City of St. Catharines
2025 Asset Management Plan

St. Catharines

Executive Summary

This AM plan helps City manage assets sustainably by balancing costs, risks, and performance, ensuring reliable services, extending asset life, and meeting community needs. It was developed to meet the legislative requirements for proposed levels of service (LOS) outlined in O.Reg. 588/17. The assets included in this AM plan are water, wastewater, stormwater, transportation, structures, buildings and facilities, corporate fleet, culture, fire, information technology, natural assets, parking, and parks.

Asset Portfolio Summary

The total replacement value of the City's assets is $7.7 billion. Of these assets, 71% are in fair or better condition indicating that the City has a commitment to maintaining its assets. A detailed condition summary according to each of the 13 service areas is provided in Figure ES-1.

Figure ES-1 City-Wide Condition Summary

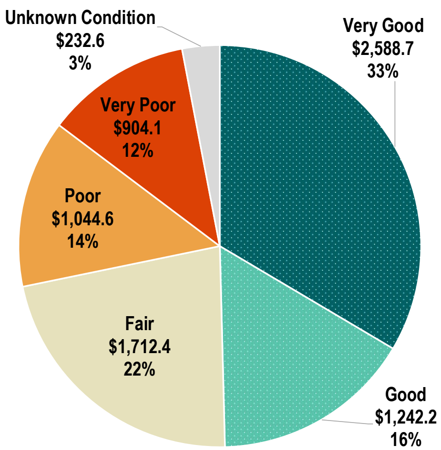
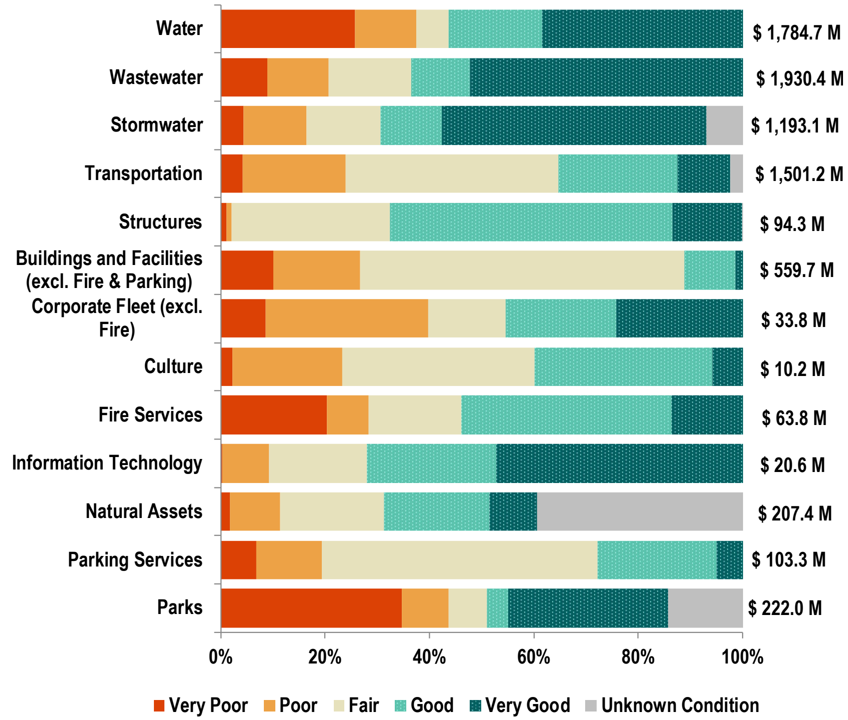


Figure ES-2 Service Area Condition Summary



Lifecycle Investment Plan

This asset management plan developed a lifecycle investment plan according to three scenarios.

A. **Anticipated Funding:** This scenario examines service level impacts on the City's infrastructure based on existing funding levels.
B. **Maintain Current Levels of Service:** This scenario shows lifecycle activities that would be needed to prevent current service levels from deteriorating.

C. **Proposed Levels of Service:** Based on the outcomes from Scenarios A and B, the City set practical proposed levels of service (LOS) to be achieved over the next 10 years. This scenario shows lifecycle activities that the City has chosen to undertake to achieve their proposed LOS.

The lifecycle activities that were evaluated for each scenario are shown in Table ES-1.

Table ES-1-1 Lifecycle Activities Summary

Lifecycle Activity Type	Definition
Non-Infrastructure Solutions	Actions or policies that can lower costs, extend useful lives or address capacity and function needs.
Operations and Maintenance	Including regularly scheduled inspection and maintenance or more significant repair and activities associated with unexpected events.
Growth	Planned activities required to extend services to previously unserved areas or expand services to meet growth demands to maintain LOS.
Upgrade	Planned activities to meet a higher level of customer need than previously provided or to limit health, safety, security, environmental and heritage impacts.
Renewal (Rehabilitation and Replacement)	Significant repairs designated to extend the life of the asset and activities that are expected to occur once an asset has reached the end of its useful life and renewal/rehab is no longer an option.
Disposal	Activities associated with disposing of an asset once it has reached the end of its useful life or is otherwise no longer needed by the City.

Based on these lifecycle activities, the costing required by service area for the three scenarios are provided in Table ES-2. The funding gap is calculated as the difference between the cost for Scenario A and the cost for Scenario C.

Table ES-1-2 Lifecycle Cost Summary

	Average Annual Cost (2026-2035) (2025 $, millions)			
Service Area	**Scenario A: Anticipated Funding**	**Scenario B: Maintain Current LOS**	**Scenario C: Proposed LOS**	**Funding Gap**
Water	$27.7	$17.2	$27.7	**N/A**
Wastewater	$27.2	$8.6	$27.2	**N/A**
Sub-total Rate-funded Services	**$54.9**	**$25.8**	**$54.9**	**N/A**
Stormwater	$6.8	$4.7	$6.8	**N/A**
Transportation	$23.3	$25.0	$29.8	**$6.5**
Structures	$1.4	$0.6	$2.1	**$0.7**
Buildings & Facilities	$19.9	$25.8	$25.9	**$6.0**
Culture	$1.3	$1.5	$1.5	**$0.2**
Fleet	$5.0	$4.3	$5.9	**$0.9**
Fire	$6.2	$3.9	$6.3	**$0.1**
IT	$8.7	$8.1	$8.7	**N/A**
Natural Assets	$5.8	$5.9	$7.2	**$1.4**
Parking	$1.1	$2.9	$2.9	**$1.8**
Parks	$18.5	$18.3	$18.8	**$0.3**
Sub-total Tax-funded Services	**$98.0**	**$101.0**	**$115.9**	**$17.9**
TOTAL All City Services	**$152.9**	**$126.8**	**$170.8**	**$17.9**

The funding gap is $17.9 million per year across 13 City services. If the investment gap is not funded or managed sufficiently, the City can expect the following impacts.

