** for more information.

- Key performance indicators for the Stormwater Network should be established and tracked annually in accordance with the levels of service framework in **Section 8.3**.

- The municipality is underfunding its long-term requirements on an annual basis. See **Section 9.0** for a detailed financial strategy designed to achieve long-term funding requirements.

6.5 Stormwater Network

6.5.1 Asset Portfolio: Quantity, Useful Life and Replacement Cost

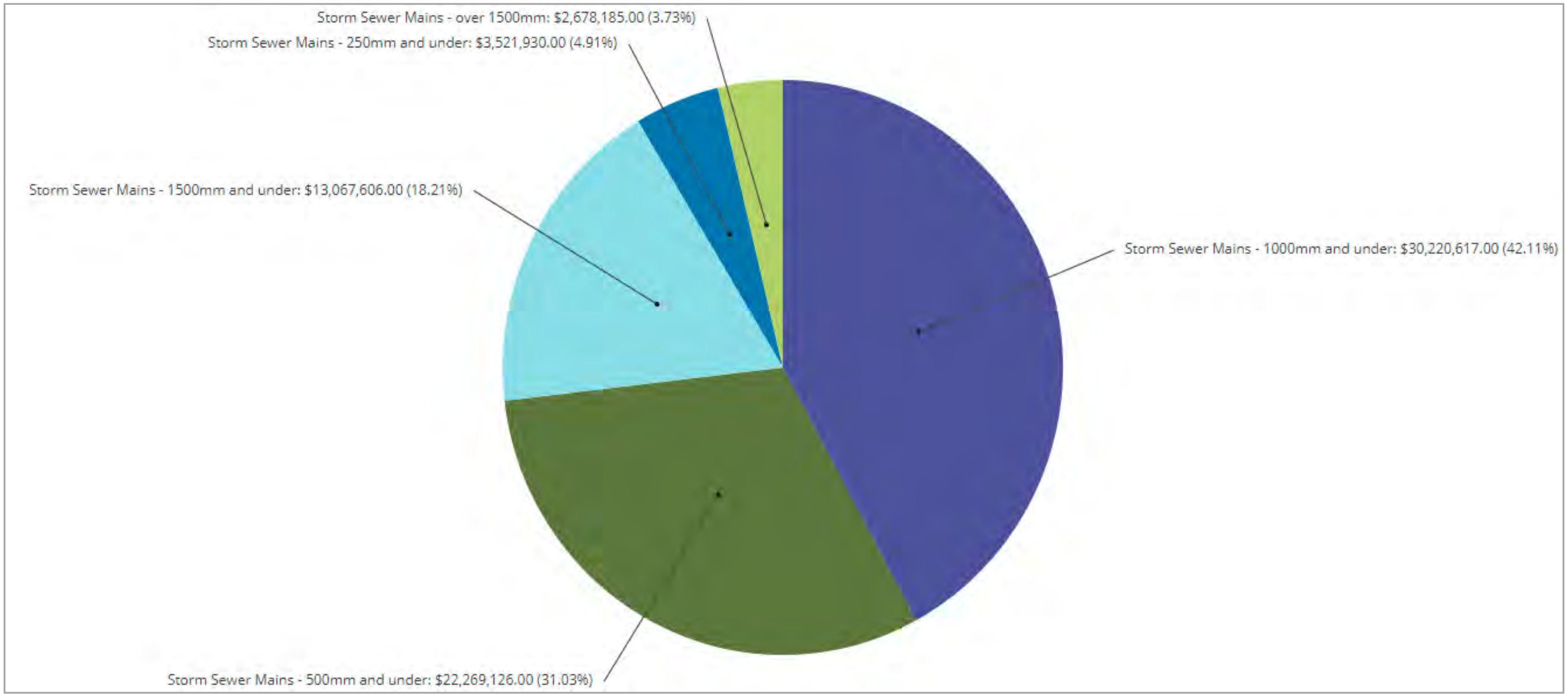
Table 11 illustrates key asset attributes for the Town's stormwater network, including quantities of various assets, their useful life, their replacement cost, and the valuation method by which the replacement costs were derived. In total, the Town's stormwater assets are valued at $71.7 million based on 2017 replacement costs. The useful life indicated for each asset type below was assigned by the municipality.

Table 11 Key Asset Attributes - Stormwater Network

Asset Type	Asset Component	Quantity	Useful Life (Years)	2017 Unit Replacement Cost	2016 Overall Replacement Cost
Stormwater Network	Storm Sewer Mains (100mm)	471.80m	75, 100	$230/m	$108,514
	Storm Sewer Mains (150mm)	3,627.98m	75, 91, 100	$256/m	$928,763
	Storm Sewer Mains (200mm)	4,895.74m	25, 72, 75, 93, 99, 100	$282/m	$1,380,599
	Storm Sewer Mains (250mm)	3,527.33m	25, 72, 73, 75, 93, 100	$313/m	$1,104,054
	Storm Sewer Mains (300mm)	19,173.38m	50, 75, 91, 93, 98, 99, 100	$370/m	$7,094,151
	Storm Sewer Mains (350mm)	415.25m	75	$436/m	$181,049
	Storm Sewer Mains (375mm)	13,923.84m	35, 65, 73, 75, 91, 100	$474/m	$6,599,900
	Storm Sewer Mains (400mm)	303.66	50, 100	$513/m	$155,778
	Storm Sewer Mains (450mm)	13,940.45m	25, 35, 50, 69, 72, 75, 91, 93, 98, 100	$587/m	$8,183,044
	Storm Sewer Mains (500mm)	85.72m	50	$644/m	$55,204
	Storm Sewer Mains (525mm)	5,123.06m	35, 72, 75, 91, 98, 100	$670/m	$3,432,450
	Storm Sewer Mains (530mm)	34.51m	75	$677/m	$23,363
	Storm Sewer Mains (575mm)	95.74m	75	$725/m	$69,412

	Storm Sewer Mains (600mm)	8,587.67m	25, 35, 69, 75, 93, 100	$757/m	$6,500,866
	Storm Sewer Mains (675mm)	4,855.63m	64, 72, 75, 100	$848/m	$4,117,574
	Storm Sewer Mains (685mm)	94.44m	75	$875/m	$82,635
	Storm Sewer Mains (750mm)	8,594.97m	75, 91, 93, 100	$938/m	$8,062,082
	Storm Sewer Mains (825mm)	1,517.51m	75	$1017/m	$1,543,308
	Storm Sewer Mains (900mm)	5,764.79m	75, 100	$1096/m	$6,318,210
	Storm Sewer Mains (975mm)	59.03m	75	$1198/m	$70,718
	Storm Sewer Mains (1050mm)	2,972.78m	75, 93, 100	$1302/m	$3,870,559
	Storm Sewer Mains (1200mm)	2,960m	75, 93, 100	$1538/m	$4,552,480
	Storm Sewer Mains (1350mm)	1,298.06m	75, 93	$2000/m	$2,596,120
	Storm Sewer Mains (1500mm)	799.55m	75	$2562/m	$2,048,447
	Storm Sewer Mains (1730mm)	137.18m	75	$2950/m	$404,681
	Storm Sewer Mains (1880mm)	710.47m	25	$3200/m	$2,273,504
				Total:	**$71,757,464**

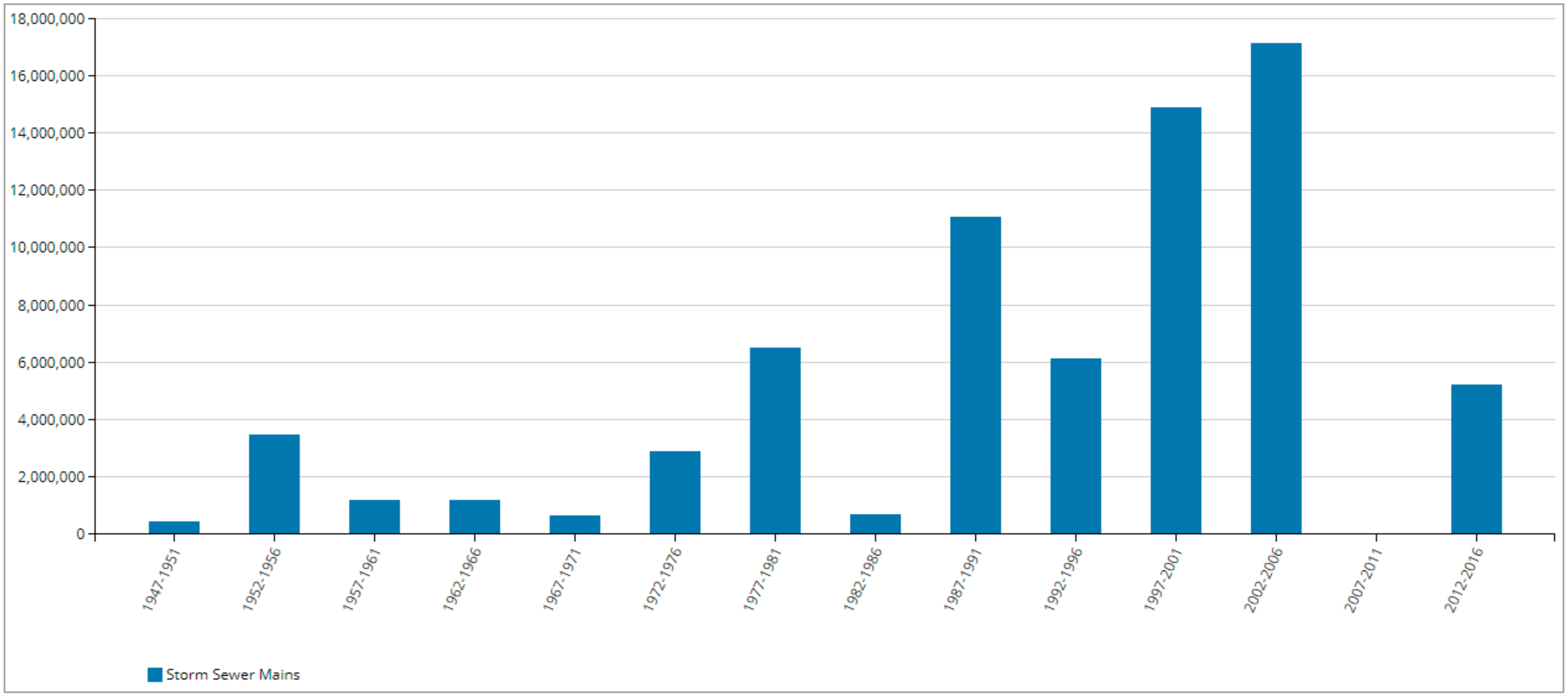
Figure 37 Asset Valuation - Stormwater Network



6.5.2 Historical Investment

Figure 38 shows the Town's historical investments in its stormwater network since 1947. While assessed condition data will provide superior accuracy in estimating replacement needs and should be incorporated into strategic plans, in the absence of such information, understanding past expenditure patterns and current useful life consumption levels can inform the forecasting and planning of infrastructure needs and in the development of a capital program. Note that this graph only includes the active asset inventory as of December 31, 2016.

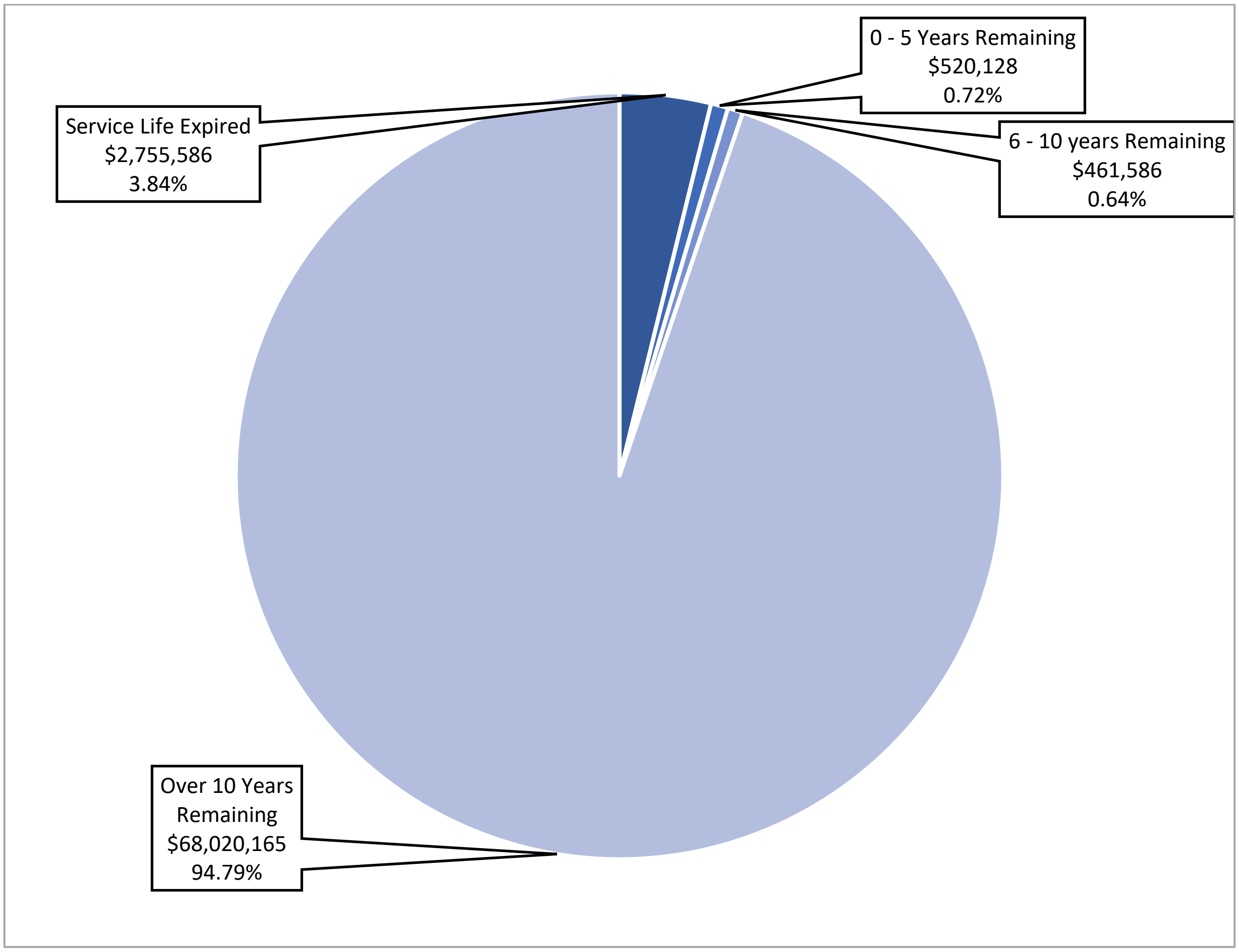
Figure 38 Historical Investment - Stormwater Network



6.5.3 Useful Life Consumption

In conjunction with historical spending patterns and assessed condition data, understanding the consumption rate of assets based on industry established useful life standards provides a more complete profile of the state of a community's infrastructure. **Figure 39** illustrates the useful life consumption levels as of 2016 for the Town's storm assets.

Figure 39 Useful Life Consumption - Stormwater Network

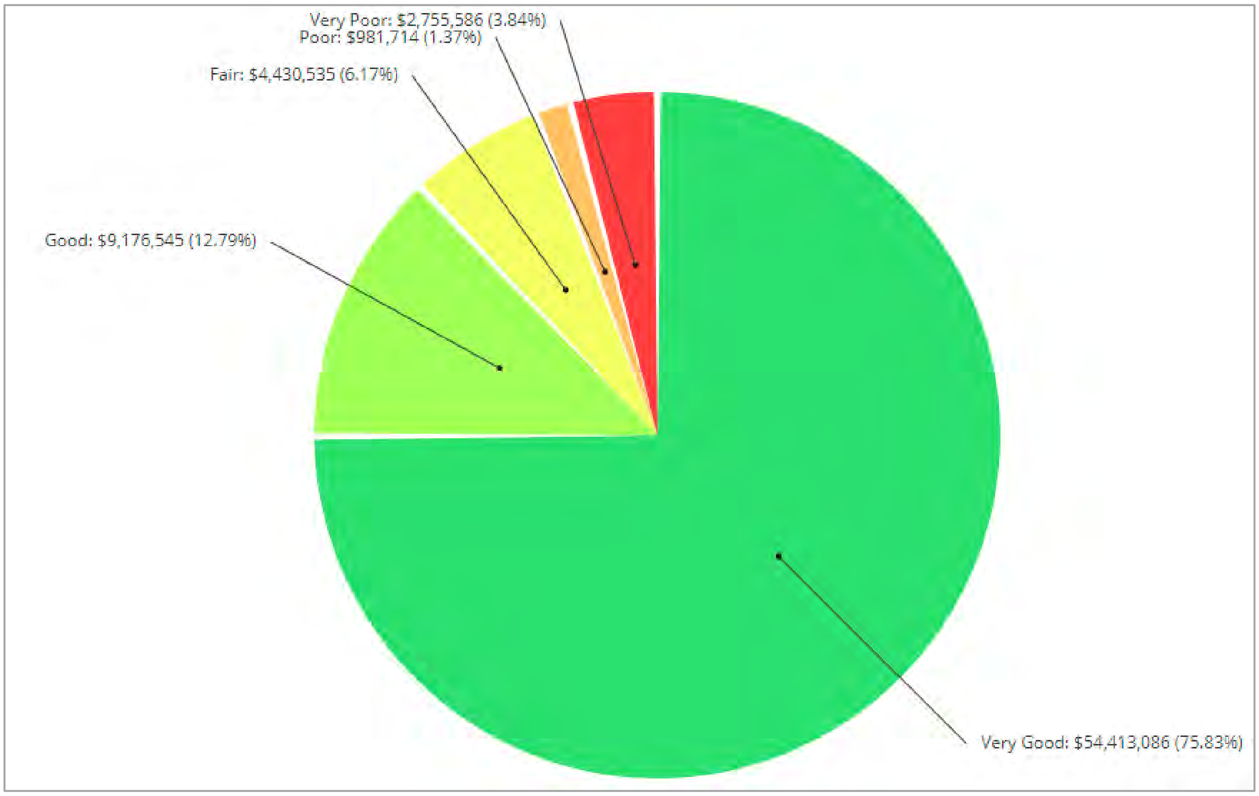


95% of the assets have at least 10 years of useful life remaining while 4% of assets are still in operation past estimated service life.

6.5.4 Current Asset Condition

Using replacement cost, in this section we summarize the condition of the Town's stormwater network. By default, we rely on observed field data as provided by the Town. In the absence of such information, age-based data is used as a proxy. The Town has not provided condition data for its storm network assets.

Figure 40 Asset Condition - Stormwater Network



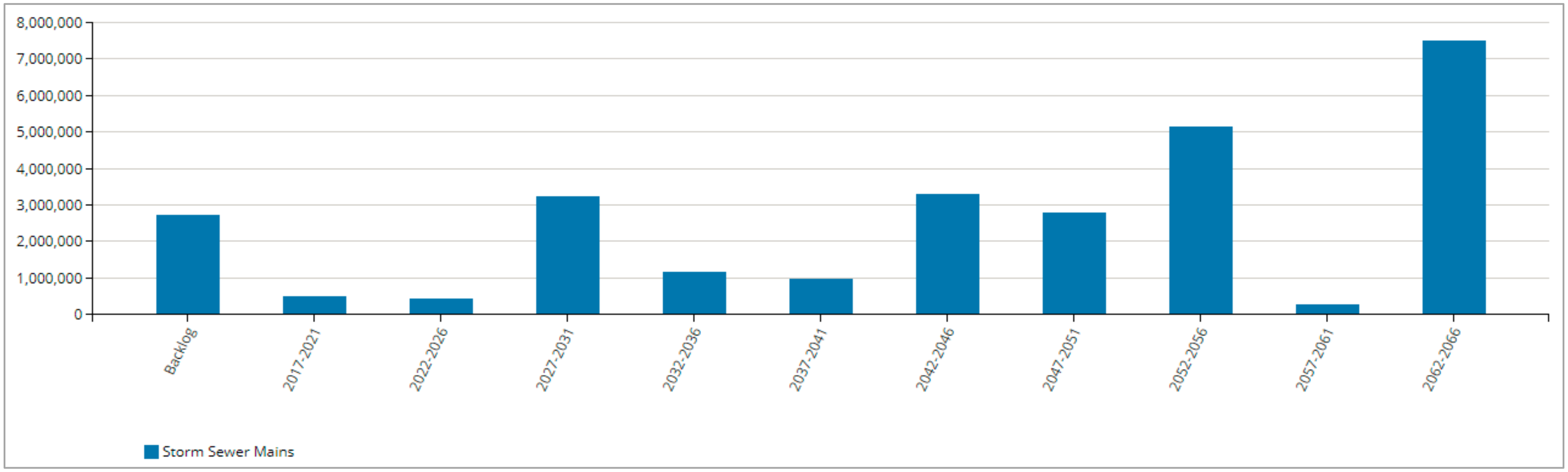
Age based data indicates that 89% of stormwater assets are in good to very good condition, while 5%, with a valuation of $3.7 million, are in poor to very poor condition

6.5.5 Forecasting Replacement Needs

In this section, we illustrate the short-, medium-, and long-term infrastructure spending requirements based on two scenarios – end-of-life replacement and with lifecycle activities – for the Town's stormwater assets. The backlog is the aggregate investment in infrastructure that was deferred over previous years or decades. In the absence of observed data, the backlog represents the value of assets that remain in operation beyond their useful life.

6.5.6 Replacement Needs (End-of-Life Replacement)

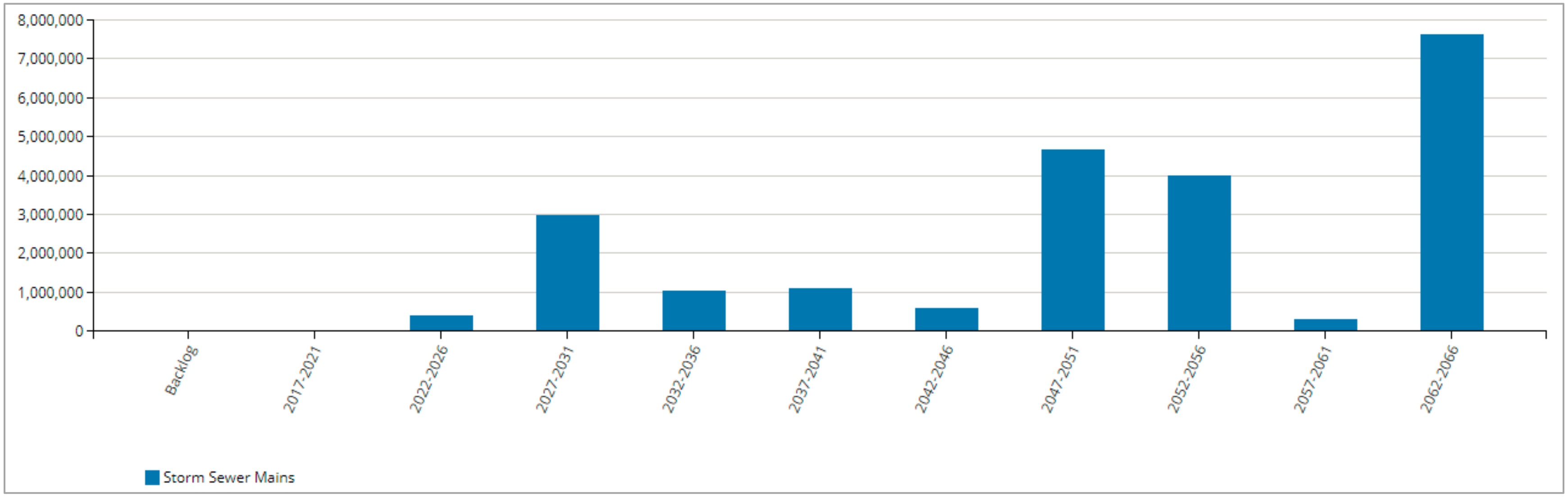
Figure 41 Forecasting Replacement Needs – Stormwater Network (End-of-Life Replacement)



Based primarily on age-based condition data the there is a backlog of $2.7 million. The Town's average annual requirements for its stormwater network (replacement only) total $996,000. At this funding level, the Town would be allocating sufficient funds on an annual basis to meet replacement needs as they arise without the need for deferring projects and accruing annual infrastructure deficits.

6.5.7 Replacement Needs (Lifecycle Activities)

Figure 42 Forecasting Replacement Needs - Stormwater System (Lifecycle Activities)



Based on the implementation of a lifecycle activity strategy as described in **Section 7.6.**, the municipality's average annual requirements total $916,000. At this funding level, the municipality would be allocating sufficient funds on an annual basis to meet the replacement needs for its various asset classes as they arise without the need for deferring projects and accruing annual infrastructure deficits.

6.5.8 Recommendations

- The Town should consider conducting condition assessments on all stormwater assets to more precisely estimate its actual financial requirements and field needs. See **Section 7.4** for more information.
- The data collected through condition assessment programs should be integrated into a risk management framework which will guide prioritization of the backlog as well as short, medium, and long-term replacement needs. As additional attribute data is collected, the municipality should consider expanding the scope of risk parameters included in the risk management framework. See **Section 7.5** for more information.
- Key performance indicators for the Stormwater Network should be established and tracked annually in accordance with the levels of service framework in **Section 8.3**.
- The municipality is underfunding its long-term requirements on an annual basis. See **Section 9.0** for a detailed financial strategy designed to achieve long-term funding requirements.

6.6 Buildings & Facilities

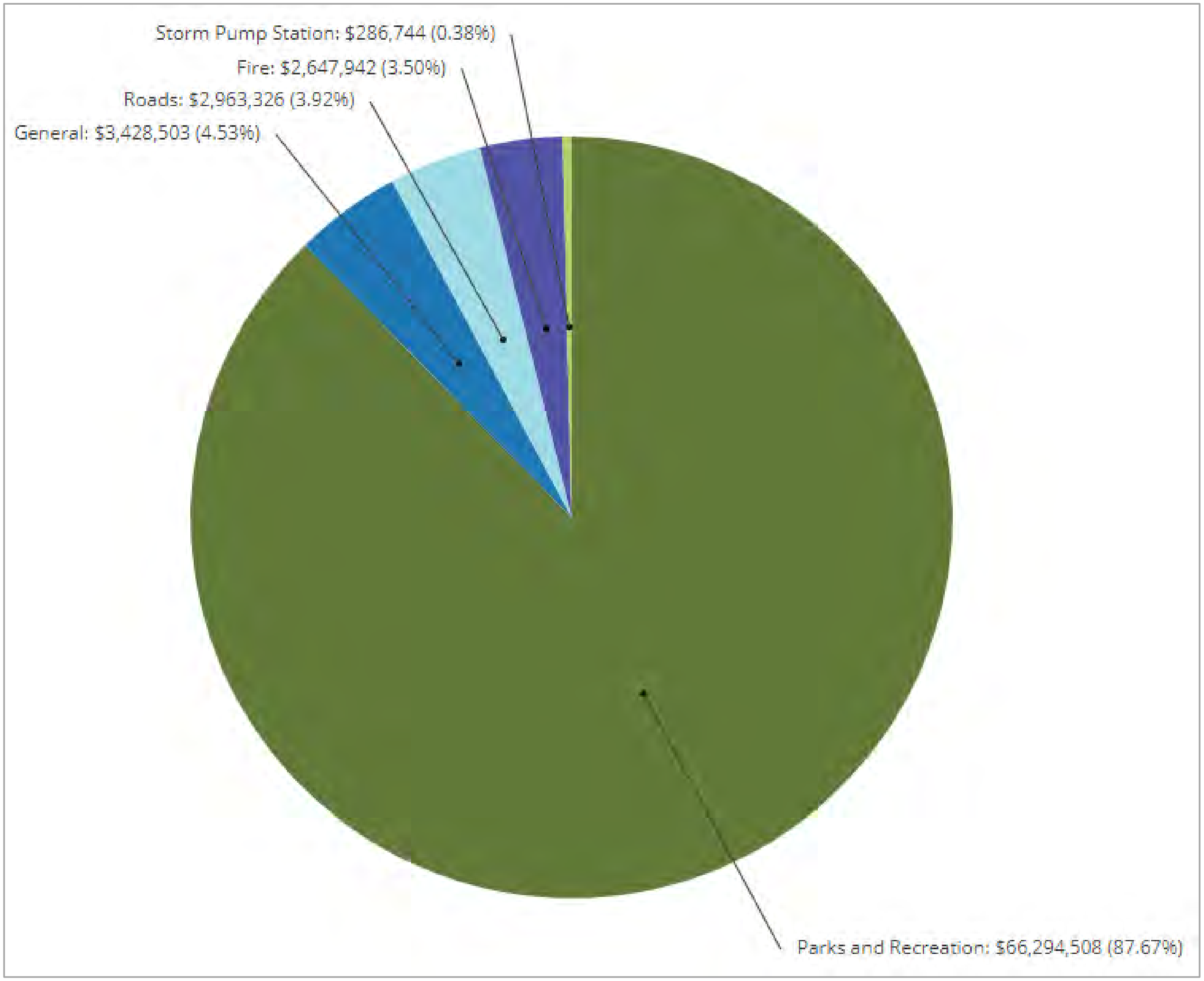
6.6.1 Asset Portfolio: Quantity, Useful Life and Replacement Cost

Table 12 illustrates key asset attributes for the Town's buildings and facilities asset portfolio, including quantities of various assets, their useful life, replacement costs, and the valuation method by which the replacement costs were derived. In total, the Town's buildings and facilities are valued at $75.6 million based on 2017 replacement costs. The useful life indicated for each asset type below was assigned by the Town.

