

CITY OF STRATFORD

Asset Management Plan Update 2025



ABOUT THIS DOCUMENT

Acknowledgements

The City of Stratford 2025 Asset Management Plan (AMP) is an update of the previous plan updated in 2021, outlining the state, risk profile, service levels, and funding needs of the City's 35,000 assets, valued at \$1.071 billion (2023). It details asset inventory, replacement costs, lifecycle strategies, and financial planning to maintain service levels. As a dynamic document, the AMP evolves with data, market conditions, technology, and service expectations.

Asset Management Team

- Karmen Krueger, Director of Corporate Services/Treasurer
- Johnny Bowes, Manager of Asset Management
- Abdullah Bashir, Asset Management Coordinator

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Corporate Management Team Members

- Joan Thompson, CAO
- Adam Betteridge, Acting CAO/Director of Building and Planning
- Taylor Crinklaw, Director of Infrastructure Services
- Tim Wolfe, Director of Community Services
- Kim McElroy, Director of Social Services
- Sean Beech, Manager of Environmental Services
- Jeremy Witzel, Manager of Public Works
- Nancy Roulston, Manager of Engineering
- Nick Sheldon, Project Manager
- Nathan Bottema, Project Engineer
- Mark Hackett, Manager of Community Facilities
- Quin Malott, Manager of Parks, Forestry and Cemetery
- Darcy Drummond, Manager of Recreation and Marketing
- Shannon Archer, Business Integration Manager
- Brent Raycraft, Supervisor of Fleet
- Naeem Khan, Chief Technology and Security Officer
- Sadaf Ghalib, Climate Change Program Manager



City of Stratford Land Acknowledgement

We acknowledge that Stratford is positioned on the traditional territory of the Haudenosaunee, Anishinaabe, and the Neutral (Attawandaron) Peoples. As we gather, we are reminded that the City of Stratford is situated on treaty land that is steeped in rich Indigenous history and home to many First Nations, Métis, and Inuit Peoples today.

We acknowledge that Stratford is situated on land that was shared between the Haudenosaunee, Anishinaabe, and the Neutral (Attawandaron) Peoples. We are grateful to have the opportunity to live, work, and play on this land.

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1. Executive Summary

Key Statistics

\$1.071 billion Replacement cost of asset portfolio ↑ Increase from 2019 (\$944 million)	\$80,605 Replacement cost of infrastructure per household ↑ Increase from 2019 (\$68,149)
2.82% Target average annual infrastructure reinvestment rate ↑ Increase from 2019 (2.28%)	1.74% Actual average annual infrastructure reinvestment rate ↑ Increase from 2019 (1.30%)
56% Percentage of assets in fair or better condition ↓ Decrease from 2019 (63%)	53% Percentage of annual infrastructure funding needs currently being met ↓ Decrease from 2019 (63%)
13,287 Number of properties in the City ↑ Increase from 2019 (12,376)	\$863 Annual deficit per household ↑ Increase from 2019 (\$664)

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

All municipalities in Ontario are required to complete an Asset Management Plan (AMP) in accordance with Ontario Regulation 588/17 (O. Reg. 588/17). This AMP outlines the current state of asset management planning in the City of Stratford. It identifies the current practices and strategies that are in place to manage public infrastructure and makes recommendations where they can be further refined. Through the implementation of sound asset management strategies, the City can ensure that public infrastructure is managed to support the sustainable delivery of municipal services.

This AMP includes the following asset categories:

Asset Category	Source of Funding
Road Network	Tax Levy
Bridges & Culverts	Tax Levy
Stormwater Network	Tax Levy
Buildings & Facilities	Tax Levy
Machinery & Equipment	Tax Levy
Fleet	Tax Levy
Land Improvements	Tax Levy
Water Network	User Rates
Wastewater Network	User Rates

The overall replacement cost of the asset categories included in this AMP totals \$1.071 billion (\$944 million in 2019) and 56% of all assets analysed in this AMP are in fair or better condition (63% in 2019). Assessed condition data was available for 39% of assets. For the remaining assets, assessed condition data was unavailable, and asset age was used to approximate condition – a data gap that persists in most municipalities. Generally, age misstates the true condition of assets, making assessments essential to accurate asset management planning, and a recurring recommendation in this AMP.

The development of a long-term, sustainable financial plan requires an analysis of whole lifecycle costs. This AMP has used a combination of proactive lifecycle strategies (roads and underground piping) and replacement only strategies (all other assets) to determine the lowest cost option to maintain the current level of service. To meet capital replacement and rehabilitation needs for existing infrastructure, eliminate infrastructure backlogs, and achieve long-term sustainability, the City's average annual capital requirement totals \$30.2 million (\$21.5M in 2019). Based on an historical analysis of sustainable capital funding sources, the City is committing approximately

\$18.7 million towards capital projects per year (\$12.3M in 2019). As a result, there is currently an annual funding gap of \$11.5 million (\$9.3M in 2019).

Staff have begun developing a financial strategy to address the annual capital funding gap. One of the requirements of this plan are to identify the funding shortfalls that exist. A comprehensive financial strategy is a requirement of the next AMP update later in 2025. A general recommendation has been included in this plan but will require further refinement in the next AMP update when updated financial and asset inventory data become available. The following table compares total and average annual budget contributions required to eliminate the City's infrastructure deficit:

Funding Source	Years Until Full Funding	Total Budget Increase Required	Average Annual Contribution Increase
Tax-Funded Assets	5-10 Years	17%	2%-3%
Rate-Funded (Water)	10 Years	50%	5%
Rate-Funded (Sanitary)	10 Years	15%	1.5%

Between this update and the previous update completed in 2021 AMP, the City has achieved compliance with O. Reg. 588/17 to the extent of the requirements that must be completed by July 1, 2024, with strong consideration for the 2025 requirements. There are additional requirements concerning proposed levels of service and future strategies for a 10-year period and growth forecasts that must be met by July 1, 2025. The work required for this future update is already underway.

This AMP represents a snapshot in time and is based on the best available processes, data, and information at the City. Strategic asset management planning is an ongoing and dynamic process that requires continuous improvement and dedicated resources. Several recommendations have been developed to guide the continuous refinement of the City's asset management program. These include:

- a) continuation of asset inventory data review and validation
- b) continuation of the formalization of condition assessment strategies
- c) the implementation of risk-based decision-making as part of asset management planning and budgeting
- d) the continuous review, development and implementation of optimal lifecycle management strategies
- e) the identification of proposed levels of service

The evaluation of the above items and further development of a data-driven, best-practice approach to asset management is recommended to ensure the City is providing optimal value through its management of infrastructure and delivery of services.

The first iteration of the City's asset management plan was completed PSD CityWide on behalf of the City of Stratford. This is a living document and this version, and future updates of the plan will build off the structure and concepts of the original AMP.

1.0 Introduction & Context

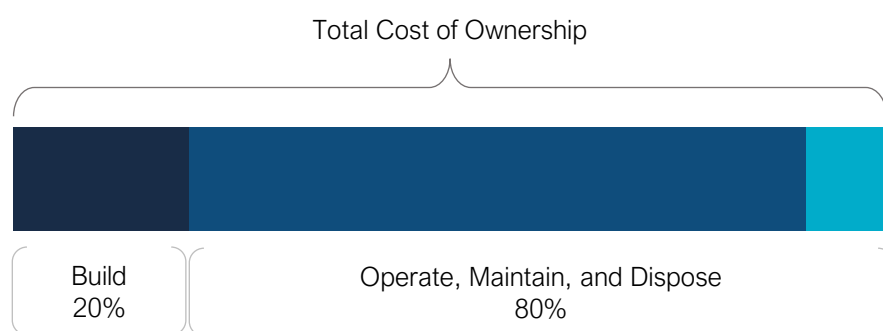
Key Insights

- The goal of asset management is to minimize the lifecycle costs of delivering infrastructure services, manage the associated risks, while maximizing the value ratepayers receive from the asset portfolio.
- The City's strategic asset management and asset capitalization policy provides clear direction to staff on their roles and responsibilities regarding asset management. The development of a data governance policy to achieve this role clarity is underway.
- Asset management planning is an ongoing process that evolves alongside the growth of the corporation, driving informed and strategic long-term planning.
- Ontario Regulation 588/17 contains several additional key requirements for asset management plans in Ontario with milestones between July 1, 2021, and 2025.

1.1 An Overview of Asset Management

Municipalities are tasked with overseeing and maintaining a wide range of infrastructure assets to provide essential services to the community. The objective of asset management is to reduce the long-term costs of infrastructure service delivery, mitigate related risks, and ensure that ratepayers receive the greatest value from the asset portfolio.

The acquisition of capital assets represents just 10-20% of their overall ownership cost, with the remaining 80-90% attributed to operations and maintenance. This AMP concentrates its analysis on the capital costs associated with maintaining, rehabilitating, and replacing existing municipal infrastructure assets.



To ensure financial sustainability, the City must plan accordingly as these costs can span decades. The development of an AMP is a critical step in planning for a sustainable financial future and a key part of a broader asset management program. This begins with the development of a Strategic Plan, followed by an Asset Management Policy and an Asset Management Strategy that aligns strategic objectives with asset management objectives, and concludes with an AMP.

1.1.1 Benefits of Asset Management

Implementing the key principles and best practices of asset management can lead to notable changes in the organizational processes. The following table highlights numerous benefits of asset management and the value of organizational change.



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



Compliance with federal and provincial regulations

1.1.2 Asset Management Policy

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

The City adopted their Strategic Asset Management Policy on June 24, 2019, in accordance with Ontario Regulation 588/17. An updated Asset Management Policy will be presented to Council in 2025.

The objectives of the policy include:

- Fiscal Responsibilities
- Delivery of Services/Programs
- Public Input/Council Direction
- Risk/Impact Mitigation

1.1.3 Asset Management Strategy

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

The City's Tangible Capital Asset Policy contains many of the key components of an asset management strategy and will be expanded on in future revisions or as part of a separate strategic document. The future Data Governance Policy will also play a key role in the asset management strategy.

1.1.4 Asset Management Plan

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

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

The City is committed to embracing Asset Management strategies in its service delivery and will use this data to inform future decision-making as the plan becomes more fulsome.

1.2 Key Concepts in Asset Management

Effective asset management integrates several key components, including lifecycle management, risk management, and levels of service. These concepts are applied throughout this asset management plan and are described below in greater detail.

1.2.1 Lifecycle Management Strategies

The condition or performance of most assets will deteriorate over time. This process is affected by a range of factors including an asset's characteristics, location, utilization, maintenance history and environment. Asset deterioration has a negative effect on the ability of an asset to fulfill its intended function, and may be characterized by increased cost, risk and even service disruption.

To ensure that municipal assets are performing as expected and meeting the needs of residents, it is important to establish a lifecycle management strategy to proactively manage asset deterioration as well as establishing the timing of required interventions though levels of service. When staff begin updating the AMP again in Q2 of 2025, staff will be working with Council and the public to establish service levels which impact these interventions and lifecycle strategies.

There are various field interventions that can help prolong an asset's life. These activities typically fall into three main categories: maintenance, rehabilitation, and replacement. The table below outlines each activity type and highlights the general cost differences between them.

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

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

The City's current approach to lifecycle management is described within each asset category outlined in this AMP. Developing, implementing and defining this approach will help staff determine which activities to perform on an asset and when they should be performed to maximize useful life at the lowest total cost of ownership while maintaining proposed or expected levels of service.

1.2.3 Risk Management Strategies

Municipalities have historically taken a ‘worst-first’ approach to infrastructure spending. Rather than prioritizing assets based on their importance to service delivery, assets in the worst condition are fixed first, regardless of their criticality. However, not all assets are created equal. Some are more important than others, and their failure or disrepair poses more risk to the community than that of others. For example, a road with a high volume of traffic that provides access to critical services poses a higher risk than a low volume rural road. These high-risk assets should receive funding before others.

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

This AMP includes a high-level evaluation of asset risk and criticality. Each asset has been assigned a probability of failure score and consequence of failure score based on available asset data. These risk scores can be reviewed and adjusted based on data as well as strategic and community priorities.

1.2.4 Levels of Service

A level of service (LOS) is a measure of what the City is providing to the community and the nature and quality of that service. Within each asset category in this AMP, quantitative metrics and qualitative descriptions that measure both technical and community levels of service have been established and measured as data is available.

These measures include a combination of those that have been outlined in O. Reg. 588/17 in addition to performance measures identified by the City as worth measuring and evaluating. The City measures the level of service provided at two levels: Community Levels of Service, and Technical Levels of Service. This AMP describes current Community LOS for all asset categories and some current and future Technical LOS. The rest of the technical LOS will be determined in the 2025 AMP update.

1.2.5 Community Levels of Service

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

1.2.6 Technical Levels of Service

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

For core asset categories (Roads, Bridges & Culverts, Water, Wastewater, Stormwater) the Province, through O. Reg. 588/17, has provided technical metrics that are required to be included in this AMP. For non-core asset categories, the City has determined the technical metrics that will be used to determine the technical level of service provided. These metrics can be found in the Levels of Service subsection within each asset category.

1.2.7 Current and Proposed Levels of Service

This AMP focuses on measuring the current level of service provided to the community. Once current levels of service have been measured, the City plans to establish proposed levels of service over a 10-year period by July 1st, 2025, in accordance with O. Reg. 588/17. It should be noted that the 10-year period is prescribed however, we recognize that implementation may take longer depending on the LOS proposed.

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

1.3 Ontario Regulation (O. Reg.) 588/17

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

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

2019

Strategic Asset Management Policy

2024

This AMP

Asset Management Plan for Core and Non-Core Assets

2022

Asset Management Plan for Core Assets with the following components:

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

2025

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

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

1.4 O. Reg. 588/17 Compliance Review

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

Requirement	O. Reg. Section	AMP Section Reference	Status
Summary of assets in each category	S.5(2), 3(i)	4.1.1 - 5.2.1	Complete
Replacement cost of assets in each category	S.5(2), 3(ii)	4.1.1 – 5.2.1	Complete
Average age of assets in each category	S.5(2), 3(iii)	4.1.4 - 5.2.4	Complete
Condition of assets in each category	S.5(2), 3(iv)	4.1.2 – 5.2.2	Complete
Description of municipality's approach to assessing the condition of assets in each category	S.5(2), 3(v)	4.1.3 – 5.2.3	Complete
Current levels of service in each category	S.5(2), 1(i-ii)	4.1.8 - 5.2.8	Complete
Current performance measures in each category	S.5(2), 2	4.1.6 - 5.2.6	Complete
Lifecycle activities needed to maintain current levels of service for 10 years	S.5(2), 4	4.1.5 - 5.2.5	Complete
Costs of providing lifecycle activities for 10 years	S.5(2), 4	Appendix A	Complete
Growth assumptions	S.5(2), 5(i-ii) S.5(2), 6(i-vi)	6.1-6.2	Complete

1.5 Climate Change

Canada's Climate Change Report (2022)

Climate change has significant impacts on human and natural systems worldwide, including Canada. These effects include rising temperatures, increased precipitation, droughts, and extreme weather events, primarily driven by human influence. In 2022, Environment and Climate Change Canada (ECCC) released *Canada's Changing Climate Report (CCCR 2022)*, highlighting the country's vulnerability to these changes.

The report revealed that between 1948 and 2022, Canada's average temperature rose by 1.9 °C, double the global average. The effects of widespread warming are evident in many parts of Canada and are projected to intensify in the future. Without significant emissions reductions, temperatures in Canada could rise by as much as 5.5 °C by 2100, compared to 2022 levels. Observed precipitation has also increased by 8% to over 70% in various regions between 1948 and 2012, with the most substantial changes occurring in northern areas. Meanwhile, smaller increases were observed in the Prairies and southwestern British Columbia. Southern Canada is expected to face more frequent summer droughts, while extreme weather events like floods, wildfires, cold and warm extremes, and record-low Arctic sea ice extent are becoming more common nationwide.

Canada's changing climate poses serious risks to its economy, society, environment, and infrastructure. Climate-related extremes such as droughts, floods, frequent freeze-thaw cycles, prolonged heatwaves, high winds, and wildfires threaten physical infrastructure, increasing the risk of damage and wear. Municipalities across Canada influence roughly half of Canada's GHG emissions and therefore are in a unique position to safeguard their local economies, communities, environments, and physical assets from these escalating threats.

1.5.1 Stratford Climate Profile

The City of Stratford is located along the Avon River in Southwestern Ontario. The Municipality is expected to experience notable effects of climate change which include higher average annual temperatures, an increase in total annual precipitation, and an increase in the frequency and severity of extreme weather events. According to [Climatedata.ca](https://climatedata.ca/), a collaboration supported by Environment and Climate Change Canada (ECCC), the City of Stratford may experience the following trends:

Higher Average Annual Temperature:

- Between the years 1971 and 2020, the annual average temperature was 7.0 °C.
- Under a high emissions scenario, the average annual temperatures are projected to increase by 2.6°C by the year 2050 and 6.5 °C by the end of the century.

Increase in Total Annual Precipitation:

- Between the years 1971 and 2020, the annual average annual precipitation was 986mm.

- Under a high emissions scenario, the City of Stratford is projected to experience an 11% increase in precipitation by the year 2050 and a 15% increase by the end of the century.

1.5.2 Integrating Climate Change and Asset Management

Sustainable service delivery is the core objective of asset management. Strategic planning is essential to ensuring that current residents receive necessary services without compromising the needs and well-being of future generations. However, climate change threatens the sustainability of municipal service levels by shortening asset lifespans and increasing the risk of premature failure, making it more challenging and expensive to maintain desired service levels.

To promote sustainability, climate change considerations must be integrated into asset management practices and policies. One example of this approach is the municipality's adoption of electric vehicles, demonstrating commitment to both climate change mitigation and adaptation in asset management planning. In September 2023, Council received and adopted the Corporate Energy and Emissions Plan (CEEP) and directed staff to advance strategies outlined in the CEEP. This direction from Council has shifted the way staff look at long term municipal planning and has evolved how asset management planning is advancing with a strategic climate lens.

2.0 Scope and Methodology

Key Insights

- This asset management plan includes 9 asset categories and is divided between tax-funded and rate-funded categories.
- The source and recency of replacement costs impacts the accuracy and reliability of asset portfolio valuation.
- Accurate and reliable condition data helps to prevent premature and costly rehabilitation or replacement and ensures that lifecycle activities occur at the right time to maximize asset value and useful life.

2.1 Asset categories included in this AMP

This asset management plan is produced in compliance with Ontario Regulation 588/17. The July 2024 deadline requires analysis of all assets (Core and Non-Core).

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

Asset Category	Source of Funding
Road Network	Tax Levy
Bridges & Culverts	Tax Levy
Stormwater Network	Tax Levy
Buildings & Facilities	Tax Levy
Machinery & Equipment	Tax Levy
Fleet	Tax Levy
Land Improvements	Tax Levy
Water Network	User Rates
Wastewater Network	User Rates

2.2 Deriving Replacement Costs

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

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

User-defined costs based on reliable sources are a reasonably accurate and reliable way to determine asset replacement costs and are the preferred source. Cost inflation is typically used in the absence of reliable replacement cost data. It is a reliable method for recently purchased and/or constructed assets where the total cost is reflective of the actual costs that the City incurred. While less preferred, much of the plan is still reliant on this method as it allows for a reasonable consistent method but can sometimes not reflect factors such as specific sector pricing factors or other supply and demand related variables.

2.3 Estimated Useful Life and Service Life Remaining

The estimated useful life (EUL) of an asset is the period over which the City expects the asset to be available for use and remain in service before requiring replacement or disposal. The EUL for each asset in this AMP was assigned according to the knowledge and expertise of municipal staff and supplemented by existing industry standards when necessary. As the data quality improves for specific assets within a class, the City can move towards a more custom approach to assigning EUL based on things like frequency of use, weather or other factors that may cause one asset to last longer than another similar asset.

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

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

2.4 Reinvestment Rate

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

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

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

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

2.5 Deriving Asset Condition

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

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

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

Using asset age alone for a condition assessment score can over or understate the remaining service life of an asset. In some cases, it may show that fully functional assets that are older, are automatically categorized as "very poor" in the absence of using non-age-based methods. For example, a sewermain pipe that has been in service for 100 years will be categorized as "very poor" condition based on its age alone. However, a video inspection or other method of physical condition assessment may determine that the pipe is in "fair or good" condition which would override the age-based assessment.

One of the long-term strategies and priorities for the City is to complete as many condition assessments on as many assets as possible to accurately determine the overall condition and EUL of City assets.

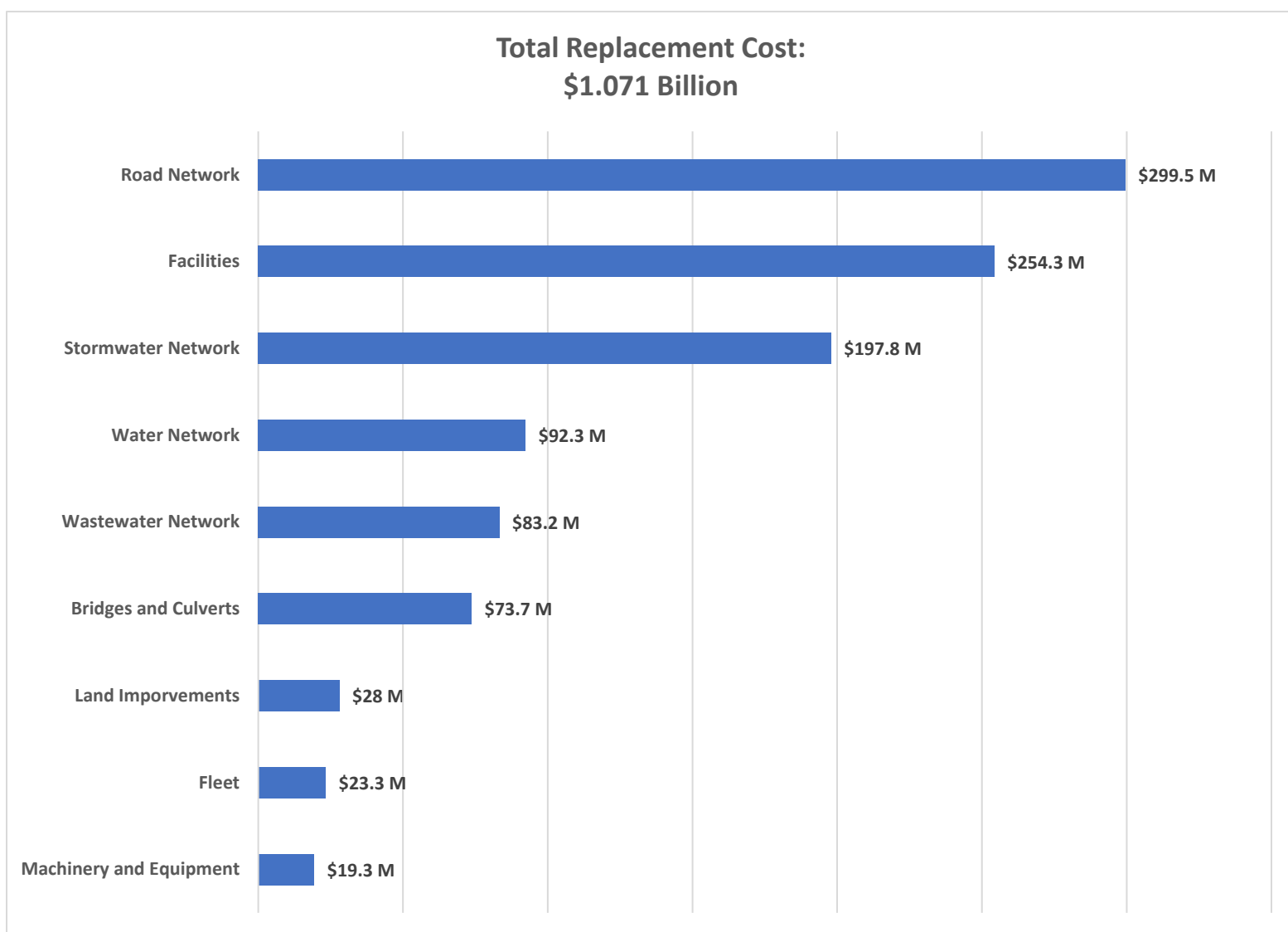
3.0 Portfolio Overview

Key Insights

- The total replacement cost of the City's asset portfolio is \$1.071 billion.
- The City's target re-investment rate is 2.82%, and the actual re-investment rate is 1.74%, contributing to an expanding infrastructure deficit.
- 56% of all assets are in fair or better condition. This has decreased compared to the previous AMP for several reasons including: better data on older assets and the reinvestment rate experienced a period that was below the effects of inflation.
- 44% of assets are projected to require replacement in the next 10 years. This percentage is mostly based on the age-based condition assessment approach which may not accurately reflect the amount of assets that need to be replaced.
- Average annual capital requirements total \$30.2 million per year across all assets; with the City currently contributing an average of \$18.7 million.

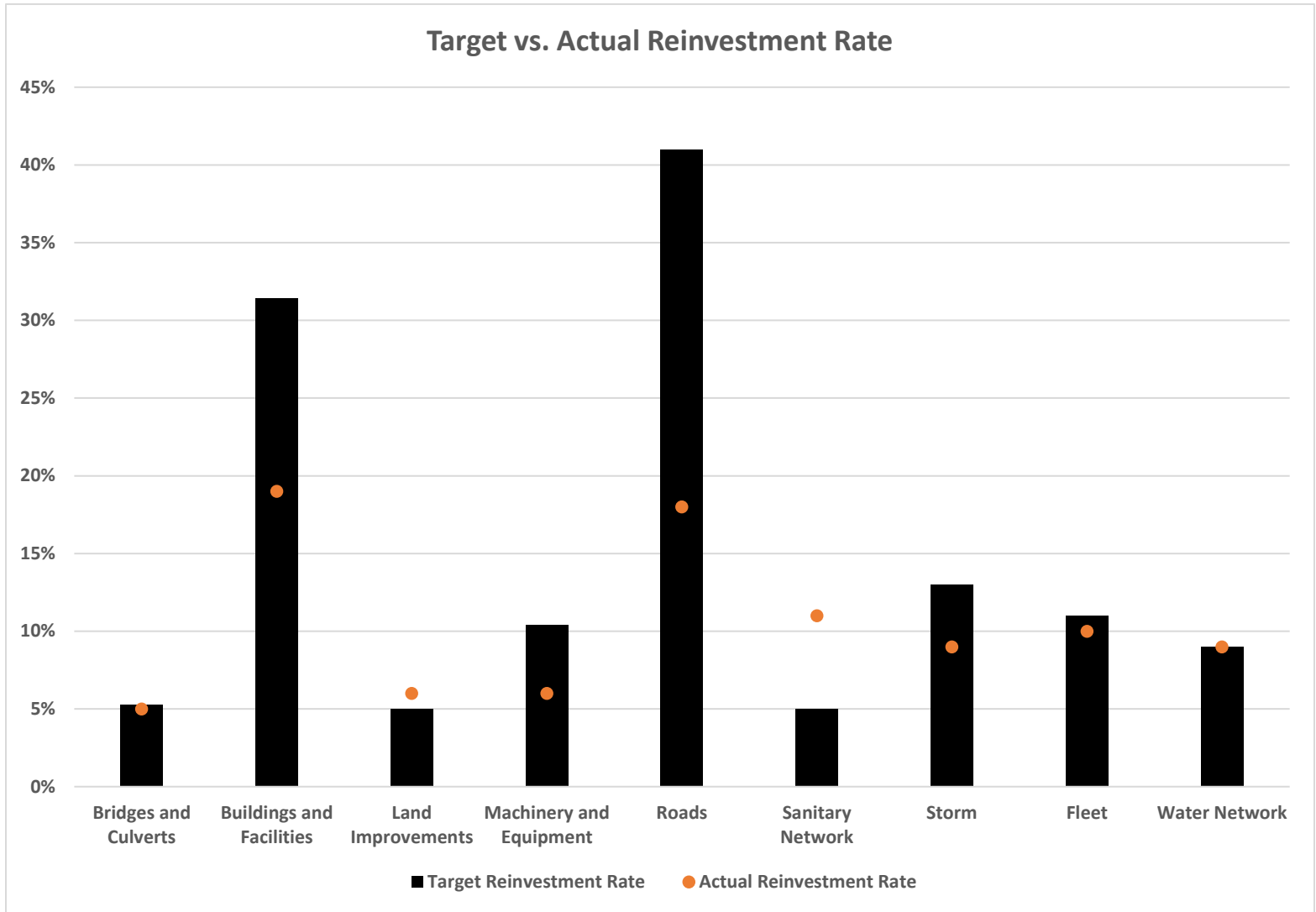
3.1 Total Replacement Cost of Asset Portfolio

The asset categories analysed in this AMP have a total replacement cost of \$1.071 billion based on inventory data from 2023 (\$944 million in 2019). This total was determined based on a combination of user-defined costs and historical cost inflation. This estimate reflects replacement of historical assets with similar, not necessarily identical, assets available for procurement today.



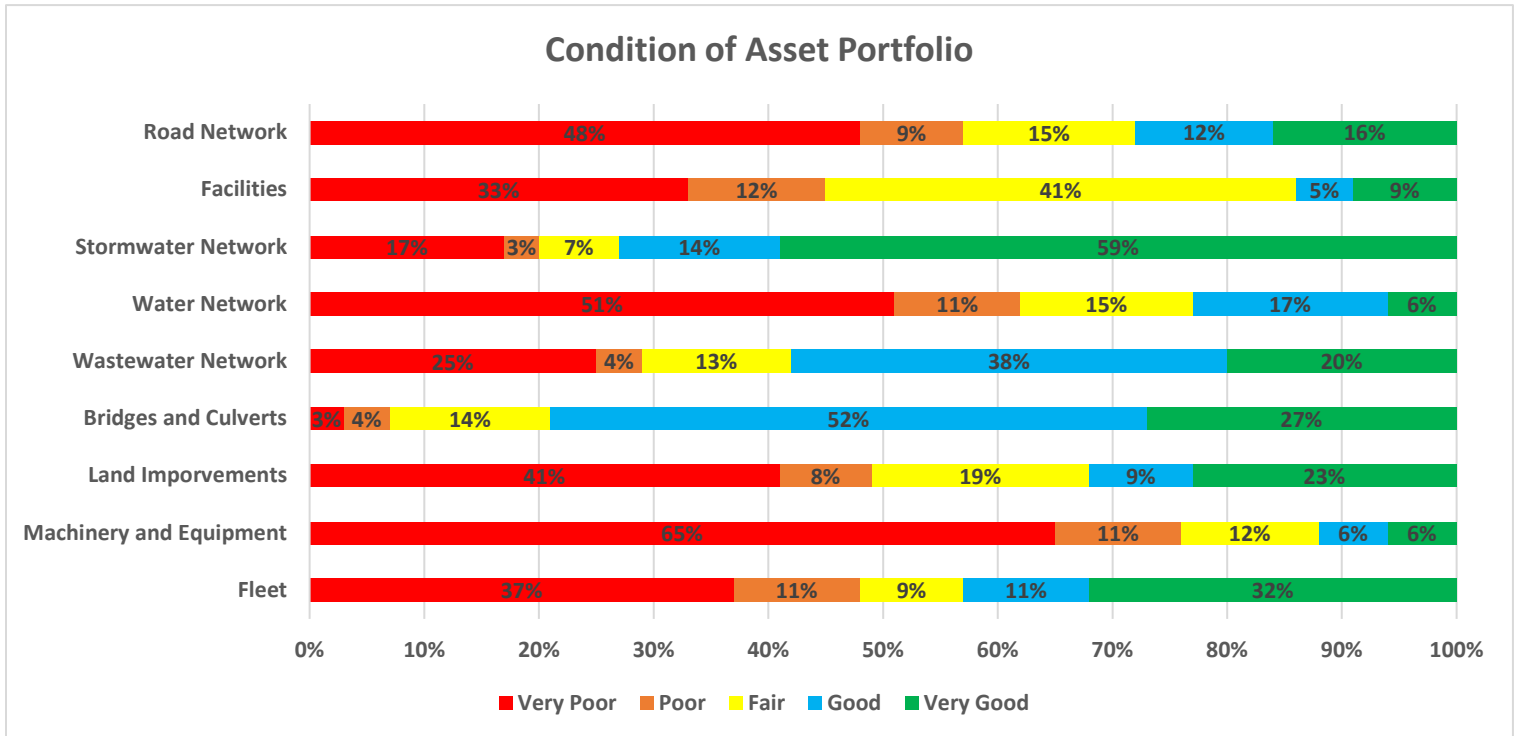
3.2 Target vs. Actual Reinvestment Rate

The graph below depicts funding gaps or surpluses by comparing target vs actual reinvestment rate. To meet the long-term replacement needs, the City should be allocating approximately \$30.2 million annually, for a target reinvestment rate of 2.82%. Actual annual spending on infrastructure totals approximately \$18.7 million, for an actual reinvestment rate of 1.74%. For comparison, in 2019 the target reinvestment rate was 2.28% and the actual reinvestment rate was 1.30%.



3.3 Condition of Asset Portfolio

The current condition of the assets is central to all asset management planning. Collectively, 56% of assets in Stratford are in fair or better condition. This estimate relies on both age-based and field condition data. For context, 60% of the assets in the previous AMP were in fair or better condition. There was significant a rise in very poor conditions for the water network (33% to 51%) over the last 4 years which is due to the majority of the assets being rated by age-based condition. As we improve our condition assessment strategies, we may see an increase in the number of assets in fair or better conditions.



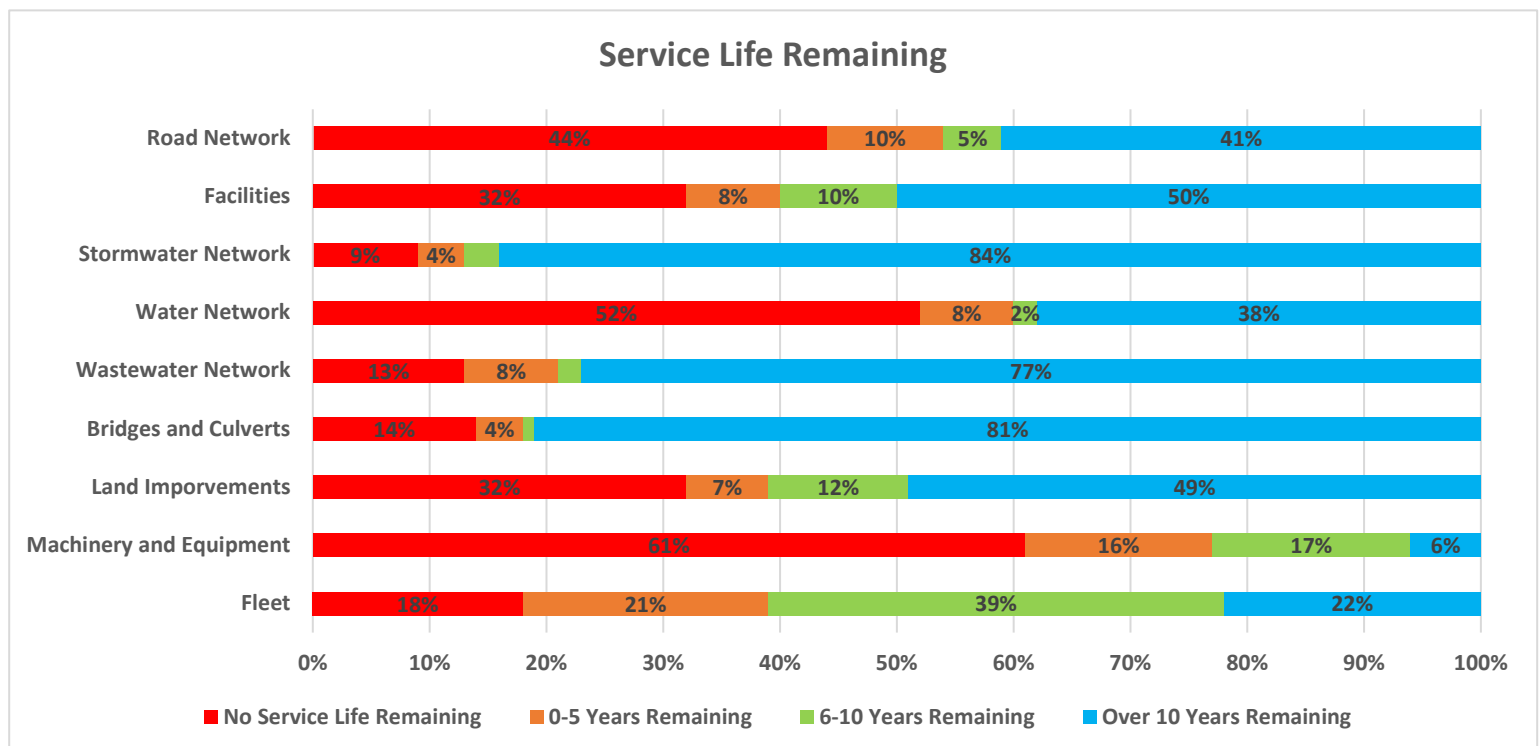
This AMP relies on assessed condition data for 39% of assets; for the remaining portfolio, age is used as an approximation of condition. Assessed condition data is invaluable in asset management planning as it reflects the true condition of the asset and its ability to perform its functions. The table below identifies the source of condition data used throughout this AMP.

Asset Category	Asset Segment	Percentage of Assets with Assessed Condition	Source of Condition Data
Road Network	Paved Roads	100%	2022 Road Needs Study
Bridges & Culverts	Bridges	100%	2023 OSIM Report
Bridges & Culverts	Retaining Walls	100%	2023 OSIM Report
Bridges & Culverts	Structural Culverts	100%	2023 OSIM Report

Stormwater Network	All	0%	In Progress
Facilities	All	64%	2020 Building Condition Assessment
Machinery & Equipment	All	0%	In Progress
Fleet	All	0%	In Progress
Land Improvements	All	5%	Staff Assessments
Water Network	All	5%	Third-party Assessments for Wells, Towers & Reservoirs Break history & water quality complaints for Mains
Wastewater Network	All	10%	Third-party Assessments for Pumping Stations Regular CCTV Inspections for Mains

3.4 Service Life Remaining

Based on asset age, available assessed condition data and estimated useful life, 44% of the City's assets will require replacement within the next 10 years. Capital requirements over the next 10 years are identified in Appendix A. This is a section that will need to be refined as we update future AMPs with the intent on reviewing our maintenance and replacement processes.

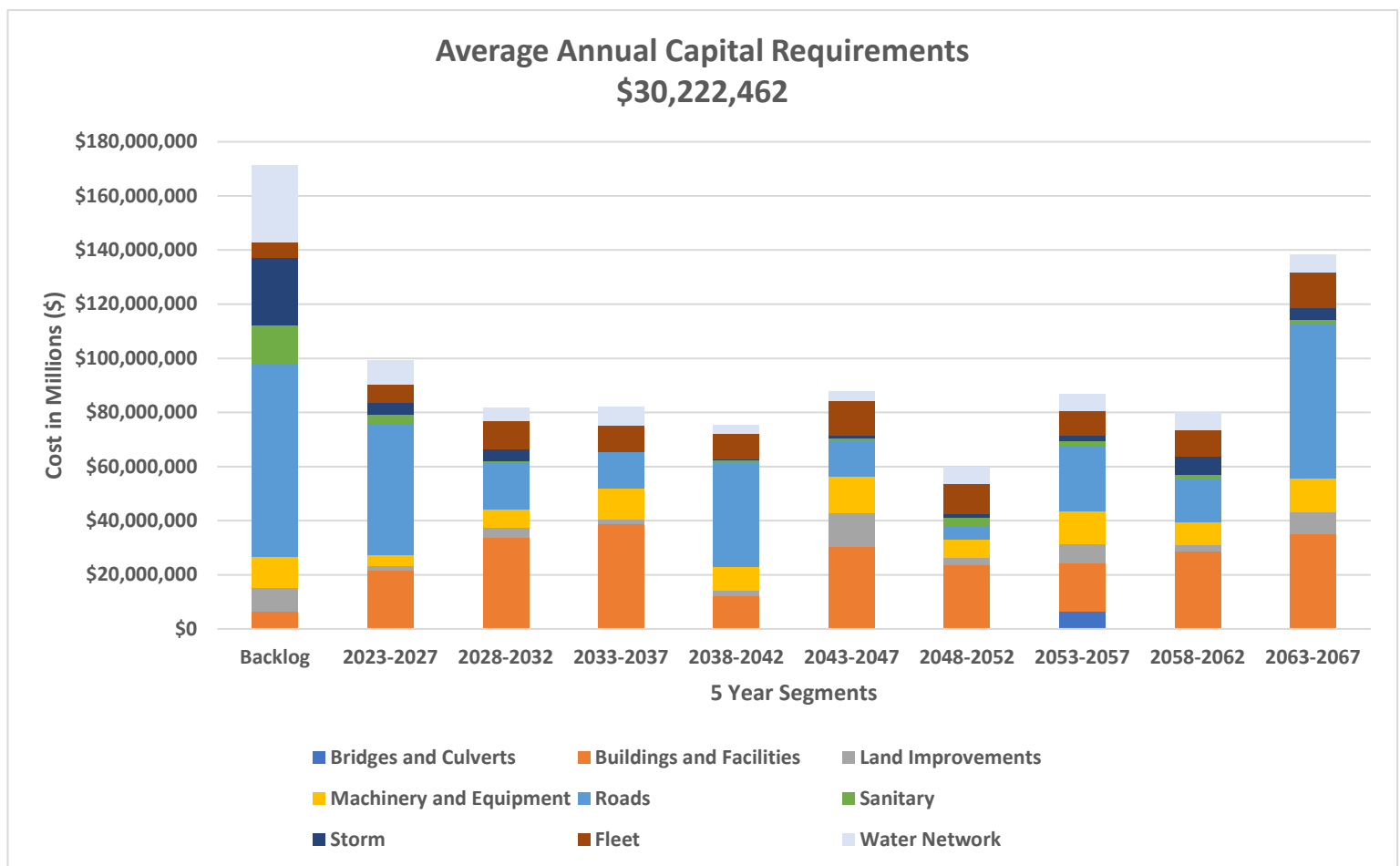


3.5 Forecasted Capital Requirements

The development of a long-term capital forecast should include both asset rehabilitation and replacement requirements. With the development of asset-specific lifecycle strategies that include the timing and cost of future capital events, the City can produce a more accurate long-term capital forecast. The following graph identifies capital requirements over the next 50 years.

The total annual capital requirement uses the Ontario Building Construction Price Index (BCPI) annual increases as well as the statistical data from the City's asset management software (Citywide). The City uses BCPI to ensure accurate and up-to-date replacement cost estimates for city assets by accounting for inflation and market fluctuations in construction costs. The current annual requirement is \$30.2 million (\$21.5 million in 2019).