- Increased unplanned maintenance and repairs.
- Increase of renewal backlog over future planning horizons, increasing the long-term cost to the City.
- Safety, compliance, reputation, and financial (insurance) risks.
- Increased traffic congestion due to unplanned repairs and poor road conditions.
- Increased operational costs
- Delayed response times from outdated fleet and Increased emissions and inefficiencies from aging fleet and transportation systems
- Lower community satisfaction due to deteriorating public spaces and services

The City plans to explore the following strategies to reduce the funding gap and associated impacts:

- Reduce near term renewal needs by deferring capital renewal projects on lower risk assets, thereby lengthening the period in which the backlog is addressed beyond the 10 years. This may result in increased maintenance costs and risks to service delivery. If this occurs, it is recommended to increase the frequency of inspections on these assets to ensure safety is maintained.
- Increase available funds through property tax increases and leveraging third party grants.
- Increase available funds by exploring the use of alternative funding models.
- Reduce renewal needs by divesting of assets. This may reduce service levels related to capacity.
- Invest and incorporate a robust predictive maintenance program that uses inspections to prevent failures before they occur. This includes the ongoing work with the ARMS project.
- Optimize lifecycle interventions, especially for larger asset classes (roads, water, wastewater, facilities, parks) and integrate into long-term budgeting.
- Increase the use of non-infrastructure solutions to manage the funding gap through management strategies and policies to allocate funds to the most critical assets and coordinating capital projects (where possible) to receive the most value for service.

Debt funding and reserve funding may also be used; however, these are not sustainable solutions, since the debt funding needs to eventually be paid back, and reserves need to be replenished.

Assumptions

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

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

Background information and reports related to this Asset Management Plan are available to the public upon request through the City.

Table of Contents

List of Figures

List of Tables

Abbreviations

Acronym	Definition
AADT	Average Annual Daily Traffic
AC	Asbestos Cement
AM	Asset Management
AMP	Asset Management Plan
AMWG	Asset Management Working Group
AODA	Accessibility for Ontarians with Disabilities Act
ARMS	Asset and Resource Management System
ATMP	Active Transportation Master Plan
BAS	Building Automation Systems
BCA	Building Condition Assessment
BCI	Bridge Condition Index
CAM	Corporate Asset Management
CAO	Chief Administrative Officer
CCTV	Closed Circuit Television
City	Corporation of The City of St. Catharines
CLOS	Customer LOS Statement
CMMS	Computerised Maintenance Management System
COF	Consequence of Failure
DB	Database
DOT	Decision Optimization Technology
DSS	Decision Support System
EFES	Engineering, Facilities and Environmental Services Department
ESA	Environmentally Significant Areas
ESL	Estimated Service Life
EV	Electric Vehicle

Acronym	Definition
FCI	Facility Condition Index
FCM	Federation of Canadian Municipalities
FMS	Financial Management Services
GFMAM	Global Forum on Maintenance and Asset Management
GHG	Greenhouse Gas
GIS	Geographic Information System
HVAC	Heating, Ventilation and Air Conditioning
IAM	Institute of Asset Management
IIMM	International Infrastructure Management Manual
IPWEA	Institute of Public Works Engineering Australasia
ISO	International Standards Organization
IT	Information Technology
KPI	Key Performance Indicator
LED	Light Emitting Diode
LOF	Likelihood of Failure
LOS	Levels of Service
MACP	Manhole Assessment and Certification Program
MECP	Ministry of Environment, Conservation and Parks
MMS	Minimum Maintenance Standards
MSP	Master Servicing Plan
MSS	Master Servicing Strategy
NA (or N/A)	Not available
NASSCO	National Association of Sewer Service Companies
NFPA	National Fire Protection Association
NG911	Next Generation 9-1-1
O&M	Operations and Maintenance

Acronym	Definition
OSIM	Ontario's Structure Inspection Manual
OSPG	Office of the Superintendent of Professional Governance
O. Reg.	Ontario Regulation
PACP	Pipe Assessment and Certification Program
PCI	Pavement Condition Index
PC	Personal Computer
PM	Planned Maintenance
PMIS	Project Management Information System
POS	Point of Sale
PQI	Pavement Quality Index
PVC	Polyvinyl Chloride
RCI	Ride Comfort Index
RFPMP	Recreation Facility and Programming Master Plan
ROW	Right-of-Way
SAMP	Strategic Asset Management Plan
SLT	Senior Leadership Team
TCA	Tangible Capital Assets
TLOS	Technical LOS Indicator
TMP	Transportation Master Plan
TSSA	Technical Standards and Safety Authority
TV	Television
UFMP	Urban Forest Management Plan
UPS	Uninterruptible Power Supply
WAMP	Waterfront Access Master Plan
WW	Wastewater

Glossary of Terms

Term	Definition
Asset	Items, object or entity that has potential or actual value to an organization. These can be physical (tangible) or non-physical (intangible).
Asset Life	Period from asset creation to asset end-of-life.
Asset Management	Coordinated activity of an organization to realize value from assets.
Asset Portfolio	Assets that are within the scope of Asset Management.
Asset Type	Grouping of assets having common characteristics that distinguish those as a group or class.
Continual Improvement	Recurring activity to enhance performance.
Levels of Service	Parameter or combination of parameters, which reflect social, political, environmental and economic outcomes that the organization delivers.
Lifecycle	Stages involved in the management of an asset.
Objective	Results to be achieved. These can be strategic, tactical or operational. Objectives can be related to different disciplines.
Organization	Person or group of people that has its own functions with responsibilities, authorities and relationships to achieve its objectives.
Organizational Objective	Overarching objective that sets the context and direction for an organization.
Policy	Intentions and direction of an organization as formally expressed by its top management.
Preventive Action	Action to eliminate the cause of a potential nonconformity or other undesirable potential situation.
Risk	Effect of uncertainty on objectives. An effect is a deviation from the expected positive and/or negative.
Stakeholder	Person or organization that can affect, be affected by, or perceive themselves to be affected by a decision or activity.

1 Introduction

1.1 Background

The Corporation of the City of St. Catharines (City of St. Catharines or City), located within the Niagara Region, has a population of 144,829 (2022) within a geographic area of 96.1 square kilometres.

This 2025 Asset Management (AM) Plan complies with requirements of Ontario Regulation (O.Reg.) 588/17 for Proposed Levels of Service. It includes both core and the remaining assets as reported in the 2021 and 2023 AM Plans and, to provide consistency and ease of understanding for readers, the same format as the previous plans: an introduction, a section reporting the AM Plan for across all of the City's services, sections reporting the AM Plan for each service functions, and then concludes with the financial strategy and recommendations for improvement. This document will enable the City to manage assets and connect day-to-day infrastructure investment decisions with the services provided to residents and businesses.