Table 12 Key Asset Attributes – Buildings & Facilities

Asset Type	Asset Component	Quantity	Useful Life (Years)	2017 Unit Replacement Cost	2017 Overall Replacement Cost
Buildings & Facilities	Fire	6 buildings	30, 40, 50	NRBCPI (Toronto)	$2,647,942
	General	5 buildings	50	NRBCPI (Toronto)	$3,428,503
	Parks and Recreation	36 buildings	10, 40, 50	NRBCPI (Toronto)	$66,294,508
	Roads	6 buildings	50	NRBCPI (Toronto)	$2,963,326
	Storm Pump Station	1 buildings	75	NRBCPI (Toronto)	$286,744
				Total:	$75,621,023

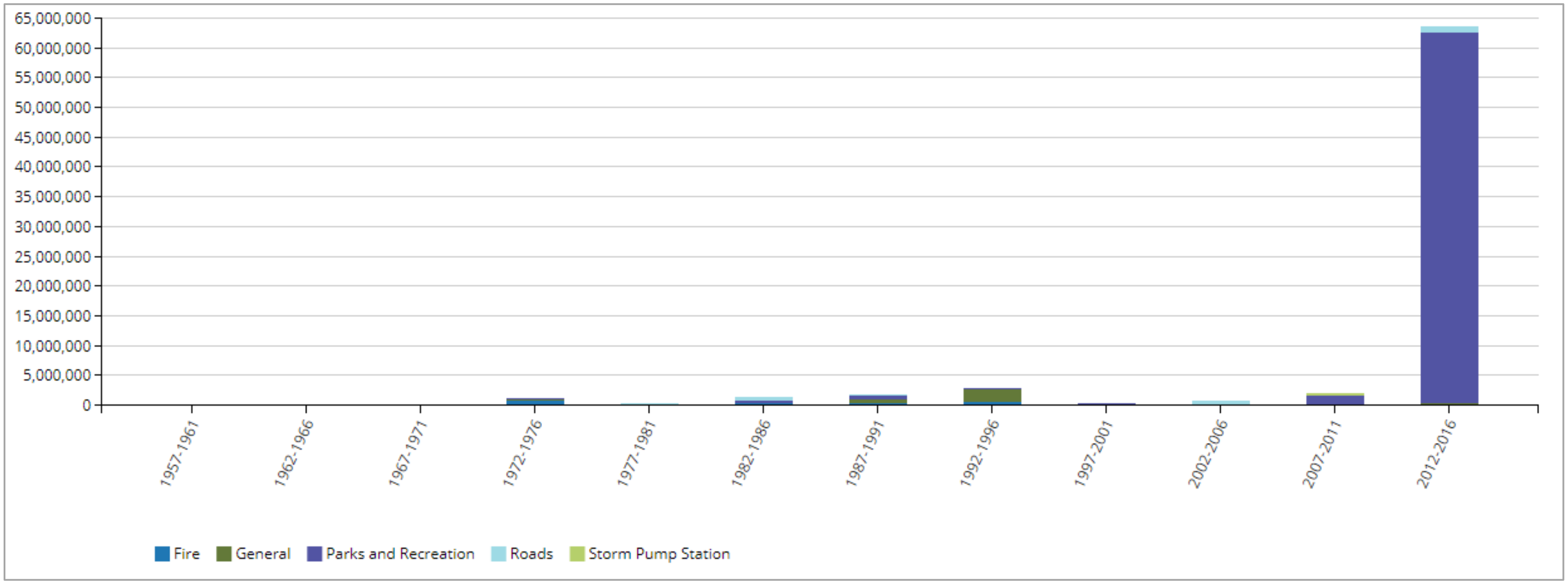
Figure 43 Asset Valuation – Buildings & Facilities



6.6.2 Historical Investment

Figure 44 shows the Town's historical investments in its buildings and facilities since 1957. While assessed condition data will provide superior accuracy in estimating replacement needs and should be incorporated into strategic plans, in the absence of such information, understanding past expenditure patterns and current useful life consumption levels can inform the forecasting and planning of infrastructure needs and in the development of a capital program. Note that this graph only includes the active asset inventory as of December 31, 2016.

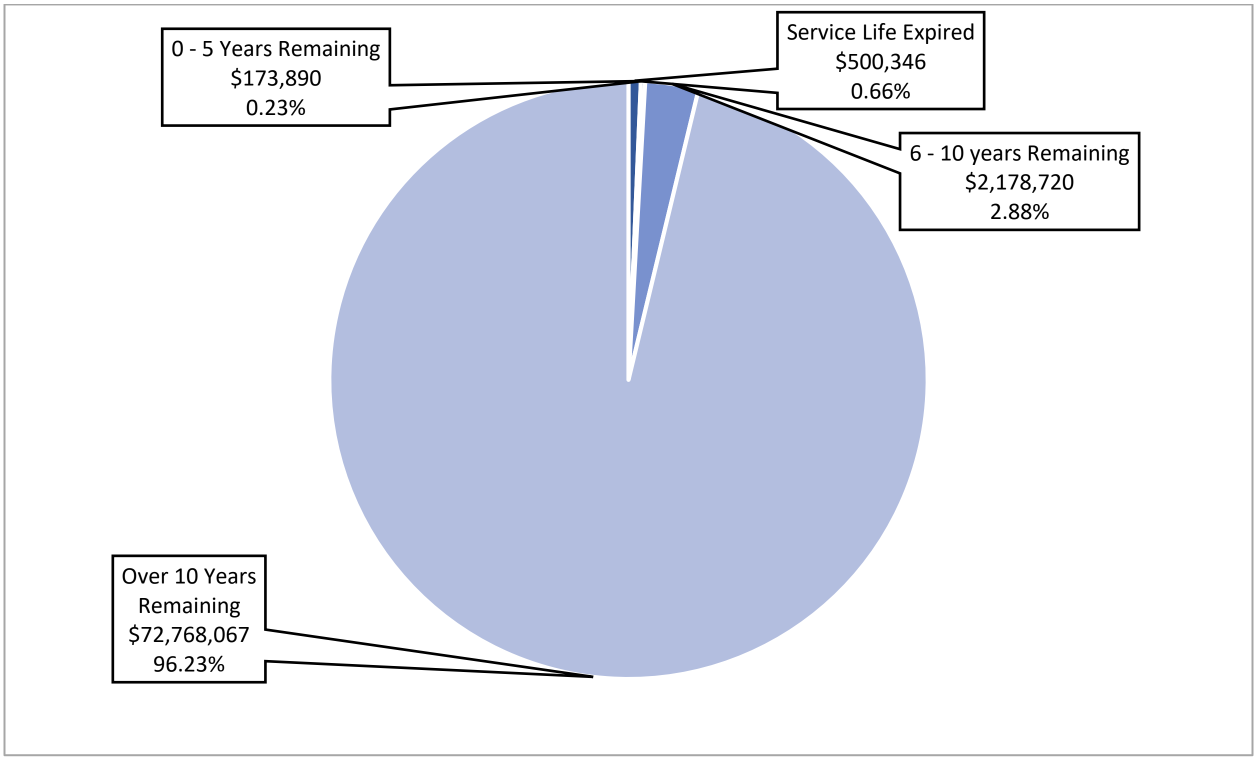
Figure 44 Historical Investment – Buildings & Facilities



6.6.3 Useful Life Consumption

In conjunction with historical spending patterns and assessed condition data, understanding the consumption rate of assets based on industry established useful life standards provides a more complete profile of the state of a community's infrastructure. **Figure 45** illustrates the useful life consumption levels as of 2016 for the Town's buildings and facilities.

Figure 45 Useful Life Consumption – Buildings & Facilities

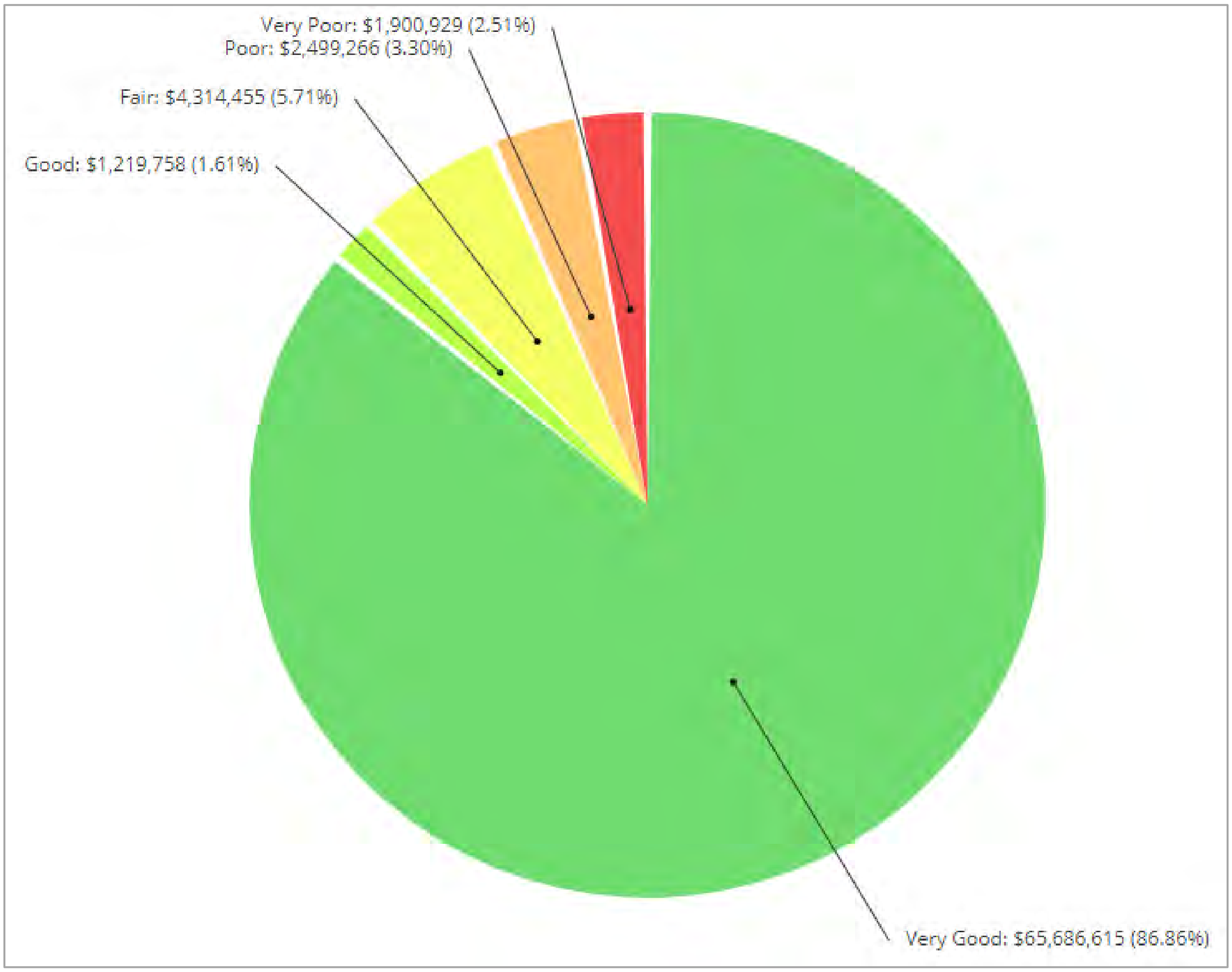


96% of assets have over 10 years of useful life remaining.

6.6.4 Current Asset Condition

Using replacement cost, in this section we summarize the condition of the Town's buildings and facilities as of 2016. By default, we rely on observed field data as provided by the municipality. In the absence of such information, age-based data is used as a proxy. The Town has not provided condition data for its buildings and facilities.

Figure 46 Asset Condition – Buildings & Facilities



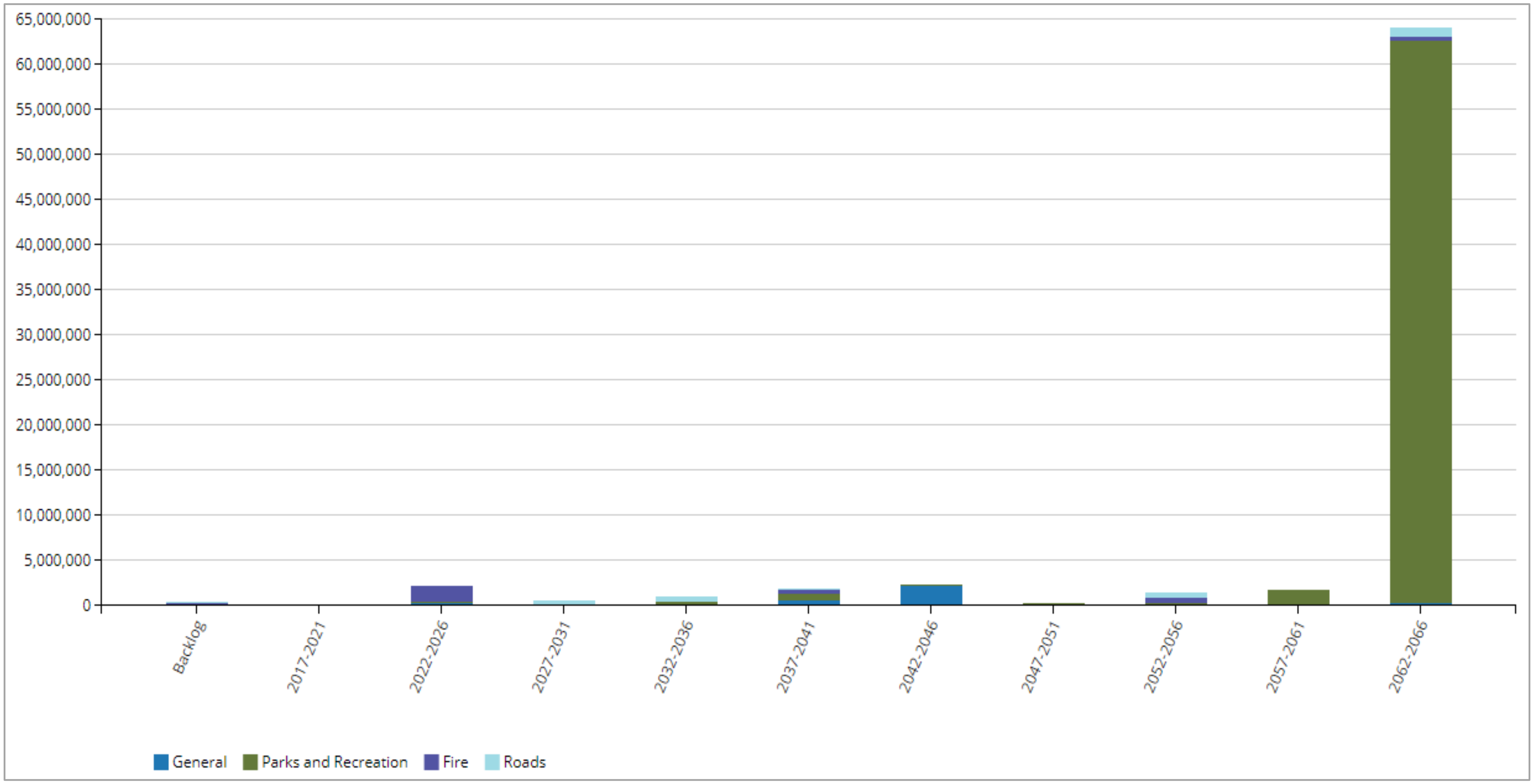
Age based data indicates that 88% of buildings and facilities assets are in good to very good condition, while 6%, with a valuation of $4.4 million, are in poor to very poor condition.

6.6.5 Forecasting Replacement Needs

In this section, we illustrate the short-, medium- and long-term infrastructure spending requirements Town's buildings and facilities. The backlog is the aggregate investment in infrastructure that was deferred over previous years or decades. In the absence of observed data, the backlog represents the value of assets that remain in operation beyond their useful life.

6.6.6 Replacement Needs (End-of-Life Replacement)

Figure 47 Forecasting Replacement Needs – Buildings & Facilities (End-of-Life Replacement)



Based on age-based condition data, there is a backlog of $500,000. The Town's average annual requirements for its buildings and facilities (replacement only) total $1.5 million. At this funding level, the Town would be allocating sufficient funds on an annual basis to meet replacement needs as they arise without the need for deferring projects and accruing annual infrastructure deficits.

6.6.7 Recommendations

- Age-based condition data indicates a backlog of $500,000. The Town should consider conducting condition assessments on all assets to more precisely estimate its actual financial requirements and field needs. See **Section 7.4** for more information.

- The data collected through condition assessment programs should be integrated into a risk management framework which will guide prioritization of the backlog as well as short-, medium-, and long-term replacement needs. As additional attribute data is collected, the municipality should consider expanding the scope of risk parameters included in the risk management framework. See **Section 7.5** for more information.

- Key performance indicators for Buildings & Facilities should be established and tracked annually in accordance with the levels of service framework in **Section 8.3**.

- The municipality is underfunding its long-term requirements on an annual basis. See **Section 9.0** for a detailed financial strategy designed to achieve long-term funding requirements.

6.7 Machinery & Equipment

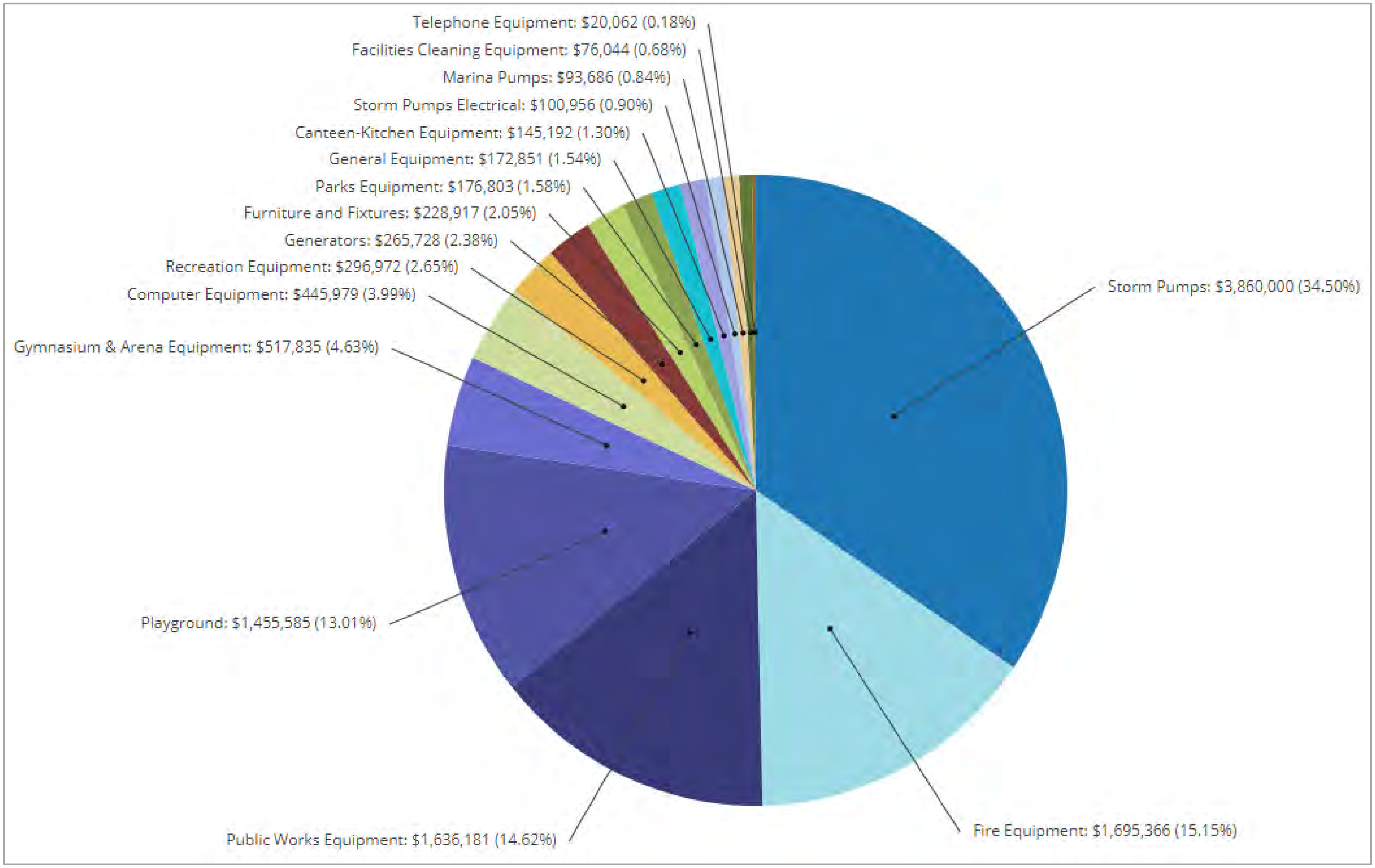
6.7.1 Asset Portfolio: Quantity, Useful Life and Replacement Cost

Table 13 illustrates key asset attributes for the Town's machinery and equipment asset portfolio, including quantities of various assets, their useful life, replacement costs, and the valuation method by which the replacement costs were derived. In total, the Town's machinery & equipment assets are valued at $11 million based on 2017 replacement costs. The useful life indicated for each asset type below was assigned by the Town.

Table 13 Key Asset Attributes – Machinery & Equipment

Asset Type	Asset Component	Quantity	Useful Life (Years)	2017 Unit Replacement Cost	2017 Overall Replacement Cost
Machinery & Equipment	Canteen - Kitchen Equipment	23 units	10	CPI (ON)	$145,192
	Computer Equipment	120 units	4, 6, 10	CPI (ON)	$445,979
	Facilities Cleaning Equipment	Pooled	10	CPI (ON)	$76,044
	Fire Equipment	24,505 units	5, 7, 10, 15, 20, 25	CPI (ON)	$1,695,366
	Furniture and Fixtures	16 units	10	CPI (ON)	$228,917
	General Equipment	7 units	10, 15, 20	CPI (ON)	$172,851
	Generators	5 units	20	CPI (ON)	$265,728
	Gymnasium and Arena Equipment	9 units	10, 20	CPI (ON)	$517,835
	Marina Pumps	3 units	15	CPI (ON)	$93,686
	Parks Equipment	10 units	10, 20	CPI (ON)	$176,803
	Playground	47 units	20	CPI (ON)	$1,455,585
	Public Works Equipment	15 units	10, 15, 18, 20	CPI (ON)	$1,636,181
	Recreation Equipment	4 units	10, 15	CPI (ON)	$296,972
	Storm Pumps	36 units	25	CPI (ON)	$3,860,000
	Storm Pumps Electrical	Pooled	30	CPI (ON)	$100,956
	Telephone Equipment	Pooled	10	CPI (ON)	$20,062
				Total:	**$11,188,157**

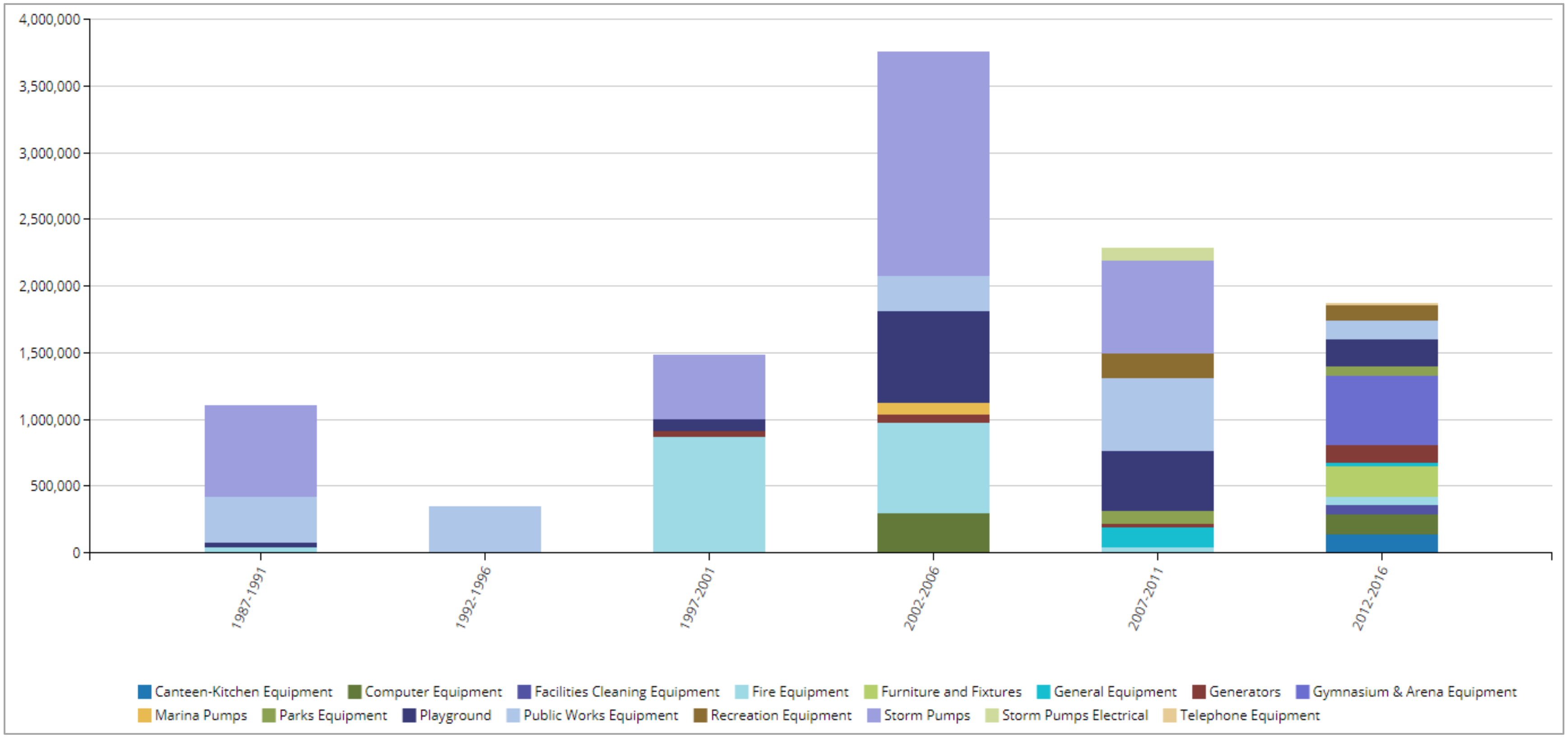
Figure 48 Asset Valuation – Machinery & Equipment



6.7.2 Historical Investment

Figure 49 shows the Town's historical investments in machinery and equipment since 1987. While assessed condition data will provide superior accuracy in estimating replacement needs and should be incorporated into strategic plans, in the absence of such information, understanding past expenditure patterns and current useful life consumption levels can inform the forecasting and planning of infrastructure needs and in the development of a capital program. Note that this graph only includes the active asset inventory as of December 31, 2016.

Figure 49 Historical Investment – Machinery & Equipment



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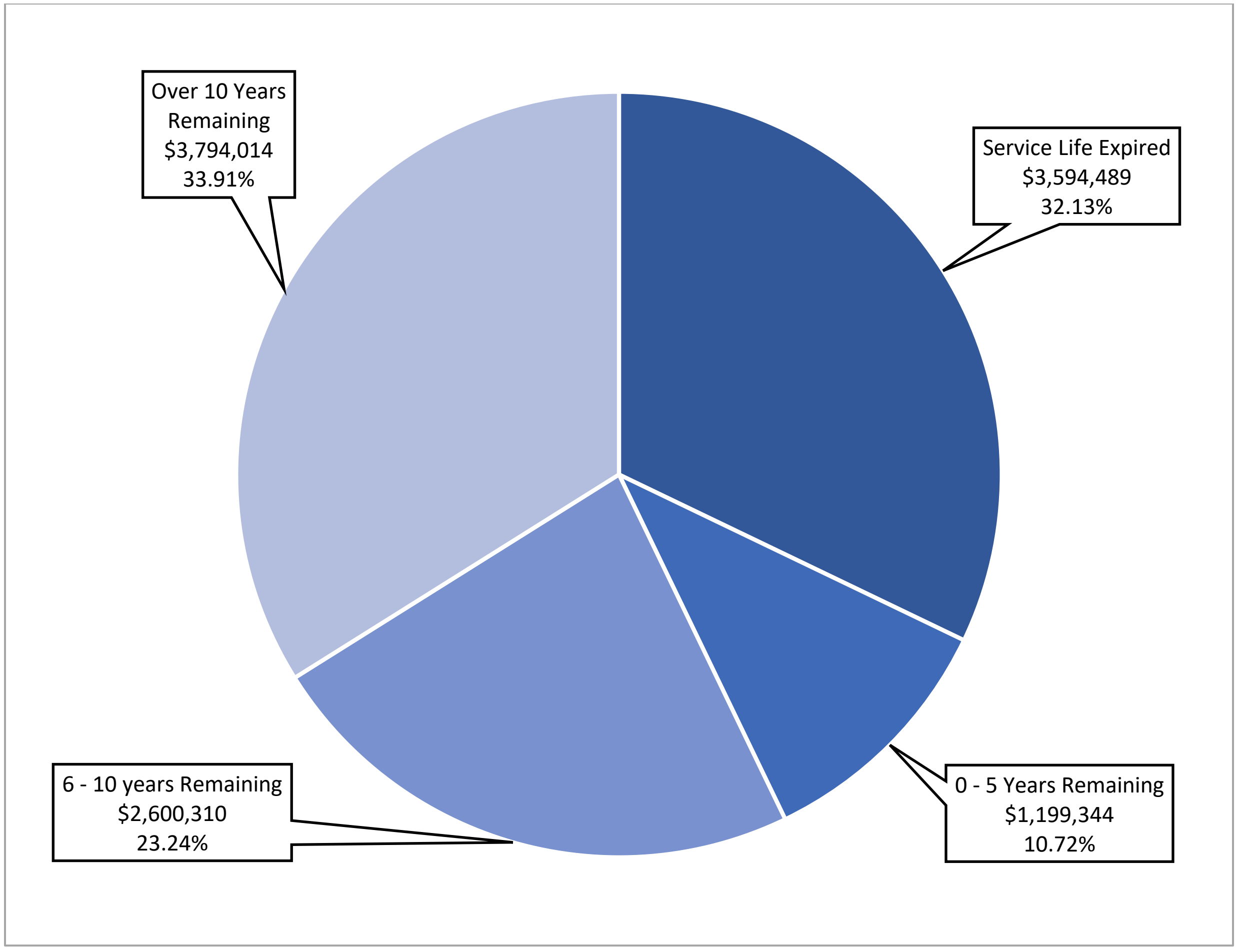
6.7.3 Useful Life Consumption

In conjunction with historical spending patterns and assessed condition data, understanding the consumption rate of assets based on industry established useful life standards provides a more complete profile of the state of a community's infrastructure. **Figure 50** illustrates the useful life consumption levels as of 2016 for the Town's machinery and equipment.