For additional context, the BCPI index is used because it represents accurate market averages for capital construction in Ontario. Most of the City's asset replacement costs are based on construction costs, not the Consumer Price Index (CPI) for goods and services.



4.0 Analysis of Tax-funded Assets

Key Insights

- Tax-funded assets are valued at \$897 million.
- 58% of tax-funded assets are in fair or better condition.
- Critical assets should be evaluated to determine appropriate risk mitigation activities and treatment options.

4.1 Road Network

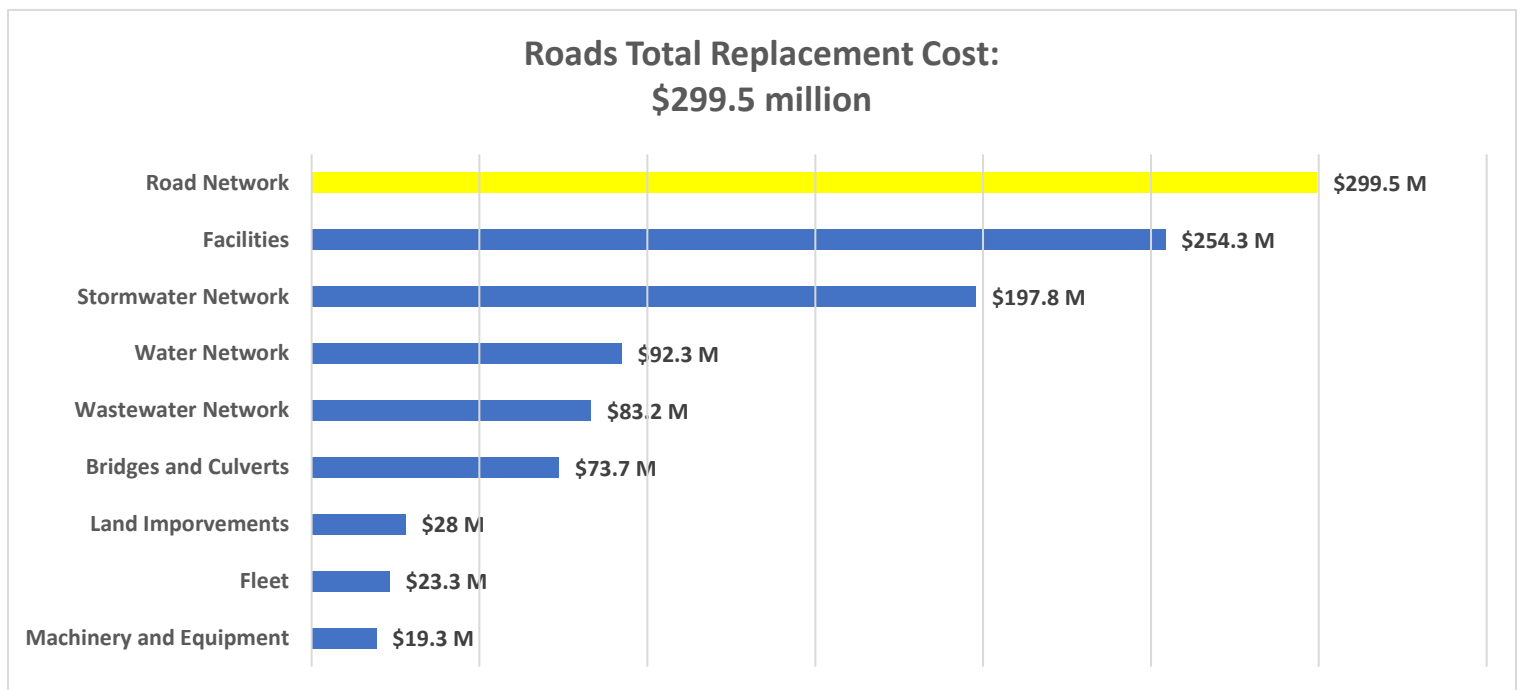
Asset Segment	Quantity	Replacement Cost Method	Replacement Cost
Paved Roads	193,118 m	100% Cost/Unit	\$228,462,312
Sidewalks	229,325 m	100% Cost/Unit	\$45,528,036
Streetlights	4,193	100% CPI Tables	\$18,535,225
Traffic Systems ¹	2,940	100% CPI Tables	\$7,045,734
Total	-	-	\$299,571,309

The Road Network is a critical component of the provision of safe and efficient transportation services and represents the highest value asset category in the City's asset portfolio. It includes all municipally owned and maintained roadways in addition to supporting roadside infrastructure including sidewalks, traffic systems and streetlights. The City does not own any gravel/unpaved roads.

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

4.1.1 Asset Inventory & Replacement Cost

The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the City's Road Network inventory. For reference, estimated replacement cost is currently \$299 million and was \$229 million in 2019.

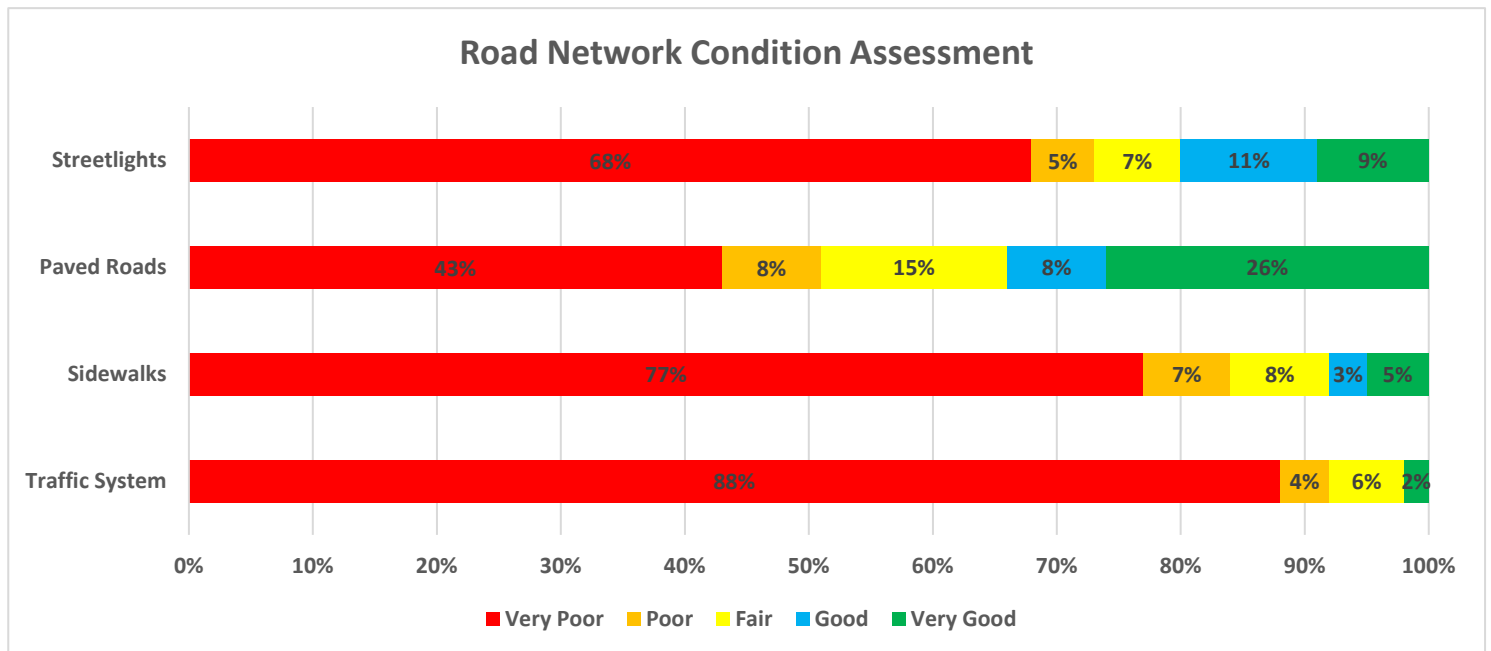


¹ Traffic systems include Traffic Signals, Box and Signs

4.1.2 Asset Condition

The table below identifies the current average condition and source of available condition data for each asset segment. The Average Condition (%) is a weighted value based on replacement cost. It should be noted that a pavement condition assessment is planned for 2025, and paved road condition may change due to an increase of road replacements completed in 2023 and 2024.

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Paved Roads	51%	Fair	100% Assessed
Sidewalks	13%	Very Poor	Age Based
Streetlights	17%	Poor	Age Based
Traffic Systems	5%	Very Poor	Age Based



4.1.3 Current Approach to Condition Assessment

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

- A Pavement Assessment Study was completed in 2022 that included a detailed assessment of the condition of each road segment. An updated assessment is scheduled for 2025.
- Sidewalks are assessed annually by City summer students per Minimum Maintenance Standards (MMS) however, condition data has not been updated accurately. This will be addressed in 2025.

- Most streetlights were replaced with LED lighting in 2016 and are subject to regular visual staff inspections. As we try to improve our condition data, we recognize that the streetlight conditions are not reflected accurately in the asset database. This will be addressed in future AMP updates as we improve our condition assessment practices.
- Pothole patching is applied per MMS requirements to repair and prevent pothole formations. Annual winter control activities such as road and sidewalk plowing, and snow removal are performed and exceed Minimum Maintenance Standards (MMS).
- Staff have a dedicated bi-annual crack sealing program incorporated in the Infrastructure Services workplan and operating budget.
- Rehabilitation is prioritized using Pavement Condition Index (PCI), cost, and Average Daily Traffic (ADT). Staff will take this data and try to focus on the worst rated and consider that in review with other linear asset conditions (water, sewer, etc.) when detaining replacement or reconstruction projects. Pavement re-surfacing is applied to deteriorating road surfaces to extend the life of road assets and prevent the need for full road reconstruction.

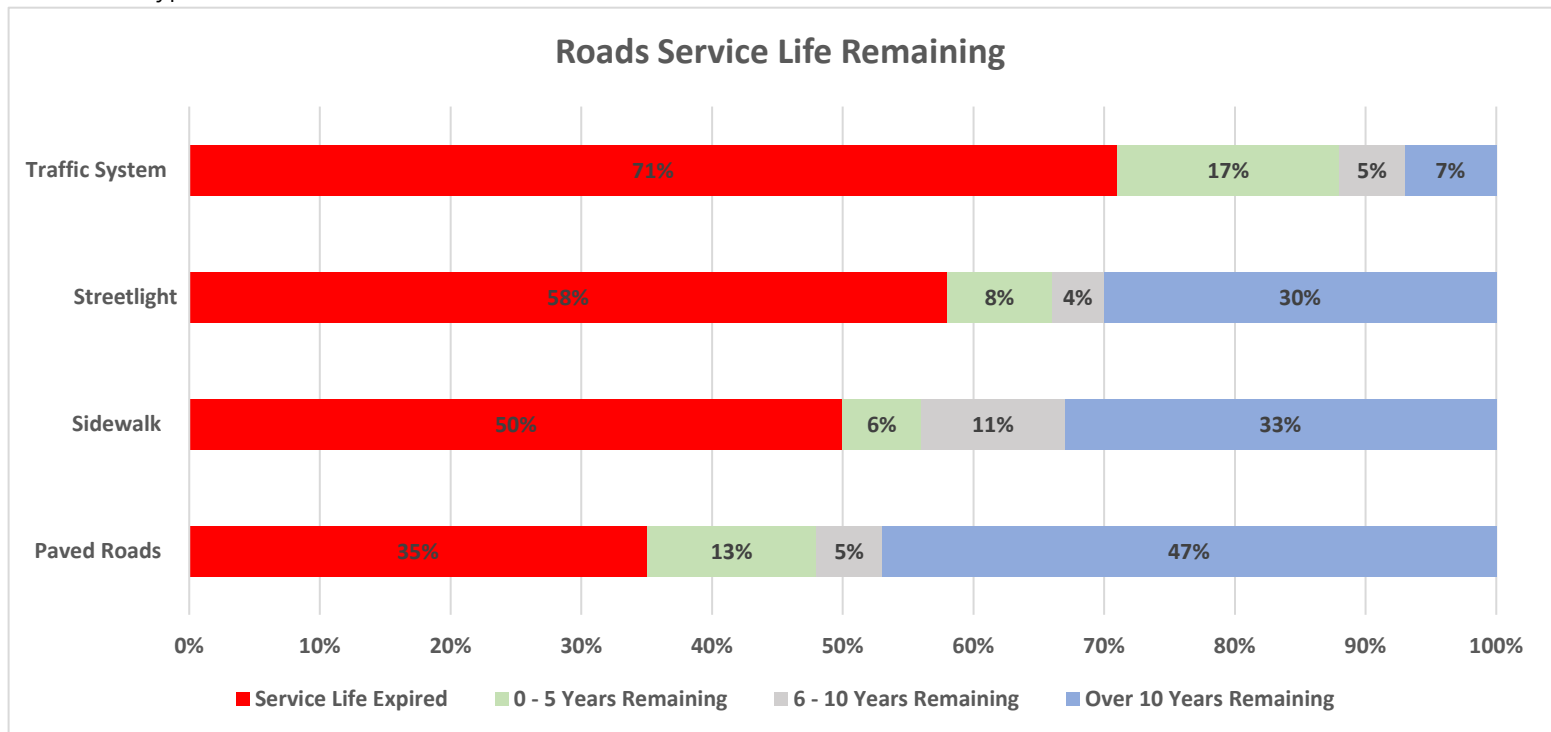
4.1.4 Estimated Useful Life & Average Age

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

A negative average service life remaining (years) means the average is that many years past the estimated useful life. Example, -21 years average service life remaining is 21 years past the EUL of 20-30 years.

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Paved Roads	30 Years	35	21
Sidewalks	25-60 Years	50	-10
Streetlights	15-50 Years	45	13
Traffic Systems	20-30 Years	46	-21

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



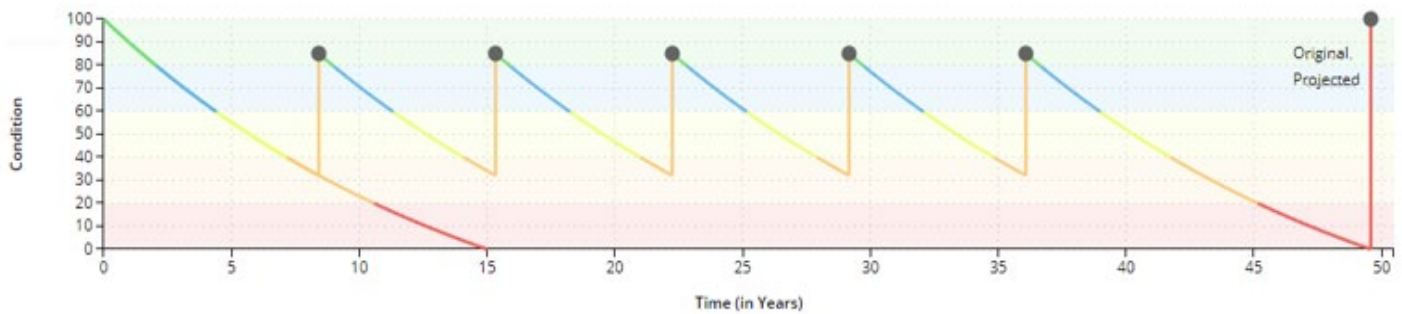
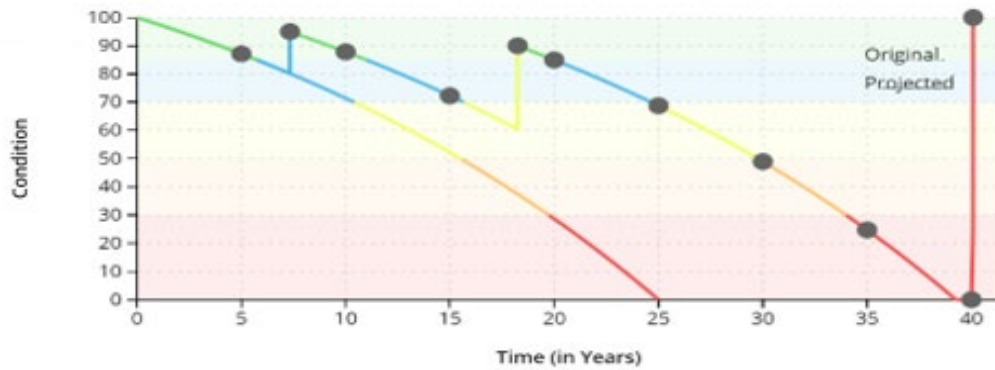
4.1.5 Lifecycle Management Strategy

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

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

Paved Roads (Arterial/Collector Roads)

Event Name	Event Class	Event Trigger
Crack Sealing	Preventative Maintenance	Every 3-5 years
Single Lift Surface Overlay	Rehabilitation	80% Condition
Double Lift Surface Overlay	Rehabilitation	60% Condition
Full Reconstruction	Replacement	40 Years



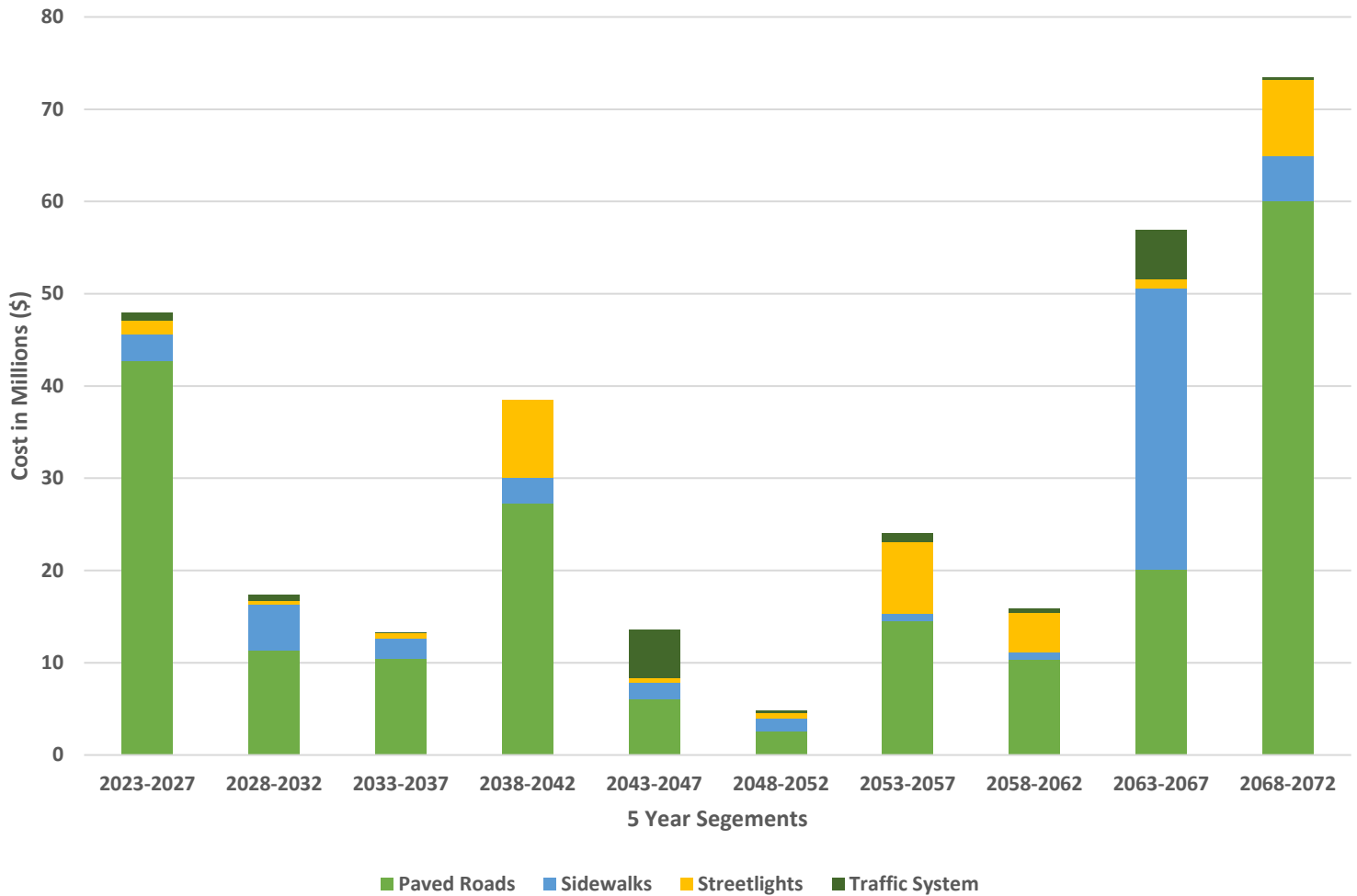
Event Name	Event Class	Event Trigger
Single Surface Treatment	Rehabilitation	8 Years (Repeated)
Full Reconstruction	Replacement	50 Years

4.1.6 Forecasted Capital Requirements

Based on the lifecycle strategies identified previously for paved roads, and assuming the end-of-life replacement of all other assets in this category, the following graph forecasts capital requirements for the Road Network.

The annual capital requirement represents the average amount per year that the City should allocate towards funding rehabilitation and replacement needs to meet future capital needs.

Roads Capital Forecast (Current Service Without Backlog)

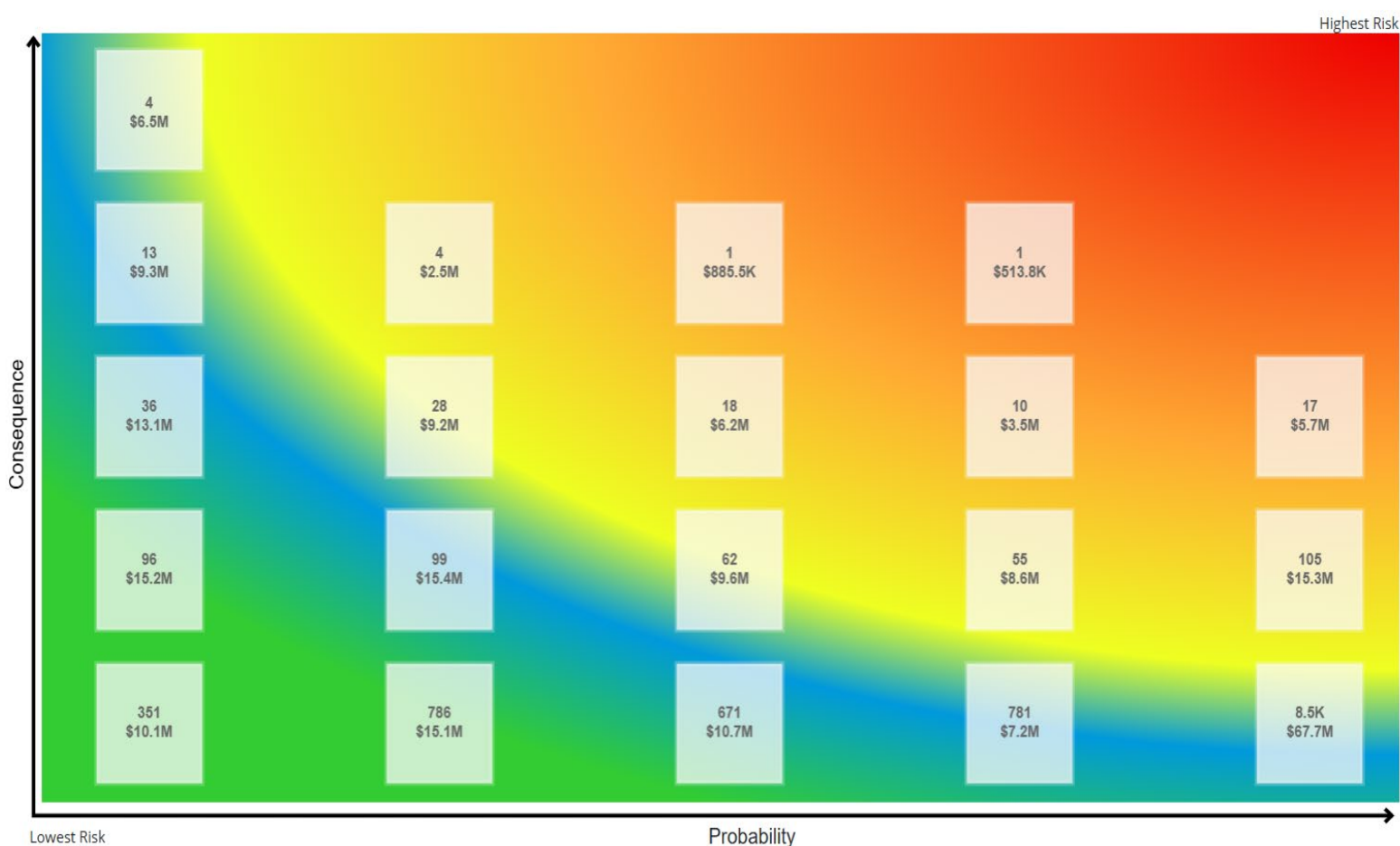


The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix A.

4.1.7 Risk & Criticality

The following risk matrix illustrates the relationship between the probability of failure and the consequence of failure for the assets within the Road asset category based on 2022 inventory data. The risk rating ranges include asset count, quantity, and replacement cost of assets within each range. See Appendix C for the criteria behind this risk rating matrix.

1 - 4 2,614 Assets 188,947.45 unit(s), km, m2, m \$71,385,451.31	5 - 7 8,514 Assets 30,317.31 unit(s), km, m2, m \$95,186,031.03	8 - 9 255 Assets 4,122.27 km, unit(s), m2 \$25,250,896.13	10 - 14 186 Assets 61.82 km, unit(s) \$32,812,411.80	15 - 25 20 Assets 8.44 km, unit(s) \$7,586,467.20
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Critical Assets

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

4.1.8 Levels of Service

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

Community Levels of Service

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

Service Attribute	Community Levels of Service	Related Assets
Scope	The City's roads enable the movement of people and goods throughout the City and to provincial highways using a variety of transportation options. In addition to passenger vehicles, these assets support the movement of commercial vehicles, pedestrians, cyclists, and trailered vehicles, and provide reliable emergency vehicle response access. The extent of the City's transportation network is illustrated in Appendix B.	Roads, Sidewalks, Streetlights, Traffic Systems
Quality	The City inspects and maintains the transportation network at a condition level to operate as designed. Descriptions and images that illustrate the different condition ratings of roads and sidewalks are provided in Appendix B respectively.	Roads, Sidewalks, Streetlights, Traffic Systems

Technical Levels of Service

The following table outlines the quantitative metrics that determine the technical level of service provided by the Road Network. The performance data was taken from several sources such as GIS data, engineered consultant inspections and staff inspections.

Service Attribute	Description of What Performance Measure Captures	Performance Metric	2023 Performance	Target Performance (Future AMP)	Related Assets
Scope	Density of the arterial class road network.	The number of lane-kilometres of arterial roads as a proportion of square kilometres of land area of the municipality.	0.17	-	Roads

Scope	Density of the collector class road network.	Number of lane-kilometres of collector roads as a proportion of square kilometres of land area of the municipality.	3.25	-	Roads
Scope	Density of the local class road network.	Number of lane-kilometres of local roads as a proportion of square kilometres of land area of the municipality.	3.52	-	Roads
Quality	Adequacy of paved road surfaces provides a smooth and comfortable ride at the posted speed.	Average pavement condition index value for paved roads.	58.6%	-	Roads
Quality	Adequacy of road surfaces for users to maintain the posted speed.	Target minimum pavement condition index value for paved roads.	50	-	Roads
Quality	Adequacy of sidewalk surfaces to provide a smooth and level pedestrian pathway.	Average sidewalk condition index value.	In Progress	-	Sidewalks
Quality	Condition of transportation network.	Percentage of assets in Poor or Very Poor condition.	57%	-	All
Accessibility	Availability of accessible sidewalks.	Percentage of sidewalks that comply with the AODA minimum clearance width of 1.5 m.	In Progress	-	Sidewalks

4.1.9 Recommendations

Asset Inventory

- Review sidewalk and streetlight inventory to ensure all municipal assets within these asset segments have been accounted for.

Condition Assessment Strategies

- Annual review and link GIS data to CityWide AM inventory, and update condition, replacement cost, and other attribute information in a timely manner.
- The last comprehensive assessment of the road network was completed in 2022. Integrate an updated assessment of all roads within this calendar year. (scheduled for Spring 2025 per Infrastructure Services Department).
- Update sidewalk, streetlight and traffic system condition assessment before 2025 update as condition assessments will likely lead to better overall conditions of these categories than age-based assumptions.

Lifecycle Management Strategies

- Implement the identified lifecycle management strategies for paved roads to realize potential cost avoidance and maintain a high quality of road pavement condition. This involves building a well thought out, achievable schedule for lifecycle activities.
- Evaluate the efficacy of the City's lifecycle management strategies at regular intervals to determine the impact cost, condition, and risk.

Risk Management Strategies

- Review existing risk models and expand them to more robustly reflect community and council priorities.

Levels of Service

- Continue to measure current levels of service in accordance with the metrics identified in O. Reg. 588/17 and those metrics that the City believes to provide meaningful and reliable inputs into asset management planning.
- Work towards operationalizing proposed levels of service to make informed decisions by utilizing the developed levels of service framework.

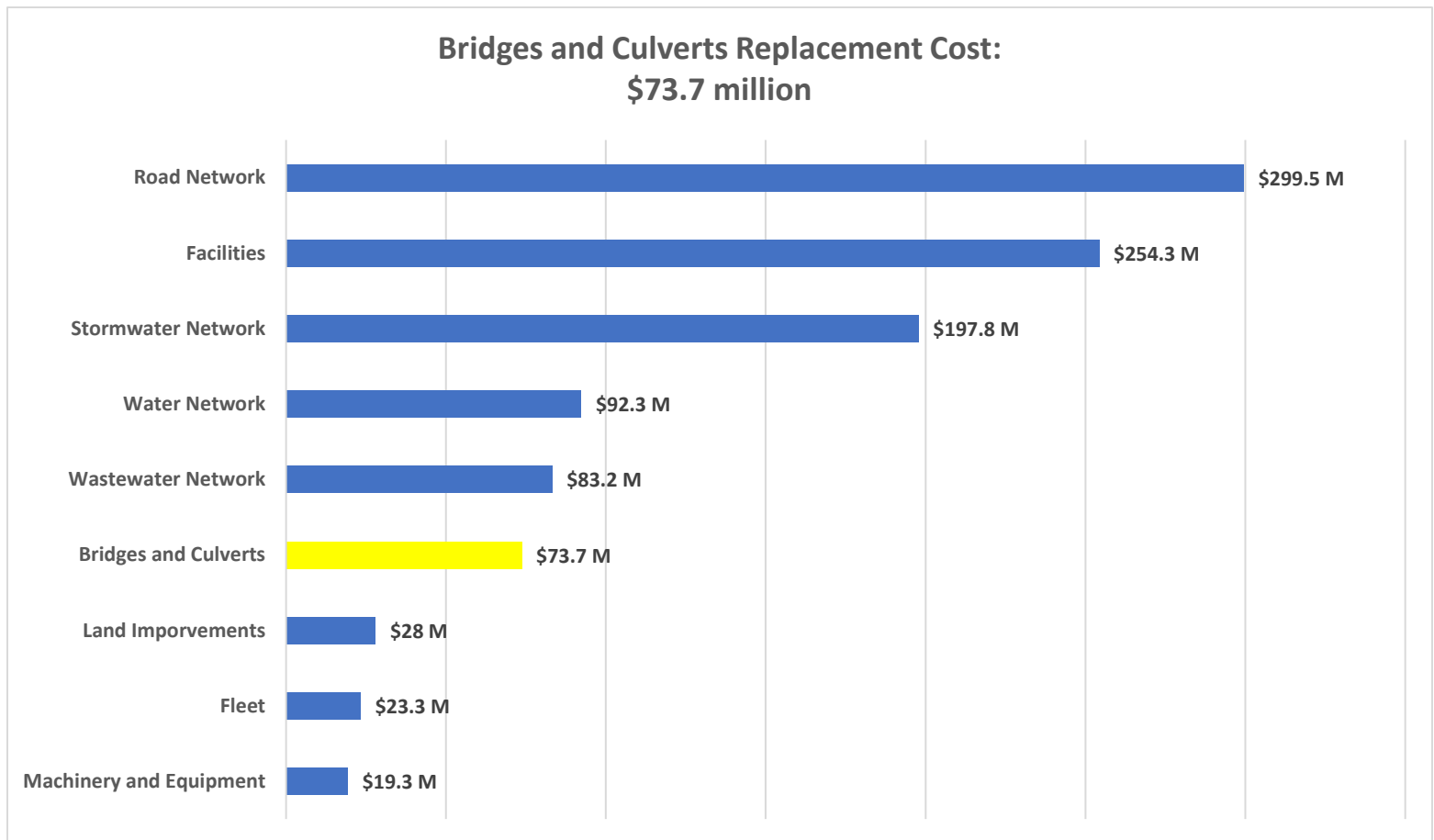
4.2 Bridges & Culverts

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

4.2.1 Asset Inventory & Replacement Cost

The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the City's Bridges & Culverts inventory. In 2019 the total replacement cost of the stormwater network was \$74 million, and it is currently \$73 million as shown below.

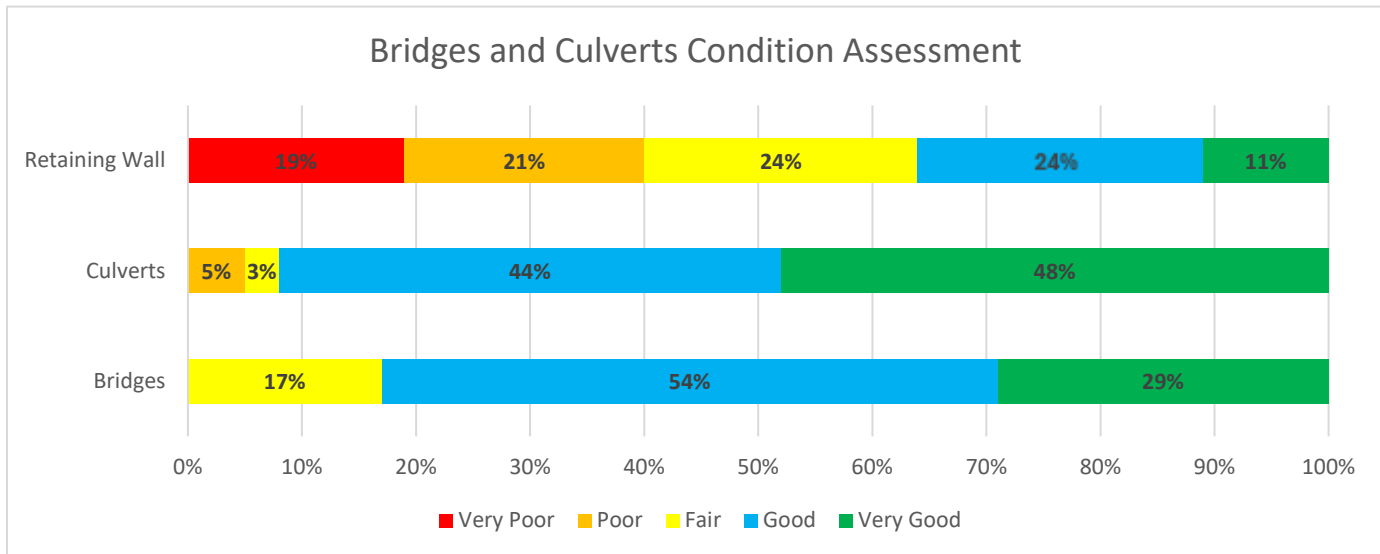
Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Bridges	32	100% User-Defined Cost	\$57,928,939
Retaining Wall	10	100% User-Defined Cost	\$9,159,630
Structural Culverts	17	100% User-Defined Cost	\$6,650,800
Total	59	100% User-Defined Cost	\$73,739,369



4.2.2 Asset Condition

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

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Bridges	75%	Good	100% Assessed
Retaining Wall	77%	Good	100% Assessed
Structural Culverts	70%	Good	100% Assessed



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

4.2.3 Current Approach to Condition Assessment

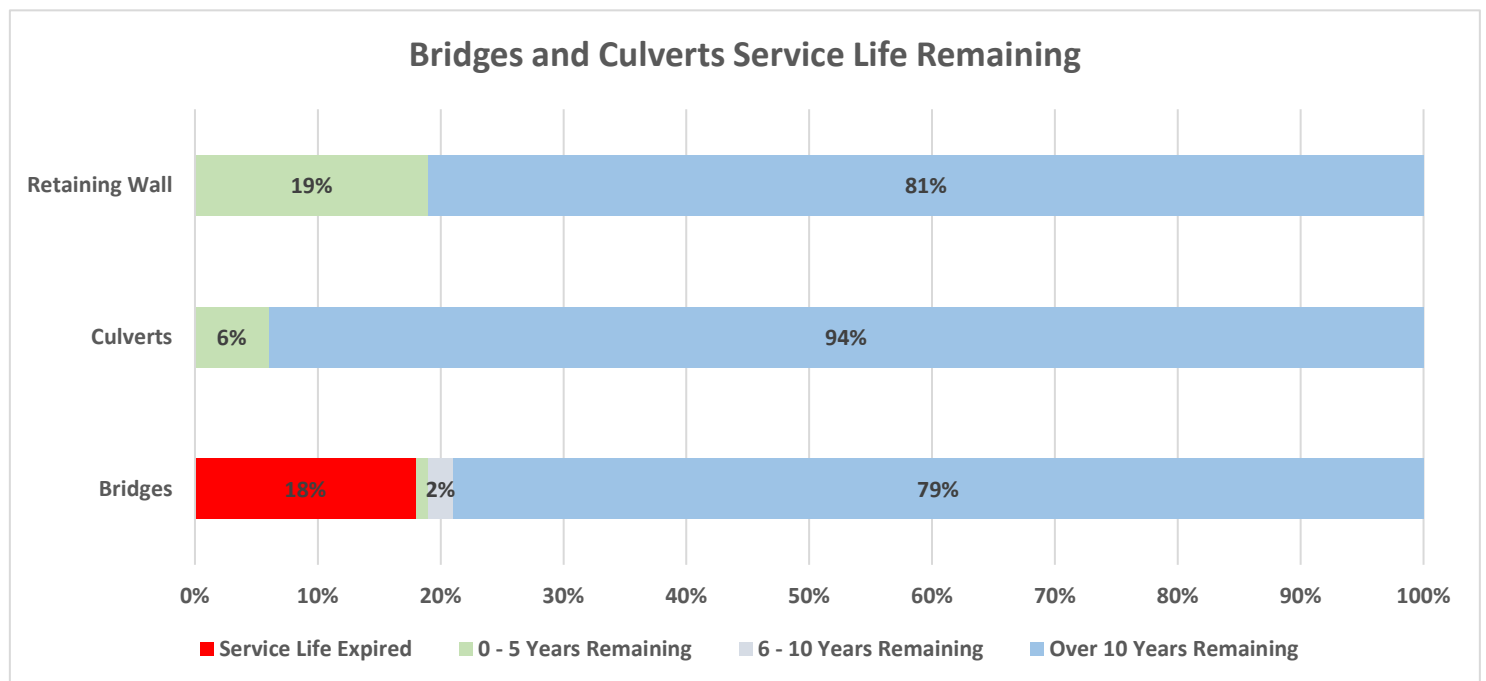
Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the municipality's current approach:

- Condition assessments of all bridges and culverts with a span greater than or equal to 3 meters are completed every 2 years (or 4 years depending on professional recommendations) in accordance with the Ontario Structure Inspection Manual (OSIM)

4.2.4 Estimated Useful Life & Average Age

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

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Bridges	50-125 Years	57	59
Retaining Wall	75-100 Years	26	48
Structural Culverts	75-100 Years	53	60



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

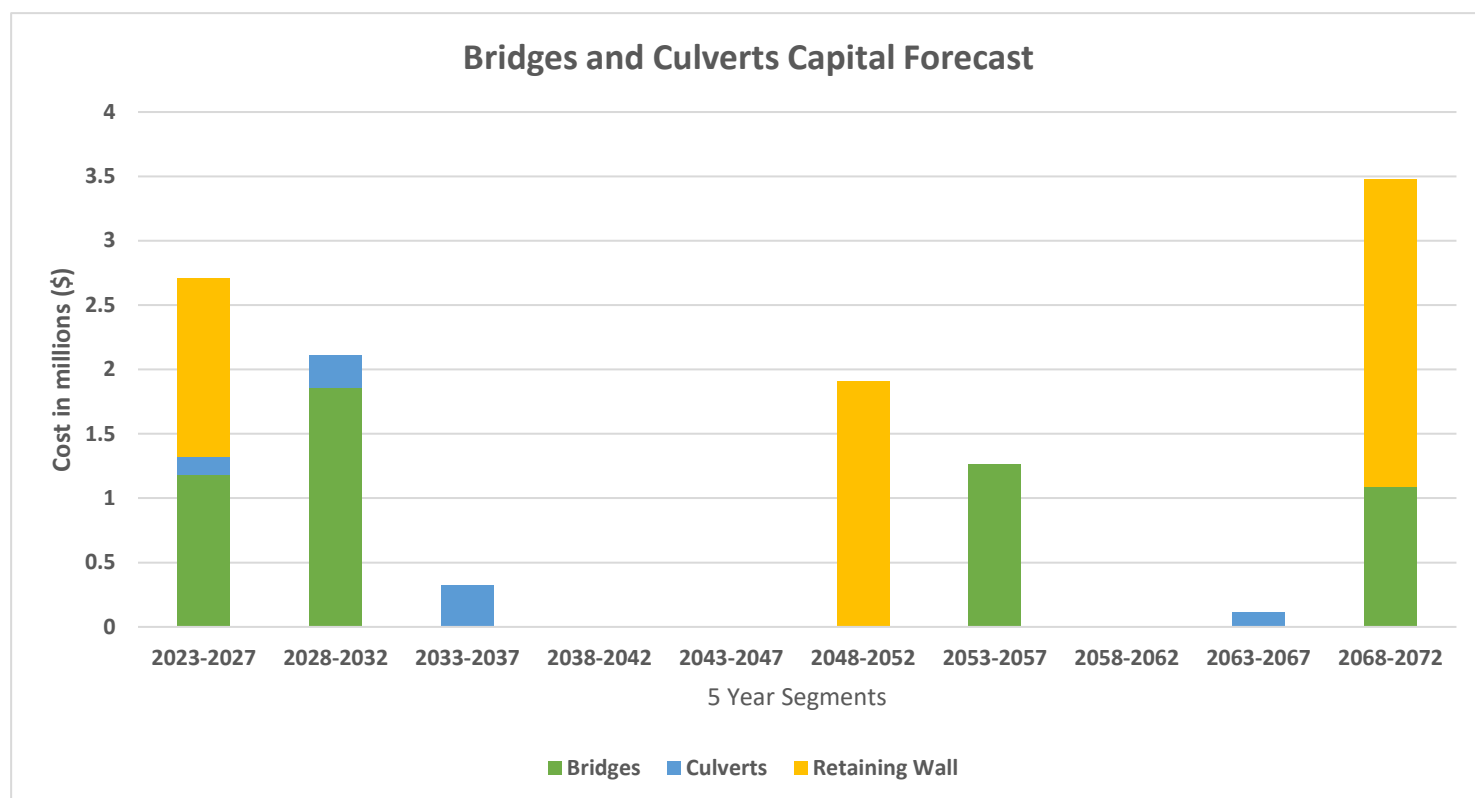
4.2.5 Lifecycle Management Strategy

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

Activity Type	Description of Current Strategy
Maintenance, Rehabilitation and Replacement	All lifecycle activities are driven by the results of mandated structural inspections completed according to the Ontario Structure Inspection Manual (OSIM)
Inspection	The most recent inspection report was completed in 2023

4.2.6 Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the City should allocate towards funding rehabilitation and replacement needs. This chart does not include bridge and culvert maintenance which is captured in the 10-year capital forecast. This will be reflected in future updates of the AMP. This chart shows full replacement costs, not maintenance.