The assets identified in this plan are worth an estimated value of approximately $7.7 billion distributed between the following service functions:

- 594 kilometres of Water Distribution System
- 564 kilometres of Sanitary Sewer Collection System
- 406 kilometres of Storm Sewer Collection System
- 574 kilometres of Road and 669 kilometres of Sidewalks and Pathways
- 135 Structures (Bridges, Culverts & Retaining Walls)
- 145 Buildings and Facilities and Associated Components
- 213 Cultural Assets
- 567 Corporate Fleet Assets (Including Vehicles, Tools, and Equipment)
- 6 Firehalls, 45 Fire Vehicles (Including Associated Components and Equipment)
- 2,523 Hardware IT assets
- 50,162 Natural Assets (Including City-Owned Street Trees and Coastal Shoreline)
- 102 Parking Lots & 2 Parking Garages
- 109 Parks (Including Park Amenities, Sidewalks & Pathways and Site Works / Land Improvements)

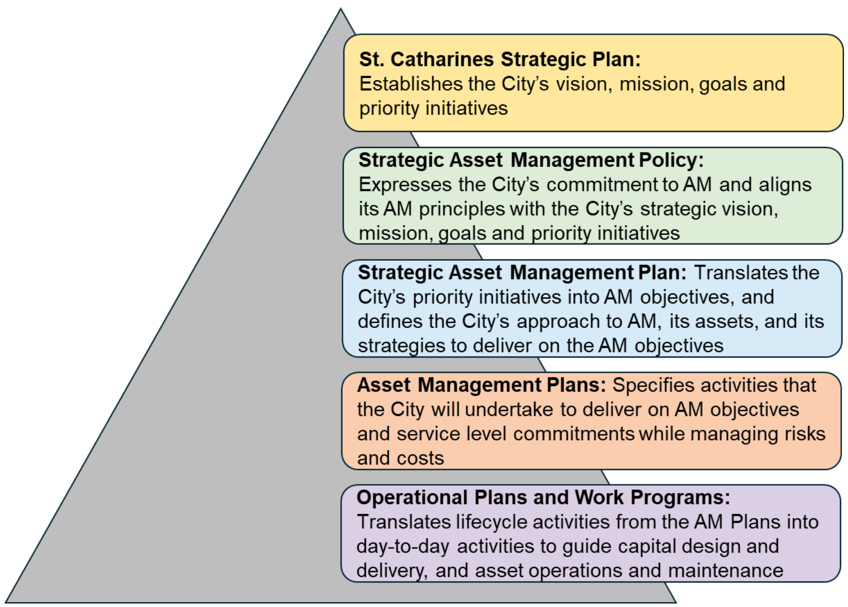
1.2 Asset Management at the City

1.2.1 City's AM Governance

The City's AM practices are mandated by the AM Plan and directed by the City's AM Policy.

The City's AM practices are intended to support the City's mission and vision statements. This is achieved through ongoing and continuous improvement of the AM Plan. These relationships are illustrated below in Figure 1-1, followed by a discussion of the City's policies AM governance documents.

Figure 1-1 City's AM Governance Framework



1.2.1.1 City's Strategic Plan 2023-2027

To make a positive impact and drive change, Council approved the following vision and mission for the City, as defined in the Strategic Plan 2023-2027:

- **Vision**
  The City will be a safe, innovative, sustainable, and caring city today and for future generations.
- **Mission**
  The City municipal government leadership will focus on accountability, affordability, innovation, and responsible stewardship of community resources.

To achieve the City's vision and fulfil its mission, Council's Strategic Plan 2023 to 2027 focuses on the following five goals:

1. Economic Prosperity
2. Social Well-Being
3. Environmental Stewardship
4. Cultural Vibrancy
5. Organizational Excellence

1.2.1.2 Strategic AM Policy

The City's Strategic AM Policy (2024) expresses the City's commitment to undertake Corporate Asset Management (CAM) in a manner which supports the City's focus on accountability, affordability, innovation, and responsible stewardship of community resources.

The Policy states that CAM shall support the City's vision and shall align with the Corporate Strategic Plan. The Report to Council (June 17, 2024 meeting, Report number

EFESFMS-B007-2024) accompanying the Strategic AM Policy highlighted that the Policy directly supports the following two goals from the Strategic Plan 2023-2027:

Environmental Stewardship Goal: The City will be recognized as a leader in environmental sustainability and resilient in the face of escalating climate change events.

- Strategic Directions:
  - Prepare community for impacts of climate change particularly increasing frequency and severity of weather-related events.
  - Ensure community planning is consistent with environmental sustainability through compliance with Garden City Plan, Regional Official Plan Amendments and Provincial Policy Statement.

Organizational Excellence Goal: The City will achieve excellence in financial and service sustainability and high customer satisfaction.

- Strategic Directions:
  - Balance fiscal stewardship with services and service levels.
  - Examine City services and service levels to balance neighbourhood quality with opportunities for taxpayer affordability.
  - Maintain quality assets in a good state of repair; identify and close the municipal infrastructure gap.
- Priority Initiatives
  - Manage public debt based on modernized AM.

The Policy also requires alignment between AM Plans and other Corporate strategies, such as master plans, development charge background studies and financial strategies.

The Policy applies to all operational areas under the direct authority of City Council which contribute to service delivery using City owned infrastructure or assets that require deliberate management. The Policy highlights the strategic alignment of AM practices with the City's Corporate Strategic Plan.

The following guiding principles from the City's AM Policy were adopted as fundamental for the management of the City's assets:

- **Customer Focused:** The City will apply Corporate Asset Management (CAM) practices including defined levels of service to promote confidence of customers in how the City assets are managed, core services are provided and community wellbeing is fostered for all.
- **Forward looking:** The City will consider current and long-term needs when making decisions and provisions to better enable its assets to meet future demands, including changing demographics and populations, customer expectations, legislative requirements, technology, and environmental factors (climate change).
- **Service based:** The City will take a holistic approach to CAM both in assessing levels of service, prioritizing capital spending, and maintaining assets. When assessing levels of service provided by its

assets, the City will take into account all related assets rather than each asset in isolation.

- **Evidence based:** The City's CAM will be based on relevant and reliable information that will form the basis of transparent decision making aimed at reducing asset life cycle costs.
- **Risk based:** The City will take a risk-based approach to prioritizing projects for the acquisition and renewal of assets. Risk will be considered in relation to the likelihood of the asset failing and the impact of asset failure. Asset failures that may impact health and safety shall be ranked as the highest priority for investment.
- **Value based and affordable:** The City will deliver the greatest value from its investment in assets respecting available funding and its customers' ability to pay.
- **Continually evolving:** CAM and asset management systems will continue to evolve and improve through ongoing evaluation of best practices, innovation, and consideration of future directions, regulations and requirements.
- **Cooperation and Coordination with other governmental plans and strategies:** The City will consider strategies, policies and plans of other governmental entities established under an act or otherwise, to promote integration and provide efficient and effective service delivery for all of our customers and collaborative partners.

1.2.1.3 Strategic AM Plan

The current AM Plan is guided by the City's Strategic Plan and the City's master plans. A Strategic AM Plan may be established in the future to further clarify the line-of-sight from the Strategic Plan to the AM plan. It would translate organizational objectives into AM objectives, define the organization's approach to AM and the organization's assets, and describe strategies and actions to deliver on AM objectives. It would detail the AM strategy, AM objectives, levels of service and performance needed to satisfy objectives, the resources and capabilities needed to deliver sustainable outcomes, and the information needed to enable the development of AM Plans.