Figure 50 Useful Life Consumption – Machinery & Equipment

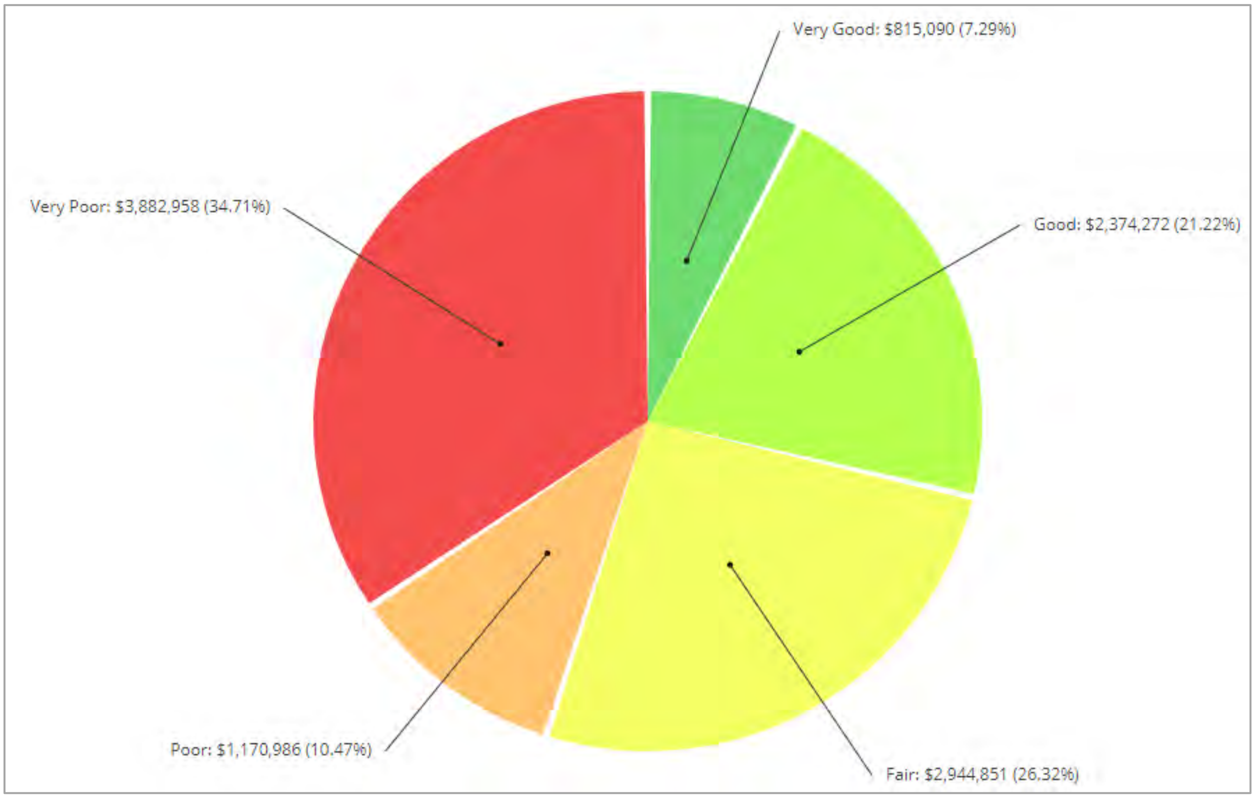


Approximately 34% of assets have over 10 years of useful life remaining while 32% are still in operation past estimated service life.

6.7.4 Current Asset Condition

Using replacement cost, in this section we summarize the condition of the Town's machinery and equipment as of 2016. By default, we rely on observed field data as provided by the municipality. In the absence of such information, age-based data is used as a proxy. The Town has not provided condition data for its machinery and equipment.

Figure 51 Asset Condition – Machinery & Equipment



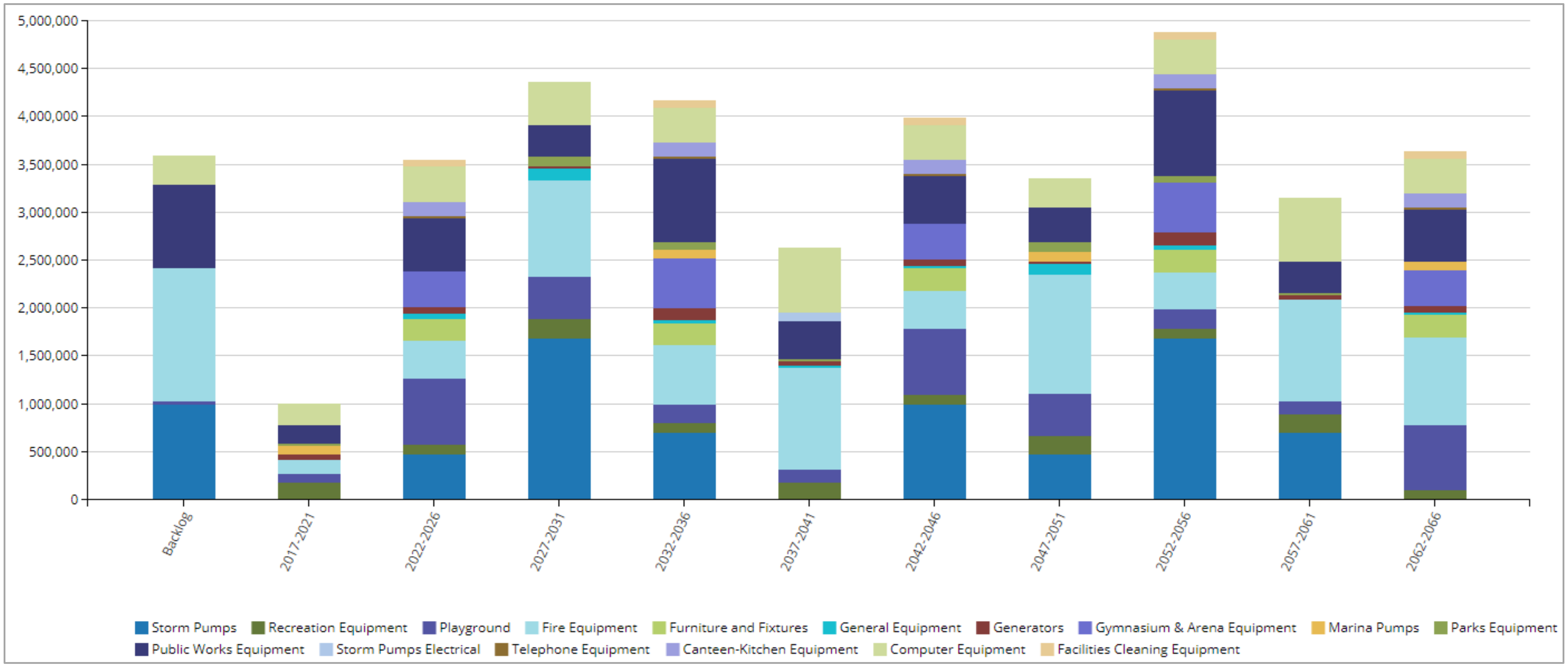
Age based data indicates that 29% of machinery and equipment assets are in good to very good condition, while 45%, with a valuation of $5 million, are in poor to very poor condition.

6.7.5 Forecasting Replacement Needs

In this section, we illustrate the short-, medium-, and long-term infrastructure spending requirements for Town's machinery and equipment. The backlog is the aggregate investment in infrastructure that was deferred over previous years or decades. In the absence of observed data, the backlog represents the value of assets that remain in operation beyond their useful life.

6.7.6 Replacement Needs (End-of-Life Replacement)

Figure 52 Forecasting Replacement Needs – Machinery & Equipment (End-of-Life Replacement)



Based on age-based condition data there is a backlog of $3.6 million. The Town's average annual requirements for its machinery and equipment (replacement only) totals $752,000. At this funding level, the Town would be allocating sufficient funds on an annual basis to meet replacement needs as they arise without the need for deferring projects and accruing annual infrastructure deficits.

6.7.7 Recommendations

- Age-based condition data indicates a backlog of $3.6 million. The Town should consider conducting condition assessments on all assets to more precisely estimate its actual financial requirements and field needs. See **Section 7.4** for more information.

- The data collected through condition assessment programs should be integrated into a risk management framework which will guide prioritization of the backlog as well as short-, medium-, and long-term replacement needs. As additional attribute data is collected, the municipality should consider expanding the scope of risk parameters included in the risk management framework. See **Section 7.5** for more information.

- Key performance indicators for Machinery & Equipment should be established and tracked annually in accordance with the levels of service framework in **Section 8.3**.

- The municipality is underfunding its long-term requirements on an annual basis. See **Section 9.0** for a detailed financial strategy designed to achieve long-term funding requirements.

6.8 Land Improvements

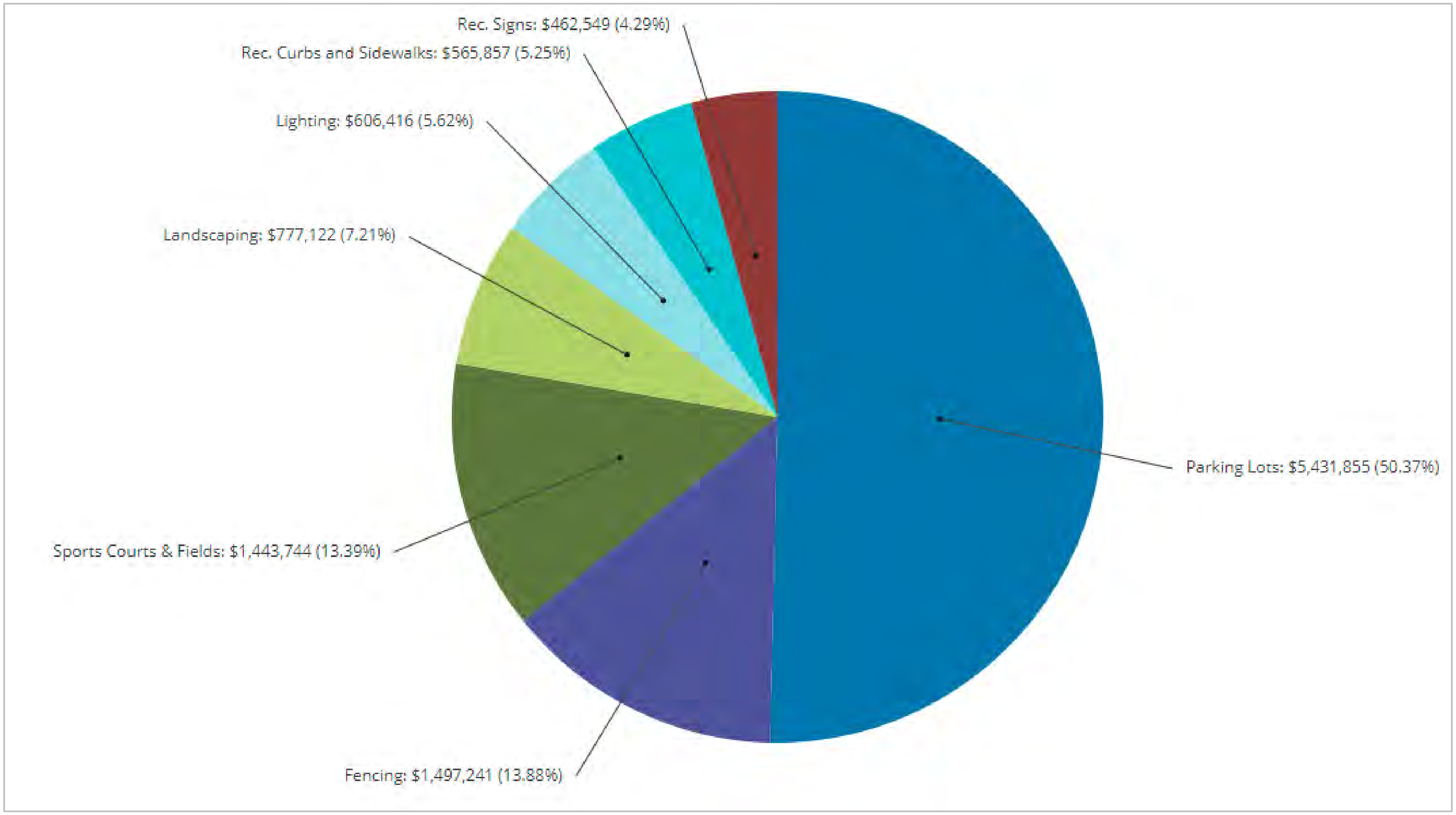
6.8.1 Asset Portfolio: Quantity, Useful Life and Replacement Cost

Table 14 illustrates key asset attributes for the Town's land improvements, including quantities of various assets, their useful life, replacement costs, and the valuation method by which the replacement costs were derived. In total, the Town's land improvements are valued at $10.8 million based on 2017 replacement costs. The useful life indicated for each asset type below was assigned by the Town.

Table 14 Key Asset Attributes – Land Improvements

Asset Type	Asset Component	Quantity	Useful Life (Years)	2017 Unit Replacement Cost	2017 Overall Replacement Cost
Land Improvements	Fencing	Pooled	20, 25, 40	NRBCPI (Toronto)	$1,875,565
	Landscaping	Pooled	20	NRBCPI (Toronto)	$398,798
	Lighting	26 units	50	NRBCPI (Toronto)	$606,416
	Parking Lots	36 units	20, 40	NRBCPI (Toronto)	$5,431,855
	Recreational Curbs and Sidewalks	Pooled	30	NRBCPI (Toronto)	$565,857
	Recreational Signs	17 units	20, 50	NRBCPI (Toronto)	$462,549
	Sports Courts and Fields	6 units	20	NRBCPI (Toronto)	$1,443,744
				Total:	**$10,784,784**

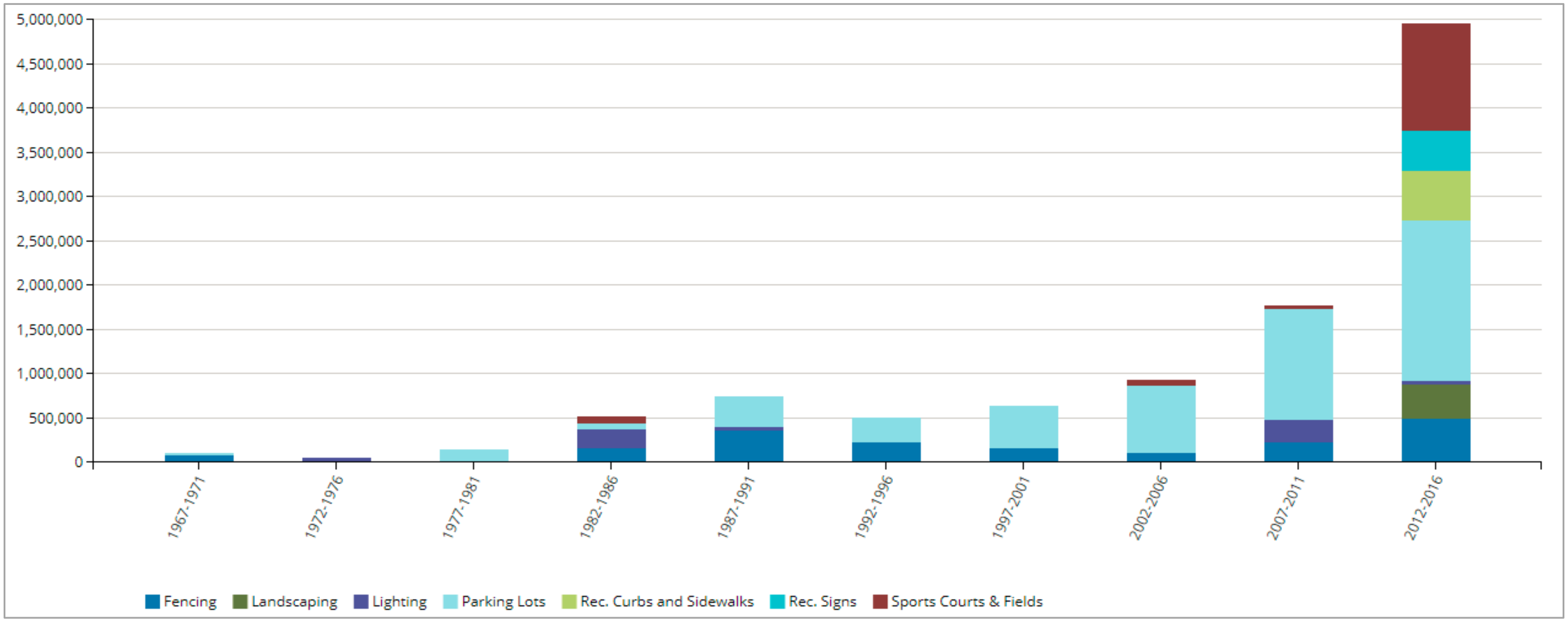
Figure 53 Asset Valuation – Land Improvements



6.8.2 Historical Investment

Figure 54 shows the Town's historical investments in land improvements since 1967. While assessed condition data will provide superior accuracy in estimating replacement needs and should be incorporated into strategic plans, in the absence of such information, understanding past expenditure patterns and current useful life consumption levels can inform the forecasting and planning of infrastructure needs and in the development of a capital program. Note that this graph only includes the active asset inventory as of December 31, 2016.

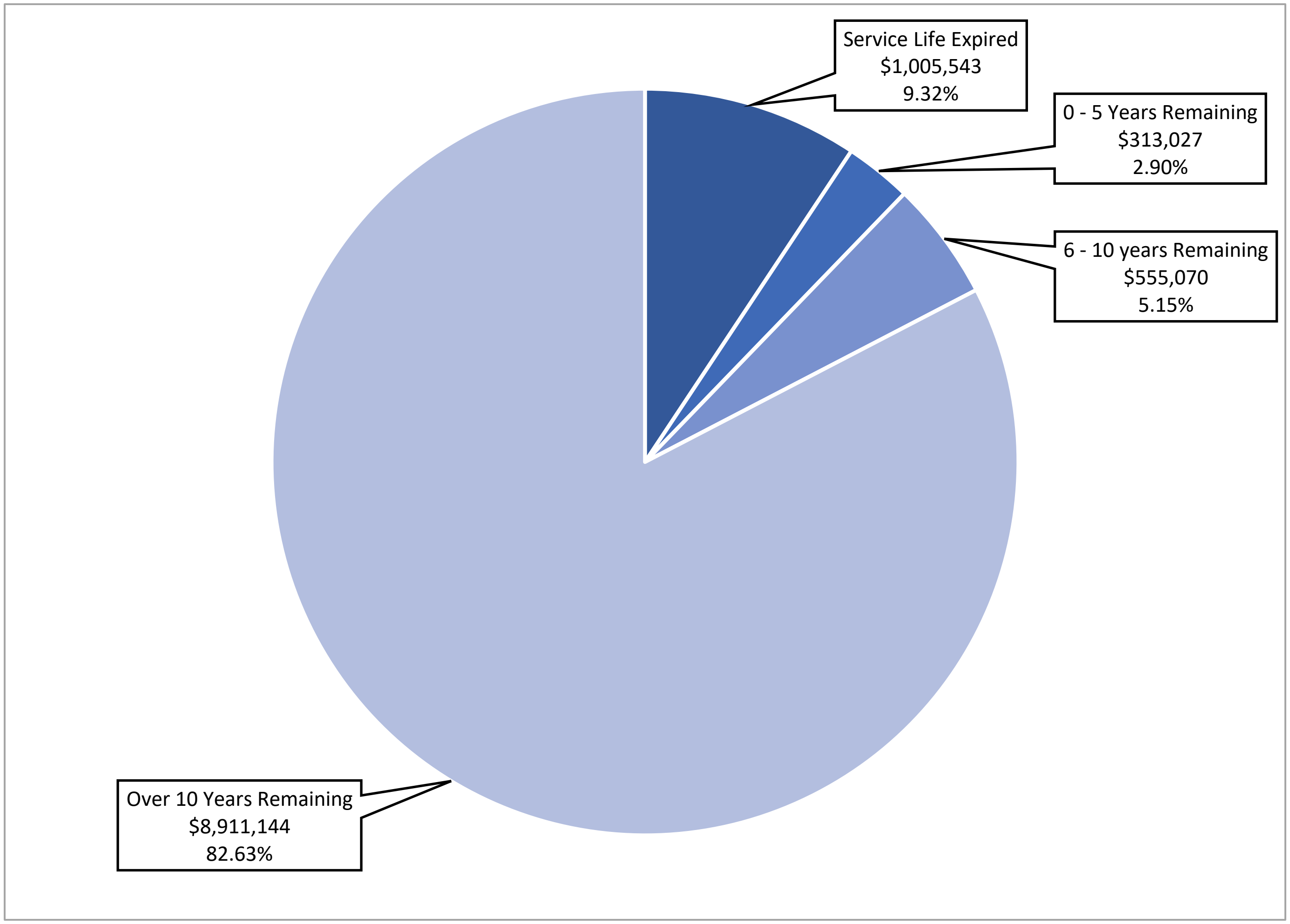
Figure 54 Historical Investment – Land Improvements



6.8.3 Useful Life Consumption

In conjunction with historical spending patterns and assessed condition data, understanding the consumption rate of assets based on industry established useful life standards provides a more complete profile of the state of a community's infrastructure. **Figure 55** illustrates the useful life consumption levels as of 2016 for the Town's land improvements.

Figure 55 Useful Life Consumption – Land Improvements

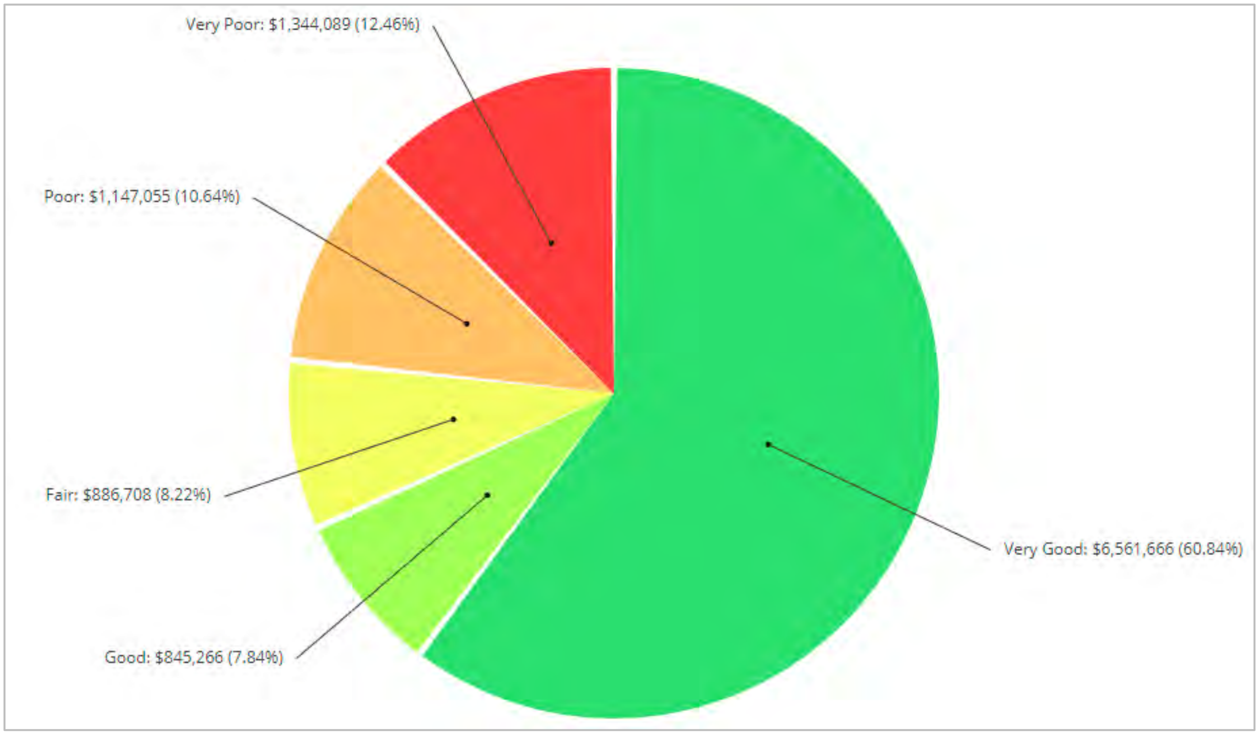


Approximately 83% of assets have over 10 years of useful life remaining while 9% are still in operation past estimated service life.

6.8.4 Current Asset Condition

Using replacement cost, in this section we summarize the condition of the Town's land improvements as of 2016. By default, we rely on observed field data as provided by the municipality. In the absence of such information, age-based data is used as a proxy. The Town has not provided condition data for its land improvements.

Figure 56 Asset Condition – Land Improvements



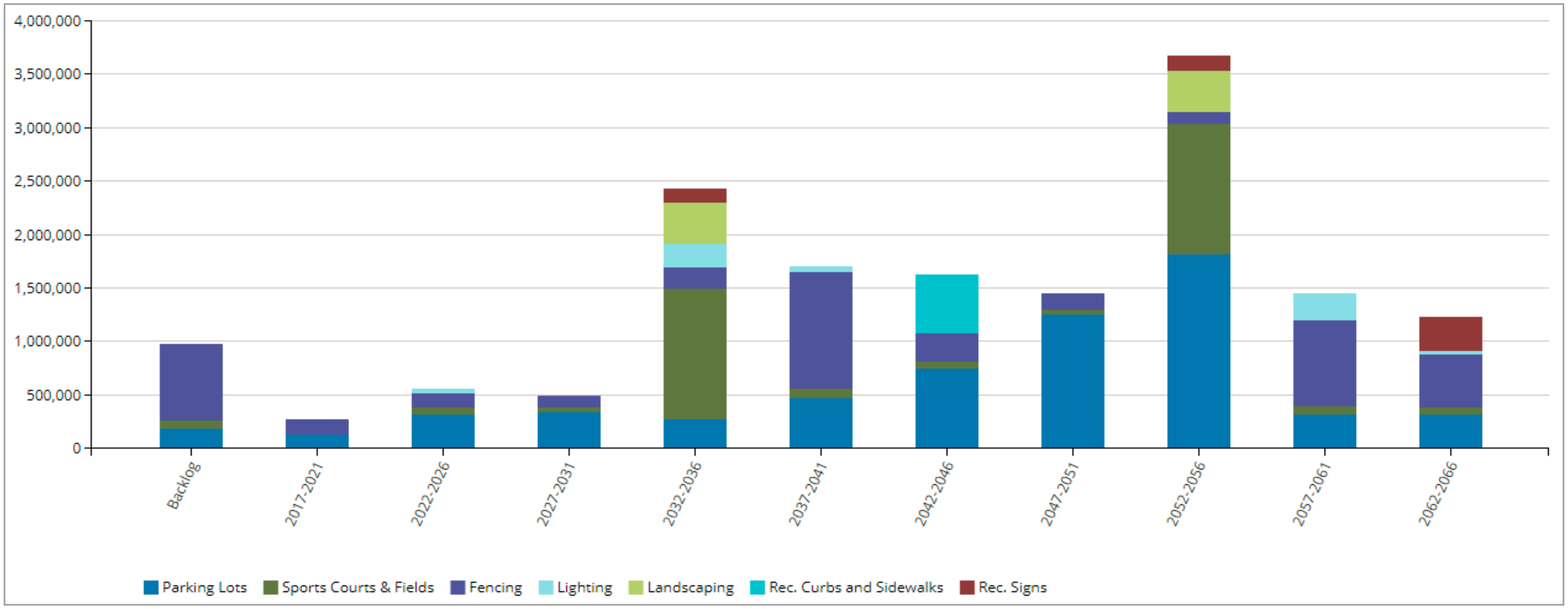
Age based data indicates that 67% of land improvements are in good to very good condition, while 23%, with a valuation of $2.5 million, are in poor to very poor condition.

6.8.5 Forecasting Replacement Needs

In this section, we illustrate the short-, medium- and long-term infrastructure spending requirements Town's land improvements. The backlog is the aggregate investment in infrastructure that was deferred over previous years or decades. In the absence of observed data, the backlog represents the value of assets that remain in operation beyond their useful life.

6.8.6 Replacement Needs (End-of-Life Replacement)

Figure 57 Forecasting Replacement Needs – Land Improvements (End-of-Life Replacement)



Based primarily on age-based condition data there is a backlog of $1 million. The Town's average annual requirements for its land improvements (replacement only) total $360,000. At this funding level, the Town would be allocating sufficient funds on an annual basis to meet replacement needs as they arise without the need for deferring projects and accruing annual infrastructure deficits.