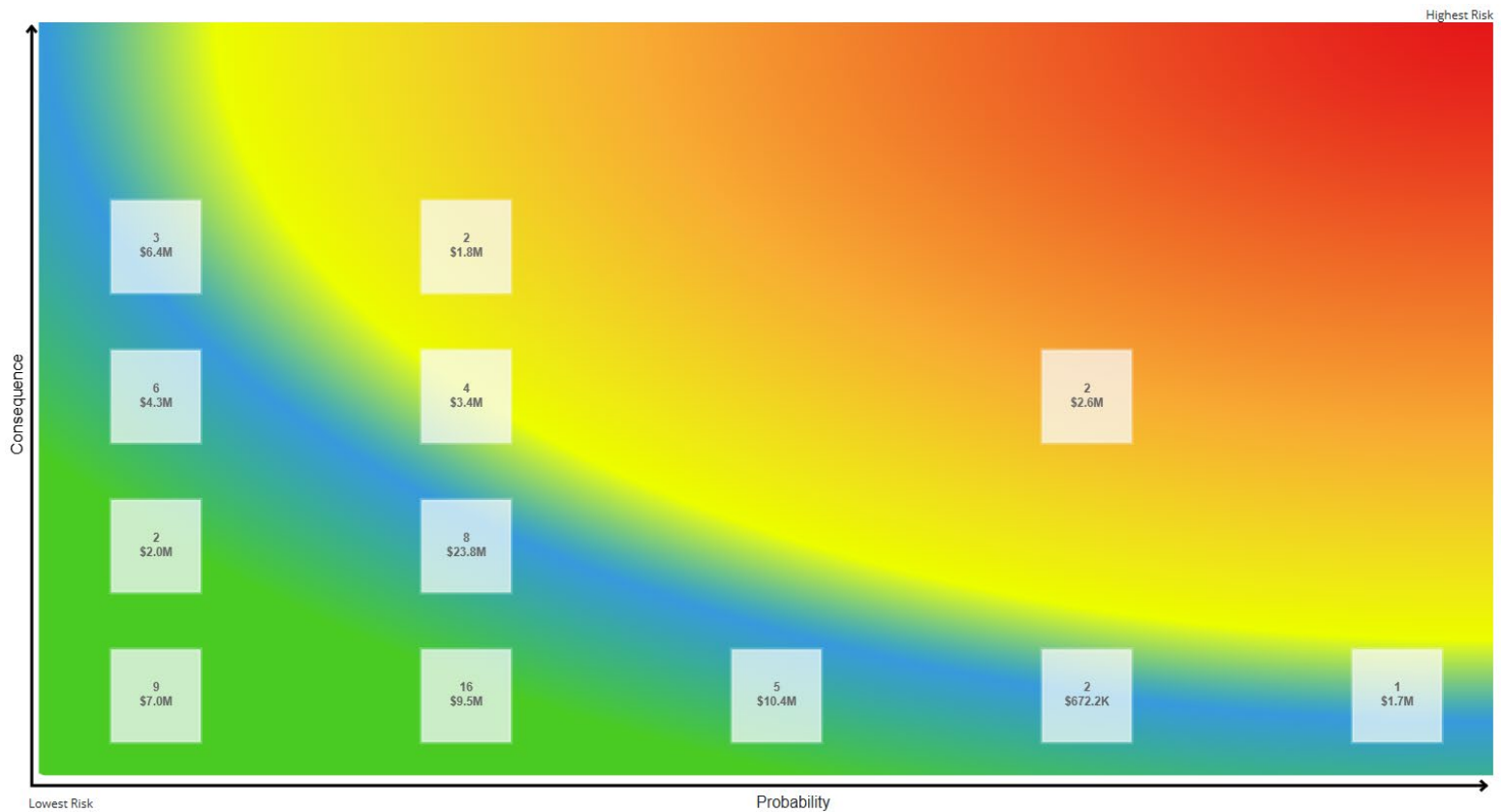


The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix A.

4.2.7 Risk & Criticality

The following risk matrix illustrates the relationship between the probability of failure and the consequence of failure for the assets within the Bridges and Culverts asset category based on 2022 inventory data. The risk rating ranges include asset count, quantity, and replacement cost of assets within each range. See Appendix C for the criteria behind this risk rating matrix.

1 - 4 51 Assets 51.00 unit(s) \$64,609,710.00	5 - 7 3 Assets 4.00 unit(s) \$4,546,250.00	8 - 9 2 Assets 2.00 unit(s) \$1,800,200.00	10 - 14 2 Assets 2.00 unit(s) \$2,612,700.00	15 - 25 0 Assets - \$0.00
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Critical Assets

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

4.2.8 Levels of Service

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

Community Levels of Service

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

Service Attribute	Community Levels of Service	Related Assets
Scope	The City's bridges and structural culvert enable the movement of people and goods throughout the City and to provincial highways using a variety of transportation options. In addition to passenger vehicles, these assets support the movement of commercial vehicles, pedestrians, cyclists, trailered vehicles, and provide reliable emergency vehicle response access.	Bridges, Retaining Walls, Structural Culverts
Quality	<p>If the condition of a bridge or structural culvert were to progress to a state of disrepair, width or load restrictions may be implemented. If the condition degradation is severe, the structure may become unusable or fail. Regular inspections inform the City of when potential restrictions or closure may need to be put in place. One bridge (Avondale Avenue Cemetery Entrance Bridge) has a loading or dimension restriction. This impacts the community level of service as it has a loading restriction.</p> <p>The City inspects and maintains the transportation network at a condition level to operate as designed. Descriptions and images that illustrate the different condition ratings of bridges and structural culverts are provided in Appendix B.</p>	Bridges, Retaining Walls, Structural Culverts

Technical Levels of Service

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

Service Attribute	Description of What Performance Measure Captures	Performance Measure	2023 Performance	Target Performance (Future AMP)	Related Assets
Scope	Adequacy of bridges to support typical traffic without restrictions.	Percentage of bridges in the City with loading or dimensional restrictions.	3%		Bridges
Quality	Density of the collector class road network.	Average bridge condition index value for bridges in the city.	74%		Bridges
Quality	Density of the local class road network.	Average bridge condition index value for culverts in the city.	85%		Culverts

4.2.9 Recommendations

Data Review/Validation

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

Risk Management Strategies

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

Lifecycle Management Strategies

- This AMP includes capital costs associated with the major rehabilitation/reconstruction of bridges and culverts as estimated by the OSIMs contractors. Staff should update lifecycle events in Citywide to reflect short term maintenance recommended by OSIM reports in addition to full replacement forecasting.

Levels of Service

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

Other

- This asset category should be viewed at this time as the benchmark for any AMP category data. It has scheduled condition assessments for 100% of the category assets every 3 years which give accurate maintenance/replacement costs and contribute to accurate risk assessments. This allows for accurate financial forecasting as the data is 100% reliable which is the key driver for a successful AMP.

4.3 Stormwater Network

The City is responsible for owning and maintaining a stormwater network of storm sewer mains, catch basins, culverts (less than 3m diameter) and other supporting infrastructure.

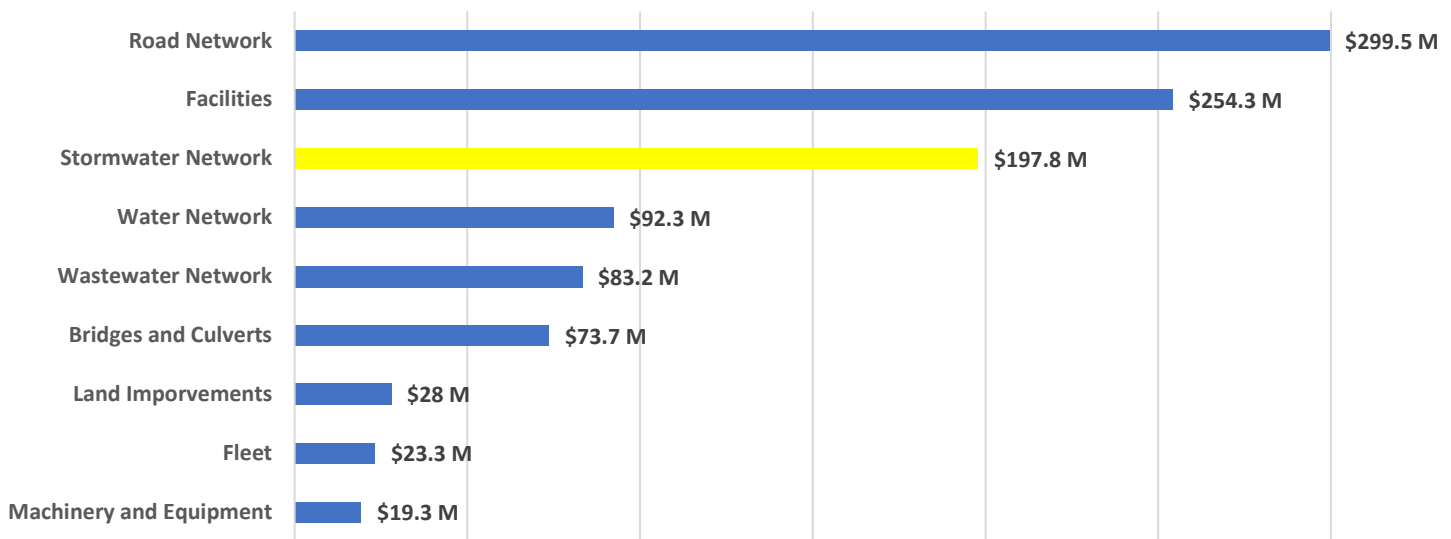
Staff are working towards improving the accuracy and reliability of their Stormwater Network inventory data to assist with long-term asset management planning.

4.3.1 Asset Inventory & Replacement Cost

The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the City's Stormwater Network inventory. The total estimated replacement cost of the stormwater network is \$197 million (\$185 million in 2019).

Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Catch Basins	4176	100% CPI Tables	\$14,254,887
Culverts	4,366 m	100% CPI Tables	\$2,826,896
Mains	181,925 m	100% Cost/Unit	\$135,245,142
Manholes	2194	100% CPI Tables	\$13,666,904
Municipal Drains	34,925 m	100% CPI Tables	\$2,091,809
Other (OGS, Ditches)	4,164 m	100% CPI Tables	\$20,739,081
Pump Stations	1	100% CPI Tables	\$611,698
Stormwater Pond Systems	319,121 m ²	100% CPI Tables	\$8,460,320
Total	-	-	\$197,896,737

Stormwater Network Replacement Cost: \$197.8 million

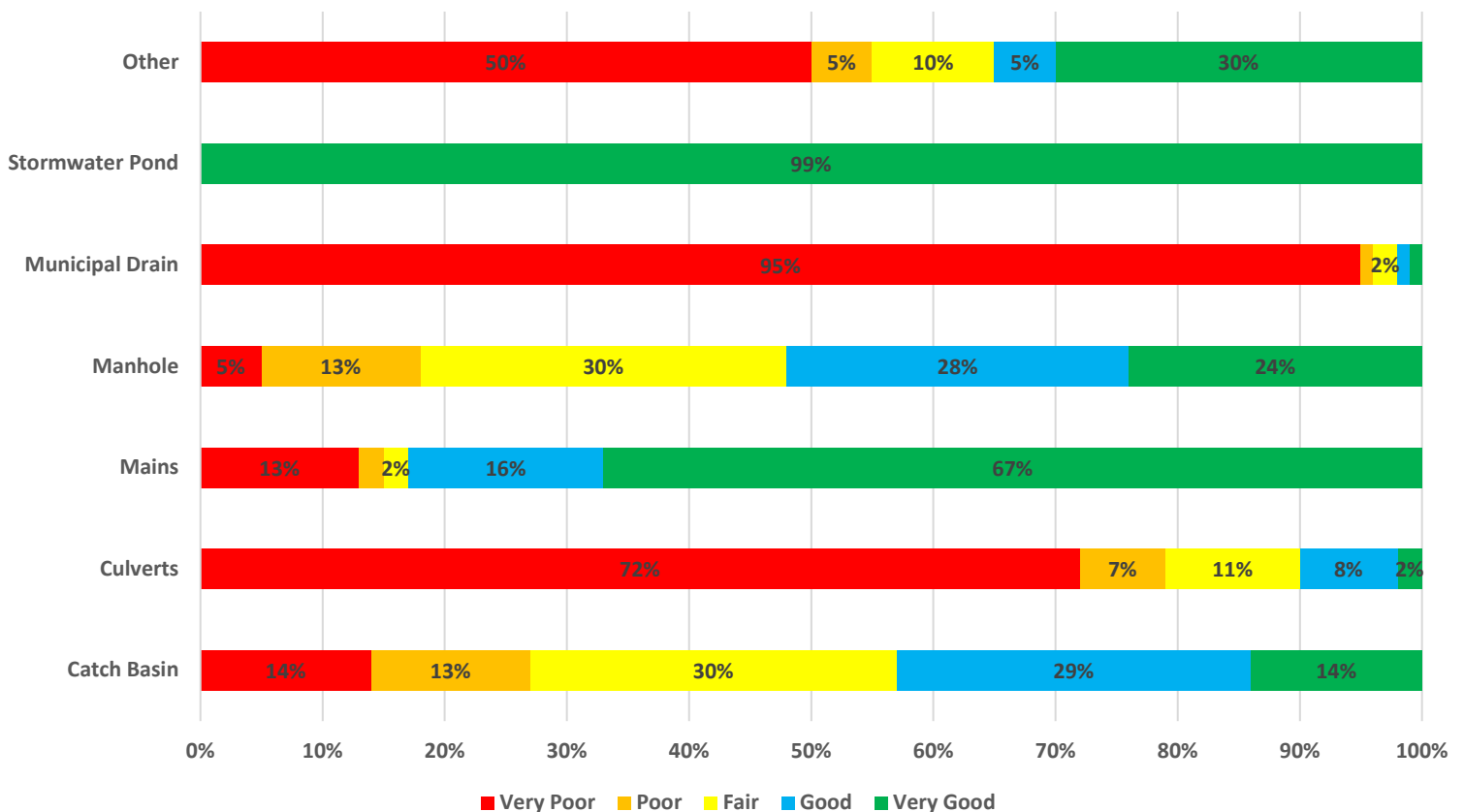


4.3.2 Asset Condition

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

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Catch Basins	50%	Fair	Age Based
Culverts	18%	Very Poor	Age Based
Mains	73%	Good	Age Based
Manholes	57%	Fair	Age Based
Municipal Drains	N/A	Fair - Poor	Age Based
Other	56%	Fair	Age Based
Pump Stations	40%	Fair	Assessed Condition
Stormwater Pond Systems	86%	Very Good	Age Based

Stormwater Network Condition Assessment



4.3.3 Current Approach to Condition Assessment

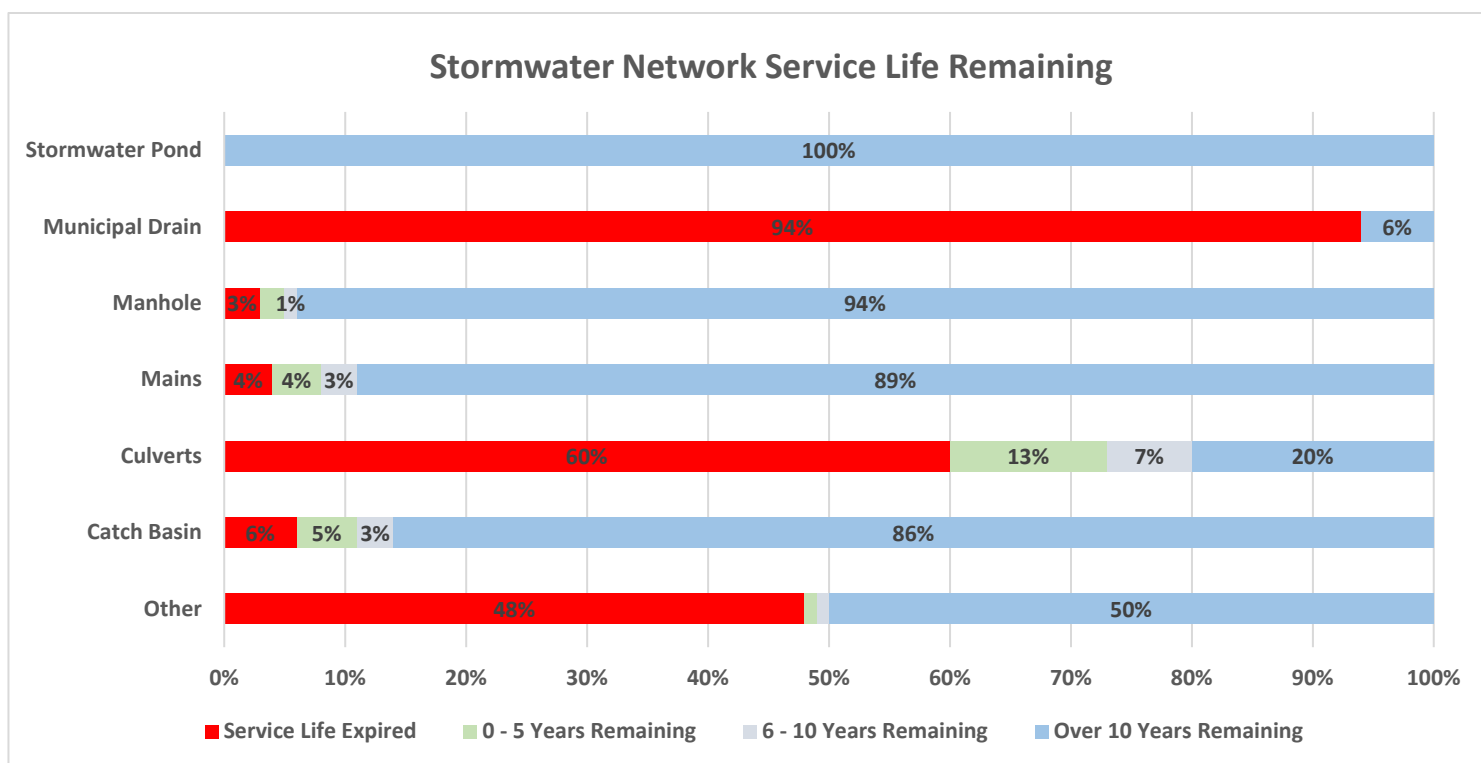
Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the municipality's current approach:

- CCTV inspections occur on select storm mains on a project basis, however, is recommended to do every 10-15 years. Trenchless re-lining activities are completed on select sewer mains in tandem with CCTV inspections. This method is much less expensive than traditional open cut replacement as the excavation and restoration often makes up the majority of replacement costs. This option is usually only available once on a cast-iron main before a full replacement is required.
- System flushing is usually performed every 5-10 years. Ditch inlets SWMP's and oil-grit separators are inspected and cleaned quarterly and after major storms to avoid blockages.
- Catch basins are inspected and cleaned out every 2 years.

4.3.4 Estimated Useful Life & Average Age

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

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Catch Basins	100 Years	50	49
Culverts	35 Years	38	-2
Mains	35-100 Years	47	48
Manholes	100 Years	42	57
Municipal Drains	80 Years	105	-25
Other	100 Years	45	52
Pump Stations	50 Years	35	15
Stormwater Pond Systems	75-100 Years	14	86



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

4.3.5 Lifecycle Management Strategy

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

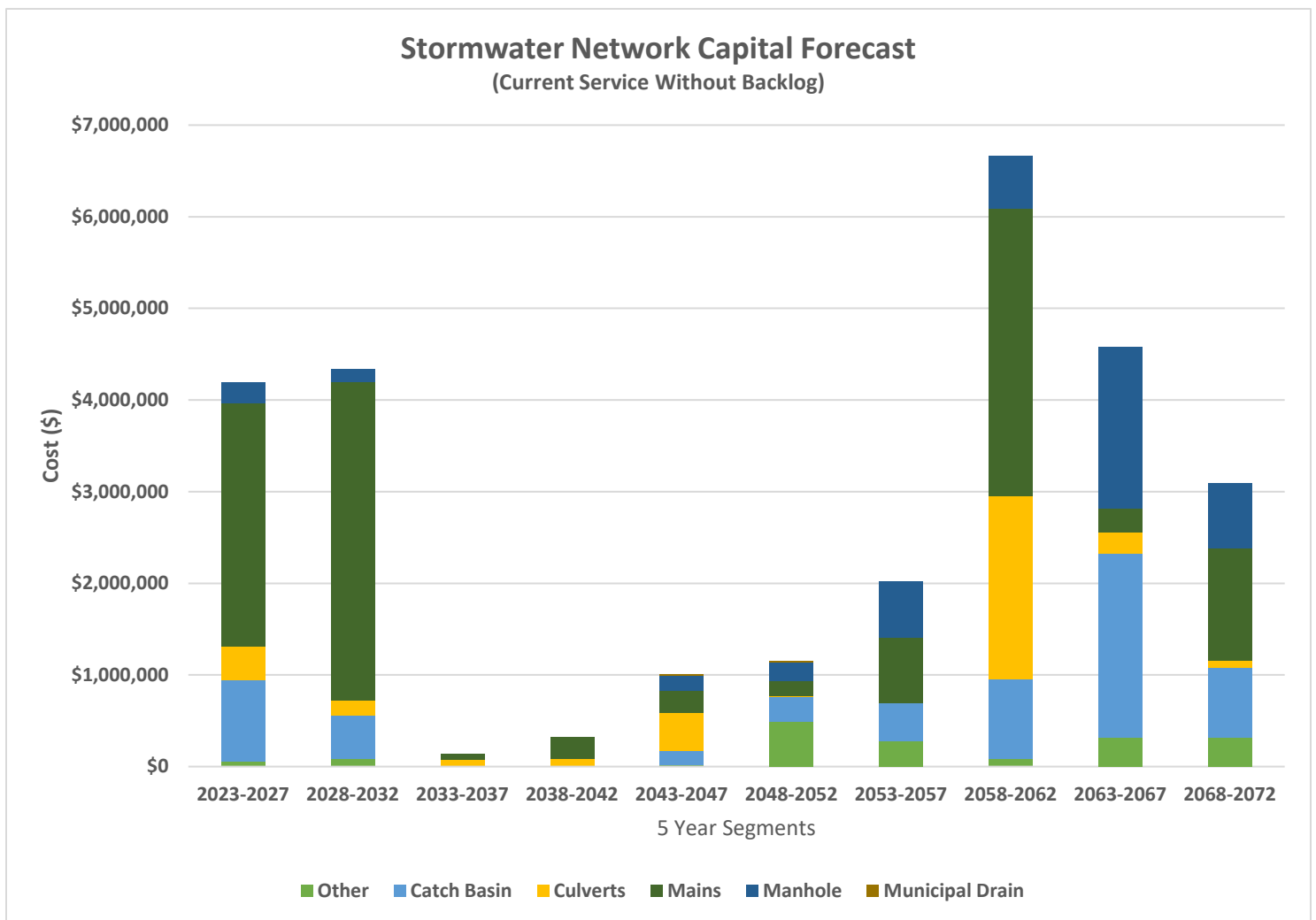
The following table outlines the City's current lifecycle management strategy.

Activity Type	Description of Current Strategy
Maintenance	Maintenance activities are completed to a lesser degree compared to other underground linear infrastructure. This is because gravity mains are less critical than pressurized mains and valves (water).
Maintenance	Primary activities include catch basin cleaning and storm main flushing, but only a small percentage of the entire network is completed per year due to the size of the system.
Maintenance	CCTV inspections and cleaning are completed as needed and this information is used to drive forward rehabilitation and replacement plans.

Maintenance	Staff will be undertaking major maintenance and clean-outs in the next few years to improve the service life of their stormwater pond systems based on sediment surveys.
Rehabilitation	Trenchless re-lining reduces total lifecycle costs but requires a formal condition assessment program to determine viability in each specific case.
Replacement	Without the availability of up-to-date condition assessment information replacement activities are purely reactive in nature.

4.3.6 Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the City should be allocating towards funding rehabilitation and replacement needs.

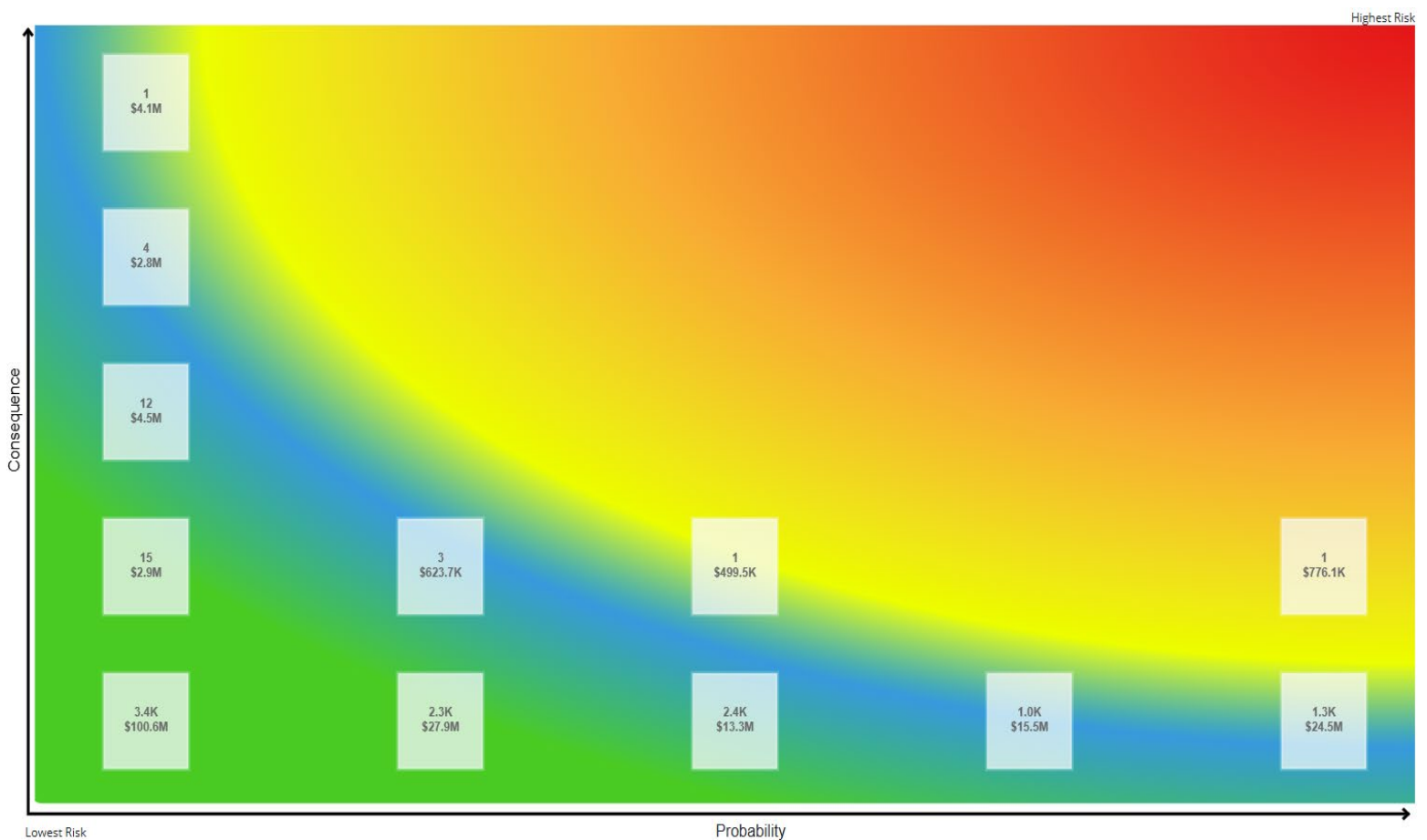


The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix A.

4.3.7 Risk & Criticality

The following risk matrix illustrates the relationship between the probability of failure and the consequence of failure for the assets within the Stormwater Network asset category based on 2022 inventory data. The risk rating ranges include asset count, quantity, and replacement cost of assets within each range. See Appendix C for the criteria behind this risk rating matrix.

1 - 4 9,106 Assets 154,974.29 unit(s), m \$166,852,145.81	5 - 7 1,330 Assets 52,713.43 unit(s), m \$30,268,448.18	8 - 9 0 Assets - \$0.00	10 - 14 1 Asset 862.38 m \$776,143.33	15 - 25 0 Assets - \$0.00
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Critical Assets

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

4.3.8 Levels of Service

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

Community Levels of Service

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

Service Attribute	Community Levels of Service	Related Assets
Scope	The City maintains a stormwater network to support reliable, safe, and efficient collection, treatment, and discharge of surface water within the community to the receiving water bodies. The extent of the City's stormwater network, including the locations of stormwater assets, is illustrated in Appendix B.	All Stormwater
Reliability	The stormwater system operates as intended to convey surface water runoff to the subsurface storm infrastructure.	All Stormwater
Quality	The City inspects and maintains the stormwater system at a condition level to operate as designed.	All Stormwater

Technical Levels of Service

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

Service Attribute	Description of What Performance Measure Captures	Performance Measure	2023 Performance	Target Performance	Related Assets
Scope	Quantifying the City's overland flow routes that can manage less frequent major storm events.	Percentage of properties in municipality resilient to a 100-year storm.	70%		All Stormwater

Scope	Quantifying the City's stormwater sewer network that can manage more frequent wet weather events.	Percentage of the municipal stormwater management system resilient to a 5-year storm.	80%		All Stormwater
Reliability	Frequency of overwhelmed stormwater infrastructure that significantly impacts the transportation network.	Annual number of emergency road closures during major storm and wet weather events.	In Progress		All Stormwater
Quality	Condition of the stormwater system.	Percentage of assets in Poor or Very Poor condition.	20%		All Stormwater
Quality	Frequency of inspections of the collection network.	Percentage of total stormwater sewer length inspected per year using in-pipe technologies.	In Progress		All Stormwater

4.3.9 Recommendations

Condition Assessment Strategies

- The development of a comprehensive CCTV strategy should be developed. A 10–15-year system-wide assessment of the condition of all assets in the Stormwater Network should be developed and put into practice.

Risk Management Strategies

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

Lifecycle Management Strategies

- Document and review lifecycle management strategies for the Stormwater Network on a regular basis to achieve the lowest total cost of ownership while maintaining adequate service levels.
- Review requirements of the stormwater network Consolidated Linear Infrastructure ECA to ensure maintenance practices align with the ECA requirements.

Levels of Service

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

4.4 Facilities

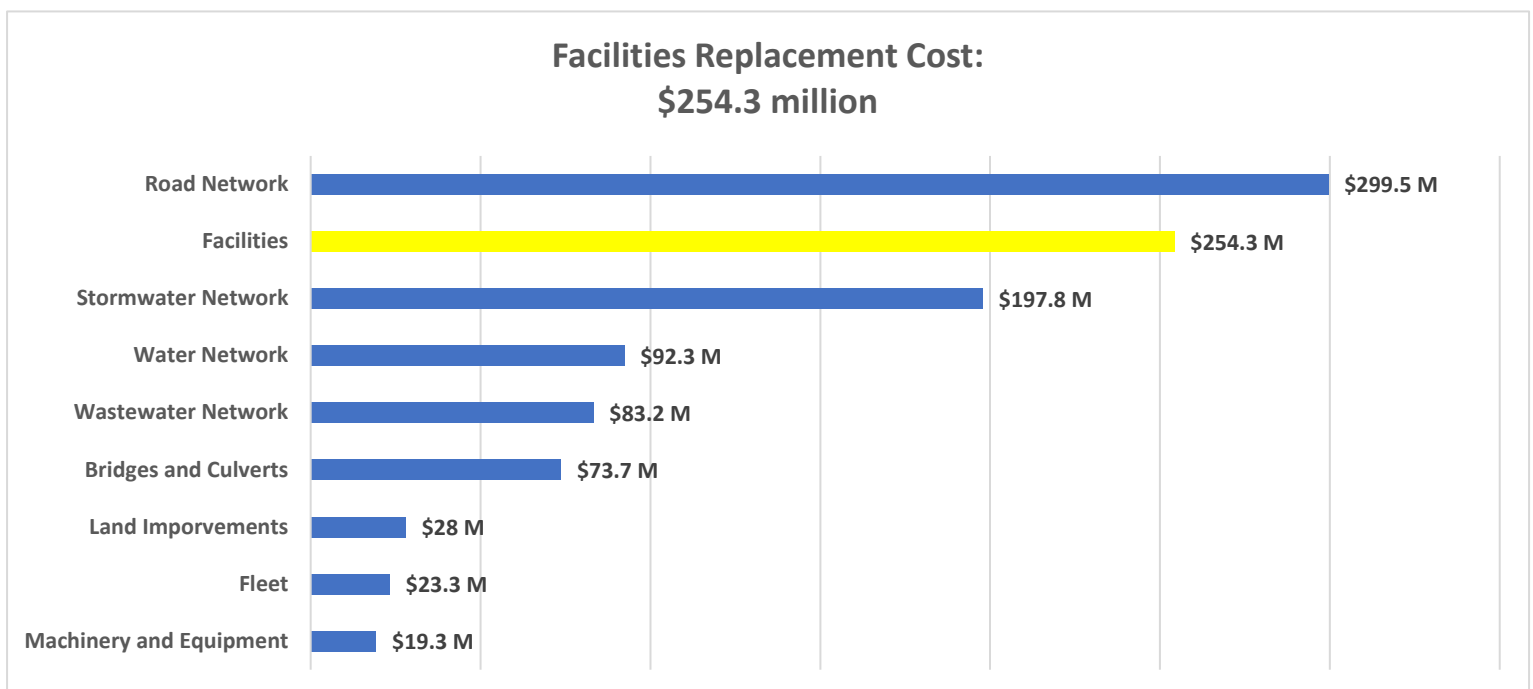
The City of Stratford owns and maintains several facilities and recreation centres that provide key services to the community. These include:

- administrative offices
- public libraries
- fire and police stations and associated offices
- public works garages and storage sheds
- arenas and community centres
- public housing

4.4.1 Asset Inventory & Replacement Cost

The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the City's Facilities inventory. For context, the total replacement cost in 2019 was \$178 million and it is \$254 million in 2024.

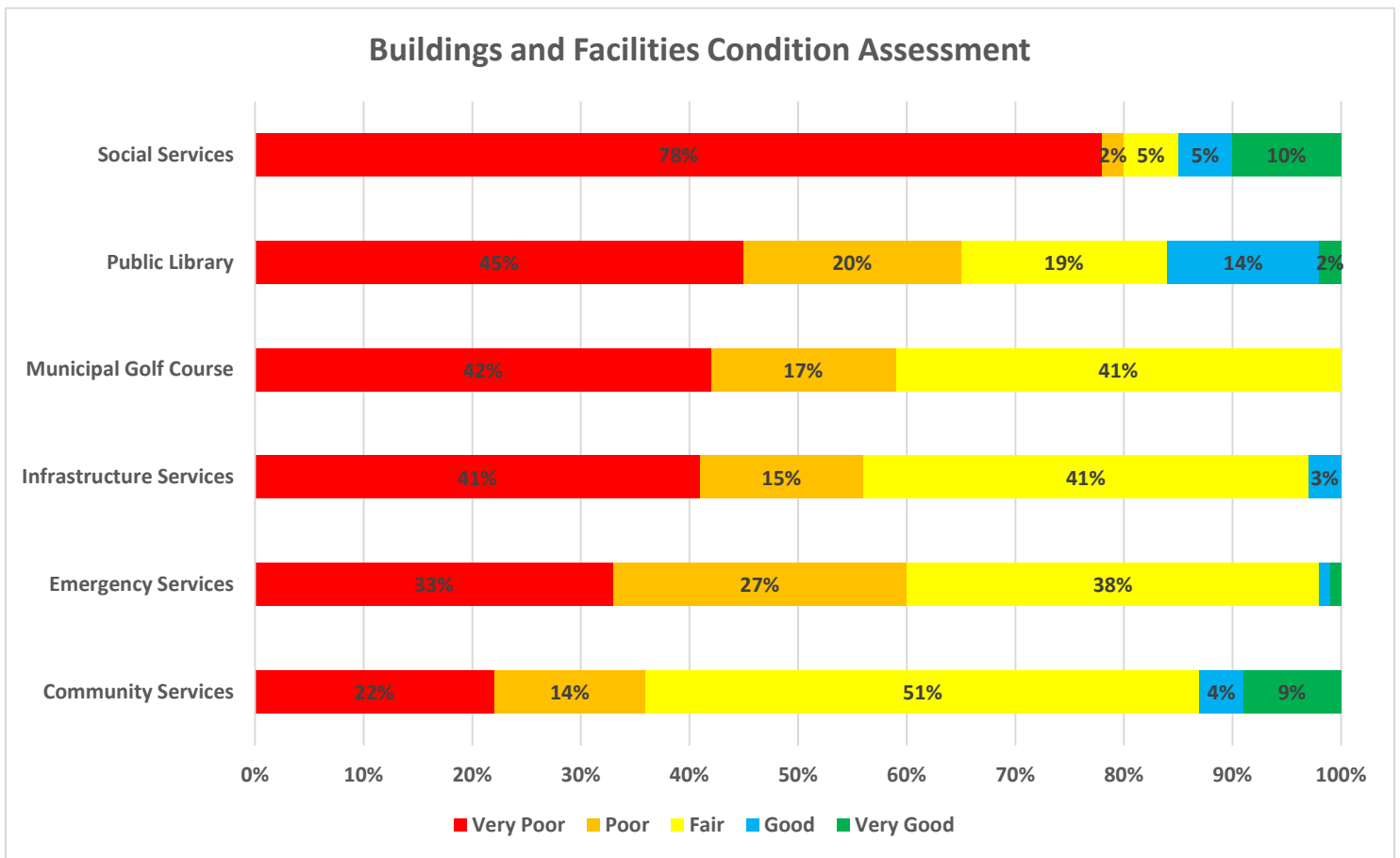
Asset Segment	Replacement Cost Method	Total Replacement Cost
Community Services	100% User-Defined Cost	\$154,070,725
Emergency Services	100% User-Defined Cost	\$23,049,250
Infrastructure Services	100% User-Defined Cost	\$7,781,127
Municipal Golf Course	100% User-Defined Cost	\$1,641,183
Public Library	100% User-Defined Cost	\$4,193,161
Social Services	100% User-Defined Cost	\$54,596,633
Total	-	\$254,332,079



4.4.2 Asset Condition

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

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Community Services	35%	Poor	85% Assessed
Emergency Services	49%	Fair	100% Assessed
Infrastructure Services	38%	Poor	80% Assessed
Municipal Golf Course	37%	Poor	100% Assessed
Public Library	35%	Poor	100% Assessed
Social Services	54%	Fair	50% Assessed



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

4.4.3 Current Approach to Condition Assessment

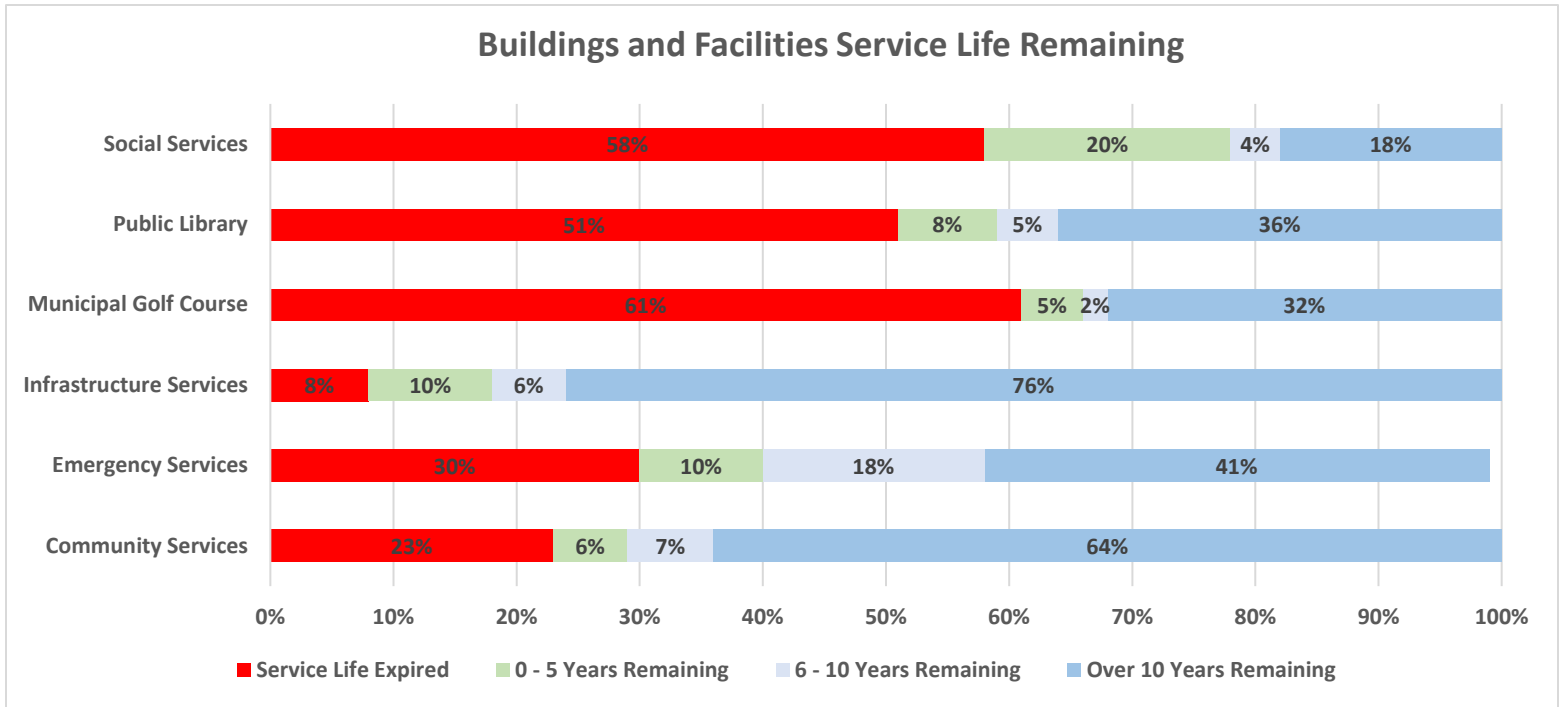
Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the municipality's current approach:

- Detailed condition assessments were completed in 2020 for 23 of the City's facilities. This included an assessment of each facility's general condition, required repairs and recommended upgrades. There are assessments planned for remaining facilities in 2025.
- Maintenance activities are undertaken because of internal inspections, prioritizing activities related to health and safety and regulatory compliance.
- Social Housing buildings are managed only on a componentized basis but not on an aggregate basis.