The Strategic AM Plan should describe the strategic context guiding the strategy, the current and future service levels and capabilities needed to achieve the objectives, and the basis for prioritization and decision-making for AM planning and lifecycle delivery. It should also describe how the organization will develop and improve its AM capabilities and the system (i.e., its processes, data, technology tools, people, resources, etc.).

1.2.1.4 AM Plans

The Federation of Canadian Municipalities (FCM) has defined an Asset Management Plan as, "a plan for the management of one or more infrastructure assets that combines multi-disciplinary management techniques (including technical and financial) over the life cycle of the asset in the most cost-effective manner to provide a specified level of service."

The goals of this Asset Management Plan are to:

- Develop asset inventory documentation, with any identified gaps filled based on a strategy based on best practices and in consultation with City collaborative partners.
- Define current levels of service, targets and key performance indicators (KPIs) that enable the City to quantify and measure efficiency and effectiveness in support of service-centric decision making, as well as communicate the services provided to its residents.
- Provide asset lifecycle strategies to enable the prediction of asset interventions based on condition and strategic business factors such as costs, levels of service, and risks.
- Provide a framework for funding requirements to support levels of service and the lifecycle management strategy.
- Develop a risk management strategy to enable the prioritization of capital investments that will provide the City with a standardized definition of asset criticality and will particularly consider risks related to climate change.
- Recommend improvement actions for data management, resources, and technology.

Part of the complexity with Asset Management is that it is not about doing one thing – it is about building a robust understanding of asset needs and implementing good practices to manage community infrastructure assets. For these reasons, this plan will help support the City's development of skills and practices in the following competency areas:

- Policy and governance to lead organizational alignment and commitment.
- People and leadership to create and sustain connections across teams.
- Data and information about assets when needed.
- Planning and decision making to ensure policies, objectives, and information consistently guide the organization.
- Contributions to Asset Management practices to support continuous improvement and ensure internal collaborative partners are well-informed, especially when communicating and participating in external knowledge sharing.

1.2.2 Continuous Improvement of the City's Asset Management Program

The City's Asset Management program is founded on the principles of continuous improvement, transparency, and accountability. The AM Plan is a living document that reflects and supports implementation of the AM Policy and Strategic Plan. As a living document, continuous improvement will be driven by:

- Implementing, revising, refining, and reporting AM based on the City's strategic priorities.
- Continual cross-functional collaboration towards identifying AM improvements in processes, systems, data, AM Plans, and AM Plan implementation strategies.

- Monitoring progress on the AM Plan implementation while quantifying and reporting benefits from AM activities.
- Ongoing evaluation of best practices, innovations, and regulatory requirements. Best practices to achieve continuous improvement include the development of an improvement plan and delivering the improvement plan with defined annual targets, appropriate benchmarks, and responsibilities for internal resources with their associated funding levels, as approved by the City's annual budgeting process.

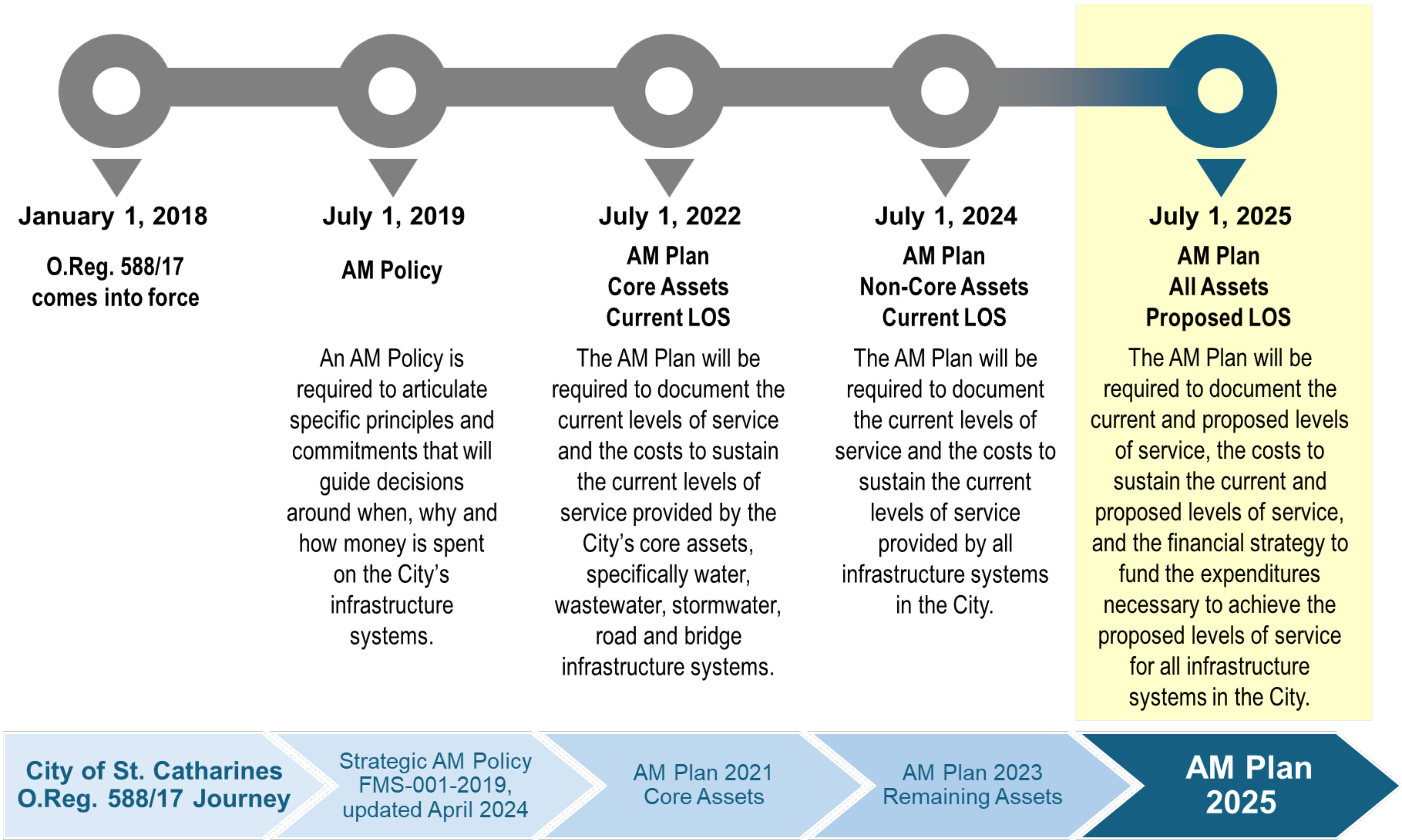
The continuous improvement of the City's AM Plan is supported by a broader Asset Management strategy that is developed in various forms for guiding the management of the assets to provide governance to City practices.

1.3 Provincial Asset Management Planning Requirements

In 2015, Ontario passed the Infrastructure for Jobs and Prosperity Act which affirmed the role that municipal infrastructure systems play in supporting the vitality of local economies. Under the Act, Ontario created O.Reg. 588/17– Asset Management Planning for Municipal Infrastructure mandating specific requirements for municipal Asset Management Policies and Asset Management Plans, phased in over a five-year period.