6.8.7 Recommendations

- Age-based condition data indicates a backlog of $1 million. The Town should consider conducting condition assessments on all assets to more precisely estimate its actual financial requirements and field needs. See **Section 7.4** for more information.

- The data collected through condition assessment programs should be integrated into a risk management framework which will guide prioritization of the backlog as well as short-, medium-, and long-term replacement needs. As additional attribute data is collected, the municipality should consider expanding the scope of risk parameters included in the risk management framework. See **Section 7.5** for more information.

- Key performance indicators for Land Improvements should be established and tracked annually in accordance with the levels of service framework in **Section 8.3**.

- The municipality is underfunding its long-term requirements on an annual basis. See **Section 9.0** for a detailed financial strategy designed to achieve long-term funding requirements.

6.9 Vehicles

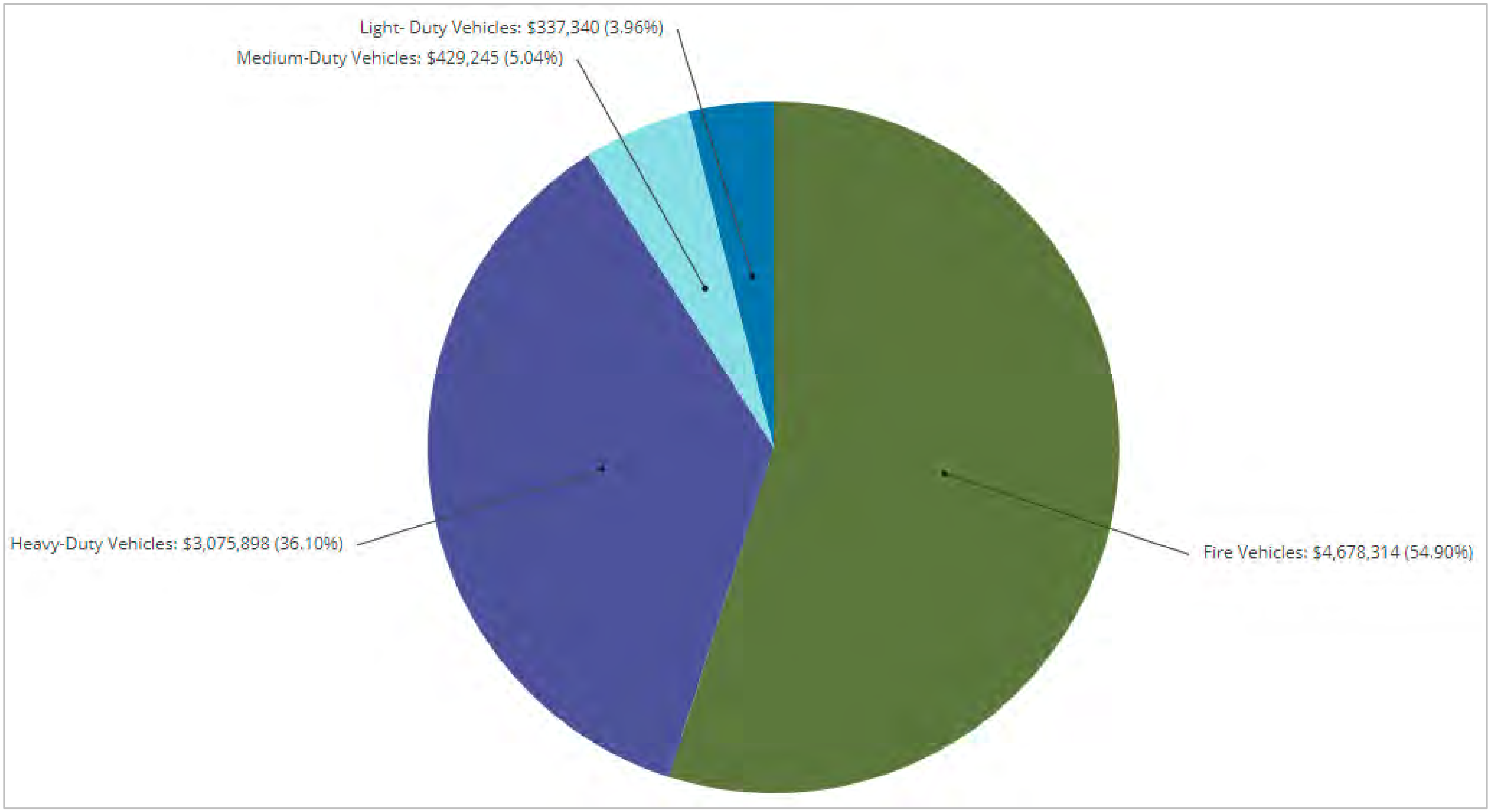
6.9.1 Asset Portfolio: Quantity, Useful Life and Replacement Cost

Table 15 illustrates key asset attributes for the Town's vehicles, including quantities of various assets, their useful life, replacement costs, and the valuation method by which the replacement costs were derived. In total, the Town's vehicles are valued at $8.5 million based on 2017 replacement costs. The useful life indicated for each asset type below was assigned by the Town.

Table 15 Key Asset Attributes – Vehicles

Asset Type	Asset Component	Quantity	Useful Life (Years)	2017 Unit Replacement Cost	2017 Overall Replacement Cost
Vehicles	Fire Vehicles	17 units	8, 9, 10, 20	CPI (ON)	$4,678,314
	Light Duty Vehicles	11 units	8, 10	CPI (ON)	$337,340
	Medium Duty Vehicles	5 units	10, 12	CPI (ON)	$429,245
	Heavy Duty Vehicles	16 units	8, 9, 10, 12, 15	CPI (ON)	$3,075,898
				Total:	**$8,520,797**

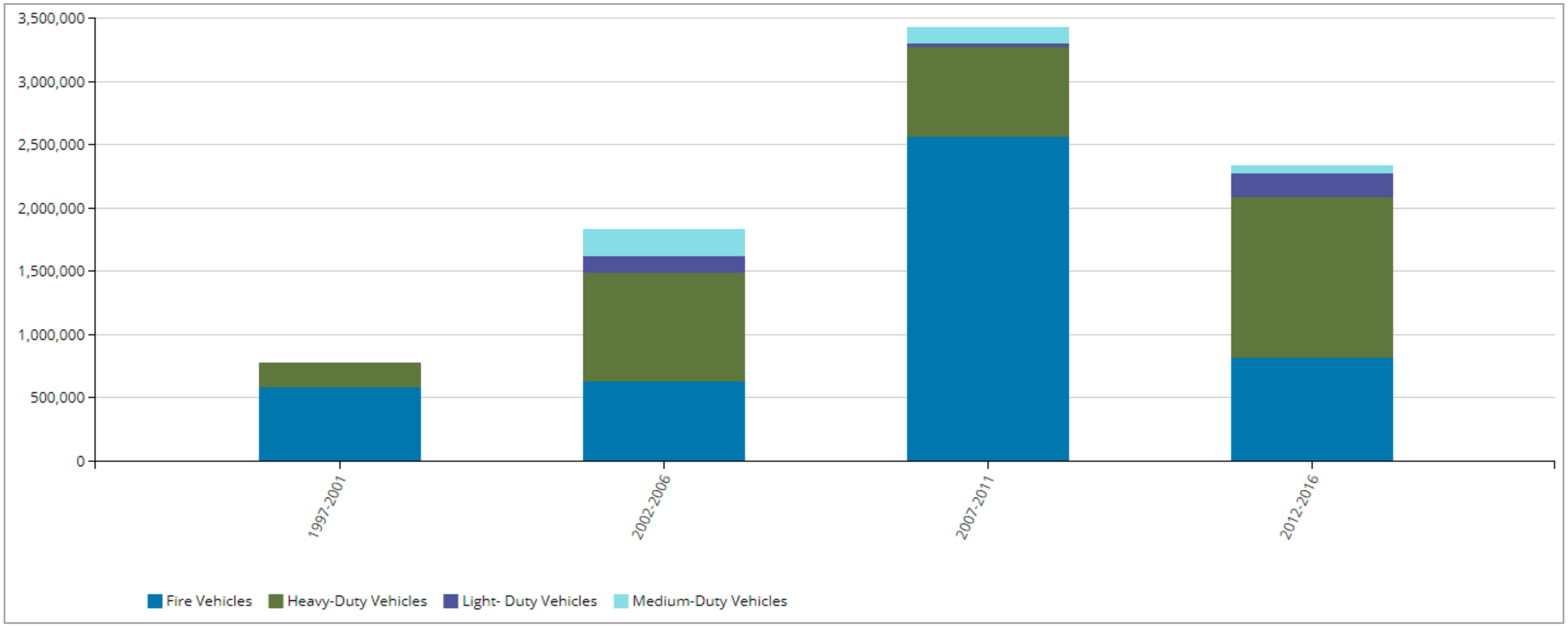
Figure 58 Asset Valuation – Vehicles



6.9.2 Historical Investment

Figure 59 shows the Town's historical investments in vehicles since 1997. While assessed condition data will provide superior accuracy in estimating replacement needs and should be incorporated into strategic plans, in the absence of such information, understanding past expenditure patterns and current useful life consumption levels can inform the forecasting and planning of infrastructure needs and in the development of a capital program. Note that this graph only includes the active asset inventory as of December 31, 2016.

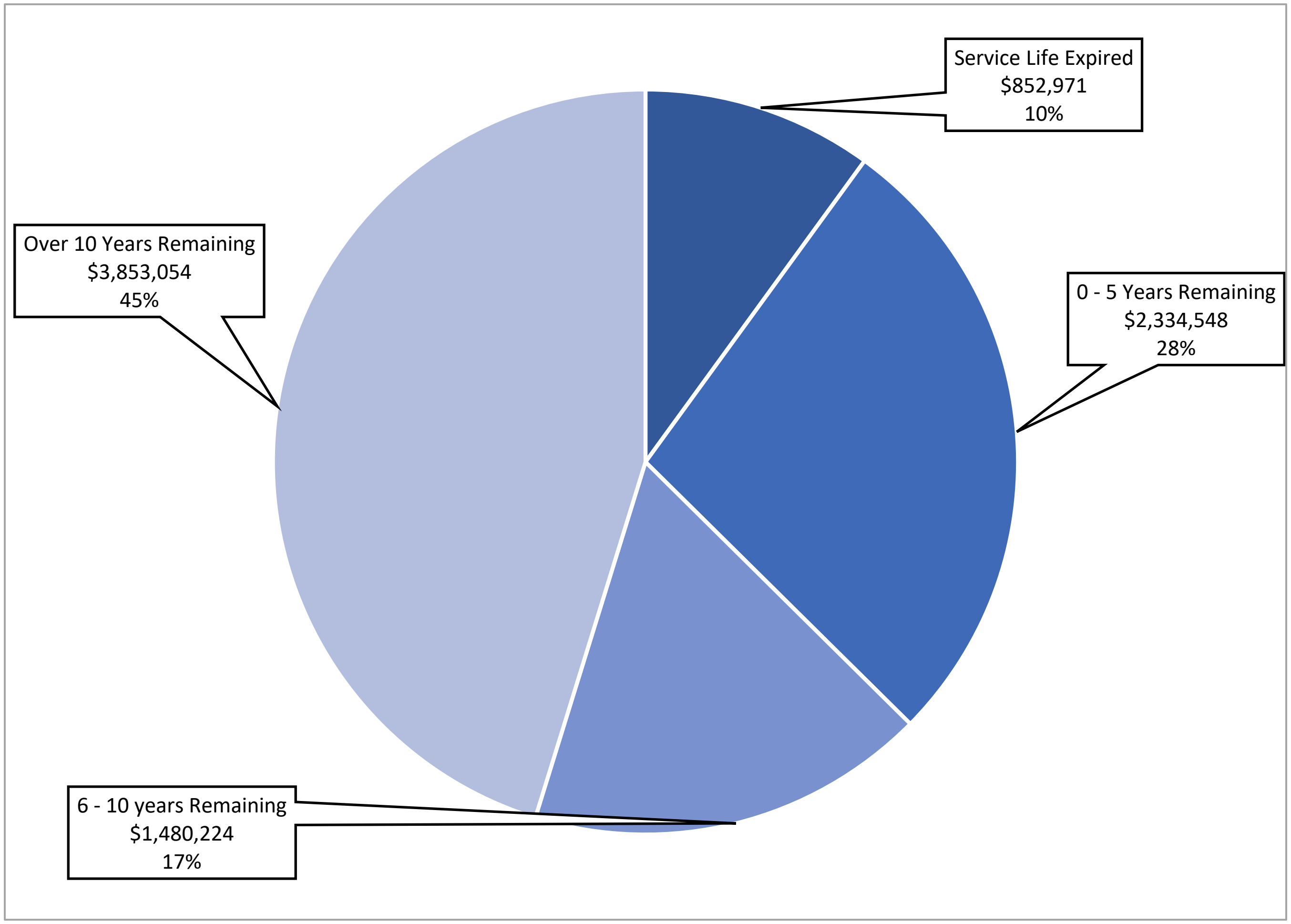
Figure 59 Historical Investment – Vehicles



6.9.3 Useful Life Consumption

In conjunction with historical spending patterns and assessed condition data, understanding the consumption rate of assets based on industry established useful life standards provides a more complete profile of the state of a community's infrastructure. **Figure 60** illustrates the useful life consumption levels as of 2016 for the Town's vehicles.

Figure 60 Useful Life Consumption – Vehicles

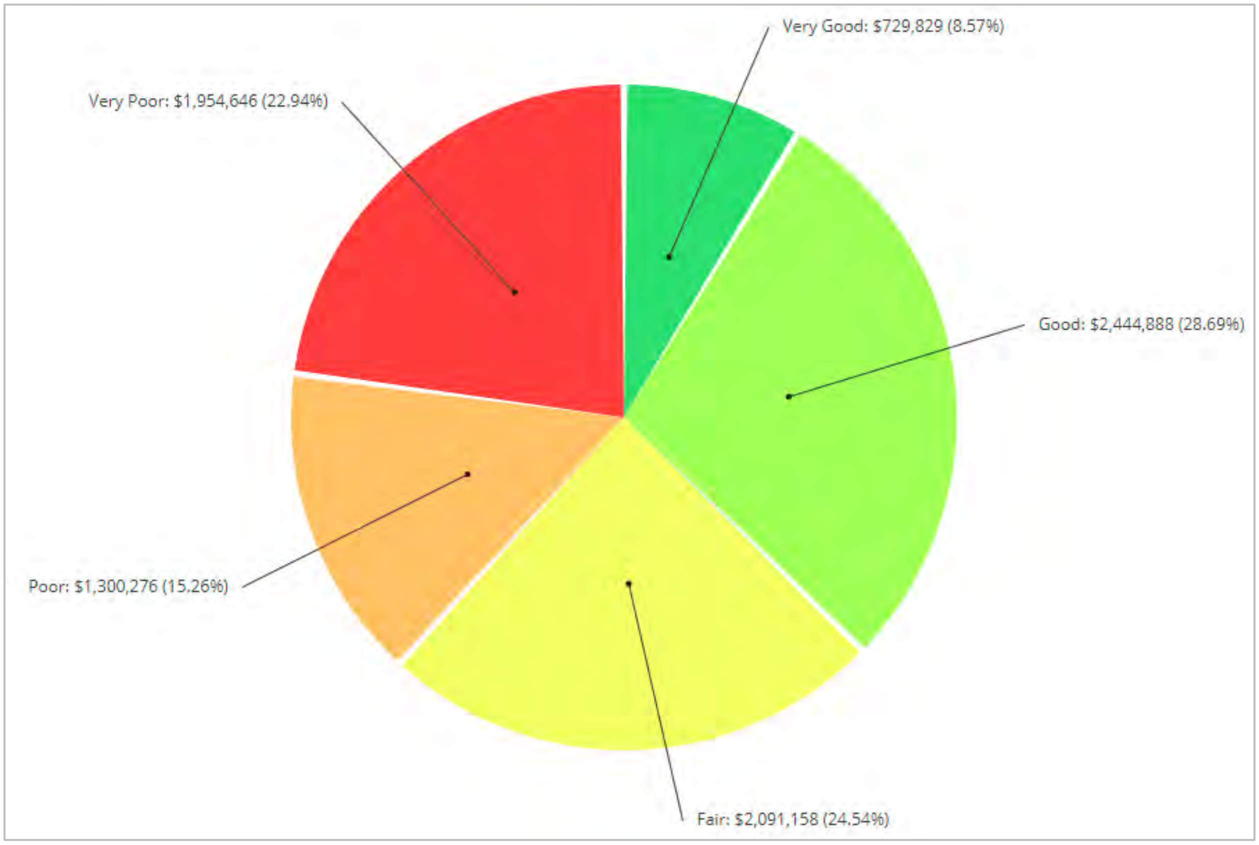


Approximately 45% of assets have over 10 years of useful life remaining while 10% are still in operation past estimated service life.

6.9.4 Current Asset Condition

Using replacement cost, in this section we summarize the condition of the Town's vehicles as of 2016. By default, we rely on observed field data as provided by the municipality. In the absence of such information, age-based data is used as a proxy. The Town has not provided condition data for its vehicles.

Figure 61 Asset Condition – Vehicles



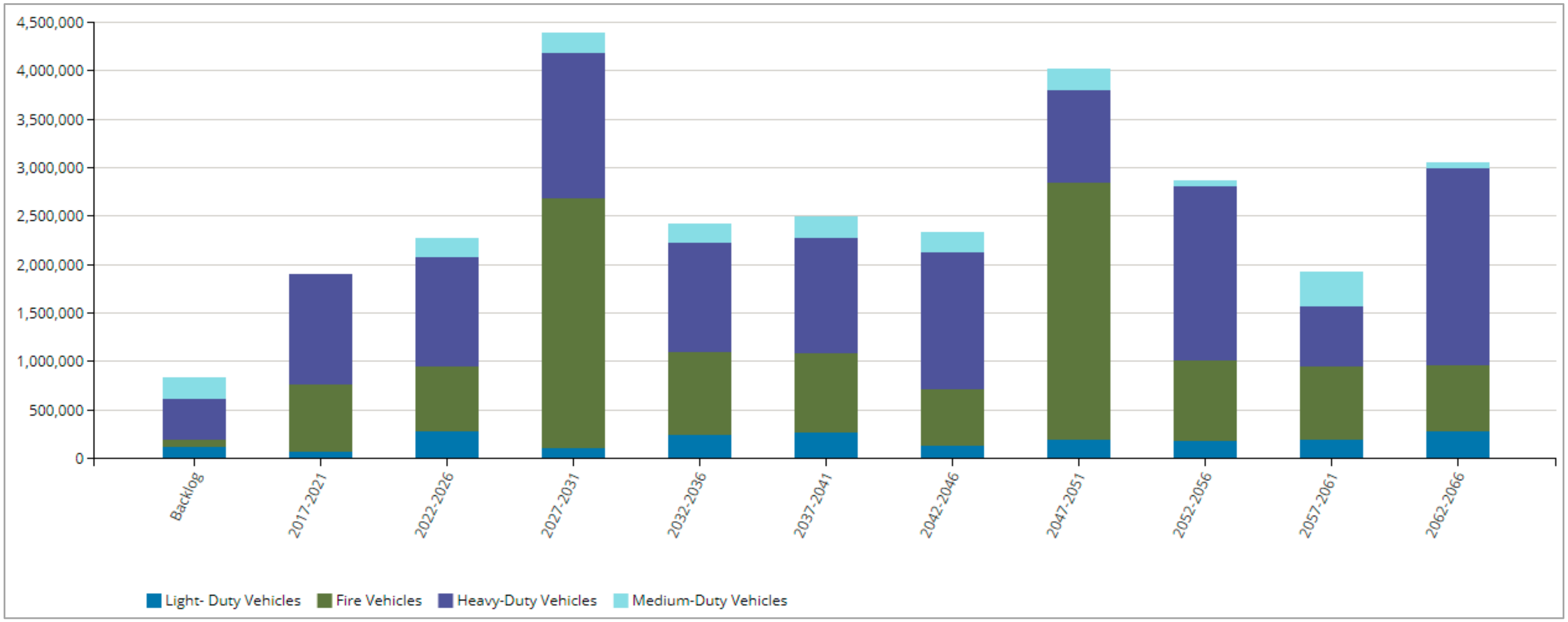
Age based data indicates that 37% of vehicles are in good to very good condition, while 38%, with a valuation of $3.2 million, are in poor to very poor condition.

6.9.5 Forecasting Replacement Needs

In this section, we illustrate the short-, medium- and long-term infrastructure spending requirements for the Town's vehicles. The backlog is the aggregate investment in infrastructure that was deferred over previous years or decades. In the absence of observed data, the backlog represents the value of assets that remain in operation beyond their useful life.

6.9.6 Replacement Needs (End-of-Life Replacement)

Figure 62 Forecasting Replacement Needs – Vehicles (End-of-Life Replacement)



Based primarily on age-based condition data there is a backlog of $0.9 million. The Town's average annual requirements for its vehicles (replacement only) total $590,000. At this funding level, the Town would be allocating sufficient funds on an annual basis to meet replacement needs as they arise without the need for deferring projects and accruing annual infrastructure deficits.

6.9.7 Recommendations

- Age-based condition data indicates a backlog of $0.9 million. The Town should consider conducting condition assessments on all assets to more precisely estimate its actual financial requirements and field needs. See **Section 7.4** for more information.

- The data collected through condition assessment programs should be integrated into a risk management framework which will guide prioritization of the backlog as well as short-, medium-, and long-term replacement needs. As additional attribute data is collected, the municipality should consider expanding the scope of risk parameters included in the risk management framework. See **Section 7.5** for more information.

- Key performance indicators for Vehicles should be established and tracked annually in accordance with the levels of service framework in **Section 8.3**.

- The municipality is underfunding its long-term requirements on an annual basis. See **Section 9.0** for a detailed financial strategy designed to achieve long-term funding requirements.

7.0 Asset Management Strategies

After outlining the State of Local Infrastructure, the next step of an AMP is to identify the procedures and practices that will support the Town's organizational objectives, and derive maximum value from its assets. Good asset management requires a focus on continuous program improvement based on industry best practice. This involves strategies for data collection and condition assessment, strategies for the analysis of collected data (lifecycle and risk) and strategies for performance measurement (levels of service).

This section contains information and best practices that will inform the Town's asset management strategies, outline Roadmap activities and their deliverables, and provide strategic recommendations for the continuous improvement of program activities and outputs.

7.1 Non-Infrastructure Solutions & Requirements

The municipality should explore, as requested through the provincial requirements, which non-infrastructure solutions should be incorporated into the budgets for its infrastructure services. Non-infrastructure solutions are such items as studies, policies, condition assessments, consultation exercises, etc., that could potentially extend the life of assets or lower total asset program costs in the future without a direct investment into the infrastructure.

Typical solutions for a municipality include linking the asset management plan to the strategic plan, growth and demand management studies, infrastructure master plans, better integrated infrastructure and land use planning, public consultation on levels of service and condition assessment programs. As part of future asset management plans, a review of these requirements should take place, and resources should be dedicated to these items.

It is recommended, under this category of solutions, that the municipality develop and implement holistic condition assessment programs for all asset classes. This will advance the understanding of infrastructure needs, improve budget prioritization methodologies and provide a clearer path of what is required to achieve sustainable infrastructure programs.

7.2 State of Maturity Report

7.2.1 Introduction

Improving your asset management practices requires a structured and coordinated approach to the individual components of an asset management program. As a first step, it is important to gauge the current state of practice related to asset management at the municipality. A thorough gap analysis helps to determine where to focus efforts in order to build a strong asset management program. In other words, you need to know where you stand before you can figure out the best way to move forward.

The first phase of PSD's Roadmap involved a comprehensive, organization-wide assessment of asset management programs and practices within the Town. The development of the State of Maturity Report involved two key components: the Asset Management Self-Assessment Test (AMSAT) and a series of stakeholder interviews. The final State of Maturity Report outlined the organization's overall state of maturity, proficiency ratings along the six key components of asset management, and recommendations to improve the Town's asset management program.

7.2.2 Asset Management Self-Assessment Test

The Asset Management Self-Assessment Tool, implemented in a survey format, relies on a series of questions across specific categories that have been established through international standards and best practice identified as the requirements of a successful asset management program. The results of the AMSAT are then aggregated to provide a performance rating (Basic, Intermediate, Advanced) across six key components. Table 16 summarizes the Town's results:

Table 16 AMSAT Results

Asset Management Component	Proficiency Level	National Average
Organizational Cognisance	Advanced	Intermediate
Organizational Capacity	Intermediate	Intermediate
Infrastructure Data/Information	Basic	Intermediate
Asset Management Strategies	Basic	Basic
Financial Strategies	Basic	Basic
Level of Service	Basic	Basic

7.2.3 Stakeholder Interviews

As a supplement to the AMSAT, additional information was gathered through a series of in-depth interviews with departmental staff who are either directly involved in or support the delivery of an asset class. The results were used for clarification of the features of the organization's asset management program along with who is responsible for managing and delivering the activities involved in the asset management process. The interviewed departments included:

1. **Administraton**
2. **Finance Services**
3. **Community and Development Services**
    a. Recreation & Leisure
4. **Engineering & Infrastructure Services**
    a. Road Network/Bridges & Culverts
    b. Water/Wastewater/Storm
    c. Parks/Buildings/Vehicles

7.2.4 Highlights from the State of Maturity Report

Workshop Date: March 31st, 2016
Report Delivery Date: July 28th, 2016

Organizational Cognizance

"The results from the AMSAT and staff interviews indicate that there is an intermediate to advanced level of understanding of asset management at both the senior management and council levels. In recent years there has been an upward movement in the prioritization of AM. This is partly due to the completion of the Town's first asset management plan in 2013/2014 under the Municipal Infrastructure Investment Initiative, and also the approval of the full AMP and AM Roadmap project currently underway." – Pg. 4

Organizational Capacity

"Through the AMSAT and staff interviews, it was determined that the organization capacity to develop asset management was at a basic to intermediate level at Lakeshore. Organizational restructuring and realignment of internal resources has helped internal processes; however, there are no dedicated staff for asset management within the operating departments and it was noted that the staff per capita ratio is low in Lakeshore." – Pg. 5

Asset Management Strategies

"A number of master plans have been completed which serve to provide high level recommendations, and there are prioritization lists for urbanization, gravel road conversion and cast iron water main replacement. However, some of these strategic plans are now more than five years old and should be updated."– Pg. 8

Financial Strategies

"Currently, the financial strategies within Lakeshore are at a basic level of maturity. While there has been reasonable analysis of short- and long-term capital and operating/maintenance requirements for water infrastructure, the same has not been completed for the other asset categories. Much of the financial analysis is not comprehensive and is premised on an incomplete understanding of overall asset performance given the absence of field condition records." – Pg. 8

Levels of Service

"Similar to most municipalities within Ontario, there are currently no holistic level of service models in place at the Town for the various capital asset categories. There are, however, several level of service initiatives in place, such as full compliance with regulatory requirements for bridges, roads and water, and the start of level of service key performance reporting as documented in the 2014 asset management plan." – Pg. 9

7.3 Asset Inventory Data

7.3.1 Introduction

An asset management program is only as strong as the data and information available in an organization's asset inventory. Without detailed and accurate asset data, the ability to analyze and evaluate the Town's state of the infrastructure is limited. Data gathering is a resource-intensive process, requiring sufficient human resources capacity and a significant amount of time to develop and maintain. However, committing resources to data collection will result in exponential benefits to the Town's asset management program. Better data results in greater data confidence and ultimately more reliable asset management and financial strategies.

7.3.2 Assessing Data Maturity

As a starting point, it is critical to understand the current state of your data collection practices. From there it is possible to develop techniques and strategies that ensure that your asset management program is being supported by detailed, consistent and complete data. A detailed data maturity assessment will evaluate and analyze the state of your organization's data collecting practices. This will help to identify what asset component data has been collected and what needs to be collected in order to increase the quality of your data and allow for more accurate and advanced analysis. **Section 5.4** contains a detailed assessment of the Town's Overall Data Maturity.

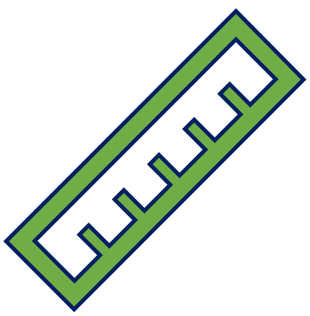
7.3.3 Ongoing Data Collection

Without plans in place for the ongoing collection of asset data and information the ability of an organization to undertake advanced forecasting and analysis will be limited. It is critical that the Town continue to provide resources for the continuing collection of data and the regular updating and maintenance of the Town's asset registry.

7.3.4 Recommendations

- Implement programs and protocols for the continuous collection and maintenance of asset data
- Centralize and consolidate all infrastructure related data (inventory, condition, needs, prioritized requirements, financial data and GIS data) into the CityWide software database, the main asset registry database
- Implement a data governance policy that outlines a consistent corporate approach to database maintenance and management including data handling procedures, roles and responsibilities

7.4 Condition Assessment Programs & Protocols



7.4.1 Introduction

The foundation of good asset management practice is comprehensive and reliable information on the current condition of your infrastructure. Municipalities need to have a clear understanding of the performance and condition of their assets, and all management decisions regarding future expenditures and field activities should be based on this knowledge.

Asset condition is a measure of the physical state of an asset or the ability of an asset to meet its required utility or level of service. An incomplete or limited understanding about the condition of a given asset can lead to substandard asset management decision-making. While there will be a point where asset rehabilitation or replacement is beneficial, it is important that field intervention activities are conducted at the optimal time to maximize the value of existing assets, and to reduce the threat of service disruption. Accurate and reliable condition data will help to prevent premature and costly rehabilitative or replacement activities, and ensure that lifecycle activities occur at the right time to maximize asset value and useful life.