4.4.4 Estimated Useful Life & Average Age

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

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Community Services	5-50 Years	29	23
Emergency Services	5-50 Years	17	12.5
Infrastructure Services	5-50 Years	41	13
Municipal Golf Course	5-50 Years	36	23
Public Library	10-50 Years	27	5
Social Services	5-50 Years	9	19



4.4.5 Lifecycle Management Strategy

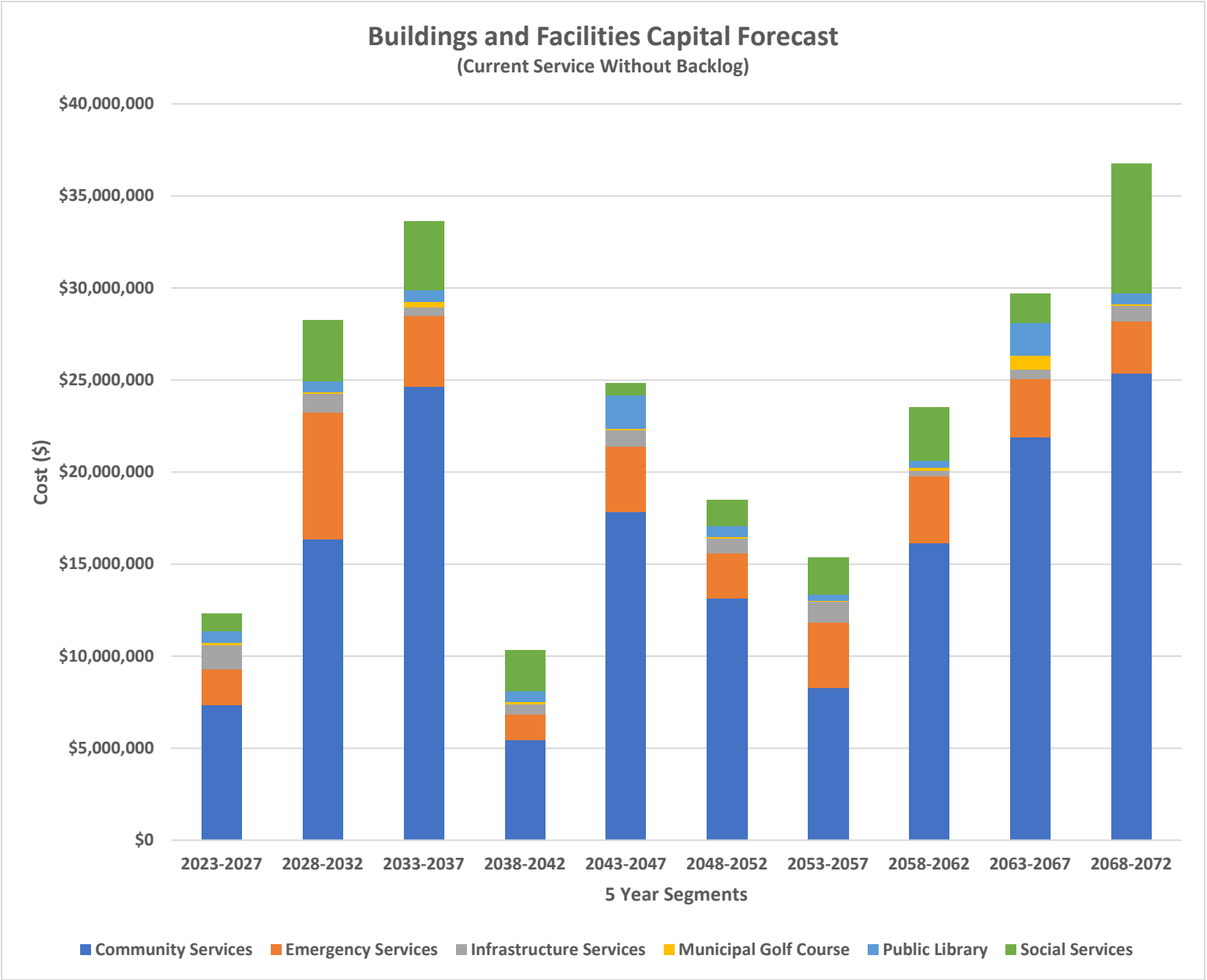
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Maintenance / Rehabilitation	Municipal buildings are subject to regular inspections to identify health & safety requirements as well as structural deficiencies that require additional attention.
Maintenance / Rehabilitation	Primary buildings have more detailed maintenance and rehabilitation schedule, while the maintenance of other facilities are dealt with on a case-by-case basis.
Replacement	As a supplement to the knowledge and expertise of municipal staff the City regularly works with contractors to complete Building Condition Assessments to inform decision making and replacement and budgeting strategies.
Replacement	Assessments are completed strategically as buildings approach their end-of-life to determine whether replacement or rehabilitation is appropriate.

4.4.6 Forecasted Capital Requirements

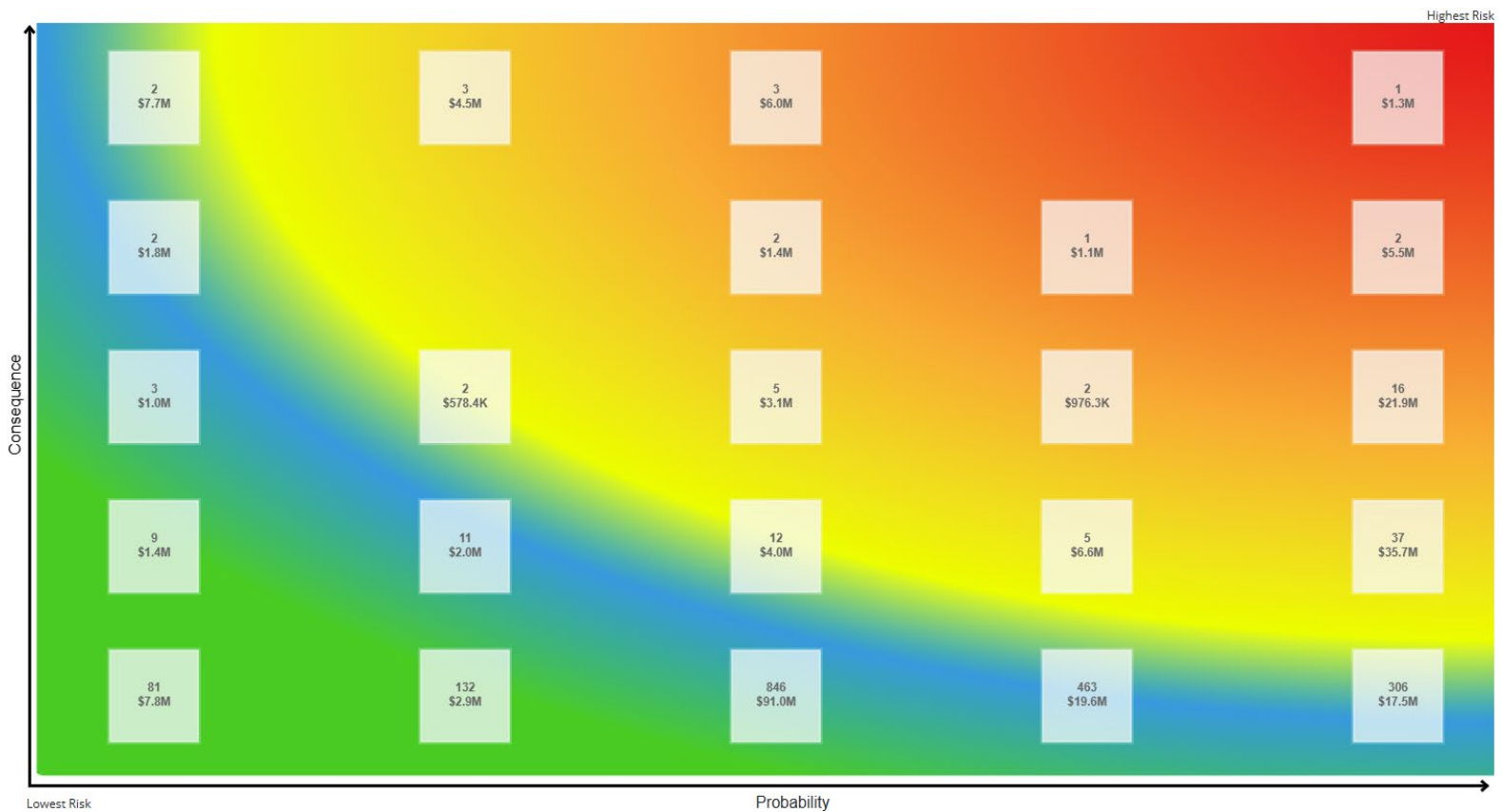
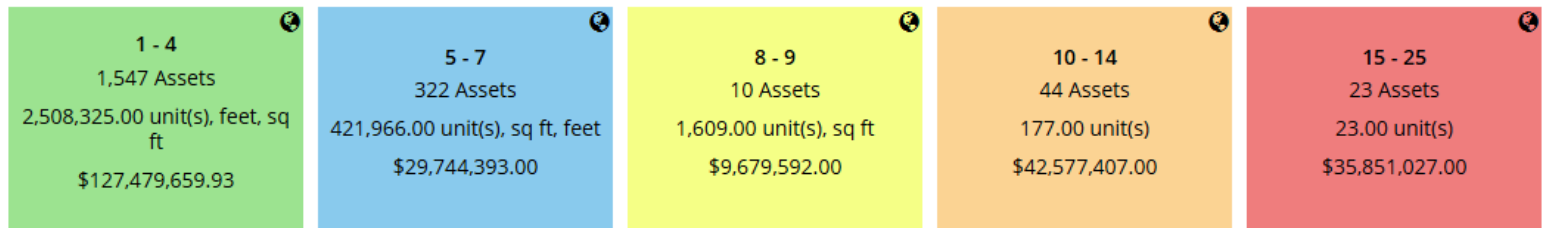
The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the City should allocate towards funding rehabilitation and replacement needs.



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

4.4.7 Risk & Criticality

The following risk matrix illustrates the relationship between the probability of failure and the consequence of failure for the assets within the Buildings and Facilities asset category based on 2022 inventory data. The risk rating ranges include asset count, quantity, and replacement cost of assets within each range. See Appendix C for the criteria behind this risk rating matrix.



Critical Assets

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

4.4.8 Levels of Service

The City's assets exist to deliver services to its users. Levels of service are a measurement of the actual service provided so that decisions are made based on the nature and quality of that service, rather than only based on the condition of an asset. These are used to summarize the type of service being provided that reflects the values and desires of stakeholders in the community.

The following tables identify the City's current level of service for the Buildings and Facilities assets. These metrics include any technical and community levels of service metrics that are required to comply with Ontario Regulation 588/17, as well as any additional metrics provided by the City. A future revision to this plan will include proposed levels of service targets for each measure.

Community Levels of Service

The following table outlines the current qualitative descriptions that determine the community levels of service provided by Buildings & Facilities.

Service Attribute	Community Levels of Service	Related Assets
Accessibility	The City strives to make its facilities accessible to everyone.	All
Comfort	The City provides facilities that are pleasant to be in.	All
Security	The City takes steps to reduce risk of criminal activities at facilities.	All
Reliability	The City strives to have its facilities available for use during normal operating hours.	All
Energy Efficiency	The City strives to reduce emissions of greenhouse gases.	All
Capacity	The City strives to align capacity of facilities to service demand.	All
Capacity	The City stores vehicles indoors and when doing so, improves operational efficiency or reduces lifecycle costs.	All
Quality	The City inspects and maintains facilities at a condition level to ensure that it functions as designed.	All

Technical Levels of Service

The table on the following page outlines the quantitative metrics that determine the technical level of service provided by City Facilities. Some measures are identified but the required data is not available for 2023/2024 and as a result, they may be calculated in a future revision.

There are also metrics added in for future discussion of 2025 LOS as this will be a requirement for the next AMP update.

Service Attribute	Description of What Performance Measure Captures	Performance Measure	2023 Performance	Target Performance	Related Assets
Accessibility	Facilities that are accessible to people with disabilities.	Number of facilities that meet <i>Accessibility for Ontarians with Disabilities Act</i> requirements as a percentage of the total number of facilities.	In Progress		All
Comfort	Appropriateness of air temperature.	Number of complaints about air temperature per 1,000 sq ft of gross floor area.	In Progress		All
Comfort	Adequacy of lighting levels.	Number of complaints about lighting levels per 1,000 sq ft of gross floor area.	In Progress		All
Comfort	Cleanliness of facilities.	Number of complaints about cleanliness per 1,000 sq ft of gross floor area.	In Progress		All
Security	Extent of vandalism at facilities.	Dollar value of repairs required because of vandalism per 1,000 sq ft of gross floor area.	In Progress		All
Reliability	Frequency of unplanned closures.	Number of unplanned closures of facilities due to component failures per 1,000 sq ft of gross floor area.	In Progress		All
Energy Efficiency	Electricity consumption.	Kilowatt-hours of electricity consumed per 1,000 sq ft of gross floor area.	In Progress		All
Energy Efficiency	Natural gas consumption.	Cubic metres of natural gas consumed per 1,000 sq ft of gross floor area.	In Progress		All
Energy Efficiency	Propane consumption.	Litres of propane consumed per 1,000 sq ft of gross floor area.	In Progress		All
Energy Efficiency	Net-zero facilities.	Number of facilities that are net-zero as a percentage of the total number of facilities.	In Progress		All
Capacity	Adequacy of indoor parking facilities for City vehicles.	Number of vehicles stored indoors as a percentage of the total number of vehicles during the winter control season.	In Progress		Corporate
Quality	Condition of the facilities' inventory.	Percentage of facilities' assets in Poor or Very Poor condition.	45%		All

4.4.9 Recommendations

Replacement Costs

- Most replacement costs used in this AMP for Buildings were based on the inflation of historical costs. These costs should be evaluated to determine their accuracy and reliability. Replacement costs should be updated according to the best available information on the cost to replace the assets in today's value.

Asset Inventory

- Staff have started breaking down facilities into major components and should continue to do so for all building assets to allow for component-based lifecycle planning.

Condition Assessment Strategies

- The City should implement regular condition assessments for all facilities to better inform short- and long-term capital requirements.
- Complete condition assessments on remaining city facilities not completed in the 2020 study.

Risk Management Strategies

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

Levels of Service

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

4.5 Machinery & Equipment

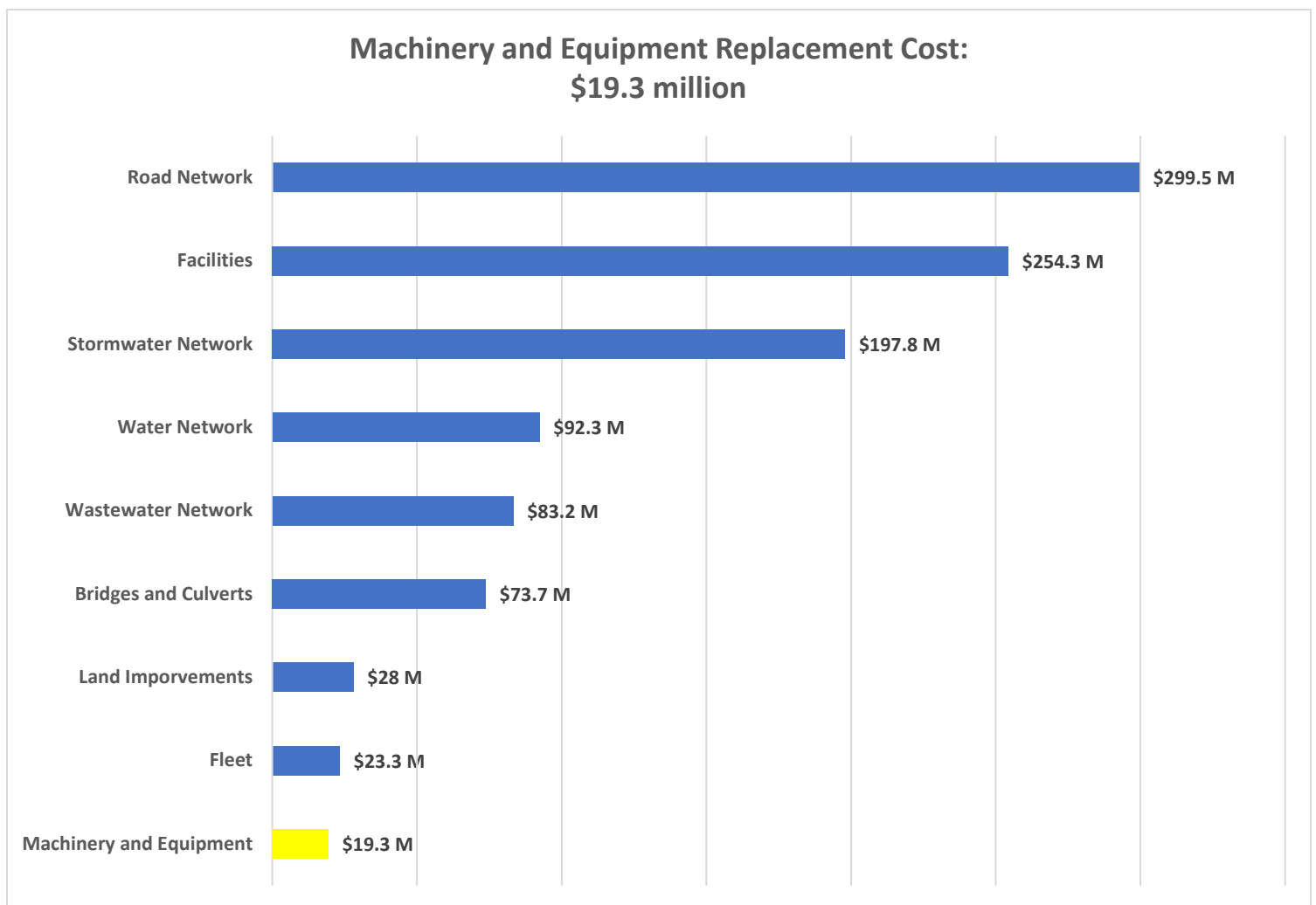
To maintain the high quality of public infrastructure and support the delivery of core services, City staff own and employ various types of machinery and equipment. This includes:

- Landscaping equipment to maintain public parks
- Fire and police equipment to support the delivery of emergency services
- Plows and sand hoppers to provide winter control activities

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

4.5.1 Asset Inventory & Replacement Cost

The following table includes the quantity, replacement cost method and total replacement cost of each asset segment in the City's Machinery & Equipment inventory. For context, in 2019 the replacement costs for machinery and equipment were \$32 million and is \$19 million in 2024.



Asset Segment	Replacement Cost Method	Total Replacement Cost
Airport	100% User-Defined Cost	\$367,092
Cemetery	100% User-Defined Cost	\$1,230
Communications and AV Equipment	100% User-Defined Cost	\$1,604,340
Computer Equipment	100% User-Defined Cost	\$4,521,024
Engineering	100% User-Defined Cost	\$202,966
Fire	100% User-Defined Cost	\$2,223,654
Library	100% User-Defined Cost	\$144,178
Light/Medium Duty Machinery	100% User-Defined Cost	\$45,848
Municipal Golf Course	100% User-Defined Cost	\$779,781
Office Equipment	100% User-Defined Cost	\$257,931
Parking	100% User-Defined Cost	\$1,115,873
Parks	100% User-Defined Cost	\$223,521
Personal Protective Equipment	100% User-Defined Cost	\$247,172
Police	100% User-Defined Cost	\$431,051
Recreation	100% User-Defined Cost	\$1,266,946
Roads	100% User-Defined Cost	\$285,711
Sanitary	100% User-Defined Cost	\$2,272,792
Transit	100% User-Defined Cost	\$950,716
Waste	100% User-Defined Cost	\$1,378,920
Water	100% User-Defined Cost	\$1,002,944
Total	-	\$19,323,690

4.5.2 Asset Condition

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

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Airport	0%	Very Poor	Age Based
Cemetery	10%	Very Poor	Age Based
Comm. and AV Equipment	33%	Poor	Age Based
Computer Equipment	7%	Very Poor	Age Based
Engineering	5%	Very Poor	Age Based
Fire	25%	Poor	Age Based
Library	54%	Fair	Age Based
Light/Medium Duty	93%	Very Good	Age Based
Municipal Golf Course	1%	Very Poor	Age Based
Office Equipment	29%	Poor	Age Based

Parking	38%	Poor	Age Based
Parks	57%	Fair	Age Based
Police	40%	Fair	Age Based
Recreation	45%	Fair	Age Based
Roads	46%	Fair	Age Based
Sanitary	33%	Poor	Age Based
Transit	30%	Poor	Age Based
Waste	55%	Fair	Age Based
Water	23%	Poor	Age Based

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

Equipment and Machinery Condition Assessment



4.5.3 Current Approach to Condition Assessment

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

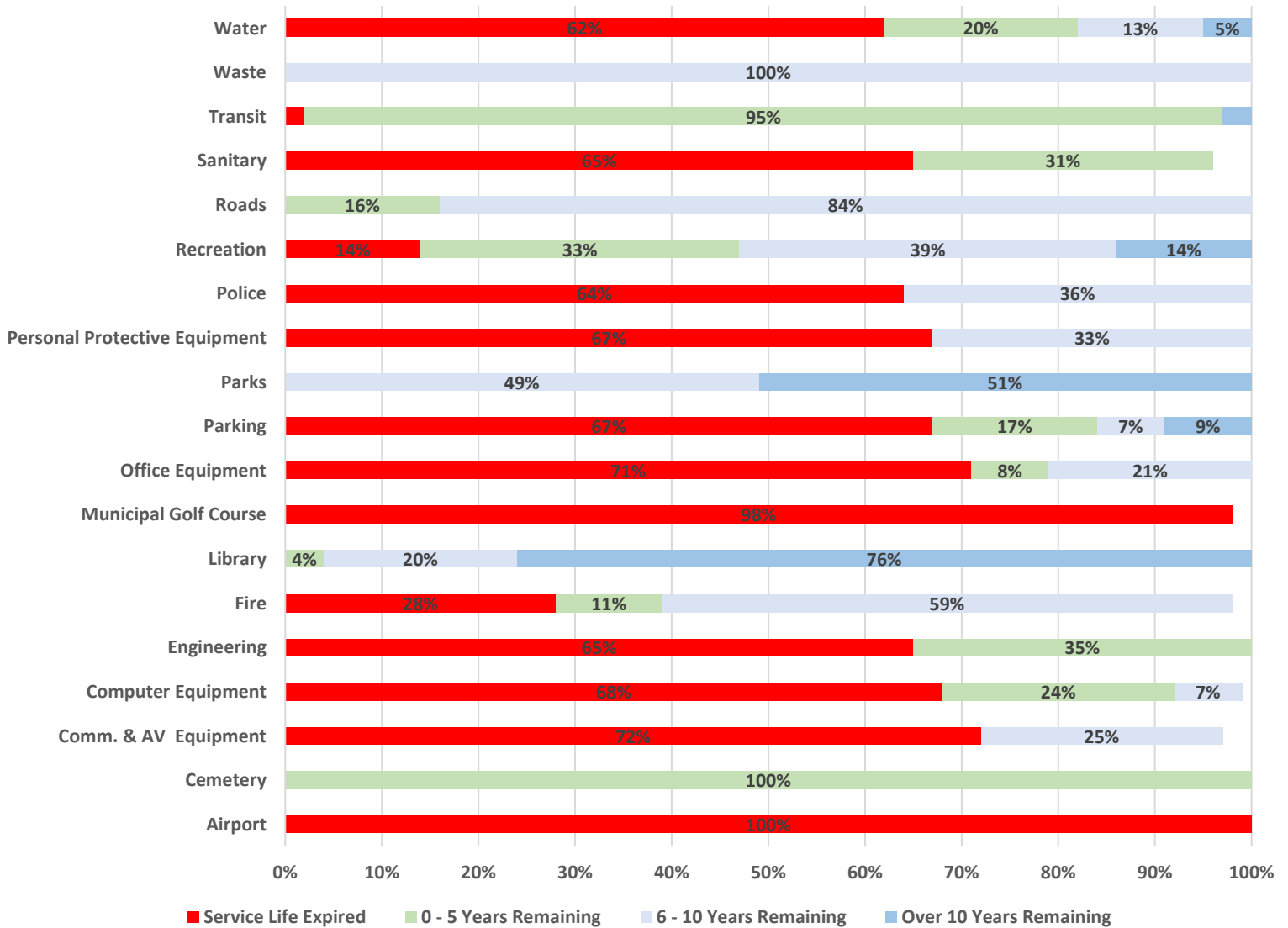
- Staff complete regular visual inspections of machinery & equipment to ensure they are in state of adequate repair. The replacement of machinery & equipment depends on deficiencies identified by operators that may impact their ability to complete required tasks.
- There are no formal condition assessment programs in place, although some machinery & equipment were assigned cursory condition ratings for this AMP

4.5.4 Estimated Useful Life & Average Age

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

Asset Segment	Average Age (Years)	Average Service Life Remaining (Years)
Airport	32	17
Cemetery	5	-6
Comm. and AV Equipment	9	2
Computer Equipment	9	-3
Engineering	16	-6
Fire	13	1
Library	6	5
Light/Med Duty Machinery	1	6
Municipal Golf Course	30	-11
Office Equipment	9	-3
Parking	10	2
Parks	6	7
Police	9	-1
Recreation	7	4
Roads	6	3
Sanitary	19	4
Transit	9	2
Waste	5	4
Water	15	-1

Machinery and Equipment Service Life Remaining



4.5.5 Lifecycle Management Strategy

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

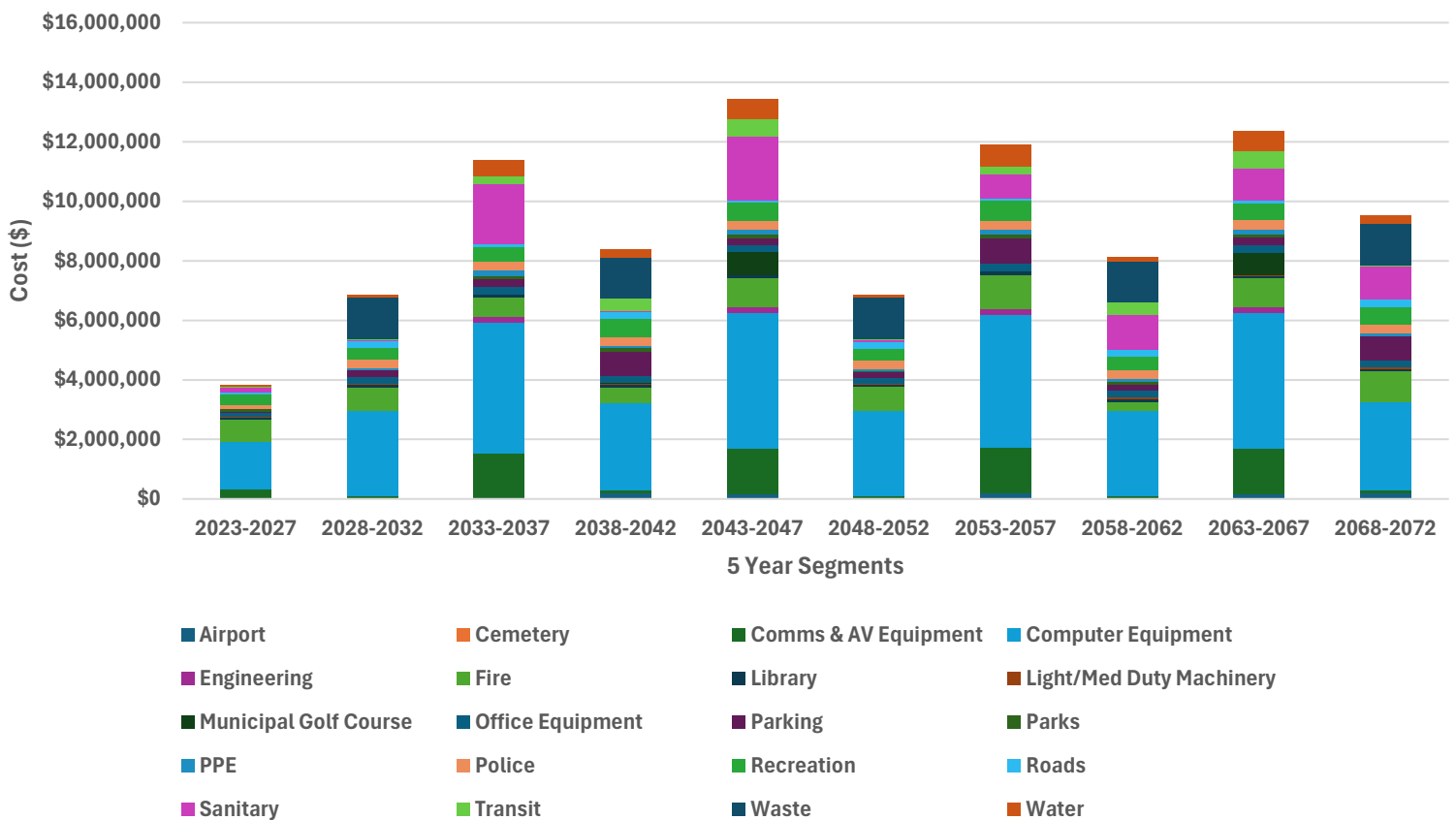
The following table outlines the City's current lifecycle management strategy.

Activity Type	Description of Current Strategy
Maintenance/ Rehabilitation	Maintenance program varies by department.
Maintenance/ Rehabilitation	Fire Protection Services equipment is subject to a much more rigorous inspection and maintenance program compared to most other departments.
Maintenance/ Rehabilitation	Machinery & equipment is maintained according to manufacturer recommended actions and supplemented by the expertise of municipal staff.
Replacement	The replacement of machinery & equipment depends on deficiencies identified by operators that may impact their ability to complete required tasks.

4.5.6 Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the City should allocate towards funding rehabilitation and replacement needs.

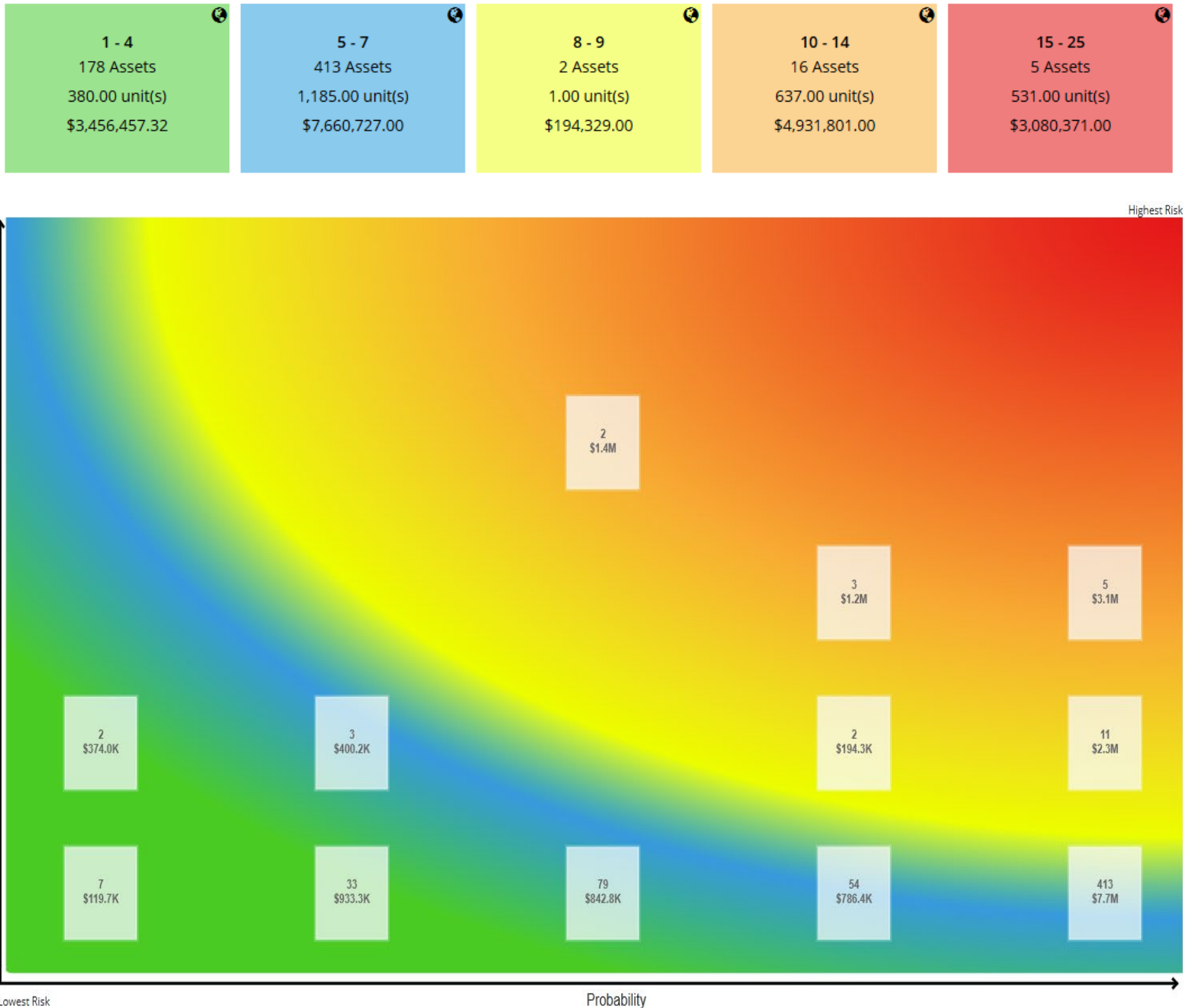
Machinery and Equipment Capital Forecast
(Current Service Without Backlog)



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

4.5.7 Risk & Criticality

The following risk matrix illustrates the relationship between the probability of failure and the consequence of failure for the assets within the Machinery and Equipment asset category based on 2022 inventory data. The risk rating ranges include asset count, quantity, and replacement cost of assets within each range. See Appendix C for the criteria behind this risk rating matrix.



Critical Assets

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

4.5.8 Levels of Service

Machinery & Equipment is considered a non-core asset category. The City must determine the qualitative descriptions and technical metrics that measure the current level of service provided. Below are metrics that City staff will start tracking as information is gathered.

Community Levels of Service

The following table outlines the current qualitative descriptions that determine the community levels of service provided by Machinery & Equipment.

Service Attribute	Community Levels of Service	Related Assets
Reliability	The City strives to have machinery and equipment perform as intended.	All
Availability	The City strives to ensure that equipment and machinery are available for use when required by staff to perform their duties.	All
Environment	The City strives to lower its carbon emissions.	All
Quality	The City inspects and maintains the machinery and equipment inventory at a condition level to ensure that it functions as designed.	All

Technical Levels of Service

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

Service Attribute	Description of What Performance Measure Captures	Performance Measure	2023 Performance	Target Performance	Related Assets
Reliability	Planning of maintenance work.	Number of proactive work orders as a percentage of the total number of work orders.	In Progress		All
Availability	Time machines and equipment are out of service.	Number of out-of-service days per asset.	In Progress		All
Availability	Availability of equipment and machinery to fill in for ones that are out of service.	Number of spare machinery and equipment as a percentage of the total number of vehicles.	In Progress		All
Quality	Condition of the machinery and equipment.	Percentage of fleet assets in Poor or Very Poor condition.	76%		All

4.5.9 Recommendations

Replacement Costs

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

Condition Assessment Strategies

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

Risk Management Strategies

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

Levels of Service

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

4.6 Fleet

Vehicles allow for the efficient delivery of municipal services and transportation of personnel. They are used to support several service areas, including:

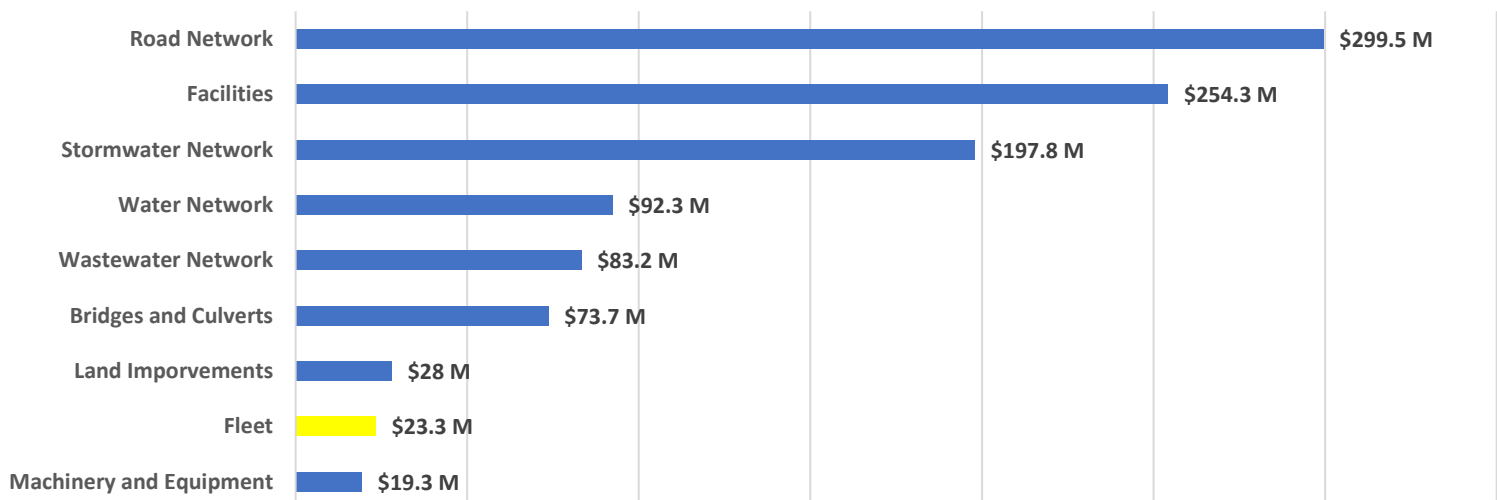
- fire and police vehicles to provide emergency services
- pick-up trucks to support the maintenance of the transportation network and to address service requests for Environmental Services and Parks & Recreation divisions
- transit buses to support affordable transportation

4.6.1 Asset Inventory & Replacement Cost

The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the City's Fleet. For context, in 2019 the replacement cost of the City Fleet was \$12 million and is now \$23 million in 2024.

Asset Segment	Replacement Cost Method	Total Replacement Cost
Fire	100% CPI Tables	\$1,882,090
Heavy Duty Licensed	100% CPI Tables	\$150,000
Heavy Machinery	100% CPI Tables	\$11,607,840
Light/Medium Duty Licensed	100% CPI Tables	\$4,742,904
Light/Medium Duty Machinery	100% CPI Tables	\$1,997,485
Parks	100% CPI Tables	\$214,534
Trailers	100% CPI Tables	\$87,054
Transit	100% CPI Tables	\$2,592,863
Total	-	\$23,274,770

Fleet Replacement Cost: \$23.3 million

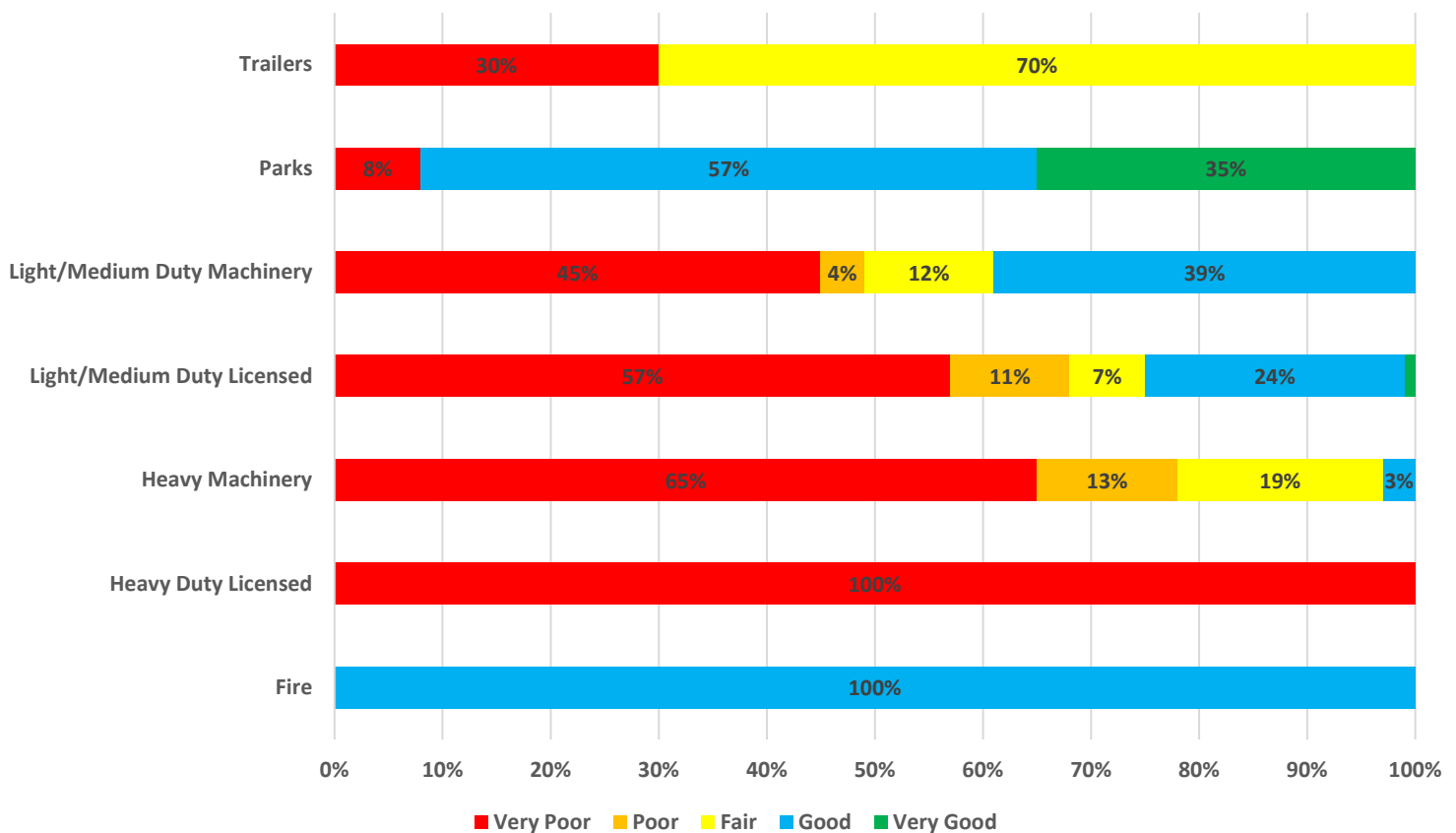


4.6.2 Asset Condition

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

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Fire	93%	Very Good	Age Based
Heavy Duty Licensed	0%	Very Poor	Age Based
Heavy Machinery	22%	Poor	Age Based
Light/Med Duty Licensed	22%	Poor	Age Based
Light/Med Duty Machinery	46%	Far	Age Based
Parks	73%	Good	Age Based
Trailers	45%	Fair	Age Based
Transit	87%	Very Good	Age Based

Fleet Condition Assessment



To ensure that the City's Fleet continue to provide an acceptable level of service, the City should monitor the average condition of all assets.