Figure 1-2 summarizes the requirements and timelines of O.Reg. 588/17, as well as the status of these requirements for the City. As shown in the Figure, the City has fulfilled all requirements to date, and the current AM Plan fulfils the 2025 requirement for an AM Plan defining Proposed Level of Service (LOS).

Figure 1-2 O.Reg. 588/17 Requirements and Timeline for Municipal AM Planning



1.4 Asset Classes Included in the Scope of this AM Plan

This Asset Management Plan includes the City's assets listed in Table 1-1 below in a parent-child relationship called the asset hierarchy. Using an asset hierarchy provides the City with the ability to organize and manage its asset information and support decision making. The subsequent chapters in this plan will provide information with the same structure that is detailed below.

Table 1-1 Hierarchy of Assets Included in the 2025 Asset Management Plan

Service Function	Asset Category	Assets and Components Included
Water Service	Water Distribution	Water mains (including corresponding service connections), in- line valves, pressure reducing valves, hydrants, curb stops and booster pumping station, bulk water station
Wastewater Service	Wastewater Collection	Sanitary sewer mains (combined or separated), force mains, maintenance holes, service connections, sewage pump station, wastewater storage facilities
Stormwater Service	Stormwater Collection	Storm sewer mains, maintenance holes, catch basins, service connections, grates, outfalls
	Treatment & Control	Oil grit separators
	Stormwater Discharge	Open channels
	Storage Facilities	Storm waster ponds and constructed wetlands
Transportation Service	Road Network	Roads (including curbs and on-road bike lanes)
	Right-of-way Assets	Streetlights, signalized intersections, guiderails and signs
	Active Transportation	Sidewalks, pathways and multi-use trails
Structures	Vehicular Bridges and Culverts with a Span equal or above 3 metres	Bridges and culverts that require regulatory inspections every 2 year or provide crossings of natural water courses. (Driveway culverts are not included.) Retaining walls
	Vehicular Bridges and Culverts with a Span under 3 metres	
	Pedestrian Bridges	
	Retaining Walls	
Buildings and Facilities (Fire Buildings & Facilities included in Fire Services)	Administration & General Government	Municipal offices and operation facilities, storage barns, and leasable spaces (including community centres, sheds, store fronts for parking facilities, schools, park offices, and park greenhouses).
	Cemeteries	Cemetery buildings (including columbaria, mausoleums, administration offices, operational facilities, storage buildings).
	Coastal	Lighthouse

Service Function	Asset Category	Assets and Components Included
	Culture	Cultural facilities such as carousel buildings, museums, market squares, performing arts centre, and associated storage buildings.
	Libraries	Stand-alone libraries
	Recreation	Recreational facilities such as arenas, bandshells, bandstands, controls facilities, offices and operational facilities at recreational areas, community centres, pavilions and sun shelters, storage facilities, washrooms, changerooms, bleachers or stands at recreational areas, animal shelters, concession stands, press booths, golf course clubhouses and the combined library and pool facility
Corporate Fleet	Parking	Vehicles, equipment, and tools associated to parking
	Water and Wastewater	Flushing trucks, utility vans and other vehicles
	All Other Corporate Fleet (Except Fire Vehicles which are included under Fire Services)	Winter operations, forestry and other vehicles
Culture Service	Carousel	Characters, Crest, Mechanical Parts, Painting. Building housing the carousel is included under Buildings and Facilities.
	Lock Walls	2nd & 3rd Welland Canal Locks, including only the exposed, above-ground portions on City property. Buried portions and portions on private property are excluded. Canal 1 was not assessed as all remaining lock walls are buried.
	Public Art	Outdoor art (including memorials, monuments, plaques, and sculptures)
Fire Services	Fire Equipment	Emergency response, technical rescue, medical response, communications, and other equipment
	Fire Facilities	Firehalls, office, shed, training tower, and parking lots
	Fire Vehicles	Emergency response, support, and other vehicle equipment
Information Technology	Hardware	Personal computers (including monitors, laptops, workstations, iPads, and cellular phones), server equipment (including blade enclosers, server blades, physical servers, storage area networks and racks), core and regular switches, firewalls, desk phones, fire and corporate phone systems, backup and security appliances, wireless infrastructure including access points and controllers, door control and cameras for security systems, printers, scanners, fax machines, meeting room hardware (including projectors, speakers, TVs, audio/video systems, and interactive white boards), large screen or mini PCs for digital signage, and software.
	Software	Various department software

Service Function	Asset Category	Assets and Components Included
Natural Assets	Coastal	Protected and unprotected shorelines
	Forestry	Forested areas, street trees and stand-alone park trees
	Horticulture	Gardens, planters, engineered bee habitat
	Urban parkland	Manicured grassy areas
	Natural Waterbodies	Water courses, ponds, lakes, and wetlands
Parking Services	Paid Parking	Parking garages, parking meters, parking lots
	Unpaid Parking	Stand-alone parking lots and parking lots at City facilities
Parks	Open Spaces	Grading, landscaping, green space, irrigation system, and land
	Park Amenities	Ball diamonds, beaches, boat ramp, outdoor basketball and tennis courts, golf course, leash free dog parks, piers, playgrounds, outdoor pools, skateboard park, splash pads, artificial turf, soccer, and other sports fields, track and field assets, garden structures, and park features (ponds).
	Sidewalks and Pathways	Park sidewalks, patios, decks, recreational trails, stairs and walkways.
	Site Works	Outdoor and sports lighting including poles, irrigation systems, park furniture (including benches, picnic tables, and bike racks), fences, flag poles, fountains, machinery and equipment, electrical control and hydro boxes, service roads, signs, parking lots, and closed landfill equipment.

1.5 Asset Management Plan Collaborative Partners

The development of this Asset Management Plan was led by the Engineering, Facilities and Environmental Services and Financial Management Services departments with the support of the City's Asset Management Working Group (AMWG) and subject matter experts from across the organization.

Representatives from all departments were consulted through different stages and contributed to the development of the data necessary to support this Plan. Table 1-2 identifies the key roles and responsibilities of the corporate collaborative partners for developing, implementing, and approving the City's AM Plan.