7.4.2 Establishing Condition Assessment Programs & Protocols

In practice, integrating condition assessments into your asset management program requires a systematic and coordinated approach to asset data collection. Standardized condition assessment protocols and data gathering templates will ensure that all collected asset data is comprehensive and comparable. Ultimately, this will lead to increased confidence in the quality of your data and provide a stronger basis for decision-making. Condition assessment protocols serve as a guide for field employees responsible for collecting condition data. This document includes all component and asset level data required, element listing and code guidelines as well as specific instructions for determining asset condition.

Condition assessment can involve different forms of analysis including subjective opinion, mathematical models, or variations thereof, and can be completed through a very detailed or very cursory approach. When establishing the condition of an entire asset class, the cursory approach (metrics such as very good, good, fair, poor, very poor) is used. This will be a less expensive and time-consuming approach when applied to thousands of assets, yet will still provide actionable data. Condition ratings derived from this model use the grading system described in **Table 17.**

Table 17 Canadian Infrastructure Report Card 2016 - Condition Grading System

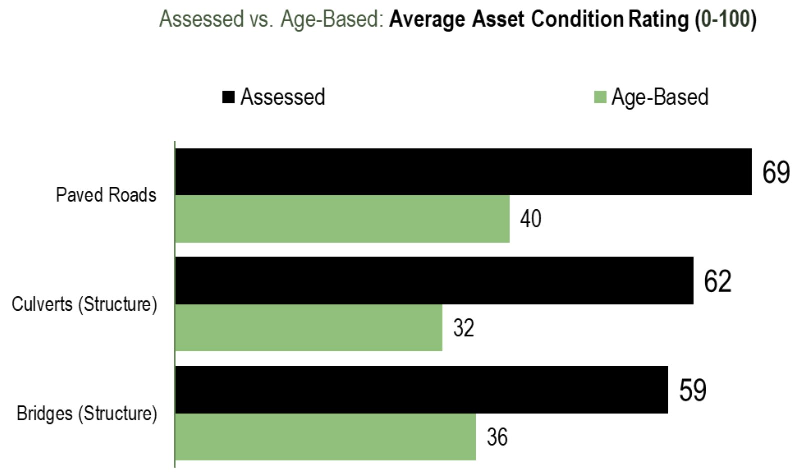
Condition Rating	Description
Very Good	Well maintained, good condition, new or recently rehabilitated
Good	Acceptable, generally approaching mid-stage of expected service life
Fair	Signs of deterioration, some elements exhibit deficiencies
Poor	Approaching end of service life, condition below standard, large portion of system exhibits significant deterioration
Very Poor	Near or beyond expected service life, widespread signs of advanced deterioration, some assets may be unusable

7.4.3 Assessed Condition Data vs. Age-based Data

Measuring asset condition can be a time consuming, labour-intensive and costly practice. However, there is strong evidence that the benefits of implementing condition assessment protocols will outweigh any additional costs. In 2015, PSD published a study in partnership with the Association of Municipalities of Ontario (AMO). The report, *The State of Ontario's Roads and Bridges: An Analysis of 93 Municipalities*, enumerated the infrastructure deficits, annual investment gaps, and the physical state of roads, bridges and culverts with a 2013 replacement value of $28 billion.

A critical finding of the report was the dramatic difference in the condition profile of the assets when comparing age-based estimates and actual field inspection observations. For each asset class, field data based condition ratings were significantly higher than age-based condition ratings, with paved roads, culverts, and bridges showing an increase in score (0-100) of +29, +30, and +23 points respectively (**Figure 63**). In other words, age-based measurements may be underestimating the condition of assets by as much as 30%. The implication of this finding is that municipalities are making asset management decisions based on inaccurate data, and as a result, are likely making ineffective lifecycle maintenance and replacement decisions.

Figure 63 Assessed vs Age-based Condition Rating



This report represents a strong statistical justification for the use of condition assessments over age-based estimates. Not only will condition-based data provide a more accurate representation of asset condition, it will also provide a stronger basis for making asset management decisions and achieving the lowest total cost of ownership.

7.4.4 PSD's Condition Assessment Programs and Protocols

Workshop Date: November 8th, 2016

On November 8th, 2016 PSD staff held an on-site workshop to guide Town staff in gathering condition data and asset attribute data for all major asset classes. The delivery of this workshop included hands-on training displaying how to effectively capture and store condition data as well as guidance for determining asset condition.

The Condition Assessment Protocol Package included internal condition assessment protocols for the following asset classes:

1. Buildings & Facilities
2. Parks & Recreational Areas
3. Road Network
4. Appurtenances
5. Sidewalks

The Town was also provided with Request for Proposal (RFP) specifications if condition assessments were preferred to be conducted by external consultant. These specifications were included for the following asset classes:

1. Buildings & Facilities
2. Parks & Recreational Areas
3. CCTV Sanitary/Storm Sewers

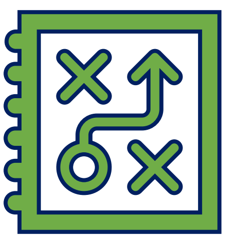
4. Zoom Sanitary/Storm Sewers
5. Paved Roads

After this workshop, the Town was given the task of collecting as much relevant and useful asset data as possible within the Roadmap project scope. The collection of additional data allows for more advanced evaluation and analysis of lifecycle and financial requirements. Throughout the Roadmap, PSD worked alongside the Town to ensure that data was collected as per their recommendations, and uploaded into the CityWide Database in the proper format.

7.4.5 Recommendations

- Work towards gathering assessed condition on the Town's entire network of infrastructure assets and implementing routine condition assessment protocols for all asset classes that were not completed during the Roadmap
- All future asset condition assessments should be synchronised with CityWide records in order for captured overall condition ratings to be stored within the CityWide database
- The use of zoom camera should be explored as an alternative inspection process for the wastewater and stormwater mains

7.5 Risk Management and Project Prioritization



7.5.1 Introduction

For an organization that manages a vast and diverse inventory of capital assets deciding which capital projects to fund can be an intimidating task. There is rarely enough money available to complete all required infrastructure projects. Generally, infrastructure needs exceed municipal financial resources and capacity. This resource scarcity means projects and investments must be prioritized according to their relative importance and risk of failure in order to ensure vital services and critical infrastructure continue to be provided to the community.

Traditionally, municipalities have prioritized capital projects according to a "worst-first" approach, in which the assets in the worst condition are the highest priority for rehabilitation or replacement. However, this approach fails to account for the fact that some assets are more important to the delivery of vital services and the provision of critical infrastructure than others. As a result, many assets that should be prioritized to prevent service disruption, are left to deteriorate

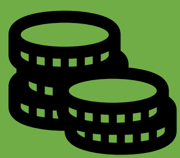
7.5.2 Risk Management

A municipality's assets are often the leading edge of its exposure to external risk. As such, it is important that policies, processes and procedures are put in place in order to manage and mitigate organizational risk exposure. Minimizing risk exposure, and using a risk-based analysis to drive asset management decision-making and capital project prioritization helps to prevent consequential asset failure and major service disruption. A robust risk management framework allows you to determine the probability and consequence of failure at both the asset class and individual asset level, and use that data to optimize capital funding decisions.

7.5.3 Economic, Social and Environmental Risks

The creation of a robust risk management framework requires the development of risk profiles that take into account three different types of risk: economic, social and environmental. This is often referred to as the “triple bottom line” of assets. These three types of risk can be defined as follows:

Table 18 Trible Bottom Line of Asset Risk

	Economic	The monetary consequences of asset failure for the organization and its customers
	Social	The consequences of asset failure on the social dimensions of the community
	Environmental	The consequence of asset failure on an asset’s surrounding environment

7.5.4 Calculating Asset Risk

Integrating a risk management framework into your asset management program requires the translation of risk potential into a quantifiable format. This will allow you to compare and analyze individual assets across your entire asset portfolio. From an asset management perspective, risk is a function of the probability of failure and, the consequence of failure.

$$Risk = Probability\ of\ Failure(PoF) \times Consequence\ of\ Failure(CoF)$$

Table 19 defines both the probability of failure and consequence of failure and the data that is used to calculate them.

Table 19 Risk Equation Explanation

	Probability of Failure	Consequence of Failure
Overview	The probability of failure directly correlates to the condition of the asset.	The consequence of failure relates to the economic, social and environmental impact of failure.
Data/Parameters	• Asset condition • % of asset life consumed • Known operational issues • Other parameters contributing to asset deterioration (e.g. traffic counts, soil types)	• **Economic**: Cost of rehabilitation or replacement • **Social**: Number of people or critical service affected • **Environmental**: Impact of failure on surrounding environment

The strength of a risk management framework depends on the reliability and availability of asset attribute data. The integration of meaningful asset attribute data that represents the economic, social and environmental risks will provide increased confidence in capital project decision-making and support evidence-based budget deliberations. While more data does not necessarily mean better outcomes, the careful selection of risk parameters that take into account the triple bottom line of assets, can optimize asset management decision-making.

7.5.5 Risk Report Summary

Workshop Date: September 29th, 2016

On September 29th, 2016 PSD delivered a workshop on developing a risk management framework in the Town of Lakeshore. PSD worked alongside staff at the Town to develop risk parameters that allow for the calculation of both the consequence and probability of asset failure. **Table 20** summarizes which asset types had customized risk profiles developed and uploaded into the CityWide database.

Table 20 Overview of Risk Models Developed by Asset Class

Asset Class	Asset Type	Risk Parameters
Roads	Road Surface (Gravel, Paved, Surface Treated)	Asset Condition Surface Material Road Class Road Type Speed Limit
Wastewater Network	Gravity Mains Force Mains	Condition Pipe Material Pipe Diameter
Stormwater Network	Stormsewer Mains	Condition Pipe Material Pipe Diameter
Water Network	Transmission Mains Distribution Mains	Condition Pipe Material Pipe Diameter

7.5.6 Project Prioritization

One of the benefits of implementing a risk management framework is that it allows you to prioritize capital projects based on the greatest risk of failure. This is not always the asset that is in the worst condition. The implementation of the developed risk management framework enables the municipality to create reports that rank assets according to the highest risk and consequence of failure.

7.5.7 Asset Class Risk Matrices

Once both the probability of failure and the consequence of failure has been calculated for each asset the results can be aggregated to obtain a high-level view of asset risk at an organizational level and for each major asset class. Risk matrices provide a valuable overview of asset risk and serve as an important medium to communicate where, and to what extent, risk is present within your asset portfolio.

The following matrices provide a visual representation of the level of risk in each asset class. Individual assets are grouped based on both their **Consequence of Failure (1-5)** and **Probability of Failure (1-5)**. The assets located closer to the bottom-left of the matrix (green boxes) are less likely to fail and have lesser consequences for the municipality if they do fail. The assets located closer to the top-right of the matrix (red boxes) are at the greatest risk of failure and will have far greater consequences for the municipality if they do.

Figure 64 Risk Matrix - Bridges & Culverts

Figure 65 Risk Matrix - Buildings

Consequence \ Probability	1	2	3	4	5
5	$4,354,657	$287,882	$489,942	$0	$0
4	$1,500,735	$319,944	$141,428	$625,605	$354,098
3	$403,329	$53,456	$60,501	$372,301	$440,170
2	$217,225	$102,583	$105,422	$69,742	$366,196
1	$85,720	$81,401	$89,415	$79,407	$183,625

Figure 66 Risk Matrix - Land Improvements

Consequence \ Probability	1	2	3	4	5
5	$4,354,657	$287,882	$489,942	$0	$0
4	$1,500,735	$319,944	$141,428	$625,605	$354,098
3	$403,329	$53,456	$60,501	$372,301	$440,170
2	$217,225	$102,583	$105,422	$69,742	$366,196
1	$85,720	$81,401	$89,415	$79,407	$183,625

Figure 67 Risk Matrix – Road Network (Road Surfaces)

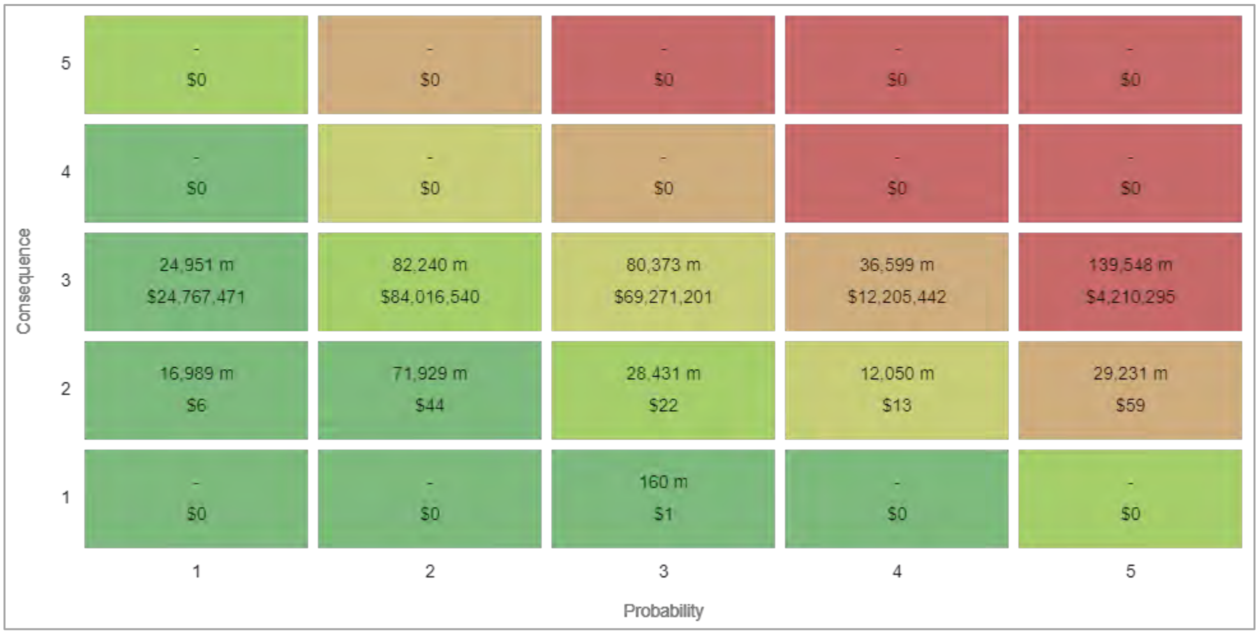


Figure 68 Risk Matrix – Wastewater Network (Sanitary Sewer Mains)

Figure 69 Risk Matrix – Stormwater (Storm Mains)

Consequence \ Probability	1	2	3	4	5
5	- $0	- $0	- $0	- $0	- $0
4	- $0	137 m $404,681	- $0	163 m $520,128	548 m $1,753,376
3	31,273 m, unit(s) $33,445,312	4,579 m $4,017,531	1,017 m $899,791	13 m $12,419	- $0
2	36,635 m, unit(s) $19,577,913	8,378 m $3,711,427	6,542 m $2,695,727	678 m $283,103	1,485 m $914,126
1	4,941 m, unit(s) $1,389,861	3,680 m $1,042,905	3,016 m $835,017	604 m $166,064	283 m $88,083

Figure 70 Risk Matrix - Vehicles

Consequence \ Probability	1	2	3	4	5
5	$300,618	$1,596,389	$1,609,592	$0	$600,862
4	$225,155	$684,833	$343,318	$1,118,730	$877,387
3	$67,792	$74,512	$91,729	$0	$224,261
2	$118,585	$64,726	$0	$145,447	$204,233
1	$17,679	$24,428	$46,519	$36,099	$47,903

Figure 71 Risk Matrix - Water Network (Water Mains)

Consequence	Probability 1	Probability 2	Probability 3	Probability 4	Probability 5
5	- $0	- $0	- $0	- $0	- $0
4	4,835 m $12,736,923	- $0	- $0	- $0	- $0
3	16,824 m $21,793,645	4,346 m $4,000,088	1,430 m $1,111,700	369 m $167,367	13,254 m $8,319,560
2	403,070 m $200,617,826	30,418 m $14,186,415	8,681 m $4,104,437	3,817 m $1,809,457	6,654 m $3,133,433
1	108,852 m $33,525,300	2,517 m $772,501	54 m $16,573	158 m $44,854	201 m $57,439

7.5.8 Recommendations

- Complete risk model development and assessment for minor asset classes including fleet, IT, land improvements etc.
- Integrate climate change risk assessment into risk management framework (exposure, vulnerability, resilience, adaptation)

7.6 Lifecycle Activity Framework

7.6.1 Introduction

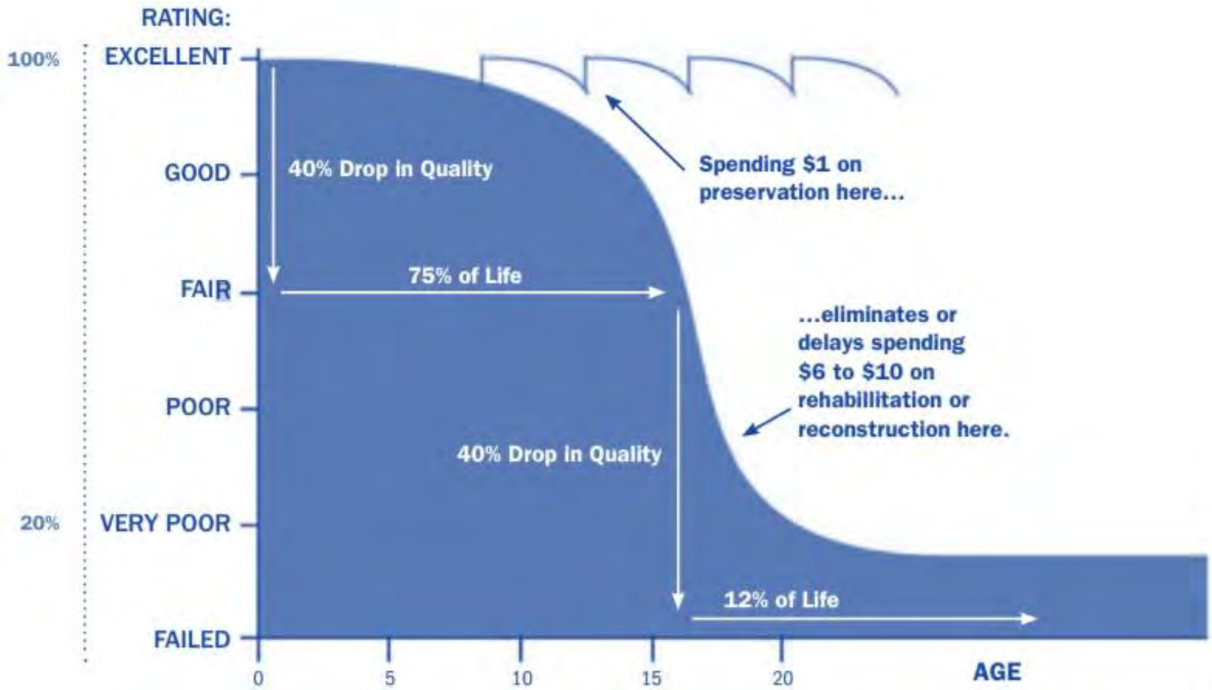
The condition or performance of most assets will deteriorate over time. This process is affected by a range of factors including an asset's characteristics, location, utilization, maintenance history and environment. This deterioration has a negative effect on the ability of an asset to fulfill its intended function, and may be characterized by increased cost, risk and even service disruption. In order to ensure that municipal assets are performing as expected and meeting the needs of your customers, it is important to establish a strategy to proactively manage the deterioration of your assets.

7.6.2 Lifecycle Activity Management

Lifecycle activity management is the practice of managing the deterioration of your assets through the implementation of a maintenance, rehabilitation and replacement strategy. An asset lifecycle strategy will ensure that you are doing the right thing to the right asset at the right time. Effective lifecycle activity management can extend the service life of assets and ensure that assets continue to meet service and performance requirements at the lowest total cost of ownership.

Figure 72 provides an example of the benefits of lifecycle activity management over the service life of an asset.

Figure 72 Deterioration Curve Outlining Benefits of Lifecycle Activities (Canadian Infrastructure Report Card 2016)



7.6.3 Developing a Lifecycle Activity Strategy

Developing a lifecycle activity strategy will help staff to determine which activities to perform on an asset and when they should be performed to maximize useful life at the lowest cost. There are a number of field intervention activities that are available to extend the life of an asset. These activities can be generally placed into one of three categories: preventative maintenance, rehabilitation and reconstruction. **Table 21** provides a description of each type of activity and the general difference in cost.

Table 21 Cost of Lifecycle Activity Types

Activity Type	Description	Example	Cost
Preventative Maintenance	Any activities that prevent defects or deteriorations from occurring	(Roads) Crack Seal	$
Rehabilitation	Any activities that rectify defects or deficiencies that are already present and may be affecting asset performance	(Roads) Mill & Resurface	$$
Reconstruction	Asset end-of-life activities that often involve the complete replacement of assets	(Roads) Surface Reconstruction	$$$

Depending on initial lifecycle management strategies, asset performance can be sustained through a combination of preventative maintenance and rehabilitation, but at some point reconstruction or replacement is required. Understanding what effect these activities will have on the lifecycle of an asset, and their cost, will enable you to make better decisions about caring for your assets. **Table 22** displays the lifecycle strategy developed for the Town of Lakeshore for an Asphalt (HCB) Road.

Table 22 Lifecycle Activity Strategy Example

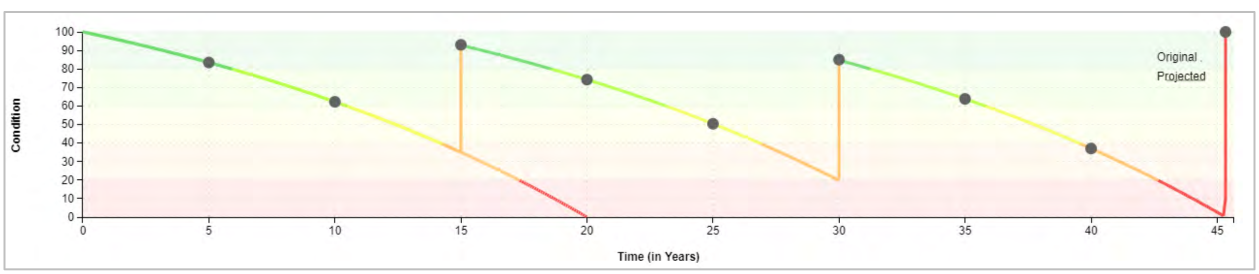
Name	Description	Event Class	Condition After	Cost	Event Range/Trigger
Crack Sealing 1	Initial Treatment	Preventative Maintenance	No Impact	$2.00 / unit	5 Years
Crack Sealing 2	Second Treatment	Preventative Maintenance	No Impact	$2.00 / unit	10 Years
Resurface – Single Lift	50 mm	Rehabilitation	93	$288 / unit	15 Years
Crack Sealing 3	Third Treatment	Preventative Maintenance	No Impact	$2.00 / unit	20 Years
Crack Sealing 4	Fourth Treatment	Preventative Maintenance	No Impact	$2.00 / unit	25 Years
Resurface – Double Lift	100 mm	Rehabilitation	85	$455 / unit	30 Years
Crack Sealing 5	Fifth Treatment	Preventative Maintenance	No Impact	$2.00 / unit	35 Years
Crack Sealing 6	Sixth Treatment	Preventative Maintenance	No Impact	$2.00 / unit	40 Years
<Asset Replacement>	End of Life Replacement	Replacement	100	-	10 to 20 Condition

7.6.4 Deterioration Curves

Understanding the point at which the cost/benefit of asset reconstruction exceeds the cost/benefit of continued preventative maintenance and rehabilitation requires a prediction of the future condition of a given asset. Assets do not generally deteriorate at a constant rate. Instead, they deteriorate along a curved line.

Deterioration curves allow you to quantify the estimated remaining useful life of your assets and calculate the impact of field intervention activities at various stages in an asset's lifecycle. **Figure 73** provides an example of what the deterioration of an asset's condition over time might look like, and how lifecycle activities impact an asset's estimated useful life.

Figure 73 Deterioration Curve – Asphalt HCB Road (Semi-Urban)



As the initial curve displays, if no lifecycle activities are performed on the road it would reach its end-of-life in 20 years and need to be reconstructed. However, timely maintenance and rehabilitation activities can extend the life of the road to 45 years – more than double the original projection – at a cost far less than simply replacing the asset at end-of-life.

7.6.5 Lifecycle Strategy and Asset Profile Development

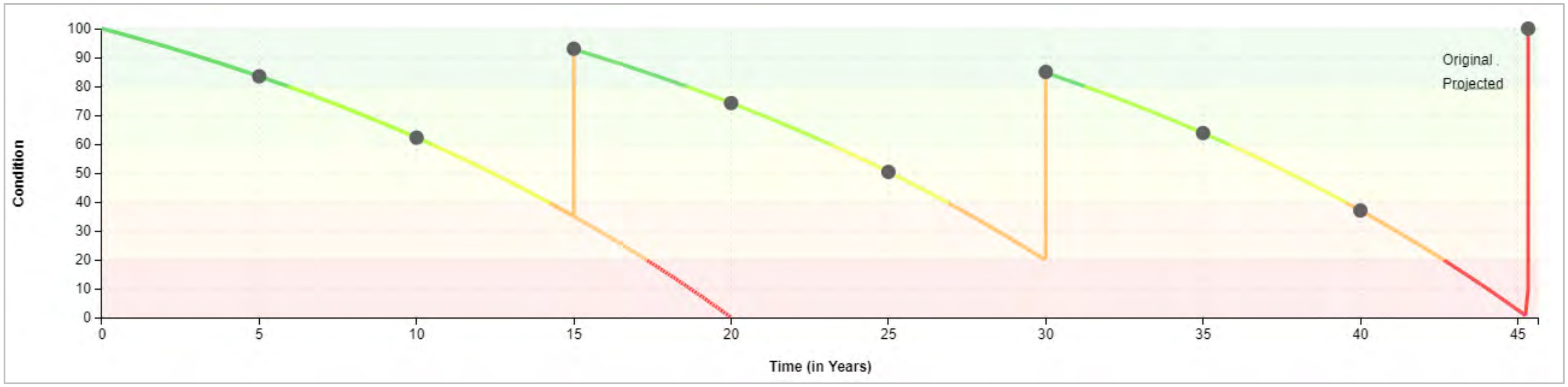
Workshop Date: September 29th, 2016

On September 29th, 2016, PSD consultants and Town of Lakeshore staff collaborated to develop customized lifecycle strategies that optimize maintenance, rehabilitation and replacement activities for major infrastructure assets. Industry best practices were integrated with existing maintenance practices in the municipality and the preferences of Town staff in order to develop a lifecycle strategy for each asset type. Each lifecycle activity strategy was then integrated with a deterioration curve in order to model the rate of deterioration for each asset.

7.6.6 Modelled Deterioration Curves

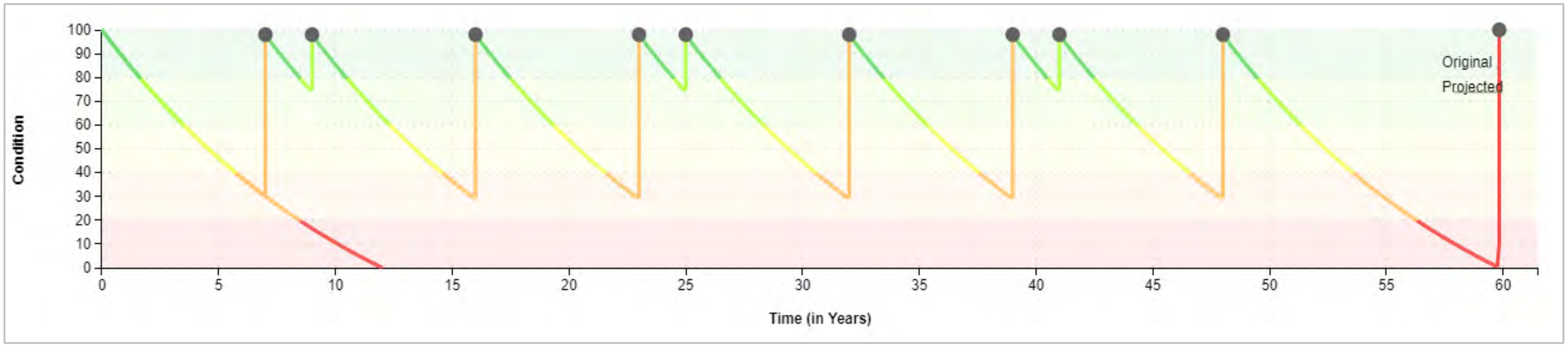
The following figures display the deterioration curves and lifecycle activity strategies that were developed for the Town of Lakeshore. Below each figure is a comparison the estimated useful life before and after implementing a lifecycle activity strategy. In each case the estimated useful life was at least doubled when lifecycle activities were modelled.