4.6.3 Current Approach to Condition Assessment

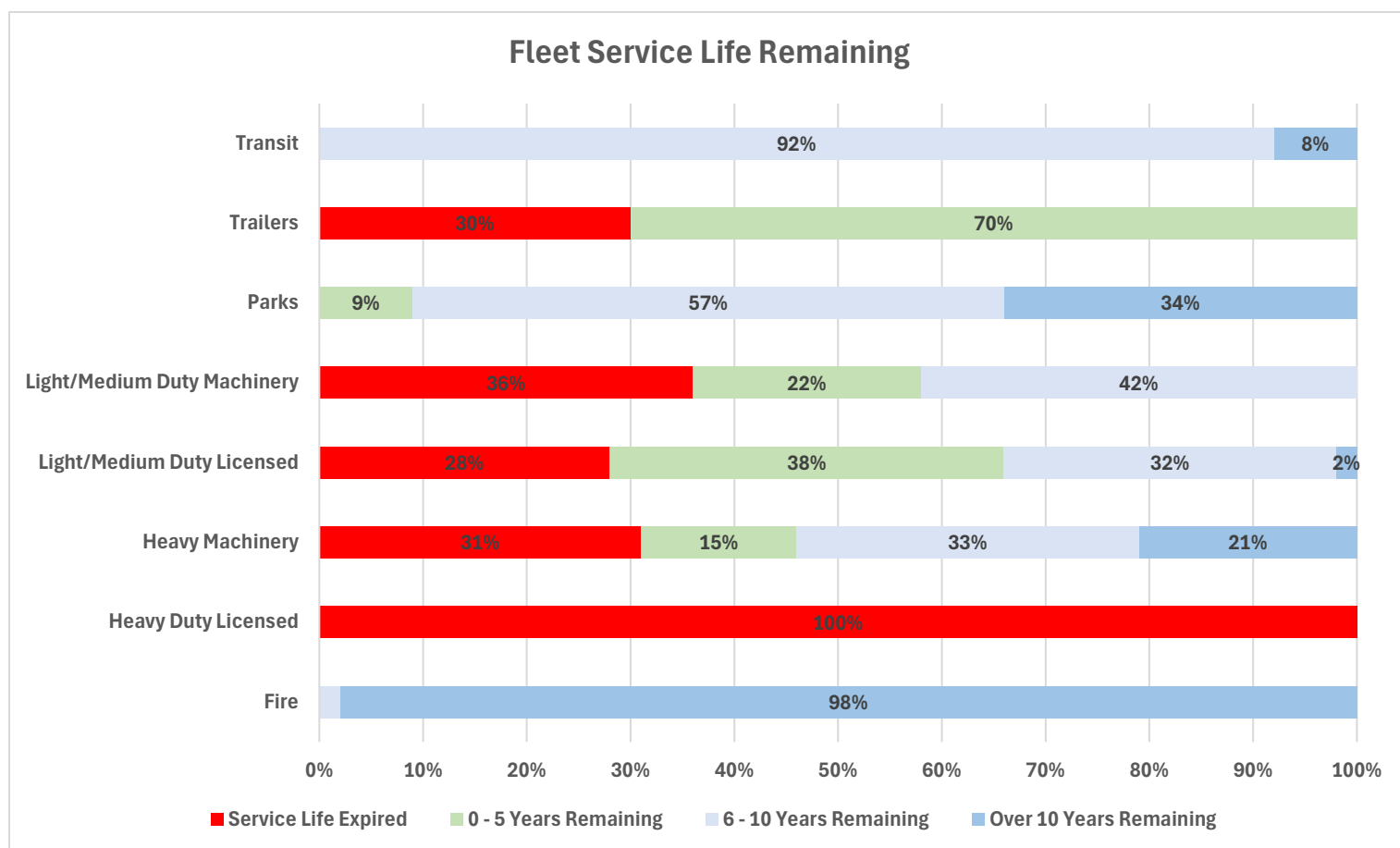
Accurate and reliable condition data allows staff to more confidently determine the remaining service life of assets and identify the most cost-effective approach to managing assets. The following describes the municipality's current approach:

- Staff complete daily visual inspections and documentation of vehicles to ensure they are in state of adequate repair prior to operation
- The mileage of vehicles is used as a proxy to determine remaining useful life and relative vehicle condition except for the Fire Department
- End of Life replacement generally occurs as mandated by MTO and NFPA requirements

4.6.4 Estimated Useful Life & Average Age

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

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Fire	10-20 Years	1	19
Heavy Duty Licensed	15 Years	25	11
Heavy Machinery	10-25 Years	11	-10
Light/Medium Duty Licensed	10 Years	7	-2
Light/Medium Duty Machinery	10 Years	10	1
Parks	10 Years	4	1
Trailers	15 Years	10	10
Transit	10-20 Years	1	-1



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

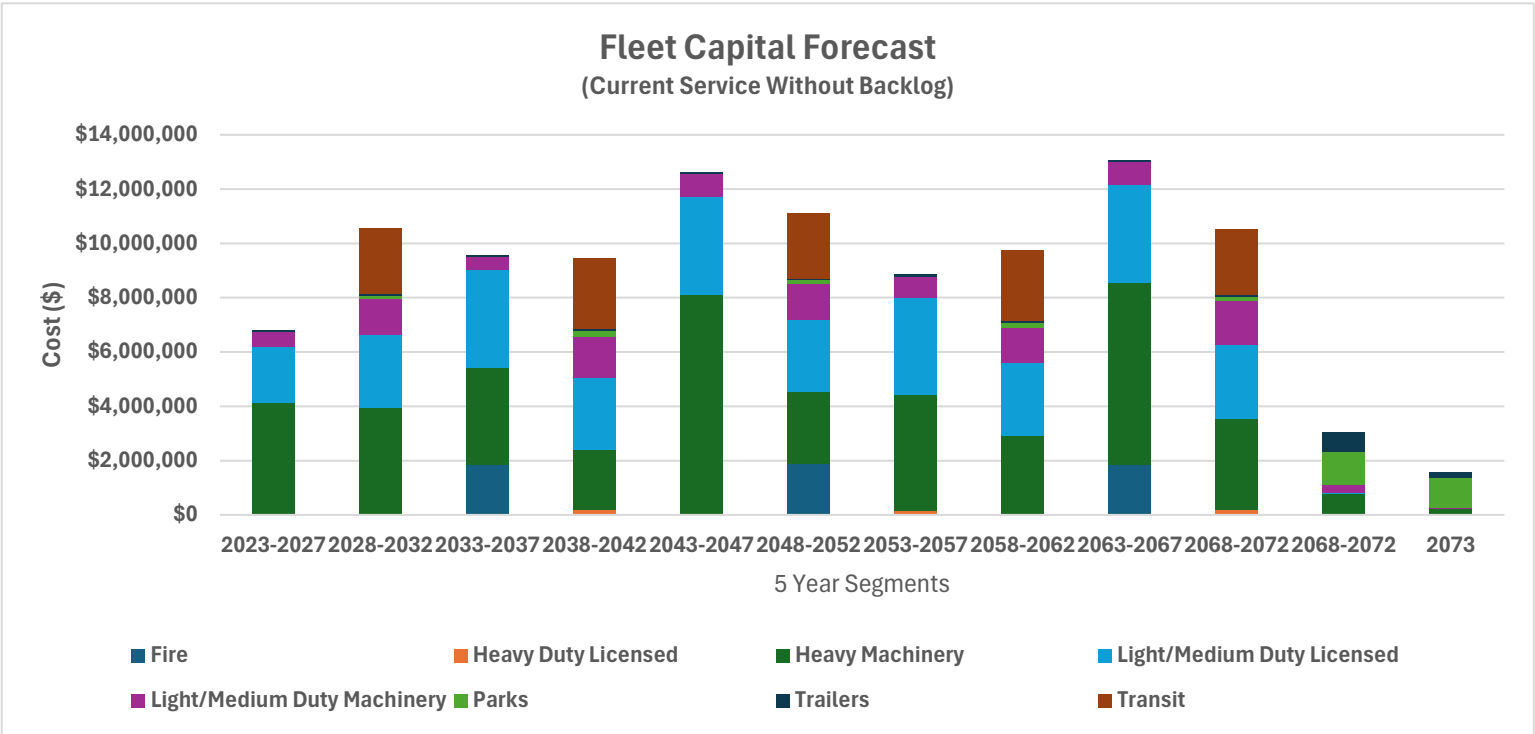
4.6.5 Lifecycle Management Strategy

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

Activity Type	Description of Current Strategy
Maintenance / Rehabilitation	Visual inspections completed and documented per use; fluids inspected at every fuel stop; tires inspected monthly.
Maintenance / Rehabilitation	Annual preventative maintenance activities include system components check and additional detailed inspections.
Replacement	Vehicle age, kilometres and annual repair costs are taken into consideration when determining appropriate options.

4.6.6 Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the City should allocate towards funding rehabilitation and replacement needs.

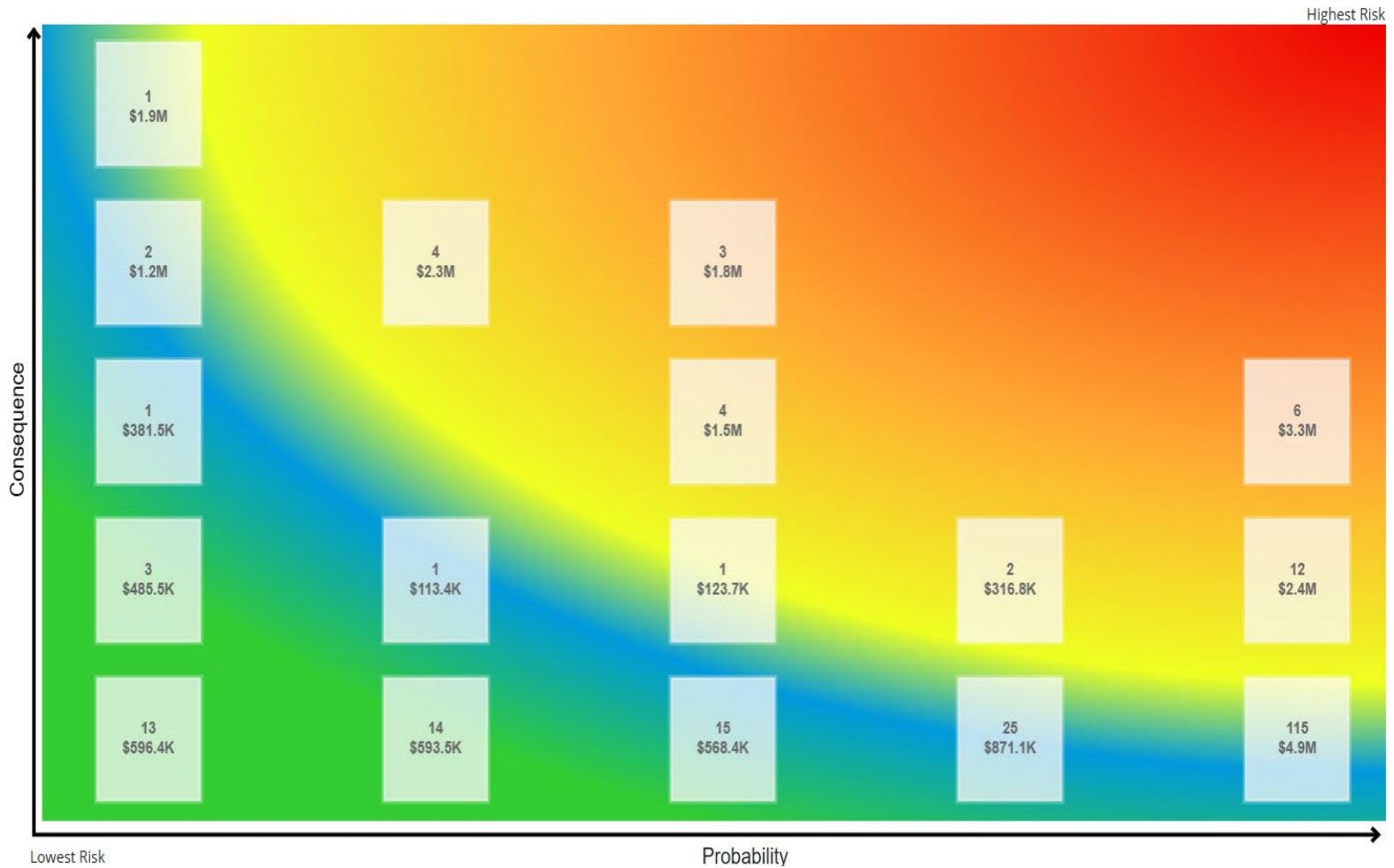


The projected cost of lifecycle activities that will need to be undertaken over the next 10 years to maintain the current level of service can be found in Appendix A.

4.6.7 Risk & Criticality

The following risk matrix illustrates the relationship between the probability of failure and the consequence of failure for the assets within the Fleet asset category based on 2022 inventory data. The risk rating ranges include asset count, quantity, and replacement cost of assets within each range. See Appendix C for the criteria behind this risk rating matrix.





Critical Assets

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

4.6.8 Levels of Service

Vehicles are considered a non-core asset category. As such, the City must determine the qualitative descriptions and technical metrics that measure the current level of service provided. Below are metrics that City staff will start tracking as information is gathered.

Community Levels of Service

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

Service Attribute	Community Levels of Service	Related Assets
Reliability	The City strives to have vehicles perform as intended.	All
Availability	The City strives to ensure that vehicles are available for use when required by staff to perform their duties.	All
Environment	The City strives to lower its carbon emissions.	All
Quality	The City inspects and maintains the fleet inventory at a condition level to ensure that it functions as designed.	All

Technical Levels of Service

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

Service Attribute	Description of What Performance Measure Captures	Performance Measure	2023 Performance	Target Performance	Related Assets
Reliability	Mechanical failures that prevent vehicles from completing trips.	Number of towing and roadside service incidents that are due to mechanical failures per 100,000 km travelled.	Future		All
Reliability	Vehicles are not in need of immediate repair or replacement.	Number of vehicles in the lowest condition rating as a percentage of the total number of vehicles.	Future		All
Reliability	Planning of maintenance work.	Number of proactive work orders as a percentage of the total number of work orders.	Future		All
Availability	Time vehicles are out of service.	Number of out-of-service days per vehicle.	Future		All
Availability	Availability of vehicles to fill in for ones that are out of service.	Number of spare vehicles as a percentage of the total number of vehicles.	Future		All
Environment	Alternative energy options of light-duty vehicles.	Number of alternative energy light-duty vehicles as a percentage of the total number of light-duty vehicles.	Future		All
Environment	Alternative energy options of medium-duty vehicles.	Number of alternative energy medium-duty vehicles as a percentage of the total number of medium-duty vehicles.	Future		All
Environment	Alternative energy options of heavy-duty vehicles.	Number of alternative energy heavy-duty vehicles as a percentage of the total number of heavy-duty vehicles.	Future		All

Environment	Alternative energy options of motorized special equipment.	Number of alternative energy specialized equipment units as a percentage of the total number of specialized equipment units.	Future		All
Environment	Total number of alternative energy fleet assets.	Number of alternative energy assets within the City of Stratford fleet.	Future		All
Quality	Condition of the fleet inventory.	Percentage of fleet assets in Poor or Very Poor condition.	48%		All

4.6.9 Recommendations

Condition Assessment Strategies

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

Risk Management Strategies

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

Levels of Service

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

4.7 Land Improvements

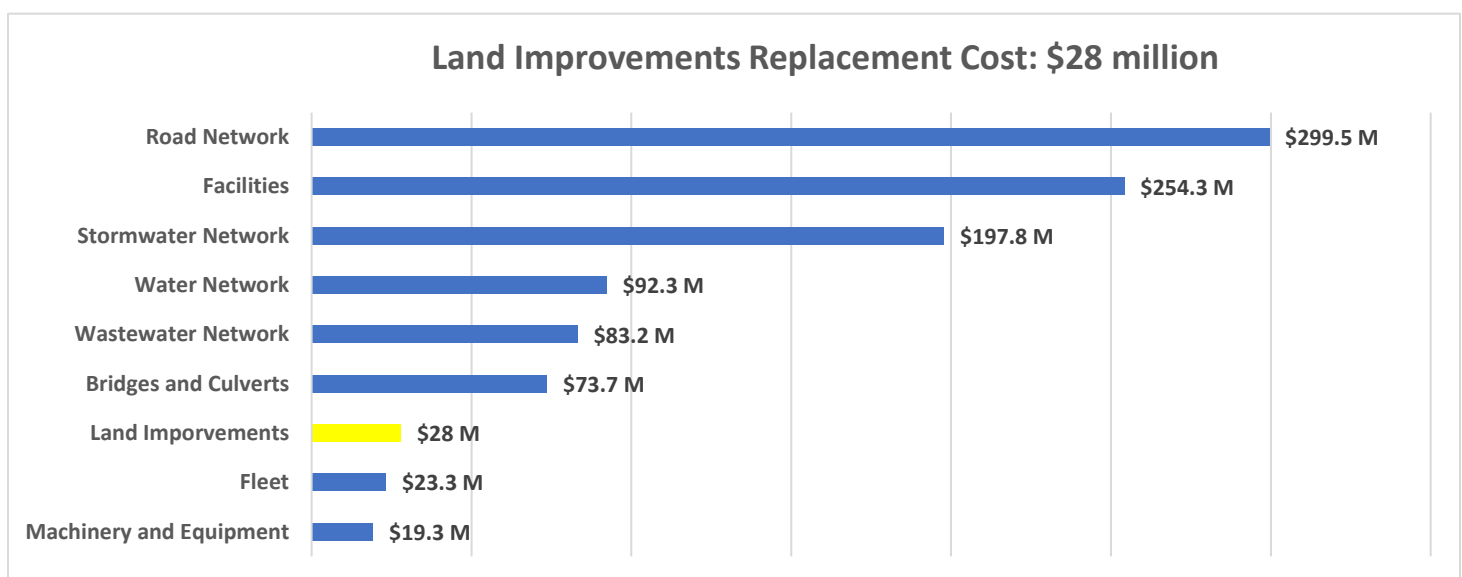
The City of Stratford owns a large number of assets that are considered Land Improvements. This category includes:

- Parking lots for municipal facilities
- Parks, parkettes, trails
- Sport structures, tennis courts, skate parks, playgrounds
- Fencing and signage

4.7.1 Asset Inventory & Replacement Cost

The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the City's Land Improvements inventory. For context, the total replacement cost for Land Improvements in 2019 was \$26 million and is now \$28 million in 2024,

Asset Segment	Replacement Cost Method	Total Replacement Cost
Exterior Lighting	100% CPI Tables	\$2,516,752
Fencing	100% CPI Tables	\$415,921
Fields Diamonds and Courts	100% CPI Tables	\$5,823,623
Irrigation Systems	100% CPI Tables	\$299,710
Landfill Cells	100% CPI Tables	\$1,619,365
Parking Areas	100% CPI Tables	\$5,541,456
Paved areas - other	100% CPI Tables	\$9,787,712
Playgrounds	100% CPI Tables	\$1,652,731
Perth/Stratford Housing	100% CPI Tables	\$387,373
Total	-	\$28,044,643

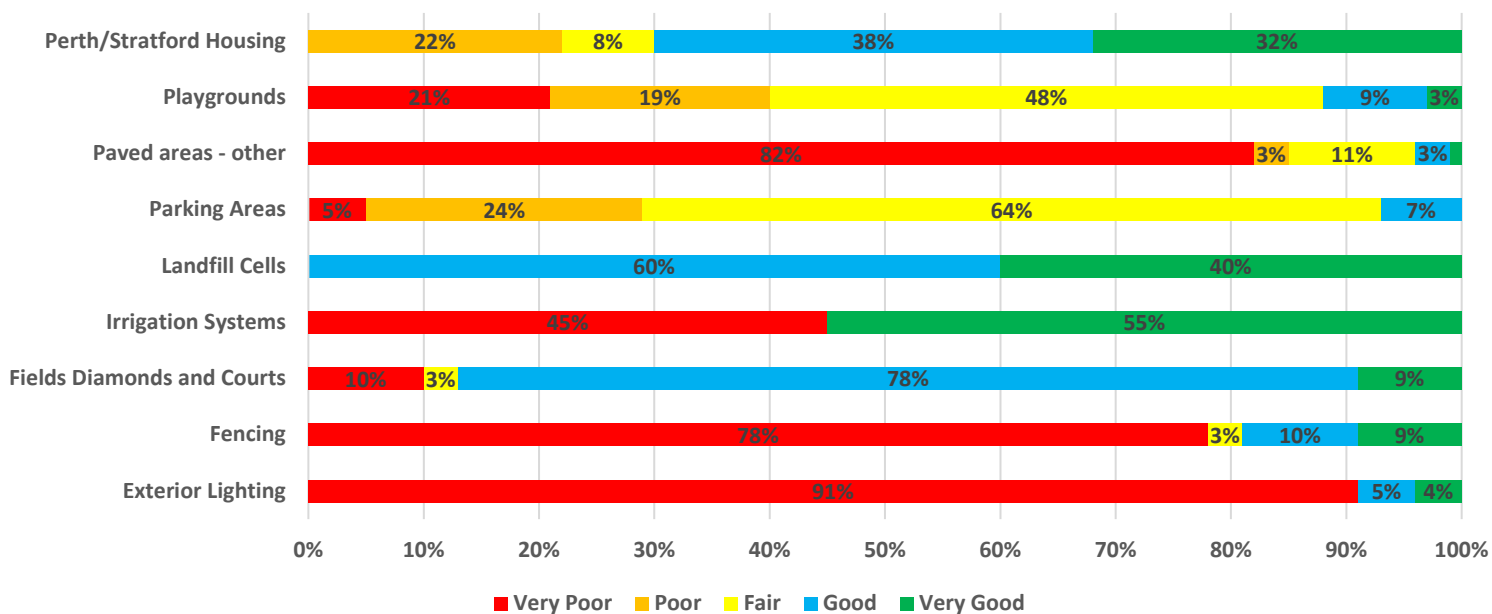


4.7.2 Asset Condition

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

Asset Segment	Average Condition (%)	Average Condition Rating	Condition Source
Exterior Lighting	46%	Fair	Age Based
Fencing	35%	Poor	Age Based
Fields Diamonds & Courts	22%	Poor	Age Based
Irrigation Systems	43%	Fair	Age Based
Landfill Cells	79%	Good	Age Based
Parking Areas	49%	Good	Age Based
Paved areas - other	27%	Poor	Age Based
Playgrounds	42%	Fair	Age Based
Perth/Stratford Housing	62%	Good	Age Based

Land Improvements Condition Assessments



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

4.7.3 Current Approach to Condition Assessment

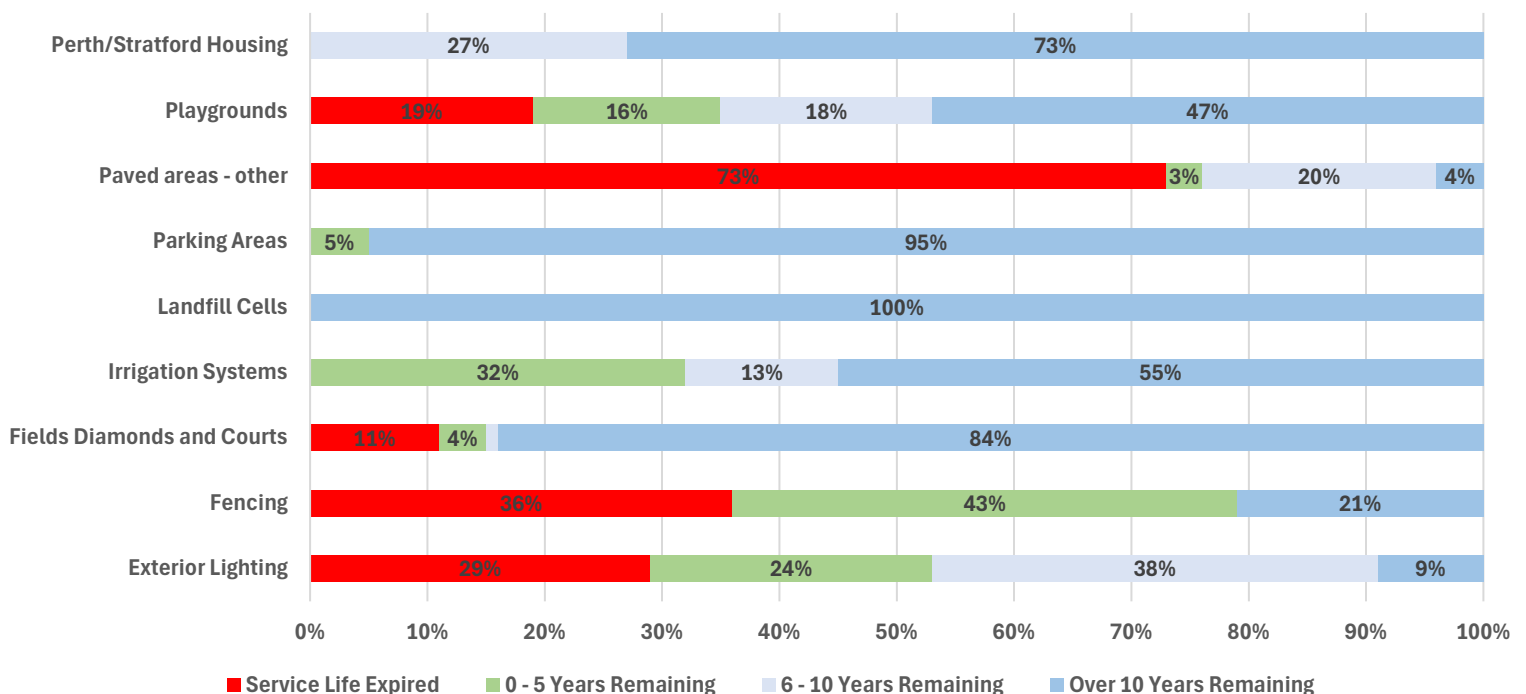
Accurate and reliable condition data allows staff to determine the remaining service life of assets and identify the most cost-effective approach to managing assets more confidently. The following describes the municipality's current approach:

- Staff complete regular visual inspections of land improvements assets to ensure they are in state of adequate repair. Parks are subjected to scheduled mowing and landscaping, prescribed by asset usage and season.
- Parks are subject to weekly inspections using internal resources. Play structures are inspected for CSA compliance.
- Playground structures are replaced on a 10-year cycle. Re-claying is done on an as-needed basis. Parking lots are crack sealed on an as-needed basis.

4.7.4 Estimated Useful Life & Average Age

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

Land Improvements Service Life Remaining



Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Exterior Lighting	30	16	14
Fencing	30	23	7
Fields Diamonds & Courts	30	32	-2
Irrigation Systems	30	17	13
Landfill Cells	25	10	15
Parking Areas	30	25	5
Paved areas	20	24	-4
Playgrounds	20	15	5
Perth/Stratford Housing	20	7	13

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

4.7.5 Lifecycle Management Strategy

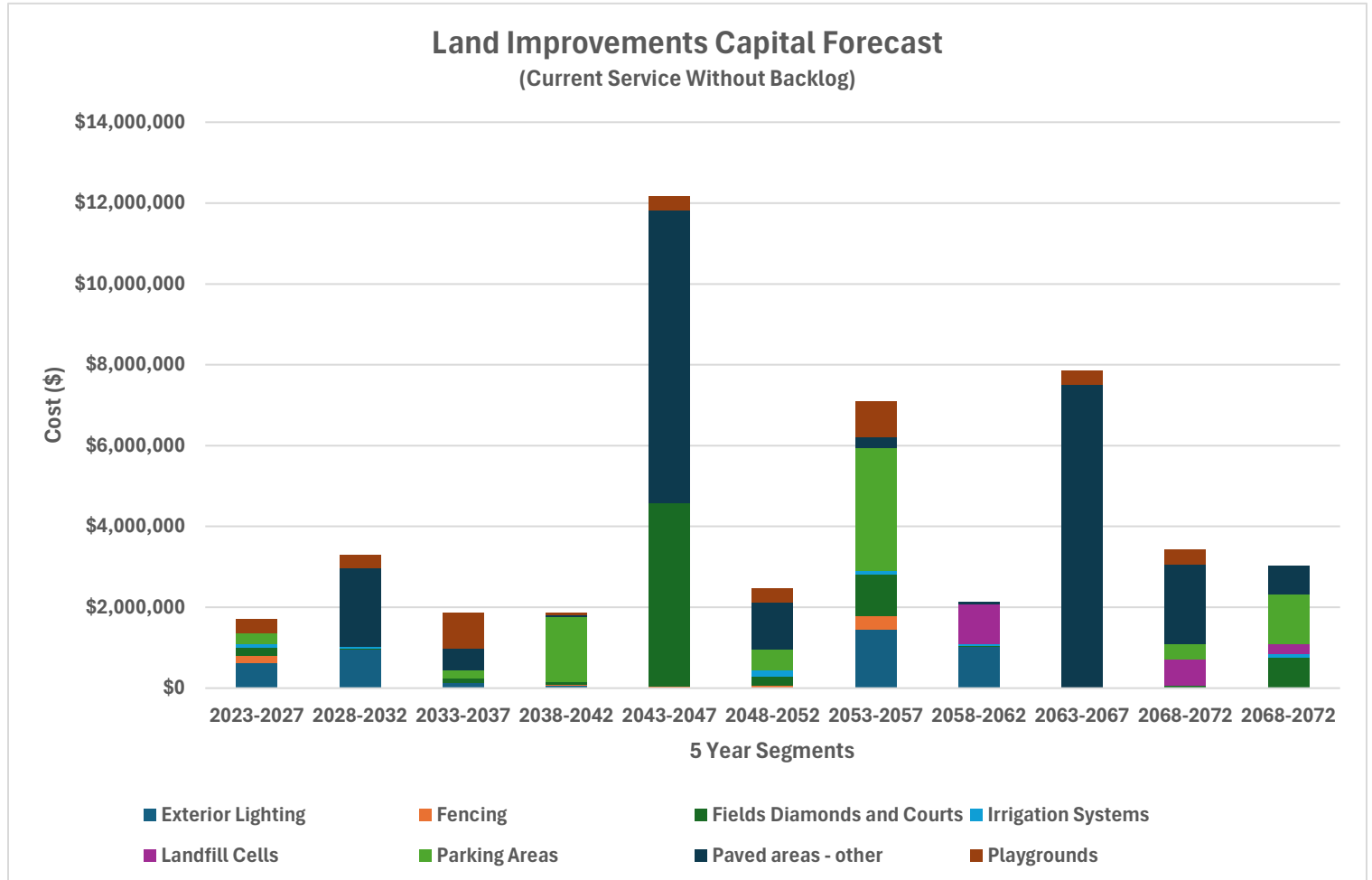
The condition or performance of most assets will deteriorate over time. To ensure that municipal assets are performing as expected and meeting the needs of customers, it is important to establish a lifecycle management strategy to proactively manage asset deterioration.

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

Activity Type	Description of Current Strategy
Maintenance, Rehabilitation & Replacement	The Land Improvements asset category includes several unique asset types and lifecycle requirements are dealt with on a case-by-case basis.

4.7.6 Forecasted Capital Requirements

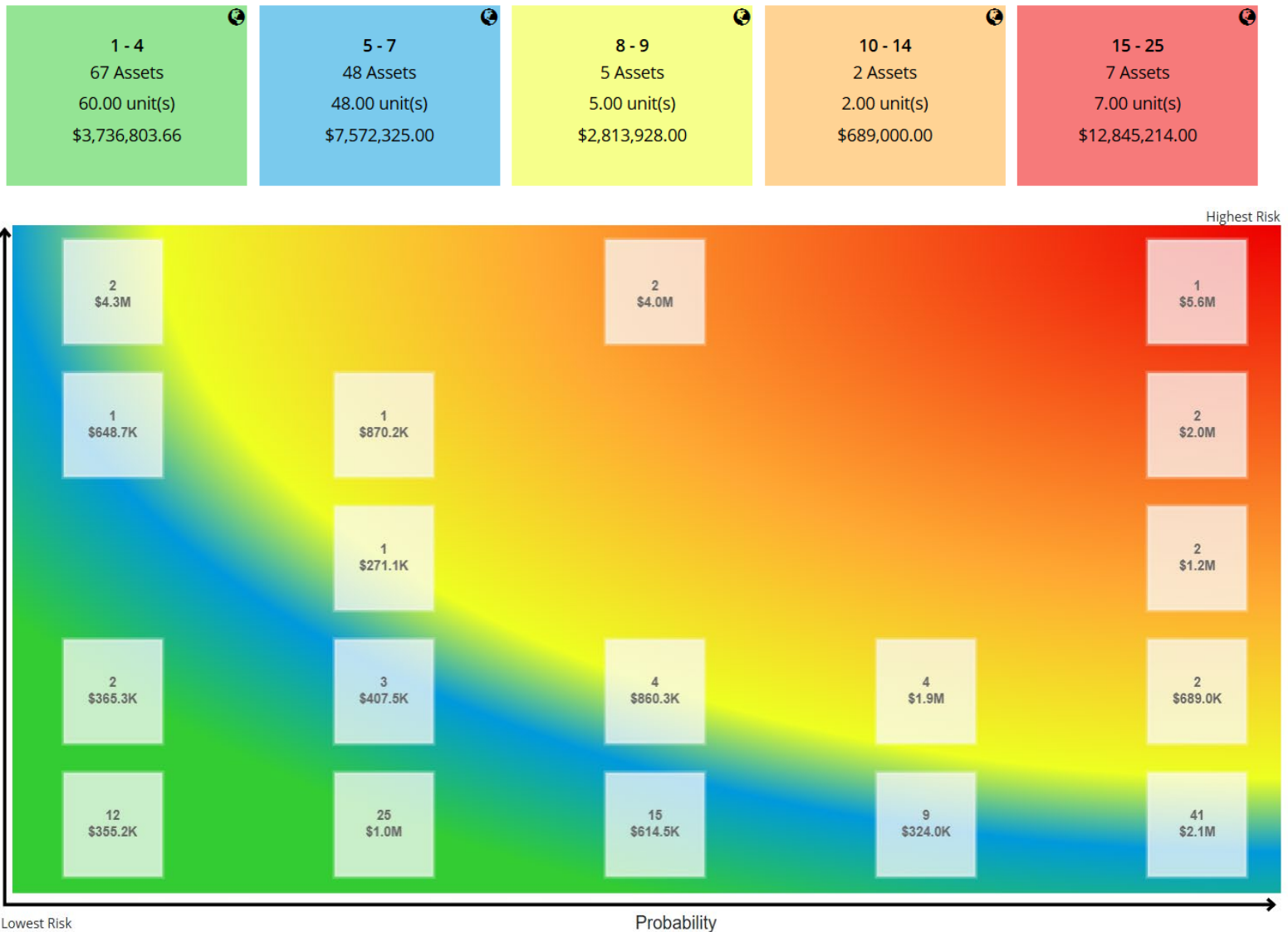
The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the City should allocate towards funding rehabilitation and replacement needs.



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

4.7.7 Risk & Criticality

The following risk matrix illustrates the relationship between the probability of failure and the consequence of failure for the assets within the Land Improvements asset category based on 2022 inventory data. The risk rating ranges include asset count, quantity, and replacement cost of assets within each range. See Appendix C for the criteria behind this risk rating matrix.



Critical Assets

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

4.7.8 Levels of Service

Land Improvements are considered a non-core asset category. As such, the City must determine the qualitative descriptions and technical metrics that measure the current level of service provided. Below are metrics that City staff will start tracking as information is gathered.

Community Levels of Service

The following table outlines current qualitative descriptions that determine the community levels of service provided by Land Improvements.

Service Attribute	Community Levels of Service	Related Assets
Proximity	The City strives to incorporate parks and green space into residential neighbourhoods.	All
Availability	The City's parks and park amenities are typically available for use with low to moderate congestion and waiting times.	All
Accessibility	The City strives to ensure that parks and park amenities can be used by everyone.	All
Quality	The City inspects and maintains the playground inventory at a condition level to ensure that it functions as designed.	All

Technical Levels of Service

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

Service Attribute	Description of What Performance Measure Captures	Performance Measure	2023 Performance	Target Performance	Related Assets
Proximity	Availability of parks within walking distance from residential properties.	Percentage of residentially zoned properties within the service radius of a park using the smallest service radius (400 m).	In Progress		All

Proximity	Availability of off-leash dog areas within walking distance from residential properties.	Percentage of residentially zoned properties within the service radius of a park with an off-leash dog area using the smallest service radius (400 m).	In Progress		All
Availability	Availability of parks for active use.	Hectares of parkland developed for active use per 1,000 residents.	In Progress		All
Availability	Availability of greenspace area.	Hectares of naturalized parkland (no regular maintenance or fertilizer) per 1,000 residents.	In Progress		All
Availability	Availability of parking at community parks.	Number of parking spots at community parks per 1,000 residents.	In Progress		All
Accessibility	Availability of accessible park amenities.	Number of AODA-compliant park amenities as a percentage of the total number of park amenities.	In Progress		All
Quality	City is following planned lifecycle for park amenities.	Replacement cost of park amenities that are within their design life as a percentage of total replacement cost of all park amenities.	In Progress		All
Quality	Paved versus unpaved parking lots.	Area of park parking lots that are paved as a percentage of the area of all parking lots.	In Progress		All
Quality	Paved versus unpaved trails.	For trails (excluding natural trails and snowmobile trails), the length of paved sections as a percentage of the length of all sections.	In Progress		All

4.7.9 Recommendations

Replacement Costs

- All replacement costs used in this AMP were based on the inflation of historical costs. These costs will continue to be evaluated to ensure their accuracy and reliability. Replacement costs should be updated according to the best available information on the cost to replace the asset in today's value.

Condition Assessment Strategies

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

Risk Management Strategies

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

Levels of Service

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

5.0 Analysis of Rate-funded Assets

Key Insights

- 57% of rate-funded assets are in fair or better condition
- The average annual capital requirement to sustain the current level of service for rate-funded assets is approximately \$2.2 million
- Critical assets should be evaluated to determine appropriate risk mitigation activities and treatment options

5.1 Water Network

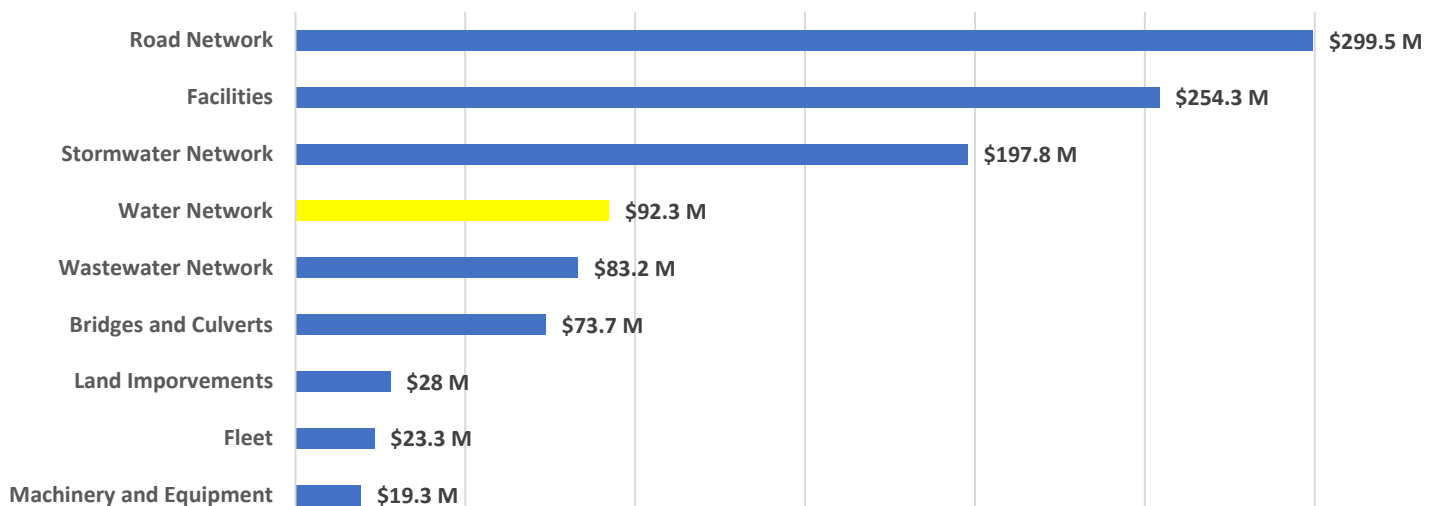
The water services provided by the City are overseen by the Environmental Services division. The division is responsible for watermains, hydrants, wells, water towers and reservoirs. Enhancement and growth-related activities are recommended in the 2018 Water Infrastructure Evaluation and Needs Assessment Report over a 20-year horizon.

5.1.1 Asset Inventory & Replacement Cost

The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the City's Water Network inventory. For context, in 2019 the total replacement cost for the water network was \$94 million and is now \$92 million in 2024.