Table 1-2 Asset Management Collaborative Partner, Roles and Responsibilities

Key Collaborative Partner	Roles and Responsibilities
Council	– Final Decision maker of all Asset Management decisions including approval of the Asset Management Policy and Corporate Asset Management Plan – Serve as representatives of citizens to set the level of services delivered, considered in conjunction with the cost-of-service provision and associated risks – Approve funding levels for both capital and operating budgets associated with Asset Management through the annual budget
Chief Administrative Officer (CAO) & Deputy CAO	– Maintains compliance with related Asset Management policy, regulations. – Provides direction that demonstrates commitment to the success of the continued improvement of Asset Management practices and documentation
Asset Management Working Group	– Support the CAO in fulfilling their role – Provide corporate collaboration to guide Asset Management Systems – Champion continuous improvement within their respective service areas and the City
Manager of Infrastructure Assets with support from the Capital Planning Supervisor	– Support Asset Management Working Group in their roles and responsibilities – Support development of City Asset Management System – Coordinate with departments to establish corporate work plans and priorities to meet legislated requirements
Departmental Directors	– Oversee Asset Management activities that fall within their service area – Contribute in a manner that supports a multi-disciplinary approach to Corporate Asset Management and promotes its ongoing success – Liaise with members of the Asset Management Working Group to ensure they are supporting CAM and that departmental planning is aligned to AMPs
Service Delivery Areas or Asset Operators	– Team of staff who engage with internal and external collaborative partners daily to deliver services – Oversee Asset Management Planning activities within their respective area – Help set service objectives and monitoring progress – Offer expertise in the development of city plans, strategies, assessments, and workflows – Collect and track asset information and other data related to assets within their functional area – Apply operation, maintenance, rehabilitation, replacement, and disposal practices to achieve levels of service, mitigate risk, and comply with regulatory requirements
Other City Staff	– Support the development, implementation, and improvement of the Asset Management system in their daily roles and responsibilities – Capture quality data as part of the daily operations

2 City-wide Overview

The Asset Management Plan's initial steps of development included data collection, compiling data, and meeting with various service function groups to discuss, review and provide feedback on each service function component of the AM Plan. Based on the information presented in the service function sections, the financial strategy was developed with the Finance team. This is one of the AM Plan's key components, as it puts the document into action and the financial strategy provides a way for the City to integrate AM planning with financial forecasting. The financial strategy outlines annual expenditure projections in alignment with the long-term investment forecast developed for the lifecycle activities.

This section provides a summary of the assets across all City Services covered in this AM Plan and provides the methodology on how each of the service area sections were developed. Specific details related to each service area can be found in Sections 3-15.

2.1 State of Local Infrastructure

The State of Local Infrastructure sections provide a quantitative assessment of the infrastructure owned by the City by summarizing the inventory of assets and their replacement values and providing the age and condition profiles for each asset category in the City's portfolio.

This section provides the City with:

- A repeatable and consistent methodology to track and report comparative analysis of asset data
- Transparency in terms of the confidence of the asset data available
- A consolidated overview of inventory, replacement value, age and condition for each asset class
- The ability to track improvements to the background data over time.
- Asset Inventory & Valuation

The assets included in this AM Plan are shown in Table 2-1. All table and figure values are shown in this report are shown in (2025) dollars. Detailed summaries for each service area are shown in the respective sections that follow.

Table 2-1 Assets Included in this AM Plan

Service Area	Replacement Value (millions, 2025 $)	Replacement Value (% Total)
Water	$1,784.7	23%
Wastewater	$1,930.4	25%
Stormwater	$1,193.1	15%
Transportation	$1,501.2	19%
Structures	$94.3	1%
Buildings & Facilities	$559.7	7%
Culture	$10.2	<1%
Fleet	$33.8	<1%
Fire	$63.8	<1%
IT	$20.6	<1%
Natural Assets	$207.4	3%
Parking	$103.3	1%
Parks	$222.0	3%
TOTAL	**$7,724.5**	**100%**

Condition ratings were assigned to all assets across each service area using the condition rating scale shown in Table 2-2. The five-point rating scale from Very Good to Very Poor is consistent with the Canadian Infrastructure Report Card (2016 & 2019) to facilitate benchmarking with other Canadian municipalities. The table shows how the condition ratings are applied to different asset types, specifically:

- Watermain break history is used to determine the condition of watermains. The overall watermain condition is the poorer of break-based and age-based condition (see Section 3.1.3.1 for details);
- Pipe Assessment Certification Program (PACP) scores are used to determine the condition of sanitary and stormwater sewer pipes;
- Pavement Quality Index (PQI) scores from pavement assessments are used to determine the condition of roads;
- Bridge Condition Index (BCI) scores from structural assessments are used to determine the condition of bridges and culverts
- Facility Condition Index (FCI) scores, calculated based on 5 years of renewal needs, are used to determine the facility condition at a building level (condition of individual building components is determined based on Remaining Life)
- Remaining Life is used to determine asset condition for all other asset types. For IT assets and vehicles, the service life is expended when they reach Poor condition. For other asset types, service life is expended when assets reach Very Poor condition.

Table 2-2 Condition Rating Scale, Estimated Remaining Life and Description

Condition Rating	Asset Description	Watermain Break History Rating*	Pipe Assessment Certification Program (PACP)	Pavement Quality Index (PQI)	Bridge Condition Index (BCI)	Facility Condition Index (FCI)**	Remaining Life IT Assets and Vehicles	Remaining Life All other assets
Very Good	Asset is typically new or recently rehabilitated.	0 to 1	0 to 1.1	80 to 100	80 to 100	0% to 5%	66% to 100%	75 to 100%
Good	Condition is acceptable, generally in mid stage of service life. Asset may show signs of deterioration requiring attention or minor maintenance.	1 to 2.5	1.1 to 2.1	60 to 80	70 to 80	5% to 10%	33% to 66%	50% to 75%
Fair	Assets show general signs of deterioration that require attention and may require immediate maintenance.	2.5 to 3.5	2.1 to 3.1	40 to 60	60 to 70	11% to 30%	0% to 33%	25% to 50%
Poor	Asset is below standard condition and approaching the end of its service life. Ongoing monitoring and significant maintenance may be required.	3.5 to 4.5	3.1 to 4.1	20 to 40	40 to 60	30% to 60%	Beyond Service Life	0% to 25%
Very Poor	Asset is at or beyond service life and shows signs of advanced deterioration. Asset may exhibit signs of imminent failure that can affect service or increase risk. Extensive monitoring, rehabilitation and/or replacement may be required.	4.5 to 5	4.1 to 5	0 to 20	0 to 40	60% to 100%	Beyond 2x Service Life	Beyond Service Life

* Calculated as weighted average of 5-year breaks/km and whole life breaks/km. Overall watermain condition is the poorer of break-based and age-based condition.

** Calculated based on renewal needs over the next 5 years.

Asset condition was assessed for each service area using the methods and condition scale described earlier. If an asset's condition was not known at this time, it was rated with an Unknown condition.

The condition profile of the City's assets is shown in Figure 2-1 and Figure 2-2. The condition assessment of the City's assets provides insight into the reliability of its infrastructure. Overall, approximately 71% of the City's assets have a condition rating of fair or better. This highlights the City's commitment to maintaining their services.

The services with the most unknown condition assets include: Stormwater ($82.3 million), Natural Assets ($81.2 million), Transportation ($53.3 million), and Parks ($31.8 million). The other service areas also have unknown assets with a total replacement value of less than $0.5 million. The City plans to identify these asset conditions in the coming years through improved data collection and management practices.