Figure 74 Deterioration Curve – Roads (HCB)



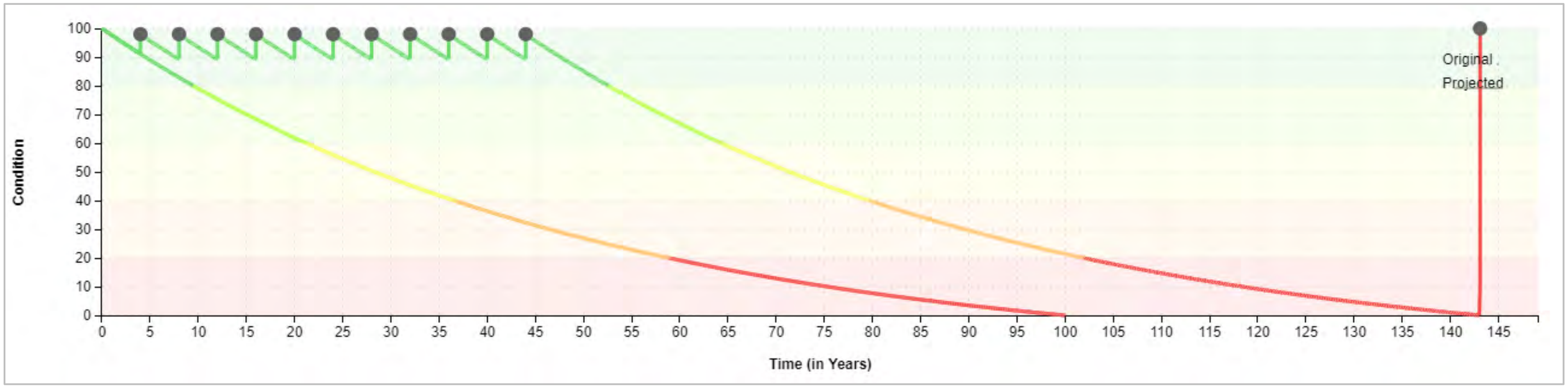
Original Estimated Useful Life: 20 years	**Extended Useful Life:** 45 years	**Difference:** +25 years

Figure 75 Deterioration Curve - Roads (LCB)



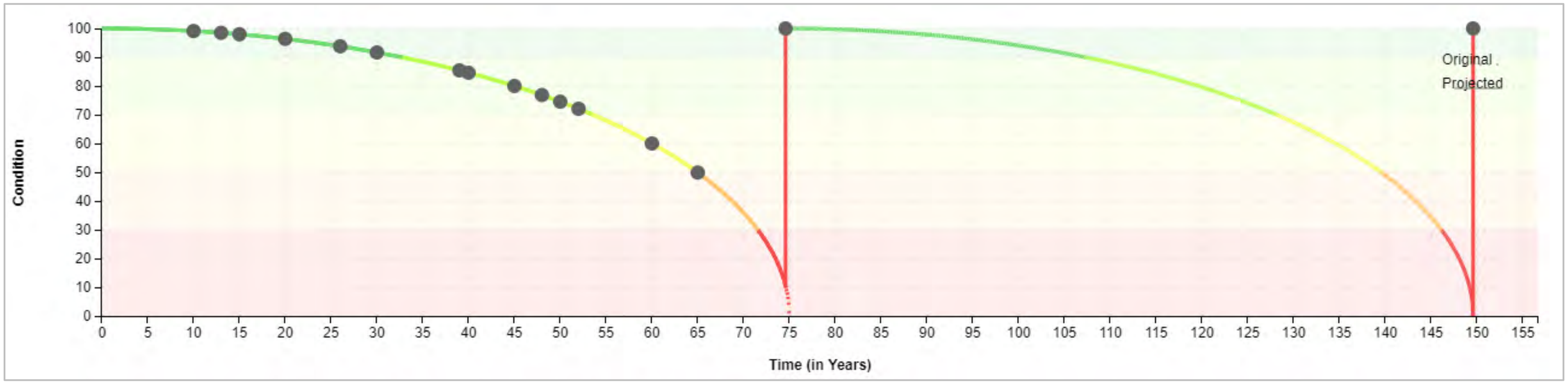
Original Estimated Useful Life: 12 years	**Extended Useful Life:** 60 years	**Difference:** +48 years

Figure 76 Deterioration Curve – Roads (Gravel)



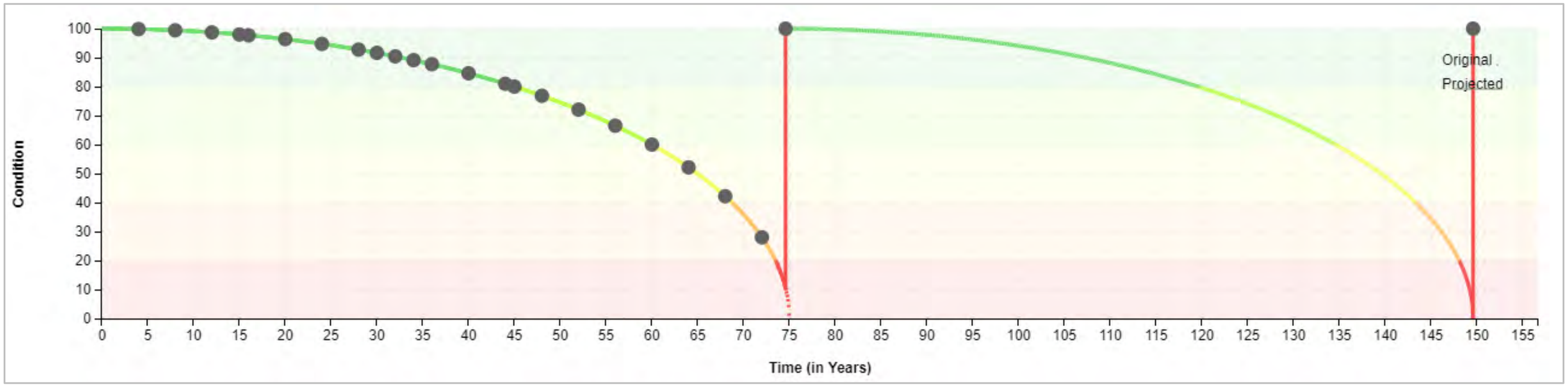
Original Estimated Useful Life: 100 years	**Extended Useful Life:** 143 years	**Difference:** +43 years

Figure 77 Deterioration Curve - Sanitary Main



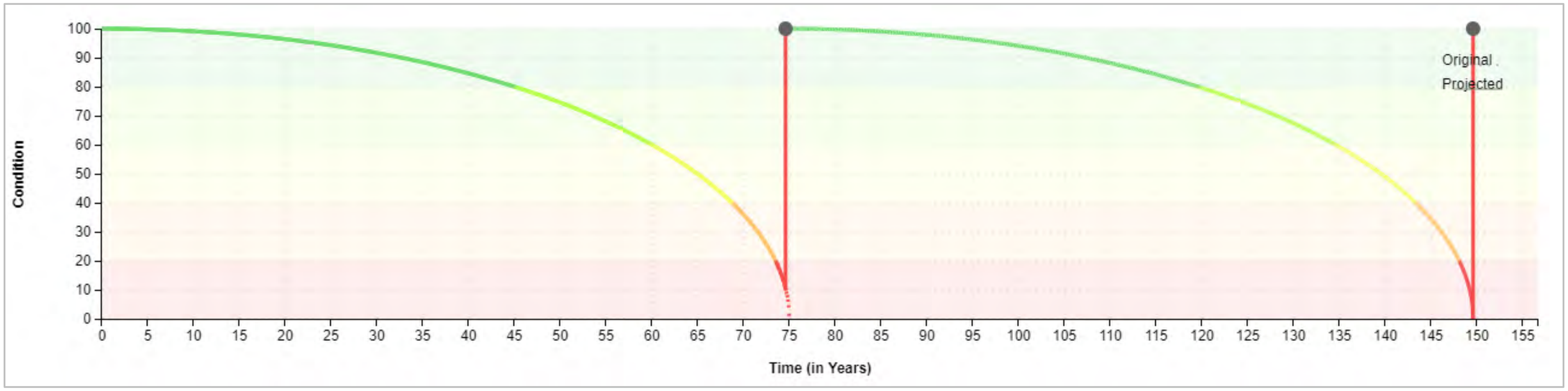
Original Estimated Useful Life: 75 years	**Extended Useful Life:** 150 years	**Difference:** +75 years

Figure 78 Deterioration Curve - Stormwater Main



Original Estimated Useful Life: 75 years	**Extended Useful Life:** 150 years	**Difference:** +75 years

Figure 79 Deterioration Curve - Water Main



Original Estimated Useful Life: 75 years	**Extended Useful Life:** 150 years	**Difference:** +75 years

7.6.7 Recommendations

- Develop lifecycle strategies for minor asset classes including fleet, IT, land improvements etc.
- Integrate lifecycle strategies based on any upcoming studies or reports (e.g. Road Needs Study, OSIM inspections)
- Update asset-specific deterioration curves as more reliable and accurate data becomes available

7.7 Growth and Demand

7.7.1 Introduction

Growth is a critical demand driver of service provision. As such, the municipality must not only account for the lifecycle cost of its existing asset portfolio, but also those of any anticipated capital projects. Demand forecasting is full of variability and uncertainty. While there is no way to be certain that forecasts are accurate, it is still critical to develop strategies that attempt to understand growth requirements. A careful examination of growth trends will provide meaningful data that should be considered alongside existing asset funding requirements in the development of an asset investment strategy.

7.7.2 Demographics and Housing

Table 23 Summary of Forecast Population and Housing Growth, 2015 to 2031 (Town of Lakeshore Official Plan Review – Growth Analysis Study, 2015)

	Total Household Units	Total Population
2015	12,940	36,200
2021	13,970	38,500
2026	14,610	39,900
2031	15,120	41,000
Annual average growth (%)	**1.12%**	**0.88%**

While the Town expects positive growth over the next 35 years, the rate of growth is below the expected growth of the Province of Ontario (1.6%). As identified in the Town's *2015 Growth Analysis Study* by Watson & Associates, the majority of new housing construction is anticipated to be comprised of mainly low-density housing forms (e.g. single and semi-detached homes), with an increase in the share of medium-density and high-density housing increasing towards the end of the forecast period due to demographic trends.

7.7.3 Economy and Employment

Table 24 Employment Growth Projections to 2026 (Town of Lakeshore Official Plan Review – Growth Analysis Study, 2015)

	Total Population	Total Employment	Activity Rate
2011	8,330	3,210	0.45
2016	8,640	3,260	0.44
2021	9,350	3,440	0.44
2026	10,280	3,620	0.42
2031	11,180	3,860	0.41
2036	11,890	4,050	0.41
2041	12,310	4,260	0.42

As Identified in the Town's 2015 Growth Analysis Study, the employment base is forecast to increase by just under 300 jobs annually. Furthermore, the Town's employment activity rate (i.e. ratio of jobs per population) is expected to increase from 29% in 2015 to 37% in 2031.

7.7.4 Demand and Levels of Service

While assessing growth is oftentimes simply a matter of collecting historical data and using measured trends to predict future growth, demand requires a slightly different approach. Both quantitative and qualitative indicators will be necessary to measure how demand is trending, and where adjustments to service delivery and asset investment may be required.

Demand is closely linked to the municipality's levels of service. As such, there will be some overlap between the development of a levels of service framework and demand analysis. Identifying and measuring technical levels of service that measure service utilization may provide sufficient data to identify and project general service trends (e.g. # of Hours of Treated Water Storage Capacity at Average Day Demand).

Obtaining qualitative data on service demand provides context to any quantitative data. A public engagement strategy can be employed as part of the level of service framework or separately to gain further insight into how individual residents are using provided services and their level of satisfaction.

7.7.5 Recommendations

- Consider the design and implemention of a network-wide demand analysis to identify rate of service utilization and customer preferences
- Integrate growth and demand forecasts into long-term asset management investment strategy
- Identify which estimated capital expenditures and significant operating costs would be related to new construction and upgraded capacity of existing assets to meet growth demands

7.8 Climate Change

7.8.1 Introduction

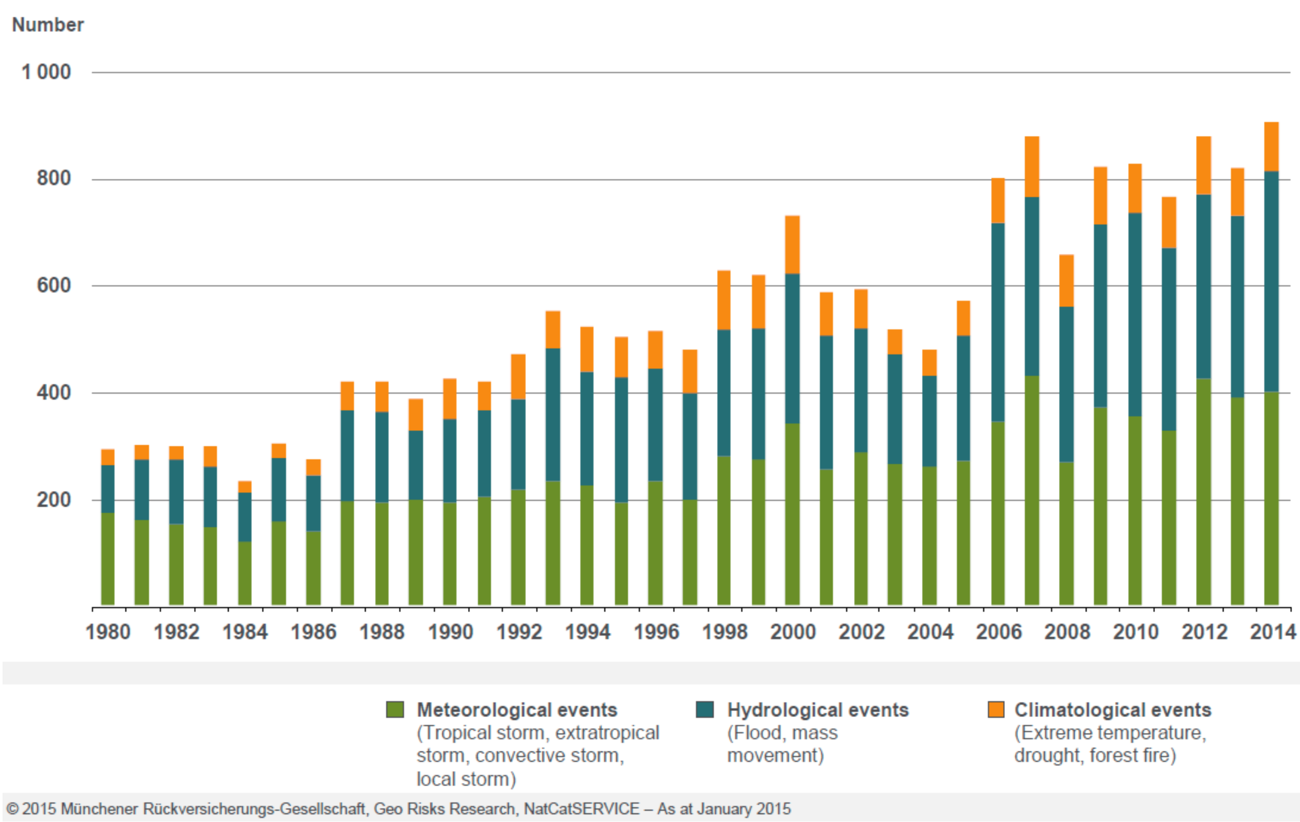
The impacts of climate change present a momentous challenge to municipal infrastructure. As temperatures and sea levels rise, and extreme weather events occur with greater frequency, it is critical that municipalities attempt to understand the emerging threat of climate change and develop strategies to ensure that vital services and critical infrastructure continue to operate as expected. This will require consideration of four key factors of climate change (exposure, vulnerability, resilience and adaptation) at every stage of an asset's lifecycle, from planning and design to maintenance and replacement.

A recent report published by the International Institute for Sustainable Development, titled *Climate Change Adaptation and Canadian Infrastructure: A Review of the Literature*, emphasized this pressing challenge. While climate change was found to have the potential to substantially affect the lifespan of infrastructure in Canada, there are several adaptive measures that can be implemented to limit costs and strengthen the resiliency of infrastructure.

7.8.2 Threat of Climate Change

Globally, there has been a significant increase in weather-related loss events resulting in property damage and/or bodily injury (**Figure 80**). Municipal infrastructure is at particular risk to meteorological, hydrological and climatological events leading to an increasing rate of asset deterioration, failure and service disruption.

Figure 80 Weather related loss events worldwide 1980-2014



According to *Canada's Sixth National Report on Climate Change 2014* the type of climate threats that are most likely to impact the Town's infrastructure include:

Higher Average Annual Temperature

- Between 1948 and 2012, the annual average air surface temperature over Canada's landmass has increased by about 1.7°C, approximately twice the global average.
- Average summer temperatures to rise by 2-4°C with more warming in the winter
- Increase in instances of heatwaves
- Increase in average rainfall

Increase in Total Annual Precipitation

- There will be significant changes in precipitation between seasons, with winters becoming wetter and summer becoming drier
- Increased rate of ice and windstorms

Increase in Frequency of Extreme Weather Events

- It is expected that the frequency and severity of extreme weather events will change
- In some geographical areas, extreme weather events will occur with greater frequency and severity than others

7.8.3 Exposure & Vulnerability

Climate change exposure is the nature and degree to which a system is exposed to significant climate variations. Exposure is a combination of the probable range of a climate stressor and the physical characteristics of a geographical location. For example, for a coastal facility, its height above sea level correlates to the exposure of the asset to rising sea levels caused by the onset of climate change. Understanding the exposure of existing infrastructure, and integrating climate change exposure into the planning and design process of asset management is a critical step towards minimizing the impacts the expected threats of climate change.

The Intergovernmental Panel on Climate Change (IPCC) defines vulnerability as "the degree to which a system is susceptible, and unable to cope with, adverse effects of climate change, including climate variability and extremes". Vulnerability considers the structural strength, integrity and function of assets or asset systems in terms of the potential for damage or functional disruption as a result of climate stressors.

7.8.4 Resilience & Adaptation

Resilience is used to refer to the capacity of a system to absorb disturbance without losing essential function. In the context of physical assets or asset systems, it is the ability of a system to continue to operate as a result of a built-in redundancy. For example, a road network's ability to operate despite the loss of a single road or bridge, or the relative ease with which it can be replaced. The context for resilience is a combination of physical constraints on repair or replacement, socio-economic limitations and system redundancy.

The IPCC defines adaptation as "the adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities". Adaptive strategies fall into three categories: protect, accommodate and retreat. In a coastal region, a protection strategy might aim to protect assets from flooding by constructing hard or soft structures by installing sea walls, beach nourishment or wetland restoration. Accommodation may call for preparing for periodic flooding by having operational plans inplace. Retreat involves no attempt to protect the asset. Under these conditions a facility or structure may be abandoned completely. Although applied specifically to coastal examples, these adaptive strategies may be generalised to all types of asset and asset geographical locations.

7.8.5 Expected Impact of Climate Change on Infrastructure

The International Institute for Sustainable Development identified the following impacts of climate change on municipal infrastructure in Canada:

Table 25 Impacts of Climate Change on Infrastructure (International Institute for Sustainable Development)

	Greater frequency of freeze-thaw cycles leading to thermal cracking, rutting, frost heave and thaw weakening
	Soil instability, ground movement and slope instability
	Triggered instability of embankments and pavement structures
	Shortened life expectancy of highways, roads and rail
	Drier conditions affecting the lifecycle of bridges and culverts
	Reduced structural integrity of building components through mechanical, chemical and biological degradation
	Increased corrosion and mold growth
	Damaged or flooded structures
	Reduced service life and functionality of components and systems
	Increased repair, maintenance, reserve fund contingencies and energy costs
	Increased water demand and pressure on infrastructure
	Loss of potable water
	Increased risk of flooding; stormwater infrastructure more frequently exceeded
	Rupture of drinking water lines, sewage lines and sewage storage tanks
	Saltwater intrusion in groundwater aquifers

7.8.6 Recommendations

- Consider the impact of climate change on the estimated useful life of all assets
- Adjust lifecycle activity strategies for assets that are particularly exposed or vulnerable to the impacts of climate change
- Develop policies that outline a commitment to consider the impact of climate change on existing infrastructure and future development
- Include climate change considerations into the design and planning phase of asset lifecycle
- Integrate impacts of climate change into risk management frameworks
- Develop disaster mitigation plans in the event of infrastructure failure

8.0 Levels of Service Framework

8.1.1 Introduction

The primary responsibility of a municipality is to ensure that they are providing adequate and sustainable services to their community. This outcome is generally supported by organizational objectives, mission statements and official plans that outline the rationale for these activities.

To ensure that organizational objectives align with expected service outcomes, it is necessary to develop a process for the systematic measurement, monitoring and evaluation of an organization's level of service. A level of service can be defined as a description of the service output for an activity or service area against which performance may be measured. To put it simply, a level of service is a measure of what a municipality is providing to its community.

8.1.2 Balancing Cost, Risk and Performance

Managing levels of service involves balancing three key factors: cost, performance and risk. Any decision to increase or decrease the provided levels of service will have an impact on each factor. For example, increasing a level of service will lead to higher costs, but this should lead to a decrease in risk and an increase in asset performance. Whereas a decrease to a level of service will mean lower costs but an increase in risk and a decrease in asset performance. As a result, managing your levels of service is all about understanding the trade-offs involved and aligning cost, performance and risk with both your organizational objectives and the desires of community stakeholders. This is one of the more challenging aspects of an asset management program.

8.1.3 Levels of Service Framework

Performance measurement is a key component of an effective level of service strategy. It allows you to analyze how well you are meeting the needs and expectations of your stakeholders, and identify where there are gaps that need to be addressed. Developing realistic levels of service using meaningful key performance indicators (KPIs) is instrumental in managing citizen expectations, identifying areas requiring higher investments, driving organizational performance and securing the highest value for money from public assets.

To facilitate this process, it is useful to develop a framework for tracking and evaluating the levels of service being provided. This will require the translation of organizational objectives and expected service outcomes into key performance indicators that reflect evolving demand on infrastructure, the organization's fiscal capacity and overall organizational objectives. A centralized database that outlines levels of service along with the KPIs that will allow you to assess whether a level of service is being met will assist with this process. The Town should then collect data on its current performance for the chosen KPIs and establish targets that reflect the current fiscal capacity of the municipality, its corporate and strategic goals, and changes in demographics that may place additional demand on service areas.

8.1.4 Guiding Principles and Core Values

As a guide to developing and measuring levels of service, it is useful to understand what the public values in the provision of municipal services. **Table 26** provides an overview of the values that the municipality should strive to accommodate when delivering services to the pubic. These are based on the values that the public generally expects to be delivered when a service is being provided to them.

Table 26 Core Values Guiding Levels of Service

Value	Description
Accessible	Services are available and accessible for customers who require them.
Reliable	Services are provided with minimal service disruption and are available to customers in line with needs and expectations.
Safe	Services are delivered such that they minimize health, safety and security risks.
Regulatory	Services meet regulatory requirements of all levels of government.
Affordable	Services are suitable for the intended function (fit for purpose).
Sustainable	Services are designed to be used efficiently and long-term plans are in place to ensure that they are available to all customers into the future.

8.1.5 Defining and Establishing Levels of Service

Figure 81 provides a basic guide to establishing levels of service.

Figure 81 Guide to Establishing Levels of Service

Core Values

- **Definition:** A description of the service outcome expected by the public
- **Process:** Establish and define core values based on expectations of stakeholders from the delivery of municipal services
- **Example:** Accessible & Reliable

LOS Statement

- **Definition:** A high-level statement that aligns with organizational objectives and describes the desired service output
- **Process:** Use the core values to develop level of service statements for each asset class or service area
- **Example:** Safe - Stormwater - "Stormwater assets protect property and people from the impacts of flooding and minimize exposure to risk "

Technical LOS

- **Definition:** A key performance indicator measured internally that indicates how an organization is performing in relation to the level of service
- **Process:** Choose technical levels of service that best measure whether the service that is being provided is consistent with the level of service statement
- **Example:** % of stormwater system resilient to a 1 in 5-year storm

Community LOS

- **Definition:** A simple, plain language description of what the customer receives
- **Process:** Choose community levels of service that describe technical levels of service in terms that easily and effectively communicate the service being provided by the municipality
- **Example:** What level of storm intensity is the municipal stormwater network designed to handle (1 in 5-year, 1 in 100-year)?

8.1.6 Selecting Technical Levels of Service

Deciding which KPIs to use when establishing technical levels of service is not a science, but there are a few key considerations to take into account. A good rule to follow in determining the best indicators is to use **SMART** system developed by the Institute of Public Works Engineering Australasia:

> KPIs should cover a **Specific** aspect of service, be **Measurable**, and have a clear plan for achieving targets (**Achievable**). They should also be **Relevant** to the level of service and strategic objective, and have a clear timeframe for when targets will be achieved (**Timebound**).

8.1.7 Levels of Service Workshop

Workshop Date: October 18th, 2017

On October 18th, 2017 PSD met with Town staff to develop a customized levels of service framework. The initial presentation and discussion covered the importance of levels of service in an asset management program and the role that it should play in decision-making moving forward. From there the workshop focused on developing meaningful level of service statements, technical and customer levels of service that take into consideration the availability of data and the ability of these indicators to provide actionable data.

The Workshop concluded with an interview of Town staff on the various internal and external factors and trends that may affect their ability to provide expected levels of service in the future. The results of this interview are summarized in **Section 8.4.**

8.2 High-Level Indicators

While technical levels of service provide a more detailed look at how the Town is providing services to the community they may not always represent the level of service actually being provided to the public. When analyzing levels of service, the municipality should take into account both the overall cost, risk and performance being provided (high-level indicators) as well as more detailed and specific performance metrics (technical levels of service).

Table 27 provides an overview of high-level indicators across all major asset classes. As referenced earlier in this section, analyzing levels of service is a matter of finding a balance between cost, performance and risk. Within this table these three factors are represented as follows:

Cost: Annual Asset Class Reinvestment Rate = $\frac{Annual\ Capital\ Expenditure}{Total\ Asset\ Class\ Replacement\ Value} \times 100$

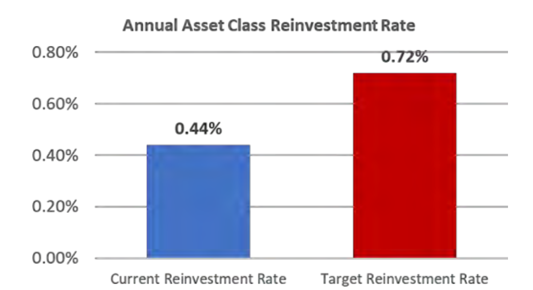
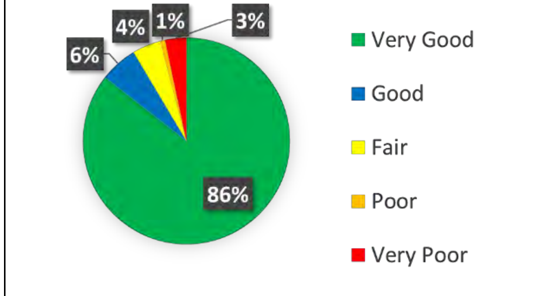
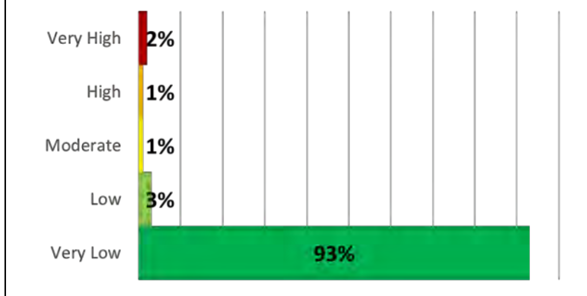
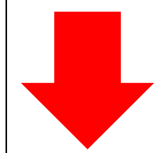
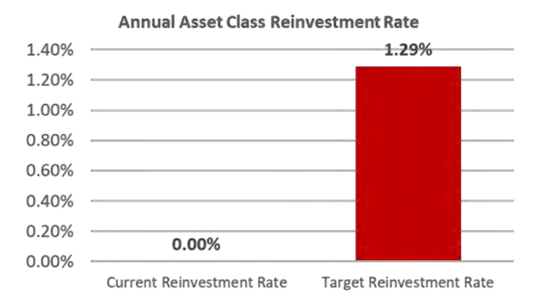
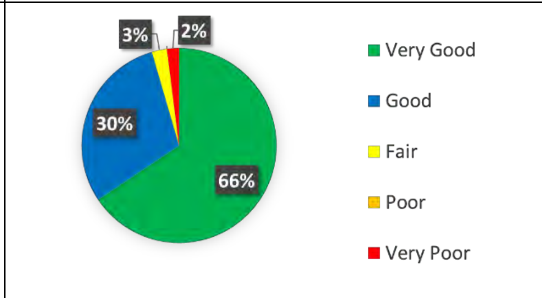
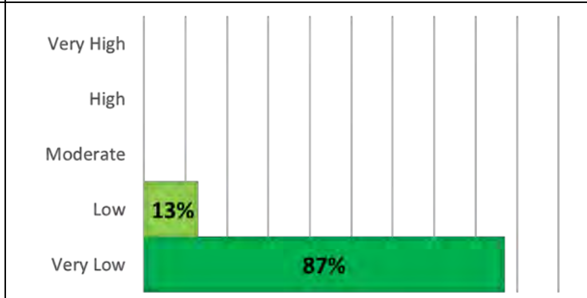
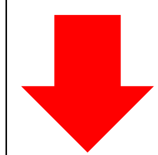
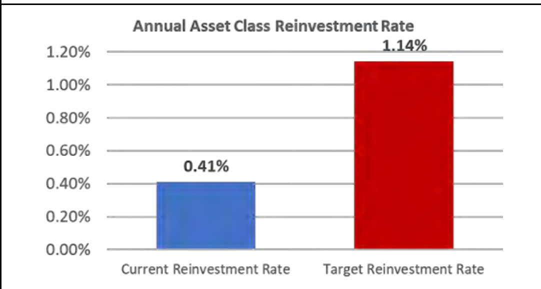
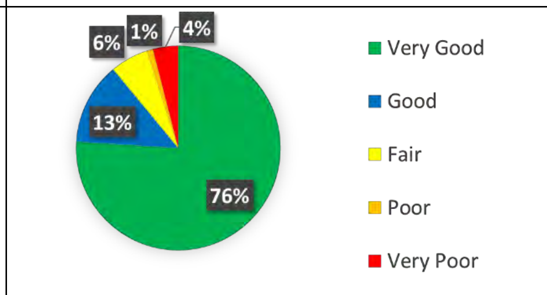
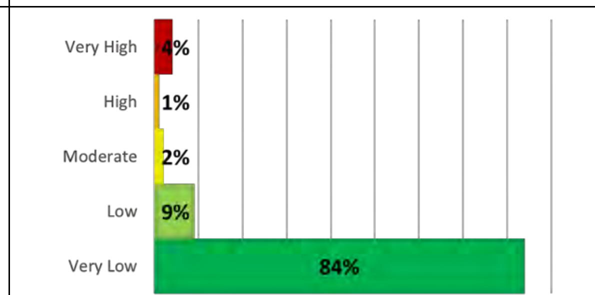
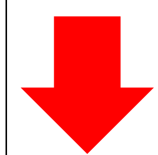
Target Reinvestment Rate is based off of the lower target published in the 2016 Canadian Infrastructure Report Card

Performance: Overall Asset Class Condition *(% of assets in very good, good, fair, poor and very poor condition*)

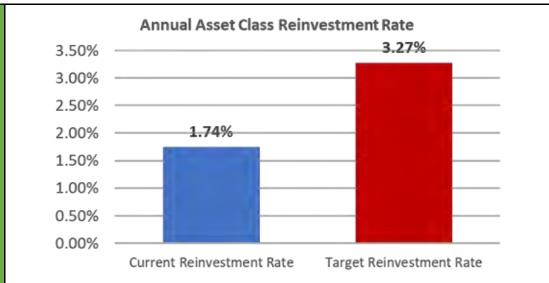
Risk: Asset Risk Distribution by Asset Class *(% of assets in very low, low, moderate, high and very high state of risk*)

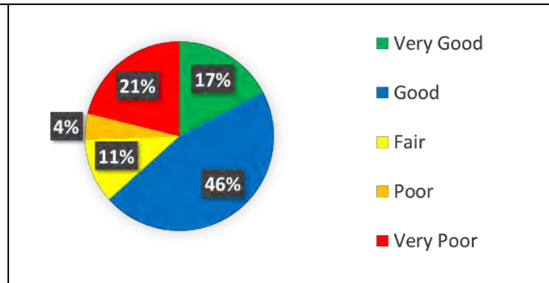
The level of service trend is a projection over the next 10+ years based on the condition and risk of failure of assets within each asset class and if asset reinvestment were to remain steady. Each asset class is given a projection of either increasing, sustained or decreasing levels of service.