Asset Segment	Quantity	Replacement Cost Method	Total Replacement Cost
Well Chamber	8	100% CPI Tables	\$113,769
Enclosed Storage Facility	3	100% Cost/Unit	\$4,000,000
Hydrants	919	100% Cost/Unit	\$11,028,000
Mains	180 km	100% CPI Tables	\$46,777,907
No Segment	2	100% CPI Tables	\$741,138
Pump House	7	100% CPI Tables	\$4,511,590
System Valve	59	100% CPI Tables	\$162,017
Valve	1771	100% CPI Tables	\$15,939,000
Valve Chamber	3	100% CPI Tables	\$42,426
Well	16	100% CPI Tables	\$9,062,128
Total	-	-	\$92,377,975

Water Network Replacement Cost: \$92.3 million

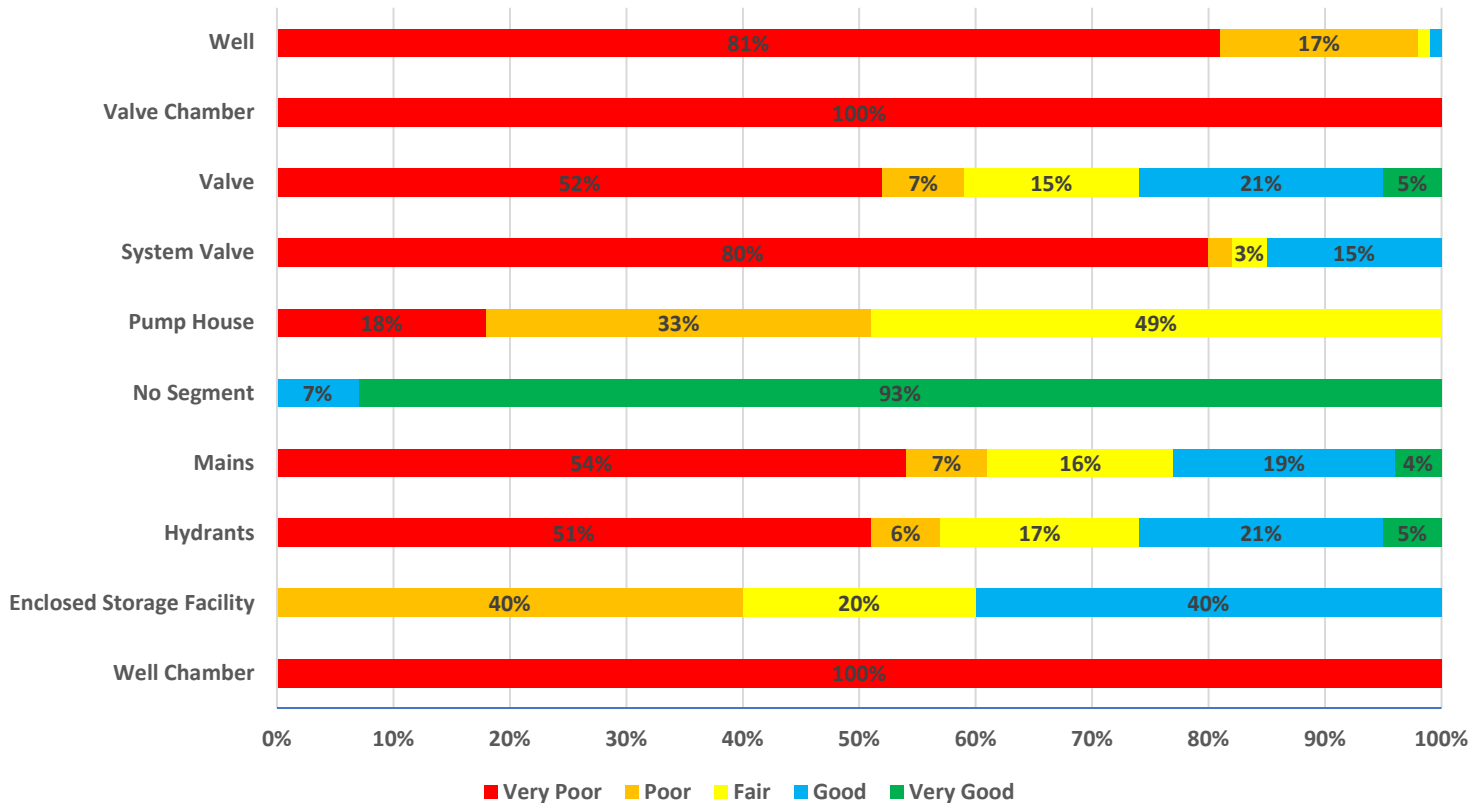


5.1.2 Asset Condition

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

Detention Pond	0%	Very Poor	Age Based
Enclosed Storage Facility	62%	Good	Age Based
Hydrants	32%	Poor	Age Based
Mains	30%	Poor	Age Based
No Segment	93%	Very Good	Age Based
Pump House	36%	Poor	Age Based
System Valve	10%	Poor	Age Based
Valve	32%	Poor	Age Based
Valve Chamber	0%	Very Poor	Age Based
Well	12%	Very Poor	Age Based
Water Network Total	31%	Poor	Age Based

Water Network Condition Assessment



To ensure that the City's Water Network continues to provide an acceptable level of service, the City should monitor the average condition of all assets.

5.1.3 Current Approach to Condition Assessment

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

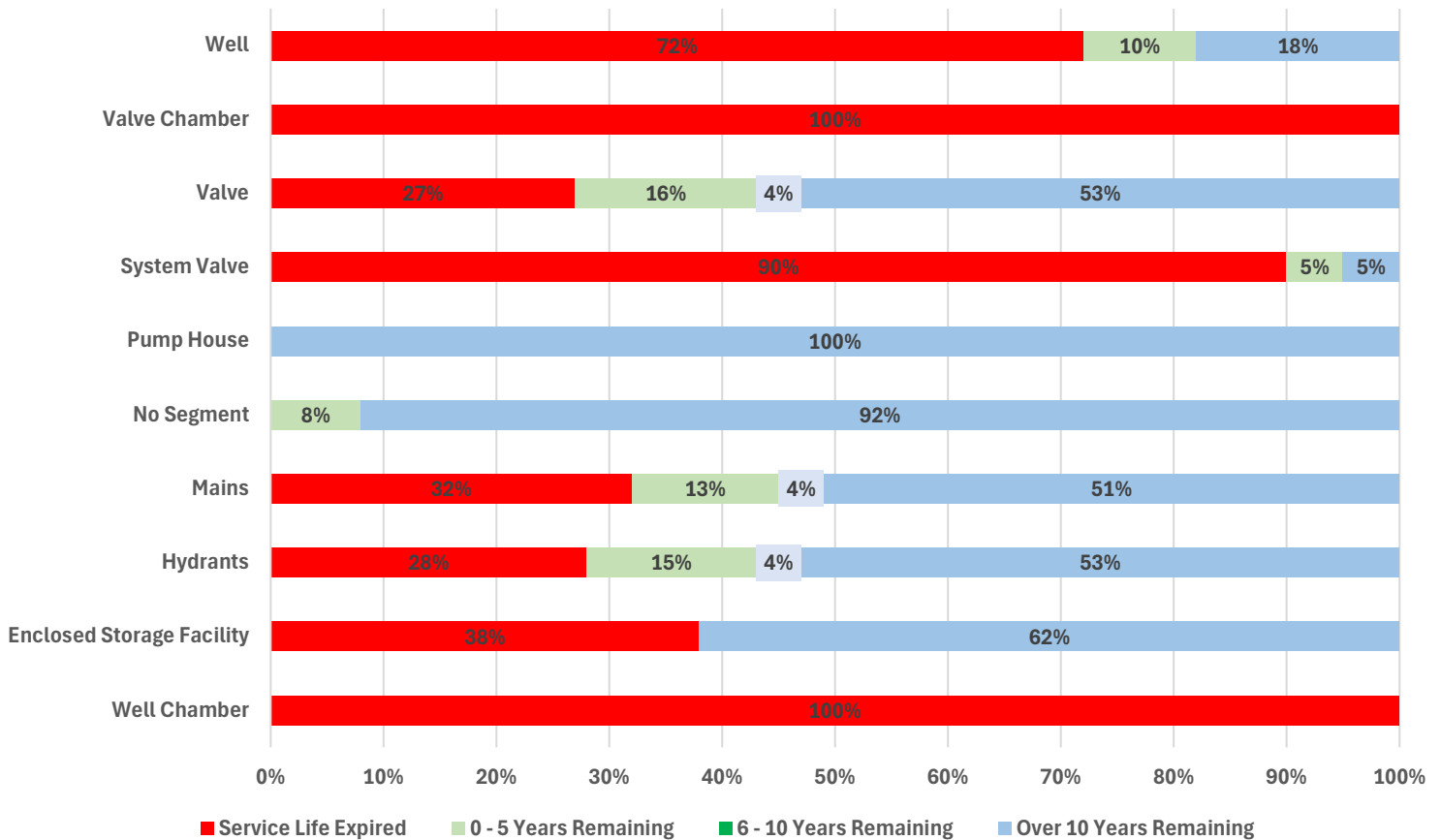
- Staff primarily rely on the age, pipe material, break history, and dirty water complaints to determine the projected condition of water mains.
- A trenchless water relining program is being developed for 2020.
- Main flushing and valve turning is completed on the network (300 valves/year). Hydrant valves are exercised regularly.
- Fire flow and pressure testing is performed annually (50/year). Uni-directional flushing is performed over a 4-year cycle.

5.1.4 Estimated Useful Life & Average Age

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

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Well Chamber	50 Years	74	-39
Enclosed Storage Facility	50 Years	38	12
Hydrants	60 Years	48	11
Mains	50-100 Years	51	9
No Segment	N/A	2	33
Pump House	35-50 Years	51	28
System Valve	60 Years	69	-9
Valve	60 Years	47	12
Valve Chamber	50 Years	59	-24
Well	50 Years	65	-15

Water Network Service Life Remaining



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

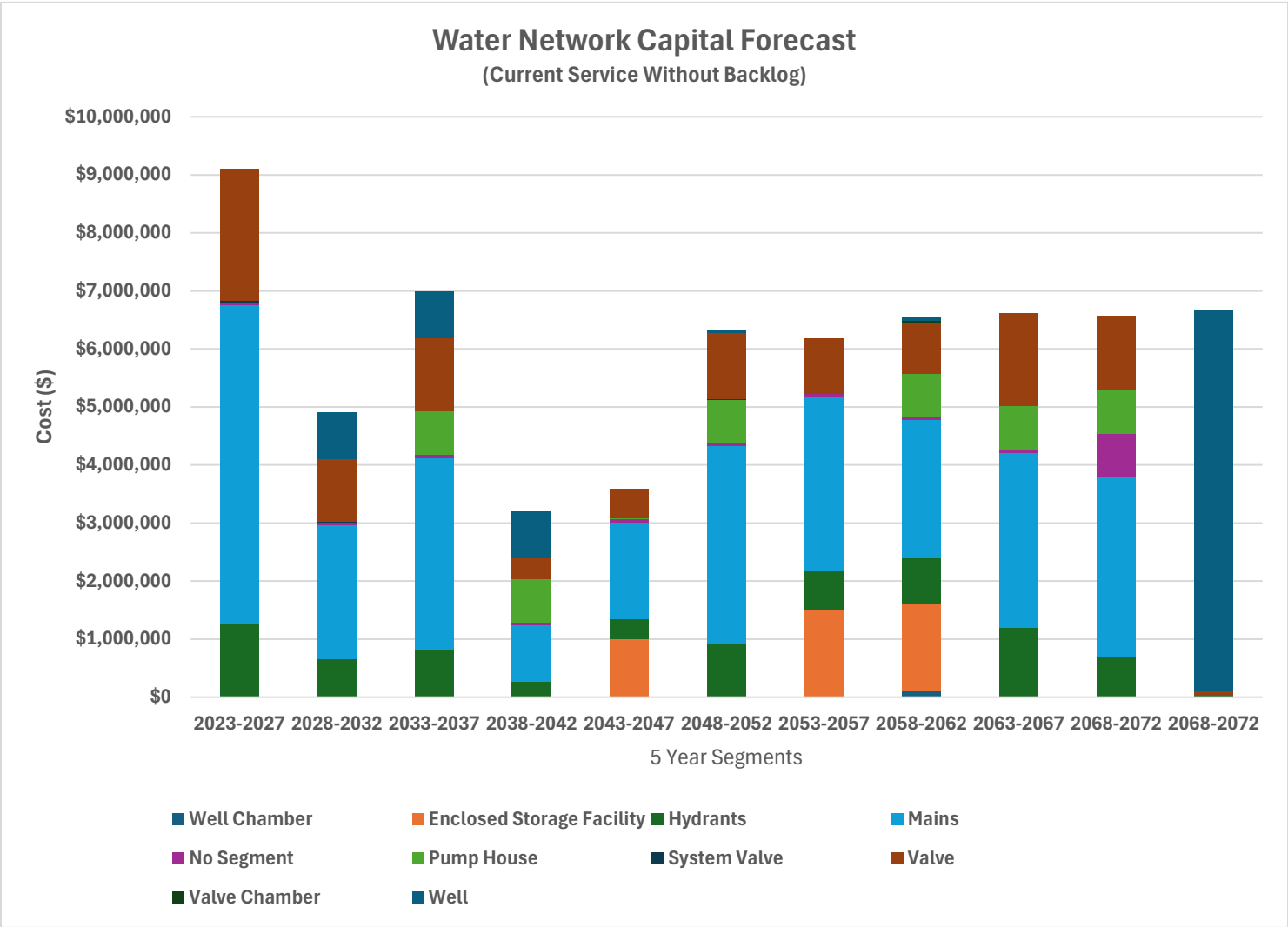
5.1.5 Lifecycle Management Strategy

The condition or performance of most assets will deteriorate over time. This process is affected by a range of factors including an asset's characteristics, location, utilization, maintenance history and environment. The following lifecycle strategy has been developed as a proactive approach to managing the lifecycle of water mains.

Event Name	Watermain Event Class	Event Trigger
Flushing/Valve Exercising	Maintenance	Annually
Uni-directional flushing	Maintenance	Every 4 Years
Cathodic Protection	Preventative Maintenance	Annually for first 25 Years
Trenchless Re-lining	Rehabilitation	40%-60% Condition
Full Reconstruction	Replacement	N/A

5.1.6 Forecasted Capital Requirements

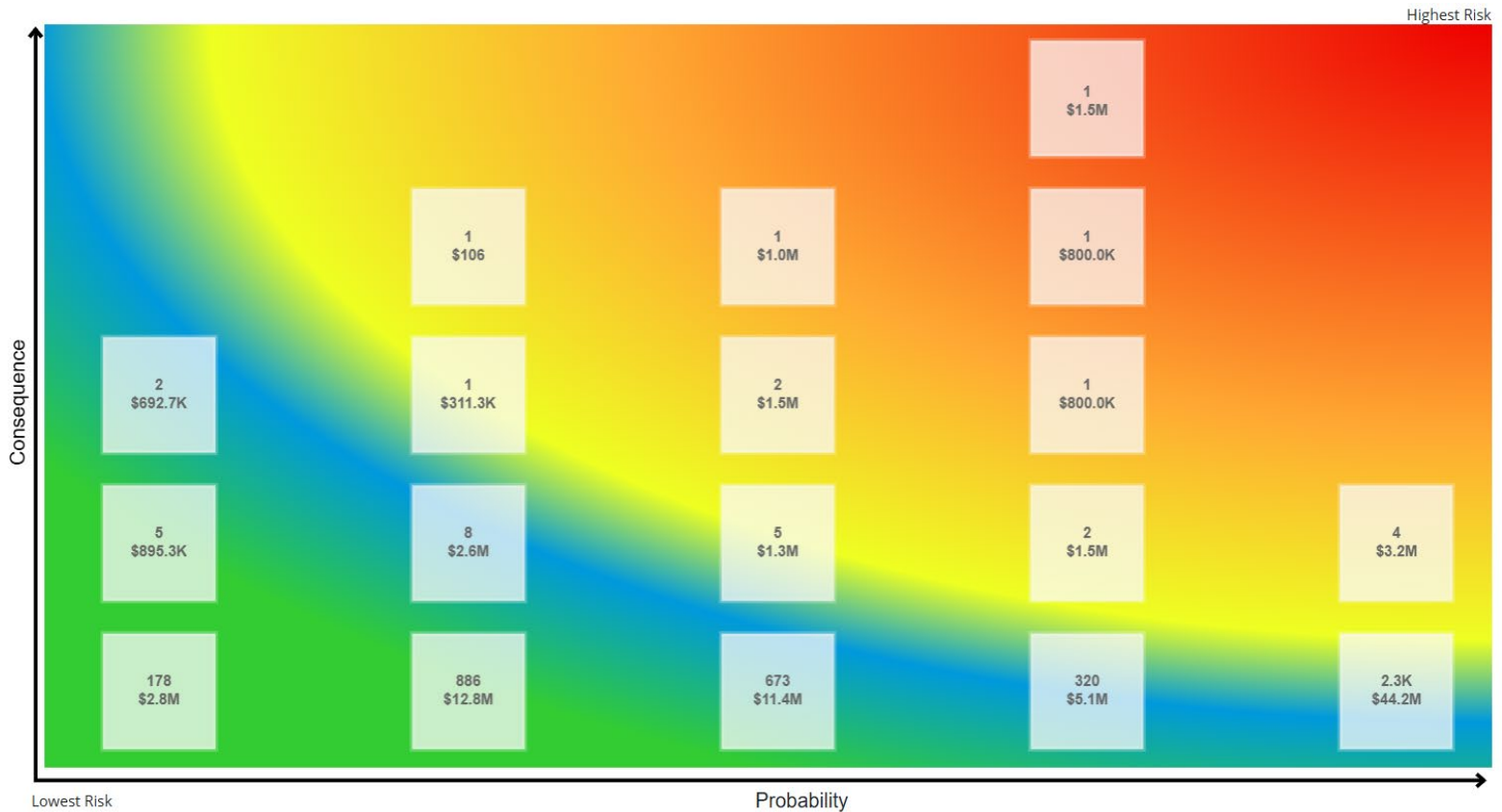
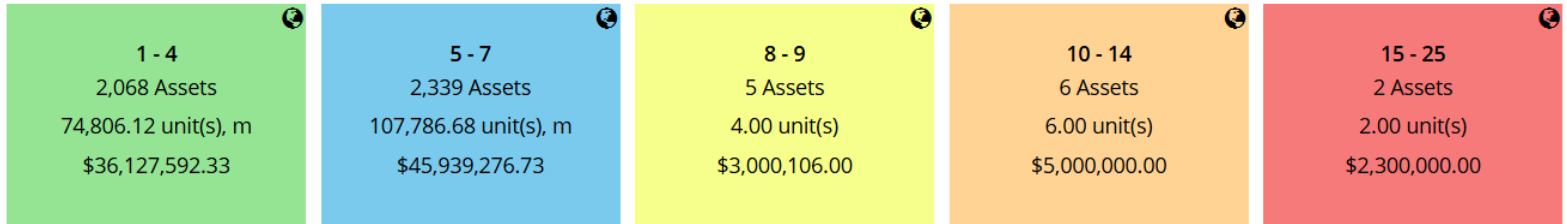
The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the City should allocate towards funding rehabilitation and replacement needs.



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

5.1.7 Risk & Criticality

The following risk matrix illustrates the relationship between the probability of failure and the consequence of failure for the assets within the Water Network asset category based on 2022 inventory data. The risk rating ranges include asset count, quantity, and replacement cost of assets within each range. See Appendix C for the criteria behind this risk rating matrix.



Critical Assets

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

5.1.8 Levels of Service

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

Community Levels of Service

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

Service Attribute	Community Levels of Service	Related Assets
Scope	<p>The City maintains a drinking water network to ensure reliable, safe, and efficient distribution of potable water for the community. The water network services provided by the City include water treatment and distribution, water meter installation, cross-connection and backflow prevention, service connections, fire hydrants, and repair of watermain breaks.</p> <p>The extent of the City's water network including the locations of water vertical assets is illustrated in Appendix B.</p>	All
Scope	The extent of the area within 150 m of a fire hydrant is illustrated by Appendix B.	Hydrants
Reliability	Boil water advisories are triggered because of adverse water quality reports from routine water quality testing or localized spot testing after events that have the potential to allow contaminants to enter the system. Watermain breaks are one such type of event where this testing takes place. The City has a standard operating procedure for managing these events and the issuance of boil water advisories.	All
Reliability	<p>Watermain breaks result from various reasons including soil conditions, weather, installation practices, and strikes during excavations. Extreme weather changes can cause the ground to swell and contract, placing excessive pressure on the watermain, causing a pipe to break. Also, as the water temperature starts to get colder in the fall, contraction of the pipes may cause pipe connections and joints to fail. If this happens, the water usually finds its way to the surface.</p> <p>Due to the watermain being under pressure, water will continue to flow until the break is repaired. Service interruptions can be caused by routine municipal projects including watermain replacement, distribution system repairs of pipe breaks, service connection repairs or replacements, and maintenance of vertical infrastructure. When feasible, users are informed in advance of any interruption, including details regarding location, duration, and any actions required by the user with instructions. If the duration of interruption is prolonged, a temporary water service may be installed to minimize the impact on users.</p>	Watermains
Quality	The City inspects and maintains the drinking water system at a condition level to operate as designed.	All
Capacity	The City strives to align capacity of infrastructure to service demand.	All

Technical Levels of Service

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

Service Attribute	Description of What Performance Measure Captures	Performance Measure	2023 Performance	Target Performance	Related Assets
Scope	How much of the City is connected to the water system.	Percentage of properties connected to the municipal water system.	81%		Watermains
Scope	How much of the City is in the preferred proximity to a fire hydrant.	Percentage of properties where fire flow is available.	100%		Watermains Hydrants
Reliability	Duration of boil water advisories.	The number of connection-days per year where a boil water advisory is in place compared to the total number of properties connected to the municipal water system.	0		All
Reliability	Duration of watermain breaks.	The number of connection days per year due to watermain breaks compared to the total number of properties connected to the municipal water system.	0.0017		Watermains
Reliability	Frequency of watermain breaks.	Number of detected and repaired watermain breaks per kilometre of watermain.	0.17		Watermains
Quality	Condition of water system.	Percentage of assets in Very Poor condition.	62%		All
Quality	Ability of the system to provide preferred flow rates for fire services.	Percentage of fire hydrants providing below-standard fire flows.	In Progress		Watermains Hydrants
Quality	Frequency of inspections of the water distribution network.	Percentage of total watermain length inspected per year using in-pipe technologies.	In Progress		Watermains
Capacity	Sufficiency of capacity of infrastructure to meet user demand.	Percentage of treated potable water as a portion of the rated treatment capacity of the network.	In Progress		All

5.1.9 Recommendations

Condition Assessment Strategies

- Identify condition assessment strategies for high value and high-risk water network assets.
- Complete staff asset inventories to ensure all water well and outlying station components are captured in the AMP software.

Risk Management Strategies

- Continue to develop water infrastructure evaluation and needs assessments on a regular basis to highlight areas of growth, deficiencies, capacity issues, and provide accurate costing. Specifically for the 6 well houses as the water towers and reservoirs are inspected per the provincial regulations.
- Review risk models on a regular basis and adjust according to an evolving understanding of the probability and consequences of asset failure.

Levels of Service

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

5.2 Wastewater Network

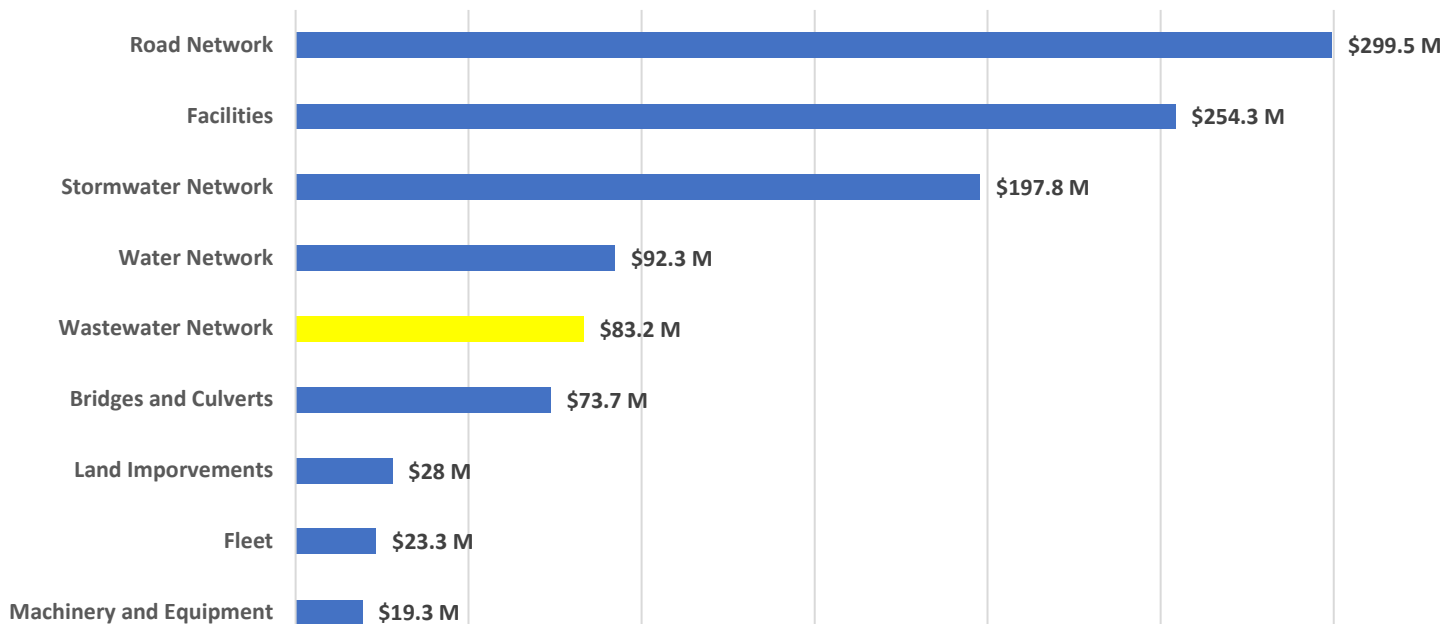
The sewer services provided by the City are overseen by the Environmental Services division. The division is responsible for sanitary sewers, pumping stations, and manholes. The sanitary treatment plant is managed by OCWA.

5.2.1. Asset Inventory & Replacement Cost

The table below includes the quantity, replacement cost method and total replacement cost of each asset segment in the City's Wastewater Network inventory. For context, the replacement cost for the wastewater network in 2019 was \$95 million and is now \$83 million in 2024. This asset segment will be reviewed internally before the next update to ensure accurate data.

Asset Segment	Replacement Cost Method	Total Replacement Cost
Force Main	100% CPI Tables	\$214,749
Gravity Main	100% Cost/Unit	\$45,377,694
Mains	100% Cost/Unit	\$9,477,694
Manhole	100% CPI Tables	\$13,159,742
No Segment	100% CPI Tables	\$272,712
Pump Station	100% CPI Tables	\$8,855,498
Treatment Plant	100% CPI Tables	\$1,030,466
2011/2012 Capital	100% CPI Tables	\$4,899,352
Total	-	\$83,287,907

Wastewater Network Replacement Cost: \$83.2 million

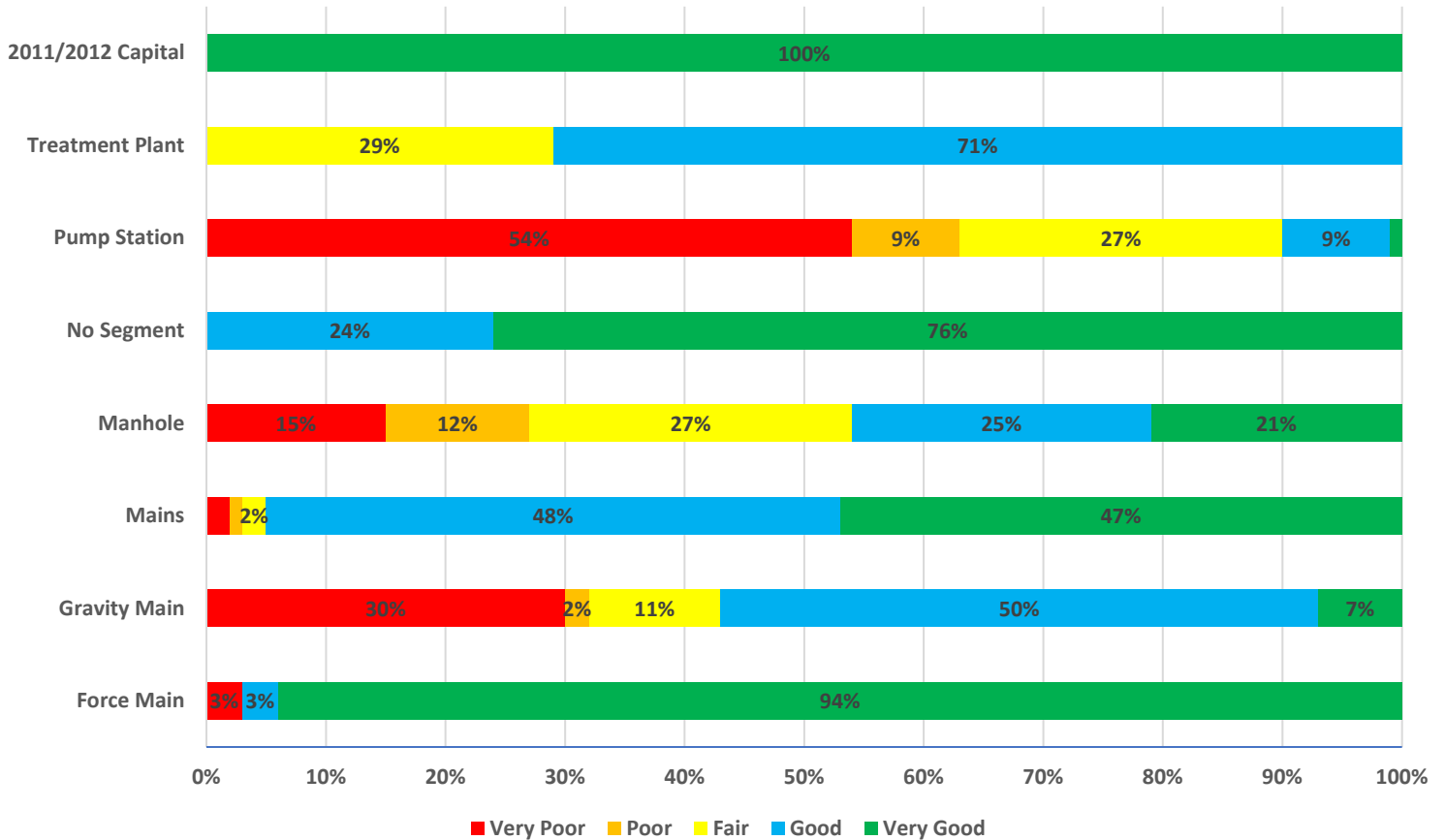


5.2.2. Asset Condition

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

Force Main	56%	Fair	Age Based
Gravity Main	57%	Fair	Age Based
Mains	85%	Very Good	Age Based
Manhole	52%	Fair	Age Based
No Segment	78%	Very Good	Age Based
Pump Station	29%	Poor	Age Based
Treatment Plant	64%	Good	Age Based
2011/2012 Capital	89%	Very Good	Age Based

Wastewater Network Condition Assessment



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

5.2.3. Current Approach to Condition Assessment

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

- CCTV inspections are completed for sanitary mains on a regular cycle. Rehabilitation projects are also prioritized by growth and capacity considerations, in addition to condition.
- Trenchless re-lining program is in place and has a dedicated budget.
- Rodding and boring are performed on an as-needed basis. Smoke testing is performed every 15 years or when necessary. Brick manholes are being replaced on an as needed basis.
- System flushing is performed every 4 years; broken out by City zones. Forcemains are not flushed or CCTV inspected due to their pressurised nature.
- Pumping stations were assessed in 2014 by an external consultant and are inspected on a weekly basis by internal City staff. The diesel generators are also inspected per Technical Standards and Safety Authority (TSSA) requirements.

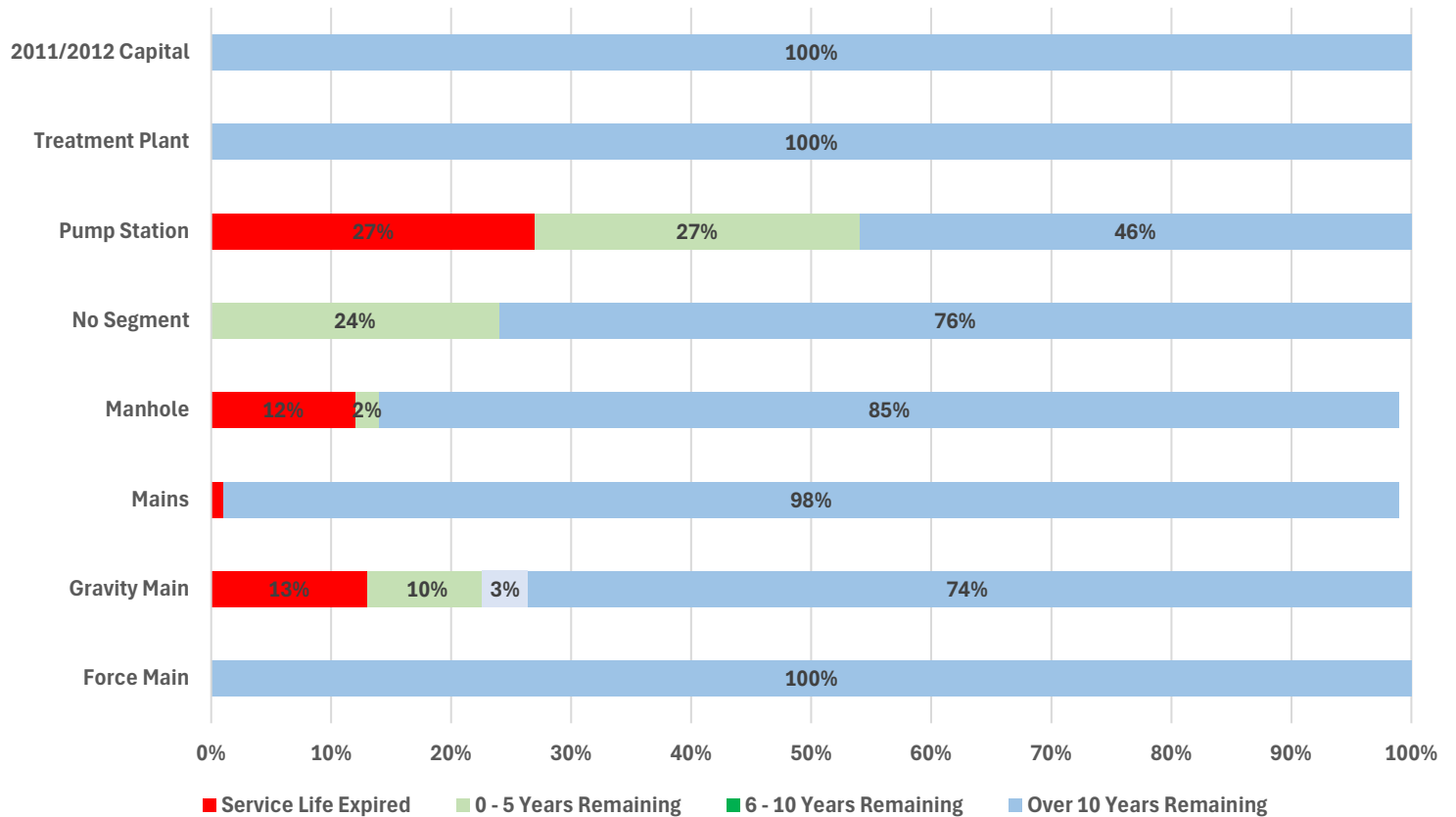
5.2.4. Estimated Useful Life & Average Age

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

Asset Segment	Estimated Useful Life (Years)	Average Age (Years)	Average Service Life Remaining (Years)
Force Main	50 Years	32	51
Gravity Main	50 Years	57	29
Mains	60 Years	17	75
Manhole	60 Years	49	50
No Segment	N/A	2	10
Pump Station	50 Years	37	10
Treatment Plant	60 Years	28	65

2011/2012 Capital	N/A	10	83
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Wastewater Network Service Life Remaining

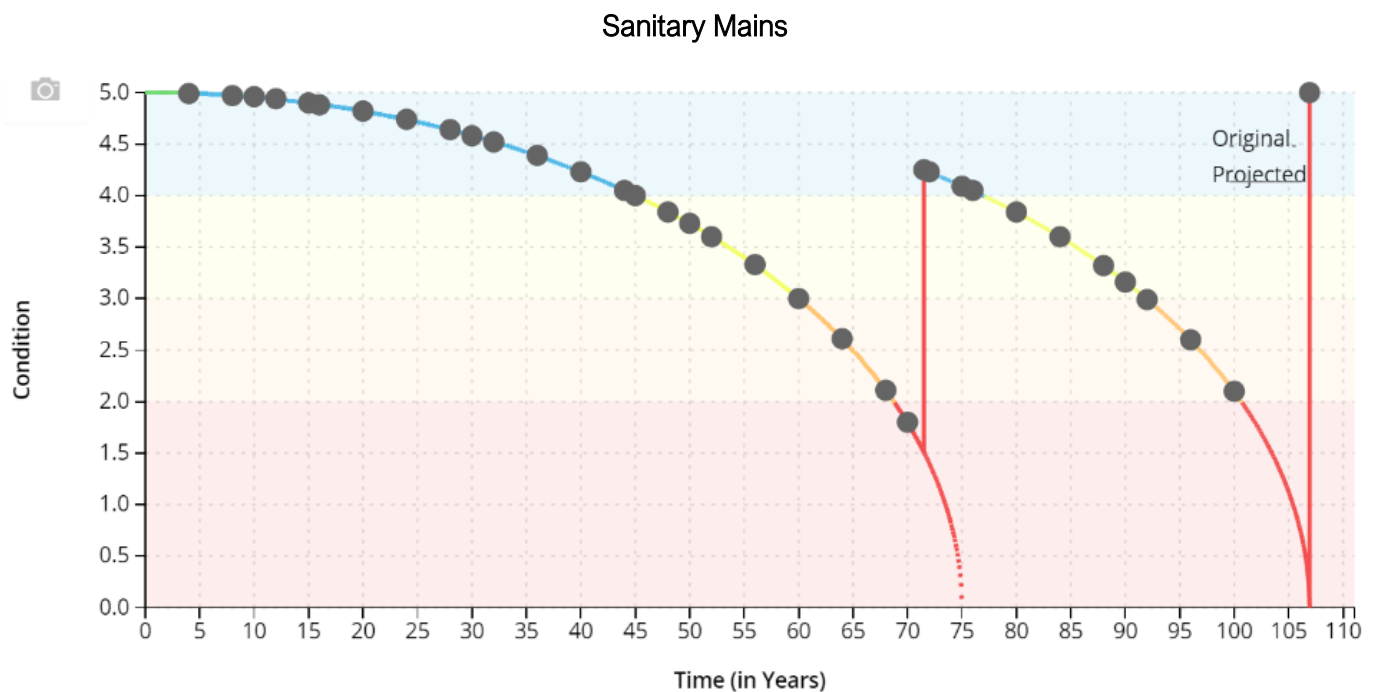


Each asset's Estimated Useful Life should be reviewed periodically to determine whether adjustments need to be made to better align with the observed length of service life for each asset type.

5.2.5. Lifecycle Management Strategy

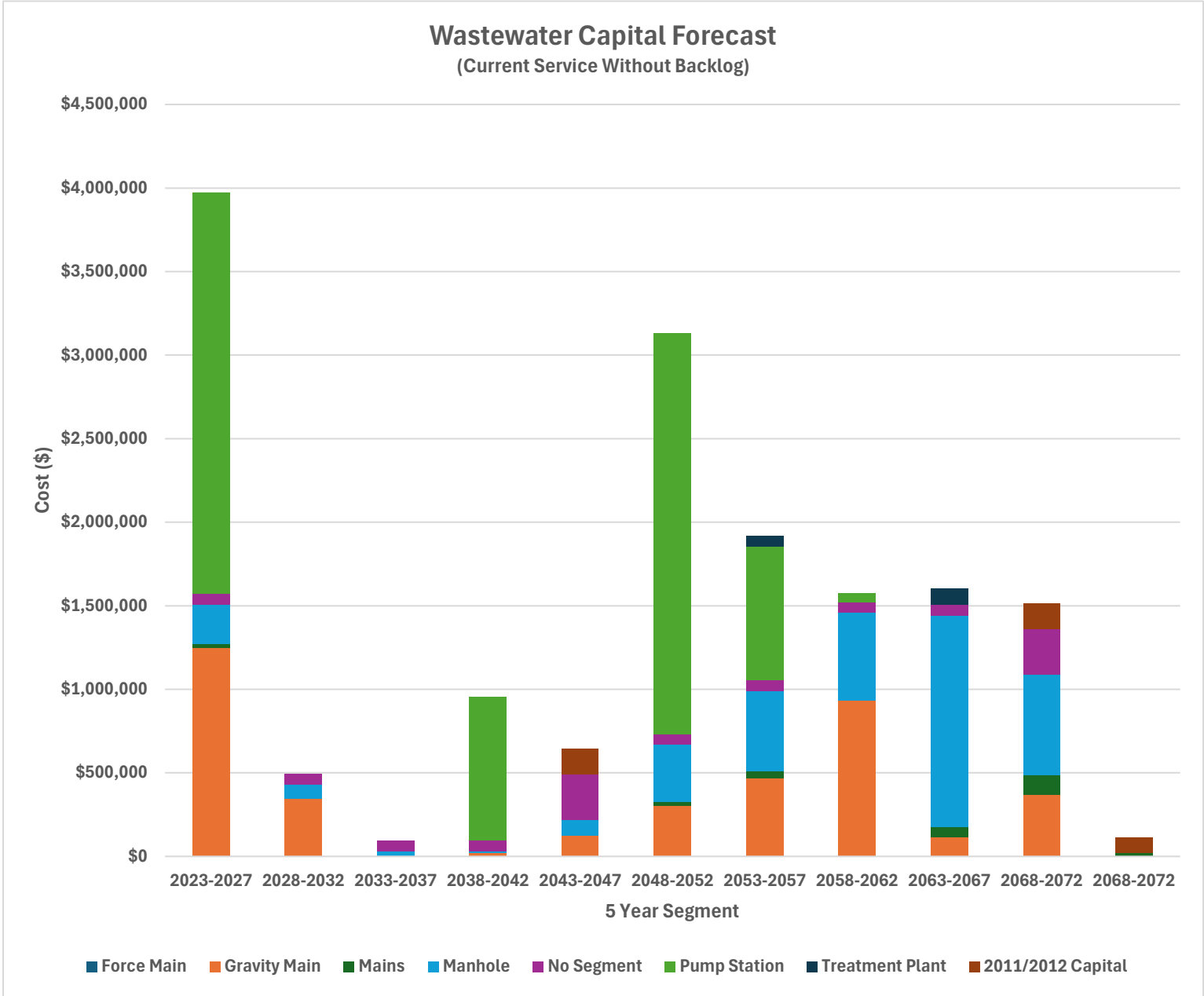
The condition or performance of most assets will deteriorate over time. This process is affected by a range of factors including an asset's characteristics, location, utilization, maintenance history and environment. The following lifecycle strategy has been developed as a proactive approach to managing the lifecycle of sanitary mains.