Figure 2-1 Asset Condition Profile ($ millions)

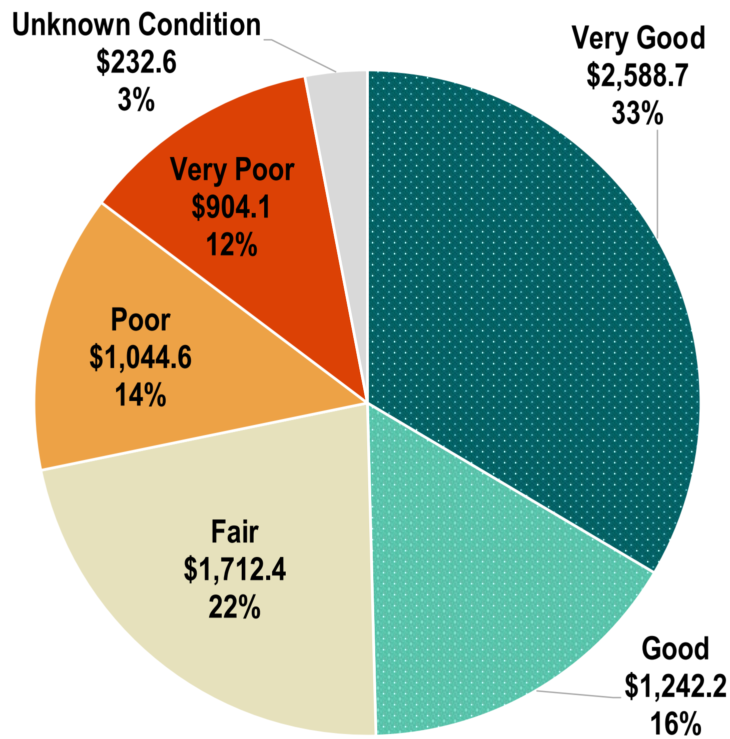
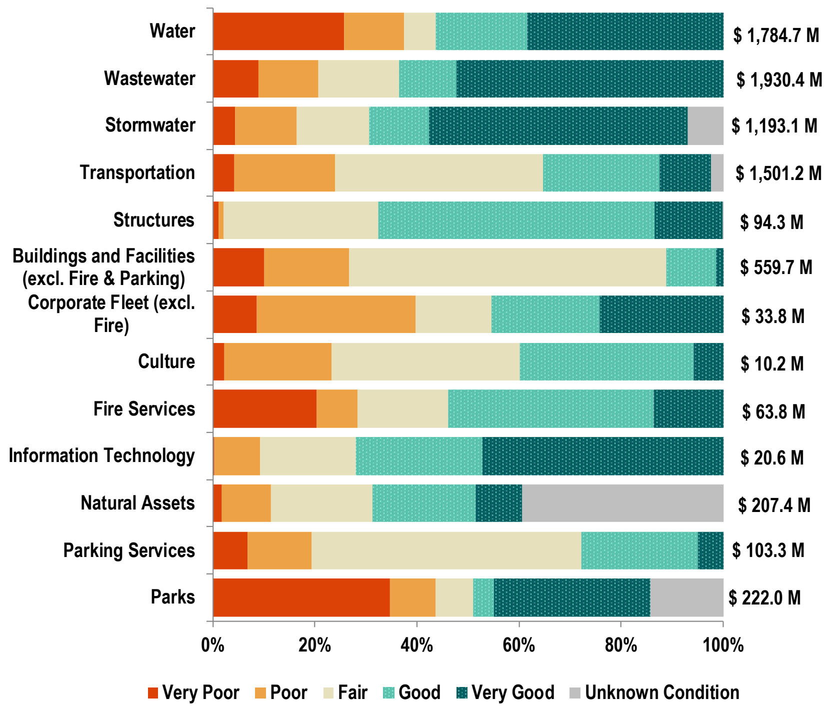


Figure 2-2 Asset Condition Profile by Service Area



2.2 Levels of Service

The Levels of Service (LOS) section provides key performance indicators that support customer service outcomes for capacity, function, reliability and financial sustainability. O.Reg. 588/17 has prescribed LOS for core assets including qualitative descriptions and technical metrics. The LOS for all other service functions were developed by City staff to support decision-making over the next five to ten years.

As required by O.Reg.588/17 for the July 1, 2025 AM Plan, this document presents the LOS that the City proposes to provide for the next ten years and an explanation of why they are appropriate.

Figure 2-3 shows the City's LOS framework. The first column shows Corporate LOS, which represent the organization's service commitments to the public. These are documented by the strategic goals listed in the City's Strategic Plan 2023-2027 (for more details, see Section 1.2.1.1). LOS commitments to the public are also dictated by government rules and regulations, which are shown in the second column.

The organization's commitments to the public are translated into Community and Technical LOS for each service area. These are defined as follows:

- **Community Level of Service (LOS):** A brief description presented in plain language for public understanding of the service provided to residents and businesses based upon the City's core values and mission.
- **Technical Levels of Service (LOS) Indicator:** A quantifiable metric of the service delivery outcomes from the perspective of the customer and service provider, expressed in terms that can be easily understood by the customer.
  Where Technical LOS indicators are designated as "FUTURE", data is not available at this time to report the performance.

LOS are categorized as follows:

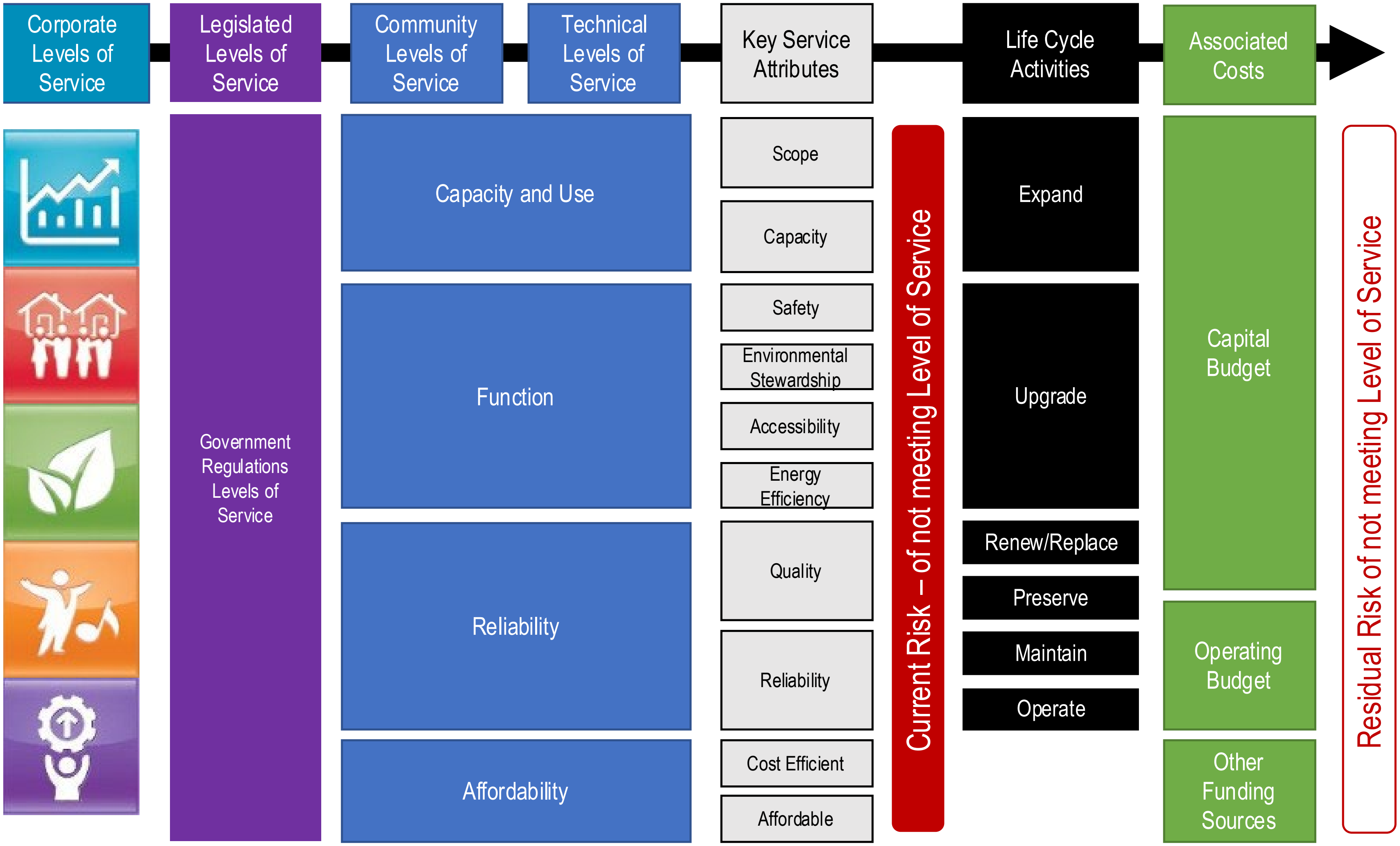
- **Capacity and Use:** Services have enough capacity and are accessible to the customers.