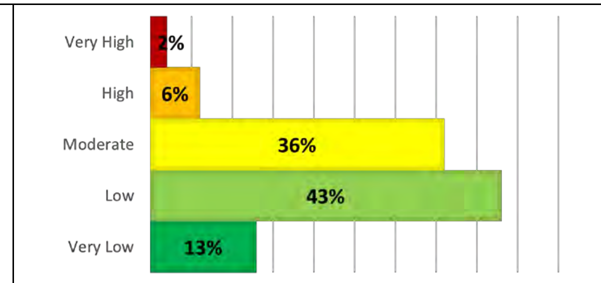
Table 27 Levels of Service (High-Level Indicators)

Asset Class	Annual Asset Class Reinvestment Rate	Condition	Risk	Levels of Service Trend
Water				
Wastewater				
Stormwater				

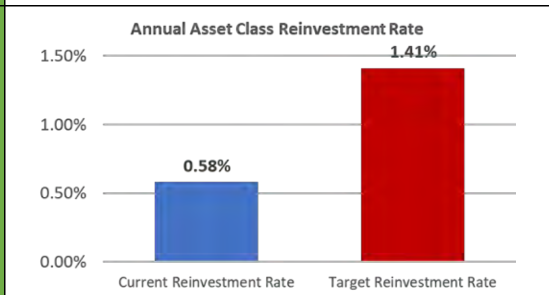
Road Network

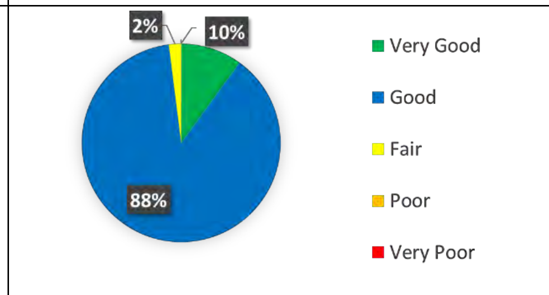


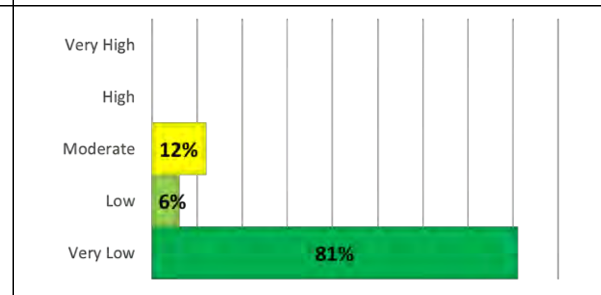




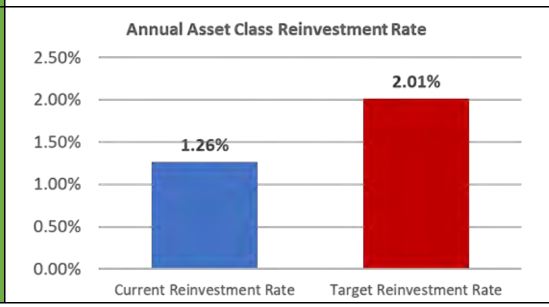
Bridges and Culverts

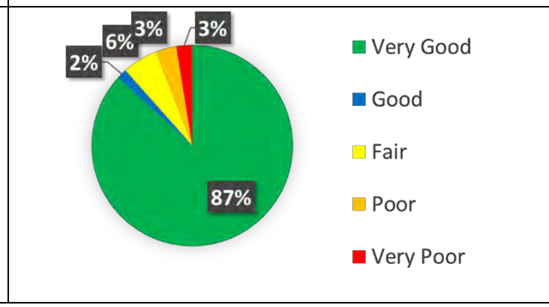


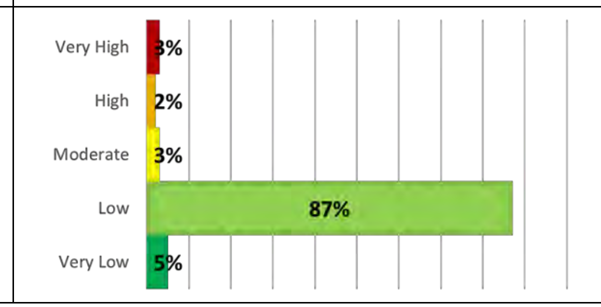




Buildings







8.3 Customized Levels of Service Framework

As part of PSD's Roadmap, the Town worked alongside PSD staff to develop a centralized database for tracking and evaluating provided levels of service. The following tables outline the Town's customized levels of service framework. Levels of service should be tracked annually for all asset classes. Regular evaluation will allow the Town to identify service deficiencies and develop asset management strategies to adequately address them.

Table 28 Levels of Service Framework – Water

Water			
Core Value	**Level of Service Statement**	**Community Level of Service**	**Technical Level of Service**
Accessible & Reliable	A reliable water supply is provided with minimal service disruptions; system failures and service requests are responded to promptly; water connections are available and accessible to all properties within the public water system	Map(s) and/or description of which user groups and/or areas of the community (e.g., residential, commercial, industrial, agricultural, institutional, mixed-use) are connected to the municipal drinking water system	% of properties serviced by the public potable water network % of properties serviced by fire flow % of properties with insufficient fire flow # of connection-days where service is interrupted due to water main breaks
Safe & Regulatory	Water supply is safe to drink and meets all regulatory requirements	An overview of Ontario drinking water standards, including an explanation of the inconvenient impacts of when they are not met (e.g., boil water advisories); and a discussion of the frequency of boil water advisories and service interruptions	# of connection-days where a boil water advisory notice is in place per year # of water quality customer complaints
Affordable	Water services are affordable and household charges are fair and reasonable	What is the amount of the average monthly residential water bill?	(Average annual residential water bill / average household income) * 100 O&M Cost (includes treatment and distribution) / pipe km length
Sustainable	Water resources are used efficiently, and long-term plans are in place for the sustainability of the water supply and all water infrastructure	When was the last time that the water AMP was reviewed?	Water AMP updated reviewed annually

Table 29 Levels of Service Framework - Wastewater

Wastewater			
Core Value	**Level of Service Statement**	**Community Level of Service**	**Technical Level of Service**
Accessible & Reliable	A reliable wastewater service is provided with minimal service disruptions; system failures and service requests are responded to promptly; wastewater connections are available and accessible to all properties within the sanitary collection system	Map(s) and/or description of which user groups or areas of the community (e.g., residential, commercial, industrial, agricultural, institutional, mixed-use) are connected to the municipal wastewater system	% of properties serviced by the municipal wastewater system
			# of customer complaints on wastewater system
			# of wastewater system complaints requiring action
			# of wastewater system blockages
Safe & Regulatory	Wastewater is managed without risk or hazard to public health; there is full compliance with all regulatory requirements	Explanation of how stormwater can get into sewers that are cracked, causing sewage to overflow into streets or backup into basements; and a description of how resilient infrastructure is to avoid this	# connection-days of backups per year
			# of MOECC effluent violations per year due to wastewater discharge
Affordable	Wastewater services are affordable and household charges are fair and reasonable	What is the amount of the average monthly residential wastewater bill?	(Average annual residential sanitary sewer bill / average household income) * 100
			O&M Cost (includes treatment and collection) / km pipe length
Sustainable	Wastewater resources are used efficiently, and long-term plans are in place for the sustainability of wastewater treatment and infrastructure	When was the last time that the wastewater AMP was reviewed?	Wastewater AMP reviewed annually

Table 30 Levels of Service Framework - Stormwater

Stormwater			
Core Value	**Level of Service Statement**	**Community Level of Service**	**Technical Level of Service**
Accessible & Reliable	A reliable stormwater system is provided, with minimal service disruptions; service requests are responded to promptly within the municipal stormwater network	Map(s) and/or descriptions of which areas of the community or user groups are protected from flooding, including how much protection they have	# of customer complaints on stormwater system
			# of stormwater system complaints requiring action
Safe & Regulatory	Stormwater system protects property and people from the impacts of flooding and minimize exposure to risk	What storm intensity is the municipal stormwater network designed to handle (1 in 5-year, 1 in 100-year)?	% of properties resilient to 1 in 100-year storm
			% of storm sewer system resilient to a 1 in 5-year storm
Affordable	Stormwater system is affordable	What is the O&M cost to maintain the stormwater network per household?	O&M Cost / km of stormsewer and urban ditches
Sustainable	Stormwater assets are managed efficiently, and long-term plans are in place for the sustainability of stormwater infrastructure	When was the last time that the stormwater AMP was reviewed?	Stormwater AMP reviewed annually

Table 31 Levels of Service Framework - Roads

Road Network			
Core Value	**Level of Service Statement**	**Community Level of Service**	**Technical Level of Service**
Accessible & Reliable	The road network is convenient and accessible to the whole community with minimal service disruptions; service requests are responded to promptly in accordance with minimum maintenance standards	Map(s) of the road network and/or a description of its level of connectivity	Lane-km of arterial roads (MMS classes 1 and 2) per land area (km/km^2)
			Lane-km of collector roads (MMS classes 3 and 4) per land area (km/km^2)
			Lane-km of local roads (MMS classes 5 and 6) per land area (km/km^2)
			Lane-km of arterial roads per household
			Lane-km of collector roads per household
			Lane-km of local roads per household
Safe & Regulatory	The network feels safe to use; traffic signs and markings are easy to see and understand; minimum maintenance standards are met	Description of Minimum Maintenance Standards for sidewalks (surface discontinuities etc.)	% of sidewalks inspected annually
			# of reported incidents related to the road network
			# of reported incidents related to the sidewalk network
Affordable	The road network is managed at the lowest possible cost for the expected level of service	What is the O&M cost to maintain the road network per household?	O&M costs for roads / lane-km (excluding winter control)
Sustainable	There are long-term plans in place for the sustainability of the road network	When was the last time the Road Network AMP was reviewed?	Road Network AMP reviewed annually
		Images that explain the different levels of road class pavement condition	Average pavement condition index (PCI)

Table 32 Levels of Service Framework - Bridges and Culverts

Bridges and Culverts			
Core Value	**Level of Service Statement**	**Community Level of Service**	**Technical Level of Service**
Accessible & Reliable	Bridges and culverts provide reliable access to the road network for vehicles and pedestrians	Description of the ability of the bridge to provide access to different users (e.g., heavy transport vehicles, motor vehicles, emergency vehicles, pedestrians, cyclists).	% of bridges with loading or dimensional restrictions
			Average duration of bridge closure (days)
Safe & Regulatory	Bridges and culverts provide safe vehicular and pedestrian passage, and all structures are fully compliant with regulatory requirements	Description of OSIM inspections (how often do they, what are the most recent results?).	% of bridges inspected every two years
Affordable	Bridges and culverts are managed at a reasonable cost for the expected level of service	What is the O&M cost to maintain bridges and culverts per household?	O&M costs for bridges and culverts / m^2
Sustainable	There are long-term plans in place for the sustainability of all bridges and culverts	When was the last time the Bridges & Culverts AMP was reviewed?	Bridges & Culverts AMP reviewed annually
		Description or images of bridge condition and what it means for the end-user	Average Bridge Condition Index (BCI)

Table 33 Levels of Service Framework - Buildings and Facilities

Buildings and Facilities			
Core Value	**Level of Service Statement**	**Community Level of Service**	**Technical Level of Service**
Accessible & Reliable	Provision of buildings and facilities meets the needs of customers; all buildings and facilities provide adequate physical access	List of facilities that meet AODA standards and any work that has been undertaken to achieve alignment	Average # of days community facilities are open and available for use (as per standard operating hours)
			% of facilities that meet AODA standards
Safe & Regulatory	Buildings and facilities are safe for occupants and do not cause a hazard to the public	Record of monthly and annual inspections	% of facilities where annual inspections have been completed
Affordable	Cost for the available facilities is fair and reasonable; buildings and facilities are managed at the lowest possible cost for the expected level of service	What is the O&M cost to maintain all community facilities per household?	O&M cost / # of community facilities
			Total equivalent kWh energy consumption / ft^2 of all buildings and facilities
Sustainable	There are long-term plans in place for the sustainability of all buildings and facilities	When was the last time that the buildings and facilities AMP was reviewed?	Buildings and facilities AMP reviewed annually

Table 34 Levels of Service - Parks and Trails

Parks & Trails			
Core Value	**Level of Service Statement**	**Community Level of Service**	**Technical Level of Service**
Accessible & Reliable	Parks and trails are provided that meet recreational needs and are reasonably accessible to the community	A map of the municipality with all municipal parks and trails highlighted	% of park area in the municipality
			Km of trails
Safe & Regulatory	Parks and trails are safe for use by the community	Describe the parks and trails inspection process and timelines for inspections	# of customer complaints about unsafe conditions in parks and on trails
			# of inspections per parks and trails
Affordable	Parks and trails are managed at the lowest possible cost to provide the expected level of service	What is the O&M cost to maintain all parks and trails per household?	O&M cost for parks/sports fields per # of parks/sports fields
			O&M cost for trails per km of trails
Sustainable	There are long-term plans in place for the sustainability of all parks and trails	When was the last time that the parks and trails AMP was reviewed?	Parks and trails AMP reviewed annually

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8.4 Trends Impacting Levels of Service

The provision of desired levels of service is not simply a matter of proper asset management. There are a wide range of internal and external factors that may impact the ability of a municipality to provide reliable public services. As part of the Levels of Service Workshop, PSD interviewed Town staff to gain greater insight into the challenges and opportunities facing the municipality now and into the future. The following sections summarize the results of this interview:

Fiscal Capacity

Maintaining municipal infrastructure and providing desired levels of service requires the allocation of adequate financial resources. Fiscal capacity and budget constraints are a constant concern for staff attempting to manage the maintenance and rehabilitation of municipal infrastructure. All asset categories have been impacted by the lack of fiscal capacity; especially the road network and stormwater system.

The Town has had limited success in securing provincial and federal government grants that are meant to support investment in infrastructure. While the Town was approved for the application-based portion of the Ontario Community Infrastructure Fund, there have been very few other grants available and accessible to support infrastructure investment.

Aging Infrastructure

The current state of capital assets will determine the quality of services the municipality can deliver to its residents. As such, levels of service will be impacted by the existing capacity of assets to deliver those services, and may vary with planned maintenance, rehabilitation or replacement activities and timelines. The Town is starting to encounter significant deterioration in a number of buildings and facilities, and may need a new fire hall, town hall and police services building in the near future. Both the road and stormwater network are also suffering from aging infrastructure and there is a considerable backlog of capital projects. On the other hand, much of the Town's underground infrastructure (water, wastewater) has been installed recently and is in a good state of repair.

Climate Change

Forecasting for infrastructure needs based on climate change remains an imprecise science. However, broader environmental and weather patterns have a direct impact on the reliability of critical infrastructure services. As such, it is important that the impacts of weather events on municipal infrastructure are accounted for in the development of asset management strategies.

The Town has experienced two 1-in-100-year rain storms within the past 11 months, placing a tremendous amount of strain on stormwater assets and rates of flooding. In addition to complaints by citizens about flooding, these rainfall events caused the closure of the Patillo Business Park for an extended period of time. The expectation of longer and more intense wet and dry periods may impact both the condition and reliability of the road network in addition to underground infrastructure. Any increase to the capital needs of municipal infrastructure to combat the impacts of climate change will place a tremendous strain on municipal resources.

While Council has shown an increased attentiveness to the impacts of climate change on municipal infrastructure, there are few plans or strategies currently in place to deal with them. In response to recent extreme weather events the Town is planning to develop a more structured approach to emergency management.

Demographic Change

The composition of residents in a municipality can also serve as an infrastructure demand driver, and as a result, can change how a municipality allocates its resources. For example, an aging population may require diversion of resources from parks and sports facilities to additional wellness centers. Population growth is also a significant demand driver for existing assets, and may require the municipality to construct new infrastructure to parallel community expectations.

To this point growth forecasts have not been integrated into an asset management plan or financial strategy. Based on observed trends, the town is experiencing rapid growth and development. Town staff expect that the current pace of growth will place great strain on the level of service provided.

Service Usage

Changing demographics, aging infrastructure and climate change mitigation can all have an impact on service usage. For rate-funded assets, such as the water distribution system, a decrease in service usage can mean a decrease in generated revenue. There has been a noticeable decline in water consumption due to ongoing water conservation efforts. User rates will have to be adjusted accordingly to ensure that water infrastructure is managed sustainably.

Parks and recreation has experienced rapid growth in recent years, and has been accompanied by even greater demands for additional facilities (pools, libraries, soccer fields etc.). This has placed tremendous added pressure on Town staff resources and capacity.

Socio-Political Expectations

The general public will often have their own opinions on how a public service should be delivered. The public should be consulted in establishing LOS; however, the discussions should be centered on clearly outlining the lifecycle costs associated with delivering any improvements in LOS. Recently there have been concerns by the public about instances of flooding even though in many cases the Town has little control over this occurrence. With growth there has also been an increase in younger families and demand for increased recreational facilities and programming, including walking trails.

In Ontario, the Municipal Act governs the ability of municipalities to legislate and act. As such, municipalities are subject to a wide range of provincial legislation that can impact municipal responsibilities. The enactment of new regulations can place strain on municipal resources and capacity, ultimately impacting levels of service. Town staff noted that there have been a number of new provincial regulations that have wide ranging impacts on service provision. These include bills regulating asset management (Bill 6), workplace conditions and wages (Bill 148) and additional requirements increasing measures of transparency and accountability.

At the Federal level, the government’s plan to legalize marijuana will have wide-ranging impacts on the duties and responsibilities of municipalities. Without additional funding, it will be difficult to meet regulatory requirements without impacting existing levels of service.

Organizational Change and Capacity

Managing municipal assets and delivering public services requires adequate organizational capacity. The availability of staff to facilitate these projects is a concern for many municipalities. With an aging workforce and the upcoming retirements, it is important to identify how staffing changes may alter service provision. Town staff identified organizational capacity as a big hurdle. There has been a lot of recent staff turnover and retirements impacting day-to-day operations. This includes six managers who are eligible within the next two years to retire. While there has been an attempt to add new staff capacity, it has been difficult to keep up with growth and address the backlog of projects.

8.4.1 Recommendations

- Continue to ensure current levels of service as part of a comprehensive performance measurement framework
- Once current levels of service have been measured, establish target levels of service
- Evaluate levels of service on an annual basis and adjust targets in collaboration with Council in an effort to balance community expectations, cost, risk and performance
- Communicate provided levels of service with the public and engage in public consultation to identify emerging perceptions and priorities

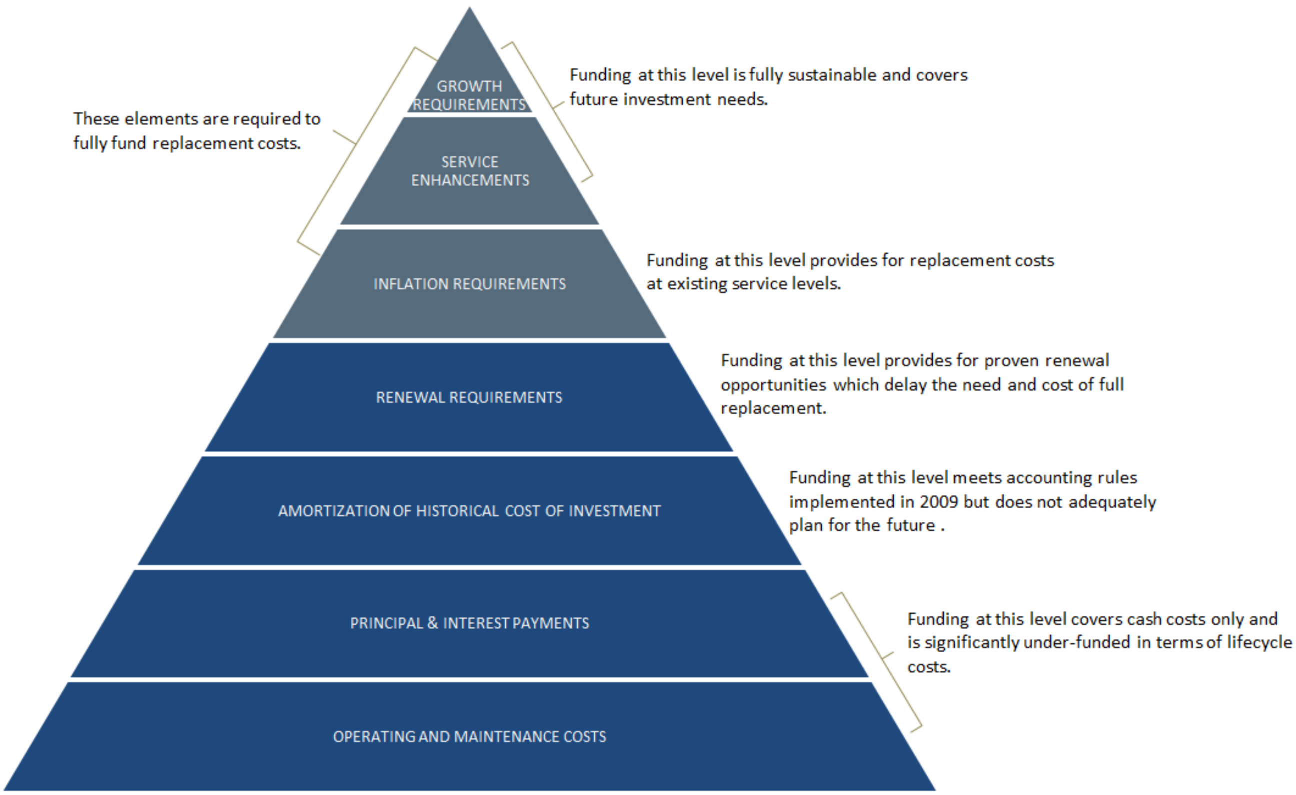
Minto

9.0 Financial Strategy

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

9.1 Financial Strategy Overview

The following pyramid depicts the various cost elements and resulting funding levels that should be incorporated into AMPs that are based on best practices.



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

1. The financial requirements (as documented in the State of Local Infrastructure – Section 6.0) for:
    a. Existing assets
    b. Existing service levels
    c. Requirements of contemplated changes in service levels (none identified for this plan)
    d. Requirements of anticipated growth (none identified for this plan)

2. Use of traditional sources of municipal funds:

a. Tax levies
b. User fees
c. Reserves
d. Debt
e. Development charges

3. Use of non-traditional sources of municipal funds:
   a. Reallocated budgets
   b. Partnerships
   c. Procurement methods

4. Use of Senior Government Funds:
   a. Gas tax
   b. Annual grants

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

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

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

This AMP includes recommendations that avoid long-term funding deficits.

9.2 Funding Objective

We have developed two scenarios that would enable Lakeshore to achieve full funding within 5 to 20 years for the following assets:

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

The two scenarios are as follows:

1. **End of Life Scenario:** Based on the assumption that assets deteriorate and – without regularly scheduled maintenance and rehabilitation – are replaced at the end of their service life
2. **Lifecycle Activities Scenario:** Based on the assumption that lifecycle activities are performed at the optimal time to extend the estimated useful life of assets at the lowest cost; assets are replaced at the end of the extended estimated useful life

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

9.3 Financial Profile: Tax Funded Assets

9.3.1 Current Funding Position – End of Life Scenario

Table 35 and **Table 36** outline, by asset class, Lakeshore's average annual asset investment requirements, current funding positions, and funding increases required to achieve full funding on assets funded by taxes under the end of life scenario.

Table 35 Summary of Infrastructure Requirements & Current Funding Available - End of Life Scenario

Asset Class	Average Annual Investment Required - End of Life Scenario	2017 Annual Funding Available					Annual Deficit/Surplus
		Taxes	Gas Tax	OCIF	Taxes to Reserves	Total Funding Available	
Road Network	15,400,000	195,000	1,650,000	626,000	2,861,000	5,332,000	10,068,000
Bridges & Culverts	796,000	0	0	0	328,000	328,000	468,000
Stormwater Network	985,000	0	0	0	291,000	291,000	694,000
Buildings	1,521,000	90,000	0	0	865,000	955,000	566,000
Land Improvements	360,000	20,000	0	0	0	20,000	340,000
Machinery & Equipment	752,000	116,000	0	0	248,000	364,000	388,000
Vehicles	590,000	87,000	0	0	248,000	335,000	255,000
Total:	20,404,000	508,000	1,650,000	626,000	4,841,000	7,625,000	**12,779,000**

Under the end of life scenario, the average annual investment requirement for the above categories is $20,404,000. Annual revenue currently allocated to these assets for capital purposes is $7,625,000 leaving an annual deficit of $12,779,000. To put it another way, under an end of life scenario, these infrastructure classes are currently funded at 37% of their long-term requirements.

9.3.2 Full Funding Requirements – End of Life Scenario

In 2017, Lakeshore had annual tax revenues of $26,716,000. As illustrated in **Table 36**, without consideration of any other sources of revenue or cost containment strategies, full funding would require the following tax change over time:

Table 36 Tax Change Required for Full Funding - End of Life Scenario

	Tax Change Required for Full Funding
Road Network	37.7%
Bridges & Culverts	1.8%
Stormwater Network	2.6%
Buildings	2.1%
Land Improvements	1.3%
Machinery & Equipment	1.5%
Vehicles	1.0%
Total:	**48.0%**

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

a) Lakeshore's formula based OCIF grant is scheduled to grow from $626,000 in 2017 to $1,375,000 in 2019.
b) As illustrated in **Table 56**, Lakeshore's debt payments for these asset categories will be decreasing by $178,000 over the next 5 years and by $333,000 over the next 10 years. Although not shown in the table, debt payment decreases will be $333,000 and $1,240,000 over the next 15 and 20 years respectively. Under the "pay as you go" strategy like Lakeshore has, these reductions would normally be applied to the infrastructure deficit as they happen. Since annual requirements are expected to increase as asset inventory data becomes more complete, Lakeshore staff have elected to hold back any debt payment decreases so that they are available to apply to those new requirements.

Table 37 outlines the use of this information and presents a number of options:

Table 37 Effect of Changes in OCIF Funding and Reallocating Decreases in Debt Costs - End of Life Scenario

	Without Capturing Changes				With Capturing Changes			
	5 Years	10 Years	15 Years	20 Years	5 Years	10 Years	15 Years	20 Years
Infrastructure Deficit	12,779,000	12,779,000	12,779,000	12,779,000	12,779,000	12,779,000	12,779,000	12,779,000
Change in OCIF Grant	N/A	N/A	N/A	N/A	-749,000	-749,000	-749,000	-749,000
Change in Debt Costs	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Resulting Infrastructure Deficit	12,779,000	12,779,000	12,779,000	12,779,000	12,030,000	12,030,000	12,030,000	12,030,000
Resulting Tax Increase Required:								
Total Over Time	**48.0%**	**48.0%**	**48.0%**	**48.0%**	**45.0%**	**45.0%**	**45.0%**	**45.0%**
Annually	9.6%	4.8%	3.2%	2.4%	9.0%	4.5%	3.0%	2.3%

The next section of this report details the opportunities available in investing in a lifecycle activity strategy versus an end of life strategy.