Event Name	Event Class	Event Trigger
Cleaning/Flushing	Maintenance	Every 4 Years
CCTV Inspections	Maintenance	Every 10 Years
Smoke Testing	Maintenance	Every 15 Years
Trenchless Re-lining	Rehabilitation	40%-60% Condition
Full Reconstruction	Replacement	N/A



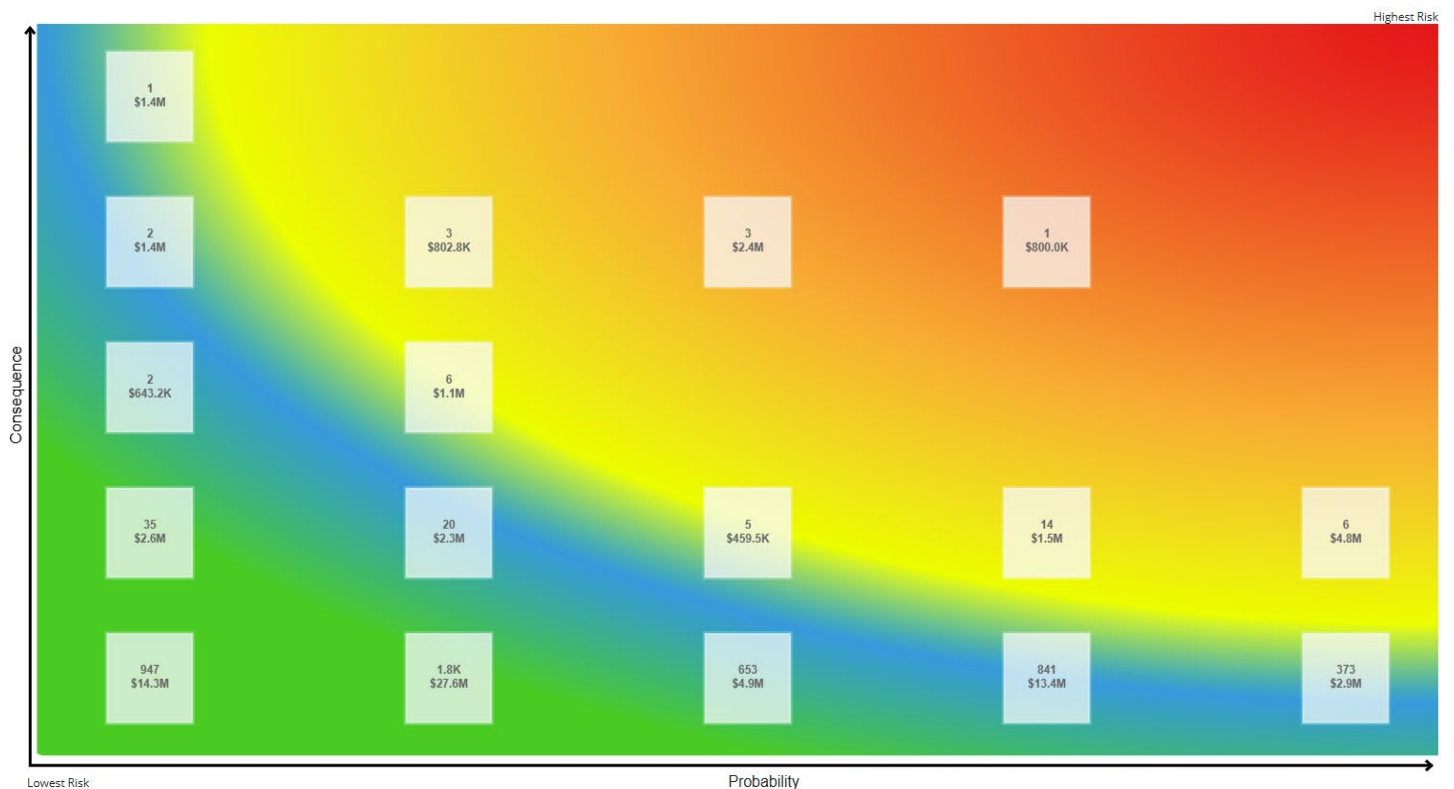
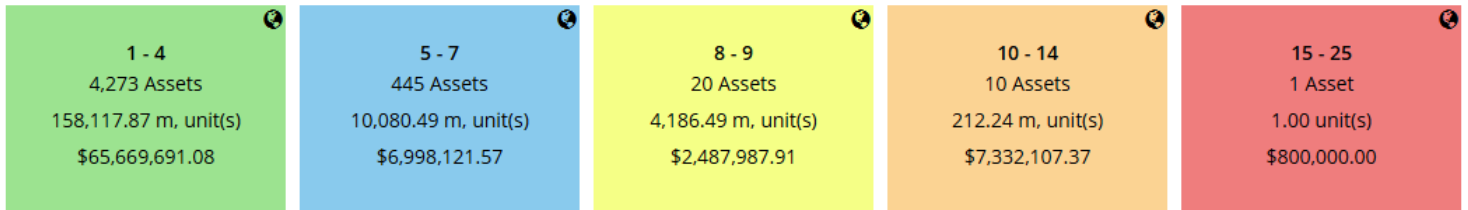
5.2.6. Forecasted Capital Requirements

The following graph forecasts long-term capital requirements. The annual capital requirement represents the average amount per year that the City should allocate towards funding rehabilitation.



5.2.7. Risk & Criticality

The following risk matrix illustrates the relationship between the probability of failure and the consequence of failure for the assets within the Wastewater Network asset category based on 2022 inventory data. The risk rating ranges include asset count, quantity, and replacement cost of assets within each range. See Appendix C for the criteria behind this risk rating matrix.



Critical Assets

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

5.2.8. Levels of Service

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

Community Levels of Service

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

Service Attribute	Community Levels of Service	Related Assets
Scope	The City maintains a wastewater network to support reliable, safe, cost effective, and efficient collection, treatment, and discharge of wastewater within the community to the receiving water body (Avon River). The extent of the City's wastewater network, including the locations of wastewater vertical assets, is illustrated in Appendix B.	All
Reliability	The City does not have combined sewers in the wastewater system.	Sewermain
Reliability	<p>Stormwater can enter the municipal wastewater system through improperly connected roof drains, damaged or deteriorated maintenance hole lids, frame, and chimneys, and through the pick holes in depressed maintenance holes.</p> <p>Groundwater can enter the system through deficiencies in the underground pipes such as breaks, cracks, root intrusion, and misaligned pipes taking up some of the available capacity of the collection and treatment infrastructure.</p>	Sewermain
Reliability	<p>The wastewater system is designed to be resilient against water inflow and infiltration. Maintenance holes are typically installed to be at grade and not in depressed areas. Repairs to maintenance holes are completed when issues are identified, and the necessary resources are available.</p> <p>Relining sewermain to repair breaks, cracks, and misaligned pipes can reduce the quantity of groundwater entering the wastewater system through these pipe defects. The wastewater system is designed with capacity to manage peak flows significantly higher than typical daily flows. If a pumping station or the wastewater treatment centre is overwhelmed with higher-than-normal flows, bypasses or overflow procedures could be used to manage the flow overwhelming the infrastructure.</p>	All
Quality	The City inspects and maintains the wastewater system at a condition level to operate as designed.	All

Technical Levels of Service

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

Service Attribute	Description of What Performance Measure Captures	Performance Measure	2023 Performance	Target Performance	Related Assets
Scope	How much of the City is connected to the wastewater system.	Percentage of properties connected to the municipal wastewater system.	95%		Sewer mains
Reliability	How often the wastewater system is unable to manage the peak flows.	The number of events per year where combined sewer flow in the municipal wastewater system exceeds system capacity compared to the total number of properties connected to the municipal wastewater system.	0		All
Reliability	Duration of wastewater backups.	The number of connection days per year due to wastewater backups compared to the total number of properties connected to the municipal wastewater system.	0.0007		All
Reliability	Frequency of wastewater effluent violations.	The number of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system.	0		Vertical
Reliability	Frequency of unplanned repairs that significantly impact the transportation network.	Annual number of emergency road closures due to emergency wastewater network repairs.	9		Sewer mains
Quality	Condition of wastewater system.	Percentage of assets in Very Poor condition.	29%		All
Quality	Frequency of inspections of the collection network.	Percentage of total sewer main length inspected per year using in-pipe technologies.	1.80%		Sewer mains

5.2.9. Recommendations

Condition Assessment Strategies

- Identify condition assessment strategies for high value and high-risk water network assets.
- Have staff complete a full inventory of all pumping station components to ensure all assets are captured in the AM software.
- Consider making the WPCP a stand-alone asset category as it is rate funded but also considered a “facility”. It should be separate from the tax funded facility category.

Risk Management Strategies

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

Lifecycle Management Strategies

- Evaluate the efficacy of the City’s lifecycle management strategies at regular intervals to determine the impact cost, condition and risk.

Levels of Service

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

6.0 Impacts of Growth

Key Insights

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

6.1. Description of Growth Assumptions

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

6.1.1. Development Charges Study and Stratford Official Plan

The City adopted its Official Plan in January 1993, and Official Plan Amendment 21 was approved by the Ministry of Municipal Affairs in July 2016. The Official Plan is a planning document for the purpose of guiding the future development of the City of Stratford, and establishes the goals and objectives established to manage the effects on the social, economic, and natural environment of the City. The growth data in the 2016 document is out of date however the next Official Plan Amendment is expected to be completed in Q4 of 2025 and the information in that document will be included in the next Asset Management Plan update.

Growth projections were also provided by the City as part of the 2022 DC Growth Plan (Watson and Associates Economists Ltd., 2022). The table below summarizes the residential and employment growth projections utilizing 2022 as the base year.

Year	Residential Population	Employment Population	Growth
2016	32,360	18,495	-
2022	34,700	19,369	3,214
2032	38,420	21,630	5,981
2041	41,530	22,860	4,340

6.1.2. Water Infrastructure Evaluation and Needs Assessment (September 2018)

The water infrastructure assessment identifies that residential and employment growth is anticipated within the City, especially within the southern industrial area, downtown core and along existing employment areas. The assessment also relies on the Official Plan's land use and intensification growth locations.

6.2. Impact of Growth on Lifecycle Activities

Planning for forecasted population growth may require the expansion of existing infrastructure and services. As growth-related assets are constructed or acquired, they should be integrated into the City's AMP. While the addition of residential units will add to the existing assessment base and offset some of the costs associated with growth, the City will need to review the lifecycle costs of growth-related infrastructure. These costs should be considered in long-term funding strategies that are designed to, at a minimum, maintain the current level of service.

7.0 Financial Strategy

Key Insights

- Given the annual capital requirement of \$30.2 million and an average actual contribution of \$18.7 million, there is currently an estimated funding gap of \$11.5 million annually.
- Although this AMP is based on 2023 data up to this point, in 2024 and 2025 respectively, Council has increased investment to capital programs without the updated data of this AMP. This is a tremendous step towards the adjustments required for full funding.
- For tax funded assets, it is recommended to continue emphasizing investment in infrastructure through annual budget increases to close the funding gap. Note that for the City to be compliant in 2025, the next AMP update requires a detailed financial strategy to address shortfalls and achieve sustainability. This update to the AMP identifies the current gaps with a general financial recommendation.
- For the Water Network, it is recommended to continue following the increases set out in the water and wastewater rate study by increasing 7% annually for the next 5 years and 3% for the following 5 years to achieve a sustainable level of funding.
- For the wastewater Network, it is recommended to continue following the increases set out in the water and wastewater rate study by increasing 2% annually for the next 5 years and 1% for the following 5 years to achieve a sustainable level of funding.

7.1. Financial Strategy Overview

The financial strategy is informed by the preceding sections of the Asset Management Plan and will continue to evolve based on enhanced data around the value and condition of the assets, the current levels of service, the risks to service delivery, and the lifecycle activities needed to reduce the risks to acceptable levels. The financial strategy considers how the City will fund the planned asset management actions to meet the current levels of service.

A municipality is in a financially sustainable position if it:

- Provides a level of service proportionate with willingness and ability to pay
- Can adjust service levels in response to changes in economic conditions
- Can adjust its implementation plans in response to changes in the rate of growth
- Has sufficient reserves and/or debt capacity to replace infrastructure when it needs to be replaced to keep its infrastructure in a state of good repair

The key challenge to financial stability is the discrepancy between level of service decisions and fiscal capacity. Additional challenges include rising costs of infrastructure investments and unforeseen threats to provincial and federal funding sources. In advance of the 2025 O. Reg. 588/17 requirements, this section of the AMP compares the annual funding requirements to the historical capital contributions to provide a preliminary funding shortfall estimate. Continuous improvements in data will refine forecasts in the next AMP update.

7.1.1. Funding Sources

Through the City's annual budget process, capital project and operating activity expenditure information is gathered from each service area, including investment needs, trends, and priorities to enable preparation of the operating budgets and capital program. As the budget is finalized, a financing plan is developed which includes several key sources of funding as outlined in the table below.

Funding Source	Description
Federal (CCBF)	A long-term grant agreement with the Association of Municipalities of Ontario (AMO), that provides a portion of the federal gas tax revenues to municipalities for revitalization of infrastructure that achieves positive environmental results.
Provincial (OCIF)	Ontario Community Infrastructure Fund for small, rural and northern communities to develop their infrastructure.
Other Grants	Project specific grants or subsidies.
Development Charges	Fees collected from developers to help pay for the cost of infrastructure required to provide municipal services to new developments.
Long Term Debt	Long term borrowing, to be paid for by future taxpayers.
User Fees	Funds collected for the use of City services or infrastructure (ex. Water and wastewater rates).

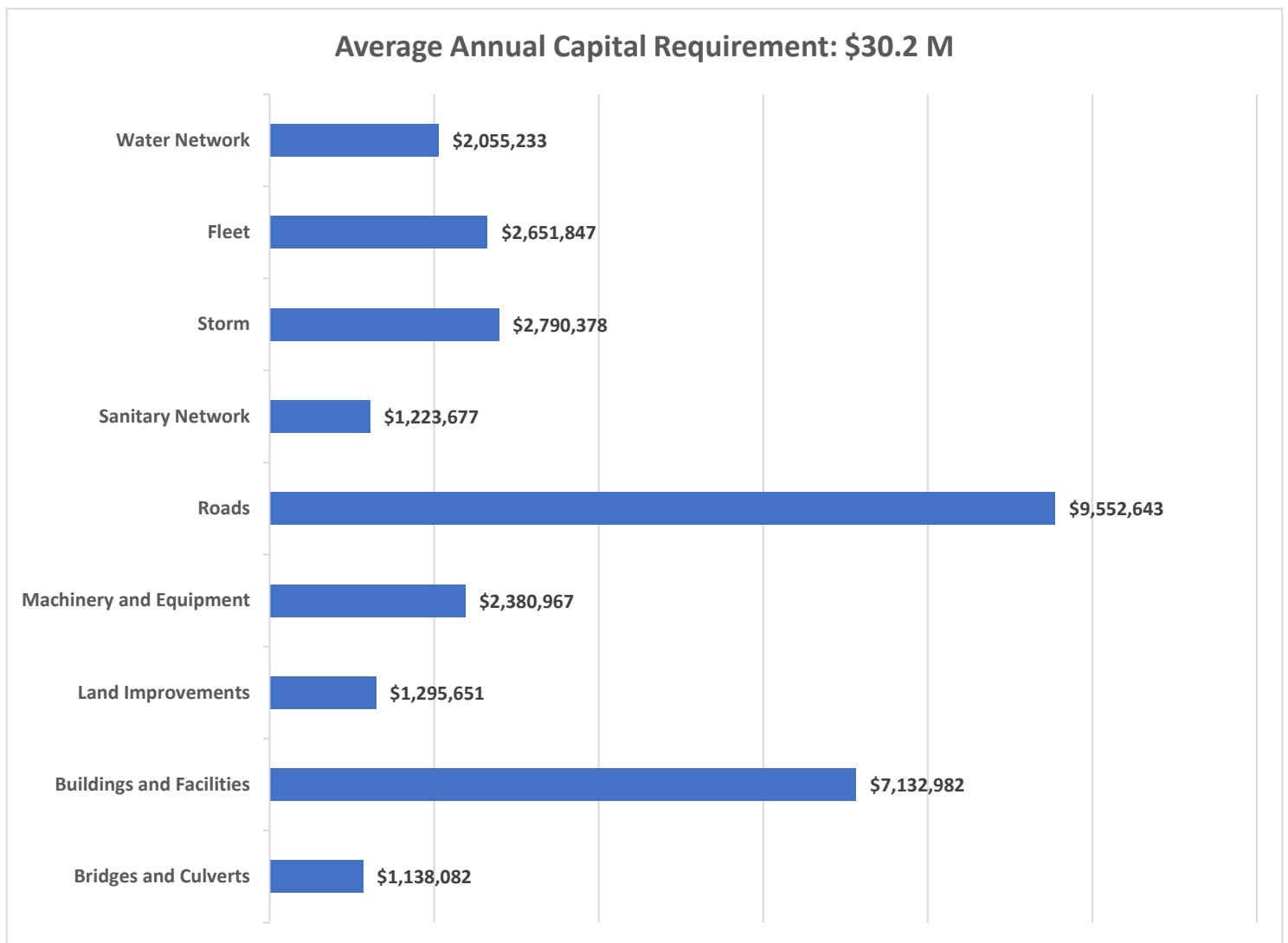
Annual Property Taxes

City property owners pay an annual tax to the City.

7.1.2. Annual Requirements & Capital Funding

Annual Requirements

The annual requirements represent the amount the City should invest annually to each asset category to meet replacement needs as they arise, prevent infrastructure backlogs and achieve long-term sustainability. In total, the City must allocate approximately \$30.2 million annually to meet the capital requirements for the assets included in this AMP. This total is estimated using a combination data sourced from the City's data from the previous AMP along with inflationary increases to better reflect recent replacement costing.



For most asset categories the annual requirement has been calculated based on a “replacement only” scenario, in which capital costs are only incurred at the construction and replacement of each asset.

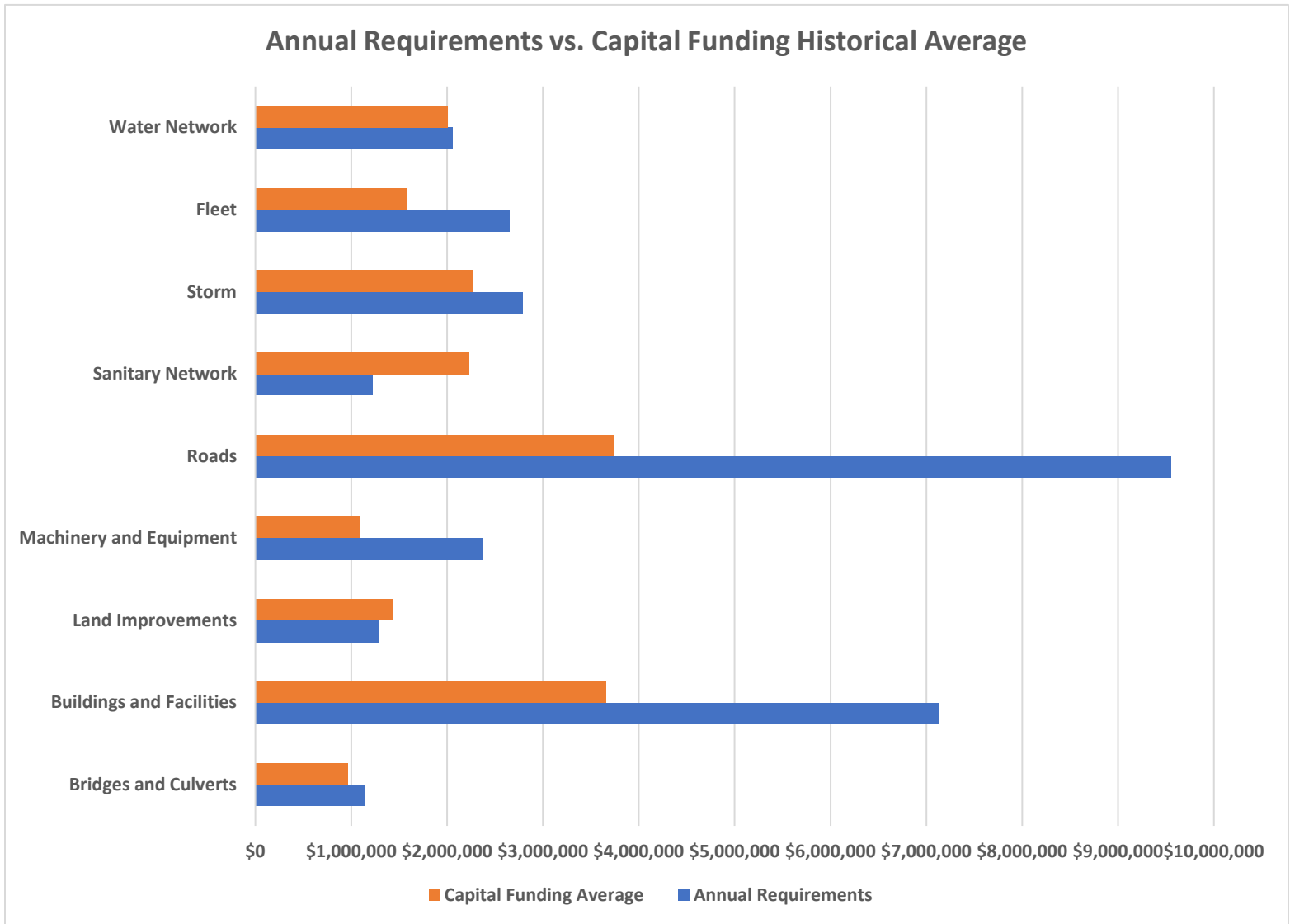
As the asset management program develops, the road, water, wastewater and stormwater networks will have lifecycle management strategies developed to identify capital costs that are realized through strategic rehabilitation and renewal of the City’s roads and mains, respectively. In other asset categories, replacement cost includes consideration of technological enhancements, obsolescence, so replacing like for like is not always possible. The development of these strategies allows for a comparison of potential cost avoidance if the strategies were to be implemented.

1. **Replacement Only Scenario:** Based on the assumption that assets deteriorate and – without regularly scheduled maintenance and rehabilitation – are replaced at the end of their service life.
2. **Lifecycle Strategy Scenario:** Based on the assumption that lifecycle activities are performed at strategic intervals to extend the service life of assets until replacement is required.
3. **Technology Driven Scenario:** Replacement with Technological advanced solutions to realize operational, environmental and social efficiencies.

The implementation of a proactive lifecycle strategy can lead to direct cost savings as well as indirect savings. For example, the relining of mains reduces costs related to road removal, traffic controls, and public dissatisfaction. These cost savings are incumbent on the current unit replacement costs used and the number of rehabilitations/replacements combined to minimize engineering and contingency costs.

7.1.3. Annual Funding Available

Annually, the City has committed approximately \$18.7 million towards capital projects per year (2016-2023) from revenue sources that have historically been reliable. Given the annual capital requirement of \$30.2 million, there is currently a funding gap of \$11.5 million annually. The annual capital funding available takes reserve funds and debt repayment into account. For comparison, at the time of the 2021 Asset Management Plan, the City was committing \$12.3 million towards capital projects and there was an annual funding gap of \$9.1 million based on the information available at that time.



7.2. Strategies to Address the Funding Gap

The Asset Management Plan directly supports the City's Strategic Plan and key strategic priorities, most specifically, enhancing our infrastructure. The City's goals and objectives of transparent and responsible decision making align with O. Reg 588/17 which requires municipalities to demonstrate financial sustainability through the AMP by identifying the forecast expenditures to maintain current service levels (Appendix A).

This AMP is proactive in setting the stage for meeting O. Reg. 588/17 requirements for year 2025 by identifying potential funding shortfalls and options with which the City may mitigate the various types of risks associated with the shortfall. This proactive approach enables the City to start the needed discussions on the affordability and sustainability of current service levels to determine appropriate future service levels for the City that effectively balance the associated costs and risks.

Based on currently available data, there are estimated funding gaps for renewing the City's assets and as described in this AMP, financial and climate change considerations that impact this gap. Municipalities generally do not have enough funding sources to address the infrastructure funding gap. To manage the risks of funding shortfall, this AMP suggests three main categories of options to be considered.

Options for Managing the Funding Gap		
Increased Funding from Existing Sources	Reduced Service Levels	Reduced Capital Need
<p>Increase property taxes to meet funding needs.</p> <p>Assessment growth from property taxes may be sufficient to authorize a special asset management levy that does not impact individual property owners (this solely depends on growth).</p> <p>Debt allows intergenerational equity through borrowing and having future taxpayers contribute to the cost of necessary infrastructure investments.</p> <p>The City will continue to maximize opportunities for grant funding from other levels of government.</p>	<p>Deferring capital renewal projects on lower risk assets ensures that critical infrastructure meets required service levels and allows less critical assets to deteriorate to lower service levels. Note that this may increase overall lifecycle costs in the long-term.</p> <p>For example, a deferral of a leaking roof project may potentially result in more expensive reconstruction costs if the leak results in other facility damages. This deferral strategy may still be appropriate for low critical assets that do not have much impact on the community even at reduced service levels.</p>	<p>Additional data collection on the condition of the assets through inspection programs will increase the accuracy of the state of infrastructure and may reduce the forecasted capital need if assets are found to be in better condition than expected compared to the age based assessment.</p> <p>Consideration of new and less expensive renewal technologies (relining for example) can also extend asset life and lower overall lifecycle costs, thereby reducing the investment forecast to maintain the same service levels.</p>

7.3. Financial Profile: Tax Funded Assets

7.3.1. Current Funding Position

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

Asset Category	Avg. Annual Requirement	Historical Grant Funding and Reserve Contributions Average	Annual Deficit (If applicable)
Bridges and Culverts	\$1,138,082	\$696,000	(\$442,082)
Buildings and Facilities	\$7,132,982	\$3,655,011	(\$3,477,971)
Land Improvements	\$1,295,651	\$1,430,228	\$134,577
Machinery and Equipment	\$2,380,967	\$1,095,107	(\$1,285,860)
Roads	\$9,552,643	\$3,737,656	(\$5,815,178)
Storm	\$2,790,378	\$2,274,591	(\$515,787)
Fleet	\$2,651,847	\$1,577,875	(\$1,073,972)
Totals	\$26,942,550	\$14,466,468	(\$12,476,273)

The average annual investment requirement for the above categories is \$26.9 million. Annual funding currently allocated (2016-2023 average) for capital purposes is \$14.7 million leaving an annual deficit of \$12.4 million. In other words, these infrastructure categories are currently funded at 53% of their long-term requirements (63% in 2019). The City would need to increase annual investment to its capital infrastructure by \$12.4 million to close this gap.

7.3.2. Full Funding Requirements

In 2023, City of Stratford had a net tax levy of \$73 million. As illustrated in the following table, without consideration of any other sources of revenue or cost containment strategies, full funding would require the following increases to capital infrastructure spending over time:

Asset Category	Budget Increase Required for Full Funding
Bridges and Culverts	0.53%
Buildings and Facilities	4.62%
Land Improvements	0.00%
Machinery and Equipment	1.57%
Roads	7.98%
Storm	0.80%
Fleet	1.50%
Total	17%

7.3.2. Financial Strategy Recommendations

Considering all the above information, it is recommended that the following approach be considered to address the funding shortfall. Please note that the 2025 AMP requires a comprehensive financial strategy. This AMP is identifying shortfalls and recommending a general financial recommendation.

1. Optimize Asset Useful Life

- a. Prioritize preventative maintenance to ensure the useful life of assets is achievable.
- b. Implement efficient lifecycle strategies to reduce total costs while maintaining functionality.

2. Continue with Incremental Capital Program Investments

- a. Annual increases to the capital program with the sole purpose of closing the annual funding gap of \$12 million per year.
- b. Increases should also be aligned with inflation of industry cost trends.

3. Reducer Service Levels

- a. Adjust service levels where feasible to reflect financial realities while ensuring core services remain unaffected.
- b. This is going to be a critical discussion for Council for the 2025 AMP update in the coming months.

4. Use Risk-Based Prioritization

- a. Prioritize high-impact projects based on service levels and risk assessments.
- b. Shift resources to critical assets in need of urgent attention.

5. Consider Further Debt Utilization and Enhanced Revenue Streams

- a. Employ strategic debt financing for long term assets with multi-generation benefits.
- b. Explore additional grants, partnerships and other funding mechanisms.

Notes:

- 1. By Provincial AMP rules, this periodic funding cannot be incorporated into an AMP unless there are firm commitments in place. We have included CCBF and OCIF funding, since this funding is a multi-year commitment. Future changes to these federal and provincial sources will impact the financial sustainability of any future AMP.
- 2. Continuously increasing budget contributions through taxation for infrastructure purposes will be very difficult to do and is not a sustainable solution. However, using a longer phase-in window may have even greater consequences due to the increased risks of infrastructure failure.
- 3. The long-term debt amounts that will be considered for the 2025 AMP forecasting do not currently include any considerations for the Grand Trunk Renewal project or any other projects that are not directly tied to established service delivery. At the time of this report, there have been no firm financial commitments made by Council to the Grand Trunk Renewal project, any future commitments will impact the City's ability to address the infrastructure shortfall on the timelines outlined.

Current data shows a backlog of approximately \$174 million for the City's tax funded assets. Prioritizing future projects will require the current data to be replaced by condition-based data. Although the current recommendations include no further use of debt, the results of the condition-based analysis may require otherwise.

7.4. Financial Profile: Rate Funded Assets

7.4.1. Current Funding Position

The following tables show, by asset category, Stratford's average annual asset investment requirements and current funding position for the water and wastewater networks.

Asset Category	Average Annual Requirement	Historical Capital Funding Average	Annual Deficit (If Applicable)
Sanitary Network	\$1,223,677	\$2,231,531	\$1,007,854
Water Network	\$2,055,233	\$2,006,281	(\$48,952)
Total	\$3,278,910	\$4,237,812	\$958,902

In November 2024, the City retained a consultant to complete a comprehensive water and wastewater rate study which is both a regulatory requirement and best practice for rate funded water and wastewater municipal systems. An important practice for an asset management program is to utilize information and resources from different sources. In the case of the water and wastewater rates, this section of the plan will source the recommendations from the rate study which was received by Council in 2024. This study is updated every 4-6 years in accordance with Ontario regulations and will continue to be cross-referenced with the AMP.

The rate study has a detailed focus which provides a more detailed rate review than capacity would otherwise allow water and wastewater as part of this plan. Cost components such as growth, capital financing and expenditures, asset preservation and renewal, inflation and market competition and pricing all form part of the rate study. As such, the recommendations from the study will be an integral part of the financial strategy of this asset management plan, and the asset management plan will be an integral part of the funding required to inform the rate study.

7.4.2. Rate Study Recommendations

Below are the main conclusions and recommendations regarding the water system:

- Approximately \$31.3 million in water capital expenditures is identified between 2025 and 2034, of which all will be financed from the capital reserve funds, development charges, third party contributions and long-term debt.
- The net annual water expenditures are expected to increase from \$6.3 million in 2025 to \$10.4 million by 2034.
- The financial statements for the water system are prepared based on the results of the rate study analyses and projections, indicate the following:
- The accumulated surplus is projected to increase from approximately \$24.2 million in 2025 to approximately \$32.5 million by 2030.
- The operating surplus ratio is projected to increase from approximately 8% in 2025 to 23% in 2030.
- The cash position is projected to decrease from \$2.3 million in 2025 to \$1.6 million in 2030.

These conclusions indicate that the financial outlook for the water system over the 6-year period 2025 to 2030 is good.

Below are the main conclusions and recommendations regarding the wastewater system:

- Approximately \$52.0 million in wastewater capital expenditures is identified between 2025 and 2034 of which all will be financed from the capital reserve funds, development charges, third party contributions and long-term debt.
- The net annual wastewater expenditures are expected to increase, from \$8.4 million in 2025 to \$10.3 million by 2034.
- The financial statements for the wastewater system are prepared based on the results of the rate study analyses and projections, indicate the following:
 - The accumulated surplus is projected to increase from approximately \$36.7 million in 2025 to approximately \$63.2 million by 2030.
 - The operating surplus ratio is projected to increase from approximately 53% in 2025 to 57% in 2030.
 - The cash position is projected to decrease from \$4.0 million in 2025 to \$1.2 million in 2030.

These conclusions indicate that the financial outlook for the water system over the 6-year period 2025 to 2030 is good.

The water and wastewater rates presented in the following chart are required in order to achieve full cost recovery and long-term sustainable financing of the City's water and wastewater systems.

Water Network	5 Years (2025-2029)	5 Years (2030-2034)	Wastewater Network	5 Years (2025-2029)	5 Years (2030-2034)
Infrastructure Deficit	1,262,000	1,262,000	Infrastructure Deficit	1,035,000	1,035,000
Rate Increase Required	35.00%	15.00%	Rate Increase Required	10.00%	5.00%
Annually:	7.00%	3.00%	Annually:	2.00%	1.00%

7.4.4. Financial Strategy Recommendations

Considering all the above information, it is recommended that the City:

- a) Continue to follow the rate study rate revenue increases by 15% for sanitary services and 50% for water services gradually for the next 10 years solely for the purpose of phasing in full funding to the asset categories covered in this section of the AMP.
- b) Increase existing and future infrastructure budgeted contributions 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 may be available during the phase-in period. This periodic funding should not be incorporated into an AMP unless there are firm commitments in place.
- 2. We realize that raising rate revenues for infrastructure purposes will be very difficult to do. However, considering a longer phase-in window may have even greater consequences in terms of infrastructure failure.
- 3. Any increase in rates required for operations would be in addition to the above recommendations.

Although this option achieves full funding on an annual basis in 10 years and provides financial sustainability over the period modeled, the recommendations do require prioritizing capital projects to fit the resulting annual funding available.

Prioritizing future projects will require the current age-based drivers to be replaced by more specific condition-based data. Although our recommendations include no further use of debt, the results of the condition-based analysis may require otherwise as it may result in assets being in worse condition than their age would indicate and thereby altering the timelines for the forecast period.

7.5. Asset Management Plan Monitoring and Improvement

7.5.1. Overview

Development of AMPs is an iterative and ongoing process that includes improving data, processes, systems, developing staff skills, and shifting organizational culture over time. This section provides an overview of the compliance of this AMP with Ontario Regulation 588/17 for current levels of service and recommends improvements to the City's asset management practices.

AMP Section	O. Reg. 588/17 Compliance (Current LOS)	Priority	Proposed Timeframe
State of Local Infrastructure	Compliance: For each asset category, the AMP provides a summary of the assets, the replacement cost of the assets, the average age of the assets, the condition of the assets and the approach to assessing condition of assets.		
	General and Specific Improvements:		
	Continue to improve knowledge of asset costs and current condition of all assets. Target efforts on high-risk assets and assets with unknown condition.	High	On-going
	Develop a data governance strategy and policy.	High	Medium-term
	Update AM software to support a single data set for inventory management.	High	Short-term
	Update asset categories and segments for 2025 AMP to allow for more department specific reporting.	High	Short-term
	Complete building condition assessments for sites not completed in 2020 and develop standardized inventory based on Uniformat standards.	High	Short-term
	Develop regular condition assessment protocols for assets such as facilities, playgrounds, water/wastewater sites.	Moderate	Medium-term
	Continue to improve GIS datasets and update WPCP and water/wastewater site equipment and facility inventories.	Moderate	Medium-term
	Update bridge and culvert profiles to include major maintenance recommendations from the OSIM reports as lifecycle events.	High	Short-term
	Develop a long-term CCTV program with the Engineering and Environmental Services divisions to ensure accurate condition assessment for wastewater and stormwater mains.	Moderate	Long-term
	Complete a full review and inventory update of the City's SWM Ponds and incorporate the findings from the 2023 sediment survey into the lifecycle events profile of the assets.	High	Medium-term

Levels of Service	Compliance: For each asset category, the AMP reports the current LOS performance. For all assets, the AMP provides qualitative community descriptions, technical metrics and current performance. There are metrics listed in some categories that will be considered for the 2025 AMP update.		
	General and Specific Improvements:		
	For the 2025 AMP update per O. Reg. 588/17, develop proposed LOS (target performance for each measure over each of the next ten years) for all asset categories.	High	Short-term
	Review facility accessibility audits and develop a LOS measure associated with accessibility initiatives.	Moderate	Medium-term
	Gain further understanding of the resilience of properties and the system to 100- and 5-year storms for O. Reg. 588/17 technical measures for stormwater. This analysis will support future actions as it relates to the City's climate change efforts.	Moderate	Long-term
Risk and Lifecycle Management Strategy	Compliance: The AMP provides the population and employment forecasts for the City. For each asset category, the AMP provides the lifecycle activities that would need to be undertaken to maintain the current LOS for each of the next 10 years based on risk and lowest lifecycle cost.		
	General and Specific Improvements:		
	Continue to update and optimize the lifecycle activities of various operations, maintenance, and renewal activity and determine the lowest cost option to maintain service delivery.	Moderate	On-going
	Establish general Data Governance to reduce gaps such as tracking of completed projects and updating associated construction year data for replaced and upgraded assets.	High	Medium-term
	Implement a cohesive city-wide work order management system to improve tracking of activities and costs on asset repair and maintenance. Leverage City-Wide for planning and maintenance management.	High	Long-term
	Improve understanding of growth and upgrade needs by incorporating recommendations from future studies, such as the Transportation Study and Water/Storm and Wastewater Master Plans.	Moderate	On-going
	Review and incorporate additional strategies as applicable from the Corporate Energy and Emissions Plan initiatives as they are completed.	Moderate	On-going
Financial Strategy	Compliance: This AMP provides the estimated funding gaps in advance of the July 1, 2025, O. Reg. 588/17 update requirement.		

	General and Specific Improvements:		
	Prepare 10-year operating budgets and capital forecasts as required by O. Reg. 588/17 for AMP's for Proposed LOS (due by July 1, 2025) and evaluate the funding shortfall to the Proposed LOS.	High	Short-term
	Update budget forecasts as impacts of on-going pressures, such as increasing costs, are better understood. Also monitor the current and expected stresses on the budget and review need for additional funding as required.	Moderate	On-going
	Continue to maximize funding sources such as grants to mitigate funding shortfalls.	Moderate	On-going

Following the next compliance update, the AMP will require updating at least every five years to ensure it reports an updated snapshot of the City's asset portfolio and its associated value, age, and condition, and comply with provincial regulation. These updates will ensure that the City has an updated 10-year outlook that includes the proposed service levels by year 2025 and every 5 years thereafter, the costs of the associated lifecycle strategies and an assessment of funding shortfalls.

Per O. Reg. 588/17, the City will conduct an annual review of its asset management progress in implementing this AMP and will discuss strategies to address any factors impeding its implementation.

Appendices

Key Insights

- **Appendix A:** Identifies projected 10-year capital requirements for each asset category
- **Appendix B:** Includes water, sewer, storm and road master plan maps
- **Appendix C:** Identifies the criteria used to calculate risk for each asset category

Appendix A: 10-Year Capital Requirements

The following tables identify the capital cost requirements for each of the next 10 years to meet projected capital requirements and maintain the current level of service. The data was compiled from reporting modules in the CityWide software. This is live data and will change with each asset management plan update as more data becomes available and modified.