- **Function:** Services meet customer needs while limiting health, safety, security, natural and heritage impacts.
- **Reliability:** Services are reliable and responsive to customers.
- **Affordability:** Services are affordable and provided at the lowest cost for both current and future customers.

These categories can be further separated into Key Service Attributes as listed in the fifth column of Figure 2-3. For each Technical LOS metric, historical and current performance are presented based on available data. Expected performance under planned and proposed funding scenarios are also presented.

The remaining columns in Figure 2-3 show that different LOS performance levels entail different risks and require different lifecycle activities to achieve the defined service level and manage risks. Moreover, each set of lifecycle activities entails a different set of costs and yields a different set of residual risks. Risk, lifecycle strategy and financial strategy are presented in separate sections for each service area for each LOS scenario.

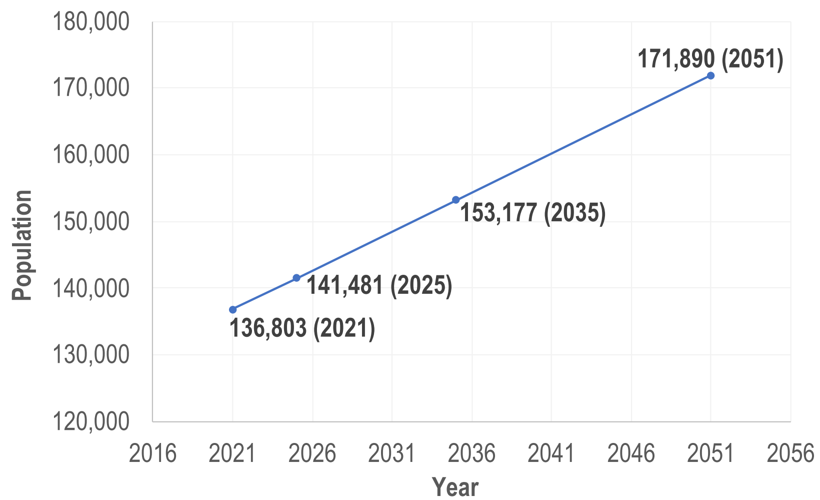
Figure 2-3 Level of Service Framework



2.3 Future Demand

Niagara Region's current Official Plan (November 2022) predicts the population of the City to grow from 136,803 in 2021 to 171,890 by 2051. Figure 2-4 shows the projected population growth to 2051, including the interpolated population in 2025 (Year 0 for the AM Plan) and 2035 (Year 10 for the AM Plan). Based on these estimates, population will increase by 11,696 (8.3%) from 141,481 in 2025 to 153,177 in 2035.

Figure 2-4 Projected Population Growth



This will place additional pressures on the existing infrastructure covered by this AM Plan as assets are added to address the needs of the new residents and businesses. In the context of the assets covered by this AM Plan, this will require the expansion of existing infrastructure or the addition of new assets such as parks, arenas, recreation centres and libraries to name a few. It should be noted that as these asset portfolios grow there will be a requirement to fund additional operations and maintenance costs and future rehabilitation and renewal investments which will need to be reflected in later AM Plans.

The City's Development Charge Study (2021) was evaluated for planned programs for growth and incorporated in this plan. Future iterations of this AM Plan will continue to develop and consider growth to meet future demands.

2.4 Climate Change

Climate change is one of the most complex challenges facing municipalities today. In recent years, Southern Ontario has experienced a significant number of extreme weather events and its adverse impacts such as flooding, ice storms, power outages, and infrastructure damage.

Rising average temperatures, shifting historical precipitation patterns with increased intensity, duration and frequency of storm events and periods of drought, increasing windstorms, and fluctuations in lake levels are anticipated to continue and AM Plans must reflect this reality.

The effects of climate change can have a significant impact on the assets that the City is responsible for, and the services delivered. Within the context of the asset management planning process, climate change assumes a dual role as both a prospective demand and a risk factor.

The City has recently completed a Climate Change Adaptation Assessment for the water and wastewater asset portfolios and the results of this assignment have allowed the City to develop a framework to address climate risks for these two asset classes. This framework is being applied to the other assets, thereby enhancing the City's overall capacity to withstand climate-related risk.

The extent to which climate change will influence a specific asset or service functions can vary significantly due to various factors including location and the type of services the assets support. The following examples relate to the Parks assets and services included within this AM Plan:

- **Extreme Precipitation –** can lead to the flooding of parks, playgrounds and sports fields making them unusable. Flooding could also result in structural damage to facilities and equipment; and degradation of playing surfaces resulting in increased maintenance costs and down-time to allow for repairs.
- **Extreme Heat –** a result of extreme heat, for example, can be that residents are uncomfortable and potentially unsafe in City park amenities, resulting in the City having to implement heat mitigation strategies such as shading, hydration stations and rescheduling events to cooler times in the day resulting in additional lighting and increased staff coverage.

How the City will address climate change can be categorized into two domains:

- **Mitigation –** refers to strategies aimed at reducing or preventing the emissions of greenhouse gas (GHG). The primary goal is to limit global warming and its impact on the environment and ecosystems.
- **Adaptation –** refers to the process of identifying and preparing for the potential impacts of climate change through adjustments to policy, procedures, designs, and asset management approaches to reduce the impacts from climate change.

The City's response to these challenges will require a variety of strategies to manage these impacts, depending on the asset. In addition, the City must account for the effects on existing infrastructure while integrating climate change resilience into