9.3.3 Current Funding Position – Lifecycle Activities Scenario

As described in this report, investing in a lifecycle activity strategy (as opposed to an end of life replacement strategy) would enable Lakeshore to lower its average annual capital requirements by $2,071,000. The table below summarizes the difference:

Table 38 Annual Capital Requirements Comparison – End of Life vs. Lifecycle Activities

	Annual Capital Requirements		
	End of Life	Lifecycle Activities	Change
Road Network	15,400,000	9,979,000	5,421,000
Bridges & Culverts	796,000	796,000	0
Stormwater Network	985,000	820,000	165,000
Buildings	1,521,000	1,521,000	0
Land Improvements	360,000	360,000	0
Machinery & Equipment	752,000	752,000	0
Vehicles	590,000	590,000	0
Total:	20,404,000	14,818,000	5,586,000
Note:			
Change is net of annual cost of lifecycle events			

Table 39 and **Table 40** restate, by asset class, Lakeshore's average annual asset investment requirements, current funding positions, and funding increases required to achieve full funding on assets funded by taxes under the lifecycle activities scenario. The bottom line difference to the information presented in the end of life scenario is that annual requirements and the annual deficit both decrease by $5,586,000. Current funding remains unchanged.

Table 39 Summary of Infrastructure Requirements & Current Funding Available - Lifecycle Activities Scenario

Asset Class	Average Annual Investment Required – Lifecycle Activities Scenario	2017 Annual Funding Available					Annual Deficit/Surplus
		Taxes	Gas Tax	OCIF	Taxes to Reserves	Total Funding Available	
Road Network	9,979,000	195,000	1,650,000	626,000	2,861,000	5,332,000	4,647,000
Bridges & Culverts	796,000	0	0	0	328,000	328,000	451,000
Stormwater Network	820,000	0	0	0	291,000	291,000	529,000
Buildings	1,521,000	90,000	0	0	865,000	955,000	566,000
Land Improvements	360,000	20,000	0	0	0	20,000	340,000
Machinery & Equipment	752,000	116,000	0	0	248,000	364,000	388,000
Vehicles	590,000	87,000	0	0	248,000	335,000	255,000
Total:	14,818,000	508,000	1,650,000	626,000	4,841,000	7,625,000	7,176,000

Under the lifecycle activities scenario, the average annual investment requirement for the above categories is $14,818,000. Annual revenue currently allocated to these assets for capital purposes is $7,625,000 leaving an annual deficit of $7,176,000. To put it another way, under a lifecycle events scenario, these infrastructure classes are currently funded at 52% of their long-term requirements.

In 2017, Lakeshore had annual tax revenues of $26,716,000. As illustrated in **Table 40**, without consideration of any other sources of revenue or cost containment strategies, full funding would require the following tax change over time:

Table 40 Tax Change Required for Full Funding - Lifecycle Activities Scenario

	Tax Change Required for Full Funding
Road Network	17.4%
Bridges & Culverts	1.8%
Stormwater Network	2.0%
Buildings	2.1%
Land Improvements	1.3%
Machinery & Equipment	1.5%
Vehicles	1.0%
Total:	27.1%

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

a) Lakeshore's formula based OCIF grant is scheduled to grow from $626,000 in 2017 to $1,375,000 in 2019.
b) As illustrated in **Table 56**, Lakeshore's debt payments for these asset categories will be decreasing by $178,000 over the next 5 years and by $333,000 over the next 10 years. Although not shown in the table, debt payment decreases will be $333,000 and $1,240,000 over the next 15 and 20 years respectively. Under the "pay as you go" strategy like Lakeshore has, these reductions would normally be applied to the infrastructure deficit as they happen. Since annual requirements are expected to increase as asset inventory data becomes more complete, Lakeshore staff have elected to hold back any debt payment decreases so that they are available to apply to those new requirements.

Table 41 outlines the use of this information and presents a number of options:

Table 41 Effect of Changes in OCIF Funding and Reallocating Decreases in Debt Costs - Lifecycle Activities Scenario

	Without Capturing Changes				With Capturing Changes			
	5 Years	10 Years	15 Years	20 Years	5 Years	10 Years	15 Years	20 Years
Infrastructure Deficit	7,193,000	7,193,000	7,193,000	7,193,000	7,193,000	7,193,000	7,193,000	7,193,000
Change in OCIF Grant	N/A	N/A	N/A	N/A	-749,000	-749,000	-749,000	-749,000
Change in Debt Costs	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Resulting Infrastructure Deficit	7,193,000	7,193,000	7,193,000	7,193,000	6,444,000	6,444,000	6,444,000	6,444,000
Resulting Tax Increase Required:								
Total Over Time	**27.1%**	**27.1%**	**27.1%**	**27.1%**	**24.1%**	**24.1%**	**24.1%**	**24.1%**
Annually	5.4%	2.7%	1.8%	1.3%	4.8%	2.4%	1.6%	1.2%

9.3.4 Financial Strategy Recommendations

The following table summarizes the key financial differences between the end of life scenario and the lifecycle events scenario:

Table 42 Budget Scenario Comparison - Tax Funded Assets

				Annual Tax Change Required				
Scenario	Annual Requirement	Current Annual Funding	Current Annual Deficit	Total	5 Years	10 Years	15 Years	20 Years
End of Life	20,404,000	7,625,000	12,779,000	45.0%	9.0%	4.5%	3.0%	2.3%
Lifecycle Activities	14,818,000	7,625,000	7,193,000	24.1%	4.8%	2.4%	1.6%	1.2%
Change	5,586,000	0	5,586,000	20.9%	4.2%	2.1%	1.4%	1.1%

Considering all of the above information, we recommend the lifecycle events strategy and the 20-year option in **Table 41** that includes the funding changes. This involves full funding being achieved over 20 years by:

a. increasing tax revenues by 1.2% each year for the next 20 years solely for the purpose of phasing in full funding to the asset categories covered in this section of the AMP
b. allocating the current gas tax and OCIF revenue as outlined in **Table 41** (see note below)
c. allocating the scheduled OCIF grant increases to the infrastructure deficit as they occur (see note below)
d. increasing existing and future infrastructure budgets by the applicable inflation index on an annual basis in addition to the deficit phase-in

Notes re Federal Gas Tax & OCIF formulae based funding:

1. Based on the current agreements that AMO has with senior governments, PSD includes these revenue streams in the financial strategies developed for their clients. Lakeshore staff feel that these revenue streams' permanency is in question. If these revenue streams were not included in the financial strategy, the 1.2% annual tax increase recommendation would increase to 1.3%.

Other notes:

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

Although this option achieves full funding on an annual basis in 20 years and provides financial sustainability over the period modeled, the recommendations do require prioritizing capital projects to fit the resulting annual funding available. Current data shows a pent-up investment demand of $9,323,000 for paved roads, $0 for bridges & culverts, $0 for stormwater network, $3,594,000 for machinery & equipment, $500,000 for buildings, $1,006,000 for land improvements and $853,000 for vehicles. Prioritizing future projects will require the current data to be replaced by condition based data. Although our recommendations include no further use of debt, the results of the condition based analysis may require otherwise.

9.4 Financial Profile: Rate Funded Assets

9.4.1 Current Funding Position – End of Life Scenario

Table 43 and **Table 44** outline, by asset category, Lakeshore's average annual asset investment requirements, current funding positions and funding increases required to achieve full funding on assets funded by rates under the end of life scenario.

Table 43 Summary of Infrastructure Requirements & Current Funding Available - End of Life Scenario

Asset Class	Average Annual Investment Required – End of Life Scenario	2017 Annual Funding Available				Annual Deficit/Surplus
		Rates	Less: Allocated to Operations	Other	Total Funding Available	
Wastewater Network	2,137,000	4,693,000	-4,693,000	0	0	2,137,000
Water Network	4,313,000	8,085,000	-6,490,000	0	1,595,000	2,718,000
Total:	6,450,000	12,778,000	-11,183,000	0	1,595,000	**4,855,000**

Under the end of life scenario, the average annual investment requirement for the wastewater network and water network combined is $6,450,000. Annual revenue currently allocated to these assets for capital purposes is $1,595,000 leaving an annual deficit of $4,855,000. To put it another way, these infrastructure categories are currently funded at 25% of their long-term requirements.

In 2017, Lakeshore has annual wastewater revenues of $4,693,000 and annual water revenues of $8,085,000. As illustrated in **Table 44**, without consideration of any other sources of revenue, full funding would require the following changes over time:

Table 44 Rate Increase Required for Full Funding - End of Life Scenario

	Rate Increase Required for Full Funding
Wastewater Network	45.5%
Water Network	33.6%

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

a) As illustrated in **Table 56** Lakeshore's debt payments for the wastewater network will be decreasing by $271,000 over the next 5 years and by $439,000 over the next 10 years. Although not shown in the table, debt payment decreases will be $1,020,000 over the next

15 years and $1,020,000 over the next 20 years. For the water network, the amounts are $0, $325,000, $1,349,000 and $1,349,000 respectively.

Our recommendations include capturing the above changes and allocating them to the infrastructure deficit outlined above. **Table 45** and **Table 46** outline this concept and presents a number of options:

Table 45 Allocation Without Change in Costs - End of Life Scenario

	Wastewater Network				Water Network			
	5 Years	10 Years	15 Years	20 Years	5 Years	10 Years	15 Years	20 Years
Infrastructure Deficit	2,137,000	2,137,000	2,137,000	2,137,000	2,718,000	2,718,000	2,718,000	2,718,000
Change in OCIF Grant	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Change in Debt Costs	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Resulting Infrastructure Deficit	2,137,000	2,137,000	2,137,000	2,137,000	2,718,000	2,718,000	2,718,000	2,718,000
Resulting Rate Increase Required:								
Total Over Time	**45.5%**	**45.5%**	**45.5%**	**45.5%**	**33.6%**	**33.6%**	**33.6%**	**33.6%**
Annually	9.1%	4.6%	3.0%	2.3%	6.7%	3.4%	2.2%	1.7%

Table 46 Allocation With Change in Costs - End of Life Scenario

	Wastewater Network				Water Network			
	5 Years	10 Years	15 Years	20 Years	5 Years	10 Years	15 Years	20 Years
Infrastructure Deficit	2,137,000	2,137,000	2,137,000	2,137,000	2,718,000	2,718,000	2,718,000	2,718,000
Change in OCIF Grant	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Change in Debt Costs	-271,000	-439,000	-1,020,000	-1,020,000	0	-325,000	-1,349,000	-1,349,000
Resulting Infrastructure Deficit	1,866,000	1,698,000	1,117,000	1,117,000	2,718,000	2,393,000	1,369,000	1,369,000
Resulting Tax Increase Required:								
Total Over Time	**39.8%**	**36.2%**	**23.8%**	**23.8%**	**33.6%**	**29.6%**	**16.9%**	**16.9%**
Annually	8.0%	3.6%	1.6%	1.2%	6.7%	3.0%	1.1%	0.8%

9.4.2 Current Funding Position – Lifecycle Activities Scenario

As described in this report, investing in a lifecycle activity strategy (as opposed to an end of life replacement strategy) would enable Lakeshore to lower its average annual capital requirements by $1,983,000. The table below summarizes the difference:

Table 47 Annual Capital Requirements Comparison – End of Life vs. Lifecycle Activities

	Annual Capital Requirements		
	End of Life	Lifecycle Activities	Change
Wastewater Network	2,137,000	1,845,000	292,000
Water Network	4,313,000	2,622,000	1,691,000
Total:	6,450,000	4,467,000	1,983,000
Note:			
Change is net of annual cost of lifecycle events			

Table 48 and **Table 49** restate, by asset category, Lakeshore's average annual asset investment requirements, current funding positions, and funding increases required to achieve full funding on assets funded by rates under the lifecycle events scenario. The bottom line difference to the information presented in the end of life scenario is that annual requirements and the annual deficit both decrease by $1,983,000. Current funding remains unchanged.

Table 48 Summary of Infrastructure Requirements & Current Funding Available - Lifecycle Activities Scenario

Asset Class	Average Annual Investment Required – Lifecycle Activities Scenario	2017 Annual Funding Available				Annual Deficit/Surplus
		Rates	Less: Allocated to Operations	Other	Total Funding Available	
Wastewater Network	1,845,000	4,693,000	-4,693,000	0	0	1,845,000
Water Network	2,622,000	8,085,000	-6,490,000	0	1,595,000	1,027,000
Total:	4,467,000	12,778,000	-11,183,000	0	1,595,000	**2,872,000**

Under the lifecycle events scenario, the average annual investment requirement for the wastewater network and water network is $4,467,000. Annual revenue currently allocated to these assets for capital purposes is $1,595,000 leaving an annual deficit of $2,872,000. To put it another way, these infrastructure categories are currently funded at 36% of their long-term requirements.

In 2017, Lakeshore has annual wastewater revenues of $4,693,000 and annual water revenues of $8,085,000. As illustrated in **Table 49**, without consideration of any other sources of revenue, full funding would require the following changes over time:

Table 49 Rate Increase Required for Full Funding - Lifecycle Activities Scenario

	Rate Increase Required for Full Funding
Wastewater Network	39.3%
Water Network	12.7%

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

a) As illustrated in **Table 56** Lakeshore's debt payments for the wastewater network will be decreasing by $271,000 over the next 5 years and by $439,000 over the next 10 years. Although not shown in the table, debt payment decreases will be $1,020,000 over the next 15 years and $1,020,000 over the next 20 years. For the water network, the amounts are $0, $325,000, $1,349,000 and $1,349,000 respectively.

Our recommendations include capturing the above changes and allocating them to the infrastructure deficit outlined above. **Table 50** and **Table 51** outline this concept and presents a number of options:

Table 50 Allocation Without Change in Costs - Lifecycle Activities Scenario

	Wastewater Network				Water Network			
	5 Years	10 Years	15 Years	20 Years	5 Years	10 Years	15 Years	20 Years
Infrastructure Deficit	1,845,000	1,845,000	1,845,000	1,845,000	1,027,000	1,027,000	1,027,000	1,027,000
Change in OCIF Grant	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Change in Debt Costs	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Resulting Infrastructure Deficit	1,845,000	1,845,000	1,845,000	1,845,000	1,027,000	1,027,000	1,027,000	1,027,000
Resulting Tax Increase Required:								
Total Over Time	**39.3%**	**39.3%**	**39.3%**	**39.3%**	**12.7%**	**12.7%**	**12.7%**	**12.7%**
Annually	7.9%	3.9%	2.6%	2.0%	2.5%	1.3%	0.8%	0.6%

Table 51 Allocation With Change in Costs - Lifecycle Activities Scenario

	Wastewater Network				Water Network			
	5 Years	10 Years	15 Years	20 Years	5 Years	10 Years	15 Years	20 Years
Infrastructure Deficit	1,845,000	1,845,000	1,845,000	1,845,000	1,027,000	1,027,000	1,027,000	1,027,000
Change in OCIF Grant	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Change in Debt Costs	-271,000	-439,000	-1,020,000	-1,020,000	0	-325,000	-1,349,000	-1,349,000
Resulting Infrastructure Deficit	1,574,000	1,406,000	825,000	825,000	1,027,000	702,000	-322,000	-322,000
Resulting Tax Increase Required:								
Total Over Time	**33.5%**	**30.0%**	**17.6%**	**17.6%**	**12.7%**	**8.7%**	**-4.0%**	**-4.0%**
Annually	6.7%	3.0%	1.2%	0.9%	2.5%	0.9%	-0.3%	-0.2%

9.4.3 Financial Strategy Recommendations

The following tables summarize the key financial differences between the end of life scenario and the lifecycle events scenario for both the wastewater network and water network separately:

Table 52 Budget Scenario Comparison - Wastewater Network

				Annual Rate Change Required (Wastewater Network)				
Scenario	Annual Requirement	Current Annual Funding	Current Annual Deficit	Total	5 Years	10 Years	15 Years	20 Years
End of Life	2,137,000	0	2,137,000	39.8%	8.0%	3.6%	1.6%	1.2%
Lifecycle Activities	1,845,000	0	1,845,000	33.5%	6.7%	3.0%	1.2%	0.9%
Change	292,000	0	292,000	6.3%	1.3%	0.6%	0.4%	0.3%

Table 53 Budget Scenario Comparison - Water Network

				Annual Rate Change Required (Water Network)				
Scenario	Annual Requirement	Current Annual Funding	Current Annual Deficit	Total	5 Years	10 Years	15 Years	20 Years
End of Life	4,313,000	1,595,000	2,718,000	33.6%	6.7%	3.0%	1.1%	0.8%
Lifecycle Activities	2,622,000	1,595,000	1,027,000	12.7%	2.5%	0.9%	-0.3%	-0.2%
Change	1,691,000	0	1,691,000	20.9%	4.2%	2.1%	1.4%	1.0%

Considering all of the above information, we recommend the following:

For Wastewater Network:
We recommend the lifecycle activities strategy and 20-year option in **Table 51** that includes the reallocations. This involves full funding being achieved over 20 years by:

a) when realized, reallocating the debt cost reductions of $1,020,000 to the infrastructure deficit
b) increasing rate revenues by 0.9% each year for the next 20 years solely for the purpose of phasing in full funding to this asset category.
c) increasing future infrastructure budgets by the applicable inflation index on an annual basis

For Water Network:

We recommend the lifecycle events strategy and 15-year option in **Table 51** that includes the reallocations. This involves full funding being achieved over 15 years by:

a) when realized, reallocating $1,027,000 of the debt cost reductions of $1,349,000 to the infrastructure deficit

b) due to a) above eliminating the infrastructure deficit, not increasing rate revenues for capital purposes for the water network
c) increasing existing and future infrastructure budgets by the applicable inflation index on an annual basis in addition to the deficit phase-in

Notes:

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

2. We realize that raising rate revenues by the amounts recommended above for infrastructure purposes will be very difficult to do. However, considering a longer phase-in window may have even greater consequences in terms of infrastructure failure.

3. Any increase in rates required for operations would be in addition to the above recommendations.

Although this option achieves full funding on an annual basis and provides financial sustainability over the period modeled, the recommendations do require prioritizing capital projects to fit the resulting annual funding available. Current data shows a pent-up investment demand of $2,487,000 for the wastewater network and $8,283,000 for the water network. Prioritizing future projects will require the current data to be replaced by condition based data. Although our recommendations include no further use of debt, the results of the condition based analysis may require otherwise.

9.5 Use of Debt

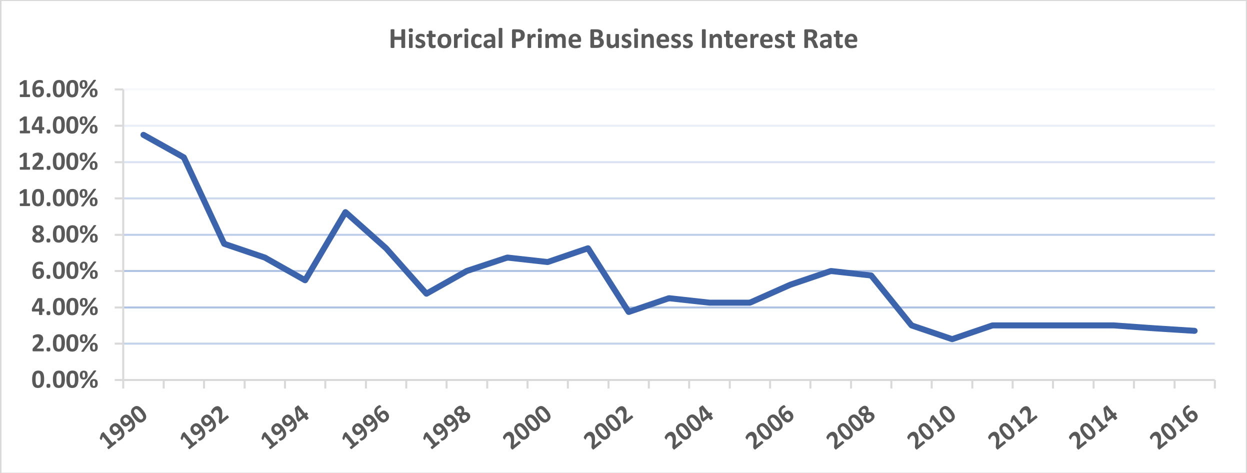
For reference purposes, **Table 54** outlines the premium paid on a project if financed by debt. For example, a $1M project financed at 3.0%[1] over 15 years would result in a 26% premium or $260,000 of increased costs due to interest payments. For simplicity, the table does not take into account the time value of money or the effect of inflation on delayed projects.

Table 54 Total Interest Paid as a % of Project Costs

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

[1] Current municipal Infrastructure Ontario rates for 15-year money is 2.8%.

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



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

Table 55 and **Table 56** outline how Lakeshore has historically used debt for investing in the asset categories as listed. There is currently $19,658,000 of debt outstanding for the assets covered by this AMP with corresponding principal and interest payments of $3,609,000, well within its provincially prescribed maximum of $10,845,000.

Table 55 Overview of Use of Debt

Asset Class	Current Debt Outstanding	Use Of Debt in the Last Five Years				
		2012	2013	2014	2015	2016
Road Network	337,000	0	0	0	0	0
Bridges & Culverts	0	0	0	0	0	0
Stormwater Network	0	0	0	0	0	0
Buildings	1,242,000	0	0	0	1,363,000	13,200,000
Land Improvements	0	0	0	0	0	0
Machinery & Equipment	0	0	0	0	0	0
Vehicles	0	0	0	0	0	0
Total Tax Funded	1,579,000	0	0	0	1,363,000	13,200,000
Wastewater Network	7,840,000	0	0	0	0	0
Water Network	10,239,000	0	0	0	0	0
Total Rate Funded	18,079,000	0	0	0	0	0

Table 56 Overview of Debt Costs

Asset Class	Principal & Interest Payments in the Next Ten Years						
	2017	2018	2019	2020	2021	2022	2027
Road Network	178,000	178,000	0	0	0	0	0
Bridges & Culverts	0	0	0	0	0	0	0
Stormwater Network	0	0	0	0	0	0	0
Buildings	1,062,000	1,062,000	1,062,000	1,062,000	1,062,000	1,062,000	907,000
Land Improvements	0	0	0	0	0	0	0
Machinery & Equipment	0	0	0	0	0	0	0
Vehicles	0	0	0	0	0	0	0
Total Tax Funded	1,240,000	1,240,000	1,062,000	1,062,000	1,062,000	1,062,000	907,000
Wastewater Network	1,020,000	1,020,000	812,000	812,000	812,000	749,000	581,000
Water Network	1,349,000	1,349,000	1,349,000	1,349,000	1,349,000	1,349,000	1,024,000
Total Rate Funded	2,369,000	2,369,000	2,161,000	2,161,000	2,161,000	2,098,000	1,605,000

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

9.6 Use of Reserves

9.6.1 Available Reserves

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

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

By asset class, **Table 57** outlines the details of the reserves currently available to Lakeshore.

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Table 57 Summary of Reserves Available

Asset Class	Balance at December 31, 2016
Road Network	5,275,000
Bridges & Culverts	747,000
Stormwater Network	497,000
Buildings	755,000
Land Improvements	0
Machinery & Equipment	1,132,000
Vehicles	978,000
Total Tax Funded	**9,384,000**
Wastewater Network	0
Water Network	4,620,000
Total Rate Funded	**4,620,000**

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

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

The reserves in **Table 57** are available for use by applicable asset categories during the phase-in period to full funding. This, coupled with Lakeshore's judicious use of debt in the past, allows the scenarios to assume that, if required, available reserves and debt capacity can be used for high priority and emergency infrastructure investments in the short to medium-term.

9.6.2 Recommendation

As Lakeshore updates its AMP, we recommend that future planning should include determining what its long-term reserve balance requirements are and a plan to achieve such balances.

10.0 Infrastructure Report Card

Overall Grade D	Infrastructure Report Card The Town of Lakeshore			
Asset Class	Asset Health (Condition)	Financial Capacity	Overall Grade	Comments
Road Network	C	D	D	While more than 73% of the municipality's road network is in good to very good condition, 10% are in poor to very poor condition. The average annual revenue required to sustain Lakeshore's road network – including lifecycle activities – totals approximately **$9,979,000**. Based on Lakeshore's current annual funding of **$5,332,000**, there is an annual **deficit of $4,647,000**.
Bridges & Culverts	B	F	D	With 11% of the municipality's bridges and culverts in very good and 88% in good condition the municipality received an asset health rating of 'B'. The average annual revenue required to sustain Lakeshore's bridges & culverts – including lifecycle activities – totals approximately **$796,000**. Based on Lakeshore's current annual funding of **$328,000** there is an annual **deficit of $468,000**.
Water Network	B	D	C	Nearly 86% of the municipality's water network very good condition, with an additional 6% in good condition. The average annual revenue required to sustain Lakeshore's water network – including lifecycle activities – totals approximately **$2,622,000**. Based on Lakeshore's current annual funding of **$1,595,000**, there is an annual **deficit of $1,027,000**.
Wastewater Network	B	F	D	Nearly 96% of the municipality's wastewater network is in good to very good condition. The average annual revenue required to sustain Lakeshore's wastewater network – including lifecycle activities – totals approximately **$1,845,000**. Based on Lakeshore's current annual funding of **$0**, there is an annual **deficit of $1,845,000**.
Stormwater Network	B	F	D	With 89% of all stormwater assets in good to very good condition the municipality received an asset health rating of 'B'. The average annual revenue required to sustain Lakeshore's storm sewer network – including lifecycle activities – totals approximately **$820,000**. Based on Lakeshore's current annual funding of **$291,000**, there is an annual **deficit of $529,000**.

Buildings & Facilities	B	C	C	With 89% of all buildings and facilities assets in good to very good condition the municipality received an asset health rating of 'B'. The average annual revenue required to sustain Lakeshore's buildings and facilities totals approximately **$1,521,000**. Based on Lakeshore's current annual funding of **$955,000**, there is an annual deficit of $566,000.
Machinery & Equipment	D	D	D	While 28% of all machinery and equipment is in good to very good condition, 71% is in fair to very poor condition. The average annual revenue required to sustain Lakeshore's machinery and equipment totals approximately **$752,000.** Based on Lakeshore's current annual funding of **$364,000**, there is an annual deficit of $388,000.
Land Improvements	C	F	F	While 69% of all land improvements are in good to very good condition, 23% are in poor to very poor condition. The average annual revenue required to sustain Lakeshore's land improvements totals approximately **$360,000.** Based on Lakeshore's current annual funding of **$20,000**, there is an annual deficit of $340,000.
Vehicles	D	D	D	While 38% of all vehicles are in good to very good condition, 38% are in poor to very poor condition. The average annual revenue required to sustain Lakeshore's vehicles totals approximately **$590,000**. Based on Lakeshore's current annual funding of **$335,000**, there is an annual deficit of $255,000.

Appendix A: Infrastructure Report Card Description

Table 58 Infrastructure Report Card Description

Financial Capacity		A municipality's financial capacity grade is determined by the level of funding available (0-100%) for each asset class for the purpose of meeting the average annual investment requirements.
Asset Health		Using either field inspection data as available or age-based data, the asset health component of the report card uses condition (0-100%) to estimate how capable assets are in performing their required functions. We use replacement cost to determine the weight of each condition group within the asset class.
Letter Grade	Rating	Description
A	Very Good	The asset is functioning and performing well; only normal preventive maintenance is required. The municipality is fully prepared for its long-term replacement needs based on its existing infrastructure portfolio.
B	Good	The municipality is well prepared to fund its long-term replacement needs but requires additional funding strategies in the short-term to begin to increase its reserves.
C	Fair	The asset's performance or function has started to deteriorate and repair/rehabilitation is required to minimize lifecycle cost. The municipality is underpreparing to fund its long-term infrastructure needs. The replacement of assets in the short- and medium-term will likely be deferred to future years.
D	Poor	The asset's performance and function is below the desired level and immediate repair/rehabilitation is required. The municipality is not well prepared to fund its replacement needs in the short-, medium- or long-term. Asset replacements will be deferred and levels of service may be reduced.
F	Very Poor	The municipality is significantly underfunding its short-term, medium-term, and long-term infrastructure requirements based on existing funds allocation. Asset replacements will be deferred indefinitely. The municipality may have to divest some of its assets (e.g., bridge closures, arena closures) and levels of service will be reduced significantly.

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Table 59 Asset Health Grading Scale

Letter Grade	Rating	Description
A	Excellent	Asset is new or recently rehabilitated
B	Good	Asset is no longer new, but is fulfilling its function. Preventive maintenance is beneficial at this stage.
C	Fair	Deterioration is evident but asset continues to full its function. Preventive maintenance is beneficial at this stage.
D	Poor	Significant deterioration is evident and service is at risk.
F	Very Poor	Asset is beyond expected life and has deteriorated to the point that it may no longer be fit to fulfill its function.

Table 60 Financial Capacity Grade Scale

Letter Grade	Rating	Funding percent	Timing Requirements	Description
A	Excellent	90-100 percent	☑ Short Term ☑Medium Term ☑Long Term	The municipality is fully prepared for its short-, medium- and long-term replacement needs based on existing infrastructure portfolio.
B	Good	70-89 percent	☑Short Term ☑Medium Term ☒Long Term	The municipality is well prepared to fund its short-term and medium-term replacement needs but requires additional funding strategies in the long-term to begin to increase its reserves.
C	Fair	60-69 percent	☑Short Term ☒Medium Term ☒Long Term	The municipality is underprepared to fund its medium- to long-term infrastructure needs. The replacement of assets in the medium-term will likely be deferred to future years.
D	Poor	40-59 percent	☒/☑ Short Term ☒Medium Term ☒Long Term	The municipality is not well prepared to fund its replacement needs in the short-, medium- or long-term. Asset replacements will be deferred and levels of service may be reduced.
F	Very Poor	0-39 percent	☒Short Term ☒Medium Term ☒Long Term	The municipality is significantly underfunding its short-term, medium-term, and long-term infrastructure requirements based on existing funds allocation. Asset replacements will be deferred indefinitely. The municipality may have to divest some of its assets (e.g., bridge closures, arena closures) and levels of service will be reduced significantly.