Bridges & Culverts

Asset Segment	Backlog	2023	2024	2025	2026	2027	2028	2029	2030	2031
Culverts & Bridges	\$0	\$0	\$0	\$75,000	\$0	\$0	\$0	\$0	\$75,000	\$0
Total	\$0	\$0	\$0	\$75,000	\$0	\$0	\$0	\$0	\$75,000	\$0

Road Network

Asset Segment	Backlog	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Roads	\$27,802,685	\$24,848,121	\$8,508,365	\$4,143,484	\$3,193,154	\$2,100,243	\$2,015,481	\$2,694,704	\$2,218,246	\$2,656,627	\$1,909,584
Sidewalks	\$27,501,913	\$2,469,849	\$3,920,736	\$2,748,089	\$2,212,850	\$5,504,721	\$5,434,087	\$2,233,711	\$3,860,822	\$2,436,737	\$5,259,474
Streetlights	\$10,026,510	\$2,809,181	\$7,295,427	\$3,132,312	\$1,648,948	\$5,767,462	\$5,584,167	\$2,384,970	\$2,775,000	\$1,275,000	\$6,525,000
Traffic	\$4,713,805	\$1,650,000	\$4,350,000	\$2,475,000	\$2,475,000	\$7,800,000	\$3,150,000	\$825,000	\$2,700,000	\$1,500,000	\$1,500,000
Total	\$70,044,913	\$31,777,151	\$24,074,528	\$12,498,885	\$9,529,952	\$21,172,426	\$16,183,735	\$8,138,385	\$11,554,068	\$7,868,364	\$15,194,058

Stormwater Network

Asset Segment	Backlog	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Catch Basins	\$629,326	\$2,158,332	\$4,409,126	\$1,028,208	\$2,187,750	\$5,120,250	\$3,513,536	\$1,785,192	\$2,573,345	\$5,553,344	\$3,920,451
Culverts	\$1,626,099	\$0	\$85,150	\$3,752	\$358,613	\$150,000	\$75,000	\$75,000	\$0	\$150,000	\$450,000
Mains	\$987,830	\$2,236,289	\$1,241,903	\$956,978	\$1,950,272	\$4,500,602	\$1,506,015	\$524,248	\$2,072,194	\$1,921,543	\$0
Ditch Inlets	\$75,769	\$75,000	\$0	\$0	\$75,000	\$0	\$150,000	\$225,000	\$0	\$600,000	\$75,000
Outfall	\$63,135	\$267,076	\$1,200,000	\$0	\$150,000	\$96,038	\$267,076	\$0	\$150,000	\$246,040	\$321,037
SQU	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$75,000	\$75,000
Manholes	\$329,470	\$88,809	\$36,160	\$101,290	\$130,212	\$226,338	\$146,707	\$177,692	\$687,230	\$282,322	\$195,372
Arch	\$10,122,690	\$0	\$75,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$75,000
Drains	\$2,005,192	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total	\$27,437,456	\$5,261,983	\$10,920,795	\$3,152,233	\$6,165,581	\$10,859,350	\$12,274,004	\$4,670,857	\$5,803,523	\$10,942,738	\$9,255,821

Buildings and Facilities

Asset Segment	Backlog	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Community Services	\$15,850,322	\$475,155	\$750,156	\$887,828	\$201,817	\$4,324,330	\$1,321,755	\$5,712,156	\$75,000	\$10,675,354	\$415,835
Emergency Services	\$3,306,146	\$187,000	\$27,200	\$201,500	\$30,000	\$870,884	\$1,520,176	\$1,193,307	\$225,000	\$1,106,955	\$13,000
Infra. Services	\$915,500	\$259,000	\$1,500	\$20,500	\$30,000	\$1,054,500	\$4,500	\$134,500	\$0	\$864,459	\$0
Golf Course	\$630,000	\$17,500	\$3,000	\$18,500	\$0	\$52,500	\$21,000	\$3,000	\$0	\$74,500	\$0
Public Library	\$510,673	\$120,780	\$1,500	\$97,005	\$75,000	\$312,120	\$43,000	\$71,000	\$75,000	\$575,000	\$0
Public Housing	\$31,656,460	\$0	\$0	\$6,102,294	\$2,893,732	\$0	\$0	\$1,917,498	\$0	\$0	\$0
Total	\$52,869,101	\$1,059,435	\$783,356	\$7,327,627	\$3,200,549	\$6,614,334	\$2,910,431	\$9,227,461	\$375,000	\$13,296,268	\$428,835

Machinery & Equipment

Asset Segment	Backlog	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Community Services	\$1,265,748	\$19,327	\$4,375	\$73,394	\$227,896	\$135,719	\$113,023	\$72,234	\$0		\$29,056
Emergency Services	\$1,060,545	\$54,554	\$61,705	\$118,894	\$447,608	\$43,831	\$605,144	\$0	\$33,594	\$2,861	\$0
Corporate Services	\$5,092,998	\$139,665	\$0	\$520,059	\$351,609	\$401,004	\$1,936,258	\$7,660	\$232,964	\$174,806	\$48,521
Infra. Services	\$2,998,408	\$21,146	\$136,424	\$71,231	\$335,596	\$600,000	\$1,392,649	\$88,380	\$0	\$0	\$0
Golf Course	\$779,781	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total	\$11,197,480	\$274,692	\$202,504	\$786,493	\$1,362,709	\$1,154,651	\$4,052,624	\$168,274	\$266,558	\$177,667	\$77,577

Fleet

Asset Segment	Backlog	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Attachments	\$20,441	\$0	\$16,324	\$0	\$0	\$0	\$18,385	\$0	\$0	\$0	\$0
Heavy Duty	\$150,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Heavy Machinery	\$3,600,277	\$2,038,977	\$315,433	\$1,143,632	\$406,249	\$196,971	\$1,365,858	\$755,163	\$0	\$0	\$1,400,000
Light/Med Licensed	\$1,193,632	\$223,555	\$84,718	\$448,096	\$349,151	\$191,421	\$299,819	\$114,172	\$65,622	\$0	\$0
Light/Med Machinery	\$588,653	\$114,193	\$90,448	\$0	\$4,470	\$75,231	\$167,016	\$22,392	\$93,975	\$0	\$0
Trailers	\$25,640	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total	\$5,578,643	\$2,376,725	\$506,923	\$1,591,728	\$759,870	\$463,623	\$1,851,078	\$891,727	\$159,597	\$0	\$1,400,000

Land Improvements

Asset Segment	Backlog	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Exterior Lighting	\$726,974	\$0	\$75,000	\$75,000	\$0	\$0	\$75,000	\$0	\$0	\$0	\$0
Fencing	\$145,180	\$0	\$0	\$0	\$375,000	\$0	\$0	\$0	\$0	\$0	\$0
Diamonds/Courts/Fields	\$680,003	\$375,000	\$0	\$0	\$150,000	\$0	\$0	\$0	\$0	\$0	\$0
Irrigation Systems	\$0	\$0	\$0	\$150,000	\$0	\$0	\$75,000	\$0	\$0	\$0	\$0
Parking Areas	\$0	\$0	\$75,000	\$256,457	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Paved Areas - Other	\$6,154,031	\$0	\$75,000	\$75,000	\$0	\$0	\$467,053	\$0	\$0	\$335,369	\$0
Playgrounds	\$0	\$75,000	\$0	\$75,000	\$0	\$108,165	\$0	\$150,000	\$150,000	\$0	\$75,000
Total	\$7,706,188	\$450,000	\$225,000	\$631,457	\$525,000	\$108,165	\$617,053	\$150,000	\$150,000	\$335,369	\$75,000

Wastewater Network

Asset Segment	Backlog	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Force Main	\$0	\$0	\$0	\$0	\$0	\$0	\$450,000	\$0	\$0	\$0	\$150,000
Gravity Main	\$9,981,147	\$1,660,063	\$1,505,509	\$296,366	\$2,625,000	\$712,554	\$4,460,312	\$1,541,199	\$2,145,177	\$3,375,000	\$2,475,000
Mains	\$147,092	\$225,000	\$10,050	\$0	\$11,356	\$0	\$226,071	\$75,000	\$0	\$600,000	\$75,000
Maint. Hole	\$1,581,000	\$1,731,961	\$1,605,400	\$337,200	\$2,550,000	\$1,287,400	\$4,281,200	\$1,249,600	\$2,199,800	\$2,250,000	\$2,550,000
Pump Station	\$2,400,000	\$0	\$0	\$800,000	\$800,000	\$800,000	\$150,000	\$0	\$0	\$0	\$75,000
WPCP	\$0	\$0	\$0	\$0	\$600,000	\$0	\$0	\$0	\$0	\$0	\$0
Total	\$14,109,239	\$3,617,024	\$3,120,959	\$1,433,566	\$6,586,356	\$2,799,954	\$9,567,582	\$2,865,799	\$4,344,977	\$6,225,000	\$5,325,000

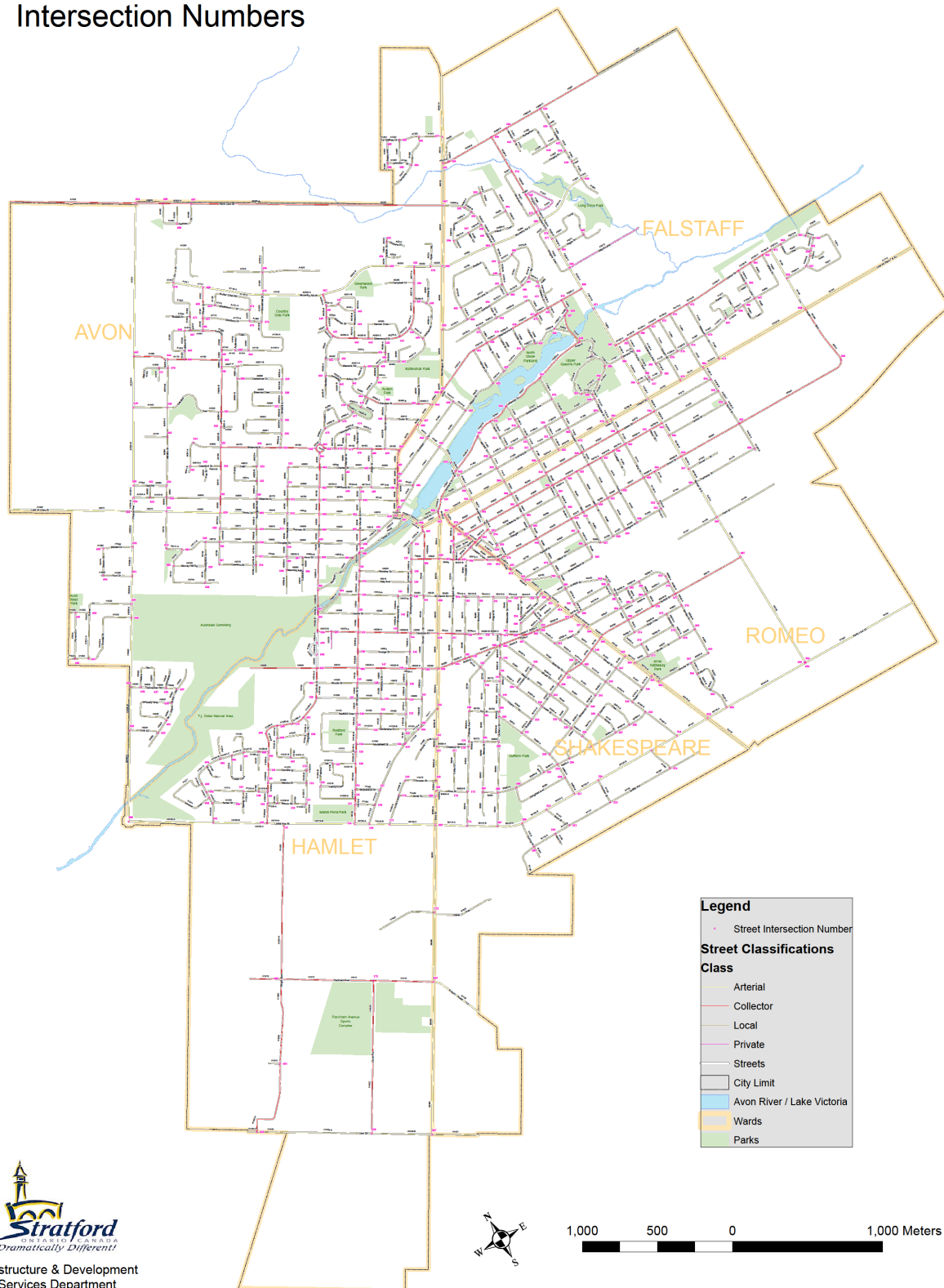
Water Network

Asset Segment	Backlog	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Water Storage	\$0	\$0	\$0	\$0	\$0	\$75,000	\$0	\$0	\$0	\$0	\$0
Hydrants	\$4,932,000	\$1,146,000	\$834,000	\$345,000	\$1,509,000	\$1,170,000	\$1,584,000	\$756,000	\$1,374,000	\$1,050,000	\$375,000
Mains	\$22,399,550	\$2,007,186	\$1,505,170	\$883,176	\$3,185,160	\$2,563,428	\$1,692,948	\$1,076,479	\$1,539,996	\$455,706	\$975,170
Pump House	\$2,261,590	\$0	\$0	\$0	\$0	\$0	\$750,000	\$0	\$0	\$0	\$0
System Valve	\$132,600	\$0	\$75,000	\$0	\$0	\$2,550	\$0	\$0	\$0	\$0	\$0
Valve	\$9,351,000	\$1,674,000	\$1,659,000	\$531,000	\$2,550,000	\$2,613,000	\$1,800,000	\$900,000	\$2,175,000	\$1,200,000	\$1,125,000
Valve Chamber	\$42,426	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Well	\$6,550,000	\$0	\$0	\$0	\$0	\$0	\$800,000	\$75,000	\$0	\$0	\$0
Total	\$45,782,935	\$4,827,186	\$4,073,170	\$1,759,176	\$7,244,160	\$6,423,978	\$6,626,948	\$2,807,479	\$5,088,996	\$2,705,706	\$2,475,170

Appendix B: City of Stratford Master Plan Maps

- Map 1: City of Stratford Road Network
- Road Condition Examples
- Bridges and Culverts Condition Examples
- Map 2: City of Stratford Water Network
- Map 3: City of Stratford Wastewater Network
- Map 4: City of Stratford Stormwater Network

City Streets & Intersection Numbers



Infrastructure & Development
Services Department
March 2025

Road Condition Examples

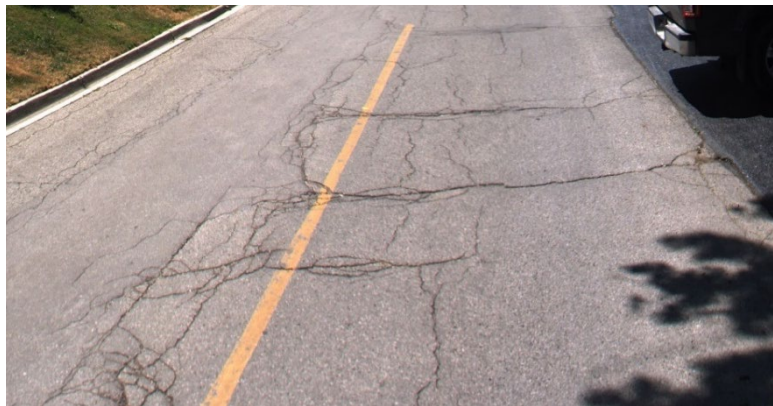
Player Street

Very Poor Road Condition



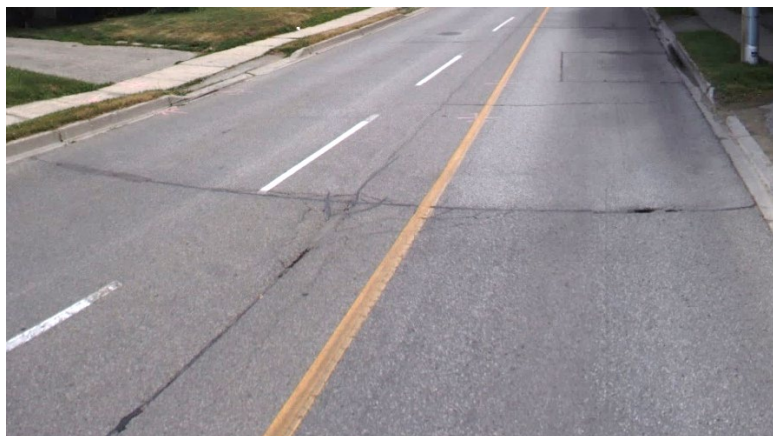
Cobourg Street

Poor Road Condition



Douro Street

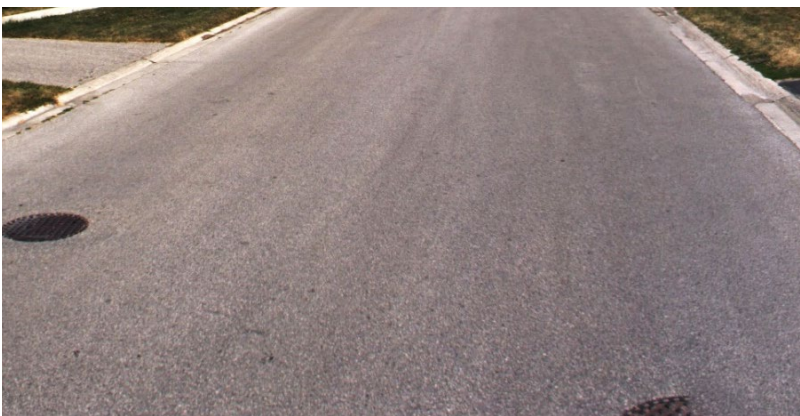
Fair Road Condition



McNab Street	Good Road Condition
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Brett Street	Very Good Road Condition
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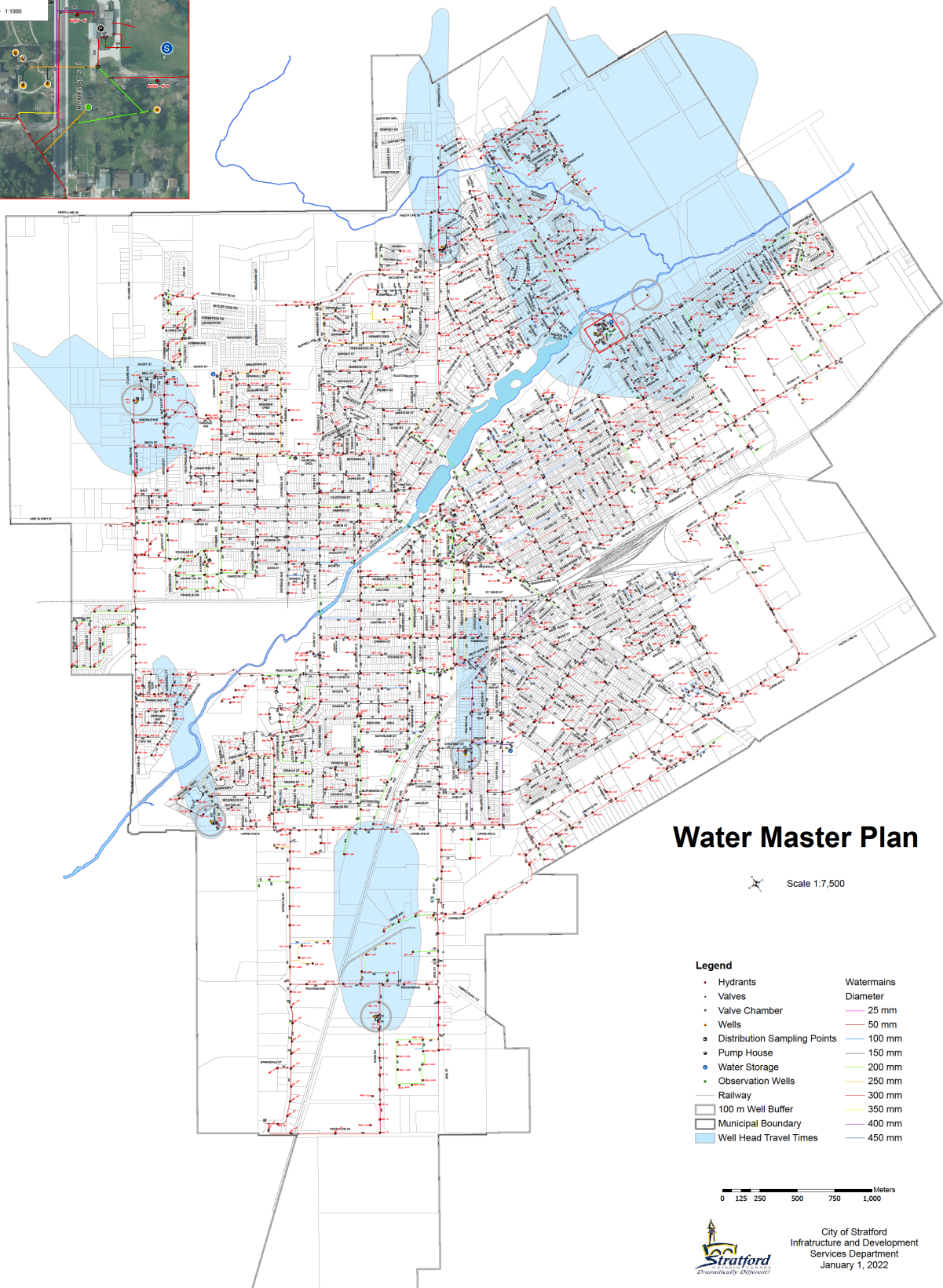
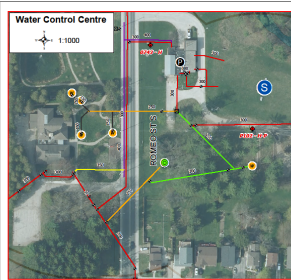
Bridge and Culvert Condition Examples

Romeo St. Bridge	Bridge in Good Condition
OSIM Report: 2023 Inspection	



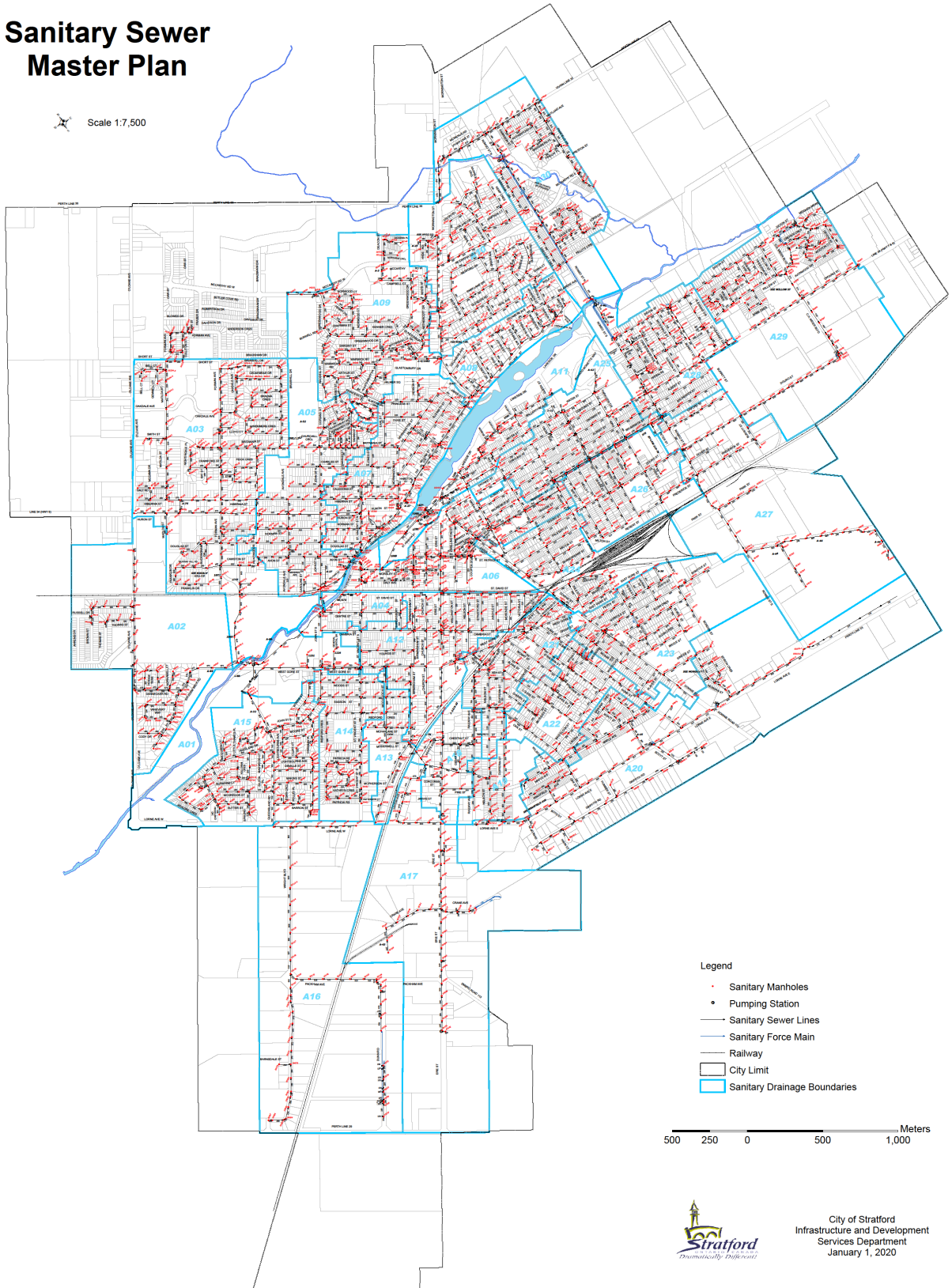
Delemere Ave. Culvert	Culvert in Good Condition
OSIM Report: 2023 Inspection	





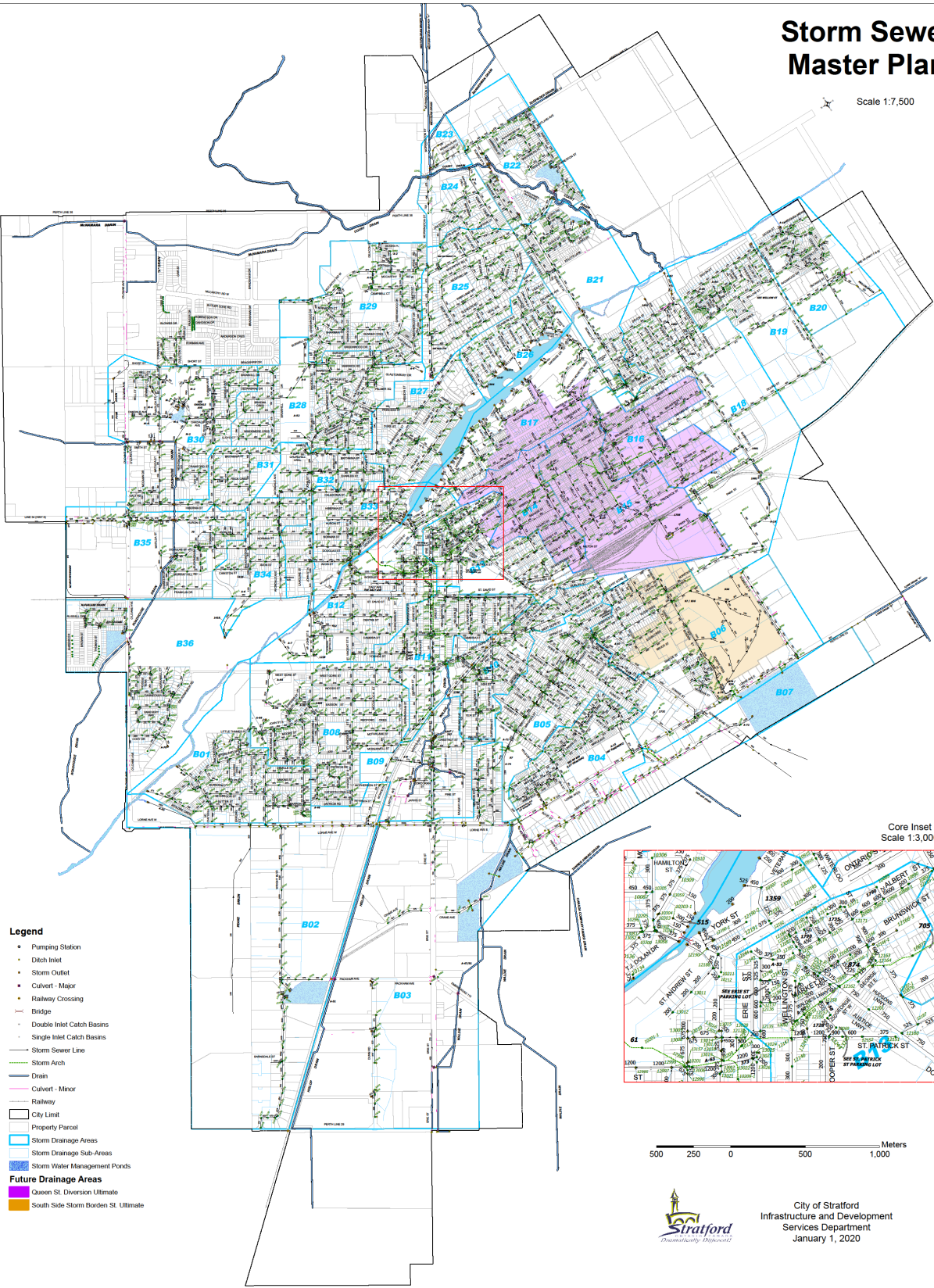
Sanitary Sewer Master Plan

Scale 1:7,500



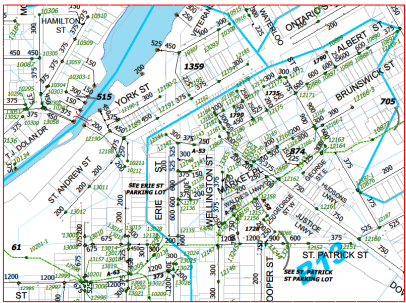
Storm Sewer Master Plan

Scale 1:7,500



- Legend**
- Pumping Station
 - Ditch Inlet
 - Storm Outlet
 - Culvert - Major
 - Railway Crossing
 - Bridge
 - Double Inlet Catch Basins
 - Single Inlet Catch Basins
 - Storm Sewer Line
 - Storm Arch
 - Drain
 - Culvert - Minor
 - Railway
 - City Limit
 - Property Parcel
 - Storm Drainage Areas
 - Storm Drainage Sub-Areas
 - Storm Water Management Ponds
 - Future Drainage Areas**
 - Queen St. Diversion Ultimate
 - South Side Storm Borden St. Ultimate

Core Inset
Scale 1:3,000



500 250 0 500 1,000 Meters



City of Stratford
Infrastructure and Development
Services Department
January 1, 2020

Appendix C: Risk Rating Criteria

Probability of Failure

Very Low Probability of Failure = 1 Very High Probability of Failure = 5

Asset Category	Risk Criteria	Value/Range	Probability of Failure Score
Road Network (Roads)	Condition	80-100	1
Road Network (Roads)	Condition	60-79	2
Road Network (Roads)	Condition	40-59	3
Road Network (Roads)	Condition	20-39	4
Road Network (Roads)	Condition	0-19	5
Road Network (Roads)	ADT	0-400	1
Road Network (Roads)	ADT	400-1000	2
Road Network (Roads)	ADT	1000-2000	3
Road Network (Roads)	ADT	2000-8000	4
Road Network (Roads)	ADT	8000+	5
Bridges & Culverts	Condition	80-100	1
Bridges & Culverts	Condition	60-79	2
Bridges & Culverts	Condition	40-59	3
Bridges & Culverts	Condition	20-39	4
Bridges & Culverts	Condition	0-19	5
Bridges & Culverts	Material	Steel	1
Bridges & Culverts	Material	Precast Concrete	3
Bridges & Culverts	Material	Corrugated Steel Pipe	4
Bridges & Culverts	Material	Wood	5
Wastewater Network (Mains)	Condition	5	1
Wastewater Network (Mains)	Condition	4	2
Wastewater Network (Mains)	Condition	3	3
Wastewater Network (Mains)	Condition	2	4
Wastewater Network (Mains)	Condition	1	5
Wastewater Network (Mains)	Pipe Material	PVC, Precast Concrete after 1970	1
Wastewater Network (Mains)	Pipe Material	CIPP	2

Wastewater Network (Mains)	Pipe Material	Asbestos Cement, Transit	3
Wastewater Network (Mains)	Pipe Material	CT, VT, GT, Brick, Precast Concrete prior to 1970	4
Wastewater Network (Mains)	Slope Percentage	2.0+	1
Wastewater Network (Mains)	Slope Percentage	1.0-2.0	2
Wastewater Network (Mains)	Slope Percentage	0.4-1.0	3
Wastewater Network (Mains)	Slope Percentage	0.2-0.4	4
Wastewater Network (Mains)	Slope Percentage	<0.2	5
Water Network (Mains)	Breaks/Segment	0-2	1
Water Network (Mains)	Breaks/Segment	4-Feb	2
Water Network (Mains)	Breaks/Segment	6-Apr	3
Water Network (Mains)	Breaks/Segment	8-Jun	4
Water Network (Mains)	Breaks/Segment	8+	5
Water Network (Mains)	Pipe Material	HDPE, PVC	4
Water Network (Mains)	Pipe Material	Steel	4
Water Network (Mains)	Pipe Material	Ductile Iron	3
Water Network (Mains)	Pipe Material	Cast Iron	3
Water Network (Mains)	Pipe Material	Riveted Steel	3
Stormwater Network (Mains)	Condition	5	1
Stormwater Network (Mains)	Condition	4	2
Stormwater Network (Mains)	Condition	3	3
Stormwater Network (Mains)	Condition	2	4
Stormwater Network (Mains)	Condition	1	5
Stormwater Network (Mains)	Pipe Material	PVC, Ribbed PVC, HDPE, Concrete after 1970, PIP	1
Stormwater Network (Mains)	Pipe Material	CIPP	2

Stormwater Network (Mains)	Pipe Material	Asbestos Cement, Transite, CSP	3
Stormwater Network (Mains)	Pipe Material	Precast Concrete prior to 1970, CT, GT, Vitrified Clay	4
Buildings & Facilities	Condition	80-100	1
Machinery & Equipment			
Fleet			
Land Improvements			
Buildings & Facilities	Condition	60-79	2
Machinery & Equipment			
Fleet			
Land Improvements			
Buildings & Facilities	Condition	40-59	3
Machinery & Equipment			
Fleet			
Land Improvements			
Buildings & Facilities	Condition	20-39	4
Machinery & Equipment			
Fleet			
Land Improvements			
Buildings & Facilities	Condition	0-19	5
Machinery & Equipment			
Fleet			
Land Improvements			

Consequence of Failure

Asset Category	Risk Criteria	Value/Range	Consequence of Failure Score
Road Network (Roads)	Replacement Cost	\$0-\$10,000	1
Road Network (Roads)	Replacement Cost	\$10,000-\$20,000	2
Road Network (Roads)	Replacement Cost	\$20,000-\$50,000	3
Road Network (Roads)	Replacement Cost	\$50,000-\$100,000	4
Road Network (Roads)	Replacement Cost	\$500,000+	5
Road Network (Roads)	Design Class	Rural Road	1
Road Network (Roads)	Design Class	Local Residential	2
Road Network (Roads)	Design Class	Collector Residential	3
Road Network (Roads)	Design Class	Local Commercial Industrial	3
Road Network (Roads)	Design Class	Collector Commercial Industrial	4
Road Network (Roads)	Design Class	Arterial	5
Road Network (Roads)	Critical Path	Low	2
Road Network (Roads)	Critical Path	Medium (Bus Route)	3
Road Network (Roads)	Critical Path	High (Truck Route, Connecting Link)	5
Road Network (Roads)	No# Lanes	5-Apr	3
Road Network (Roads)	No# Lanes	3-Feb	4
Road Network (Roads)	No# Lanes	1	5
Bridges & Culverts	Replacement Cost	\$0-\$50,000	1
Bridges & Culverts	Replacement Cost	\$50,000-\$350,000	2
Bridges & Culverts	Replacement Cost	\$350,000-\$1,000,000	3
Bridges & Culverts	Replacement Cost	\$1,000,000-\$2,000,000	4
Bridges & Culverts	Replacement Cost	\$2,000,000+	5
Bridges & Culverts	Detour Distance (km)	2-Jan	1
Bridges & Culverts	Detour Distance (km)	5-Feb	2
Bridges & Culverts	Detour Distance (km)	8-May	3
Bridges & Culverts	Detour Distance (km)	10-Aug	4
Bridges & Culverts	Detour Distance (km)	10+	5
Stormwater Network (Mains)	Replacement Cost	\$0-\$50,000	1
Stormwater Network (Mains)	Replacement Cost	\$50,000-\$150,000	2
Stormwater Network (Mains)	Replacement Cost	\$150,000-\$250,000	3
Stormwater Network (Mains)	Replacement Cost	\$250,000-\$500,000	4
Stormwater Network (Mains)	Replacement Cost	\$500,000+	5
Stormwater Network (Mains)	Pipe Diameter (mm)	50-100	1

Stormwater Network (Mains)	Pipe Diameter (mm)	100-250	2
Stormwater Network (Mains)	Pipe Diameter (mm)	250-450	3
Stormwater Network (Mains)	Pipe Diameter (mm)	500-700	4
Stormwater Network (Mains)	Pipe Diameter (mm)	700+	5
Stormwater Network (Mains)	Population Affected	0-5 persons	1
Stormwater Network (Mains)	Population Affected	5-20 persons	2
Stormwater Network (Mains)	Population Affected	20-50 persons	3
Stormwater Network (Mains)	Population Affected	50-100 persons	4
Stormwater Network (Mains)	Population Affected	100+ persons	5
Stormwater Network (Mains)	Proximity to Critical Services	Rural	1
Stormwater Network (Mains)	Proximity to Critical Services	Commercial/Residential	2
Stormwater Network (Mains)	Proximity to Critical Services	Schools	3
Stormwater Network (Mains)	Proximity to Critical Services	Pump Stations	4
Stormwater Network (Mains)	Proximity to Critical Services	Hospitals/Care Facilities	5
Buildings & Facilities	Replacement Cost	\$0 - \$100,000	1
Buildings & Facilities	Replacement Cost	\$100,000 - \$500,000	2
Buildings & Facilities	Replacement Cost	\$500,000 - \$2,000,000	3
Buildings & Facilities	Replacement Cost	\$2,000,000 - \$10,000,000	4
Buildings & Facilities	Replacement Cost	\$10,000,000+	5
Buildings & Facilities	Facility Type	Cemetery	1
Buildings & Facilities	Facility Type	Storage	1
Buildings & Facilities	Facility Type	Art Gallery	1
Buildings & Facilities	Facility Type	Market Square	1
Buildings & Facilities	Facility Type	Library	3
Buildings & Facilities	Facility Type	Day Care	3
Buildings & Facilities	Facility Type	Municipal Office/Admin of Justice	3
Buildings & Facilities	Facility Type	Community Halls/Complex	3
Buildings & Facilities	Facility Type	Recreation Arenas	4
Buildings & Facilities	Facility Type	Housing	4
Buildings & Facilities	Facility Type	Roads/Operations	4
Buildings & Facilities	Facility Type	Fire/Police Station	5
Buildings & Facilities	Population Affected	0-5 persons	1

Buildings & Facilities	Population Affected	5-20 persons	2
Buildings & Facilities	Population Affected	20-50 persons	3
Buildings & Facilities	Population Affected	50-100 persons	4
Buildings & Facilities	Population Affected	100+ persons	5
Machinery & Equipment	Equipment Type	Cemetery	1
Machinery & Equipment	Equipment Type	Administration & Finance	1
Machinery & Equipment	Equipment Type	Airport	2
Machinery & Equipment	Equipment Type	Social Services	2
Machinery & Equipment	Equipment Type	Maintenance	3
Machinery & Equipment	Equipment Type	Transit	3
Machinery & Equipment	Equipment Type	Recreation	3
Machinery & Equipment	Equipment Type	IT	4
Machinery & Equipment	Equipment Type	Library	4
Machinery & Equipment	Equipment Type	Operations	4
Machinery & Equipment	Equipment Type	Fire & Rescue, Police	5
Fleet	Replacement Cost	\$0-\$25,000	1
Fleet	Replacement Cost	\$25,000-\$50,000	2
Fleet	Replacement Cost	\$50,000-\$150,000	3
Fleet	Replacement Cost	\$150,000-\$300,000	4
Fleet	Replacement Cost	\$300,000+	5
Fleet	Vehicles Type	Off Road (ATV)	1
Fleet	Vehicles Type	Small Equipment	1
Fleet	Vehicles Type	Light Duty Vehicle	1
Fleet	Vehicles Type	Medium Duty Vehicle	2
Fleet	Vehicles Type	Light Duty Machinery	2
Fleet	Vehicles Type	Heavy Duty Vehicle	3
Fleet	Vehicles Type	Attachment	3
Fleet	Vehicles Type	Medium Duty Machinery	4
Fleet	Vehicles Type	Heavy Machinery	5
Land Improvements	Replacement Cost	\$0-\$25,000	1
Land Improvements	Replacement Cost	\$25,000-\$50,000	2
Land Improvements	Replacement Cost	\$50,000-\$100,000	3
Land Improvements	Replacement Cost	\$100,000-\$150,000	4
Land Improvements	Replacement Cost	\$150,000+	5
Land Improvements	Land Improvement Type	Naturalized	1
Land Improvements	Land Improvement Type	Trails	2
Land Improvements	Land Improvement Type	Parkette	2
Land Improvements	Land Improvement Type	Parking Lots	2
Land Improvements	Land Improvement Type	Airport	3
Land Improvements	Land Improvement Type	Municipal Golf Course	3
Land Improvements	Land Improvement Type	Neighborhood Park	3

Land Improvements	Land Improvement Type	Special Use Park	4
Land Improvements	Land Improvement Type	Community Park	5
Water Network (Mains)	Pipe Diameter (mm)	25-50	1
Water Network (Mains)	Pipe Diameter (mm)	100-150	2
Water Network (Mains)	Pipe Diameter (mm)	200-300	3
Water Network (Mains)	Pipe Diameter (mm)	300+	5
Water Network (Mains)	Replacement Cost	\$0-\$25,000	1
Water Network (Mains)	Replacement Cost	\$25,000-\$50,000	2
Water Network (Mains)	Replacement Cost	\$50,000-\$100,000	3
Water Network (Mains)	Replacement Cost	\$100,000-\$150,000	4
Water Network (Mains)	Replacement Cost	\$150,000+	5
Water Network (Mains)	Proximity to Critical Services	Rural	1
Water Network (Mains)	Proximity to Critical Services	Commercial/Residential	2
Water Network (Mains)	Proximity to Critical Services	Schools	3
Water Network (Mains)	Proximity to Critical Services	Major Commercial/Industrial	4
Water Network (Mains)	Proximity to Critical Services	Hospitals/Care Facilities	5
Water Network (Mains)	Proximity to Critical Services	Railway	5
Water Network (Mains)	Proximity to Critical Services	Towers/Wells	5
Wastewater Network (Sanitary Mains)	Replacement Cost	\$0-\$25,000	1
Wastewater Network (Sanitary Mains)	Replacement Cost	\$25,000-\$50,000	2
Wastewater Network (Sanitary Mains)	Replacement Cost	\$50,000-\$100,000	3
Wastewater Network (Sanitary Mains)	Replacement Cost	\$100,000-\$150,000	4
Wastewater Network (Sanitary Mains)	Replacement Cost	\$150,000+	5
Wastewater Network (Sanitary Mains)	Pipe Diameter (mm)	50-100	1
Wastewater Network (Sanitary Mains)	Pipe Diameter (mm)	100-250	2
Wastewater Network (Sanitary Mains)	Pipe Diameter (mm)	250-450	3
Wastewater Network (Sanitary Mains)	Pipe Diameter (mm)	500-700	4
Wastewater Network	Pipe Diameter (mm)	700+	5

(Sanitary Mains)			
Wastewater Network	Population Affected	0-5 persons	1
(Sanitary Mains)			
Wastewater Network	Population Affected	5-20 persons	2
(Sanitary Mains)			
Wastewater Network	Population Affected	20-50 persons	3
(Sanitary Mains)			
Wastewater Network	Population Affected	50-100 persons	4
(Sanitary Mains)			
Wastewater Network	Population Affected	100+ persons	5
(Sanitary Mains)			
Wastewater Network	Proximity to Critical Services	Rural	1
(Sanitary Mains)			
Wastewater Network	Proximity to Critical Services	Commercial/Residential	2
(Sanitary Mains)			
Wastewater Network	Proximity to Critical Services	Schools	3
(Sanitary Mains)			
Wastewater Network	Proximity to Critical Services	Pump Stations	4
(Sanitary Mains)			
Wastewater Network	Proximity to Critical Services	Hospitals/Care Facilities	5
(Sanitary Mains)			
Wastewater Network	Easement	No Easement Required	1
(Sanitary Mains)			
Wastewater Network	Easement	Private Property with Easement	3
(Sanitary Mains)			
Wastewater Network	Easement	Private Property with no Easement	4
(Sanitary Mains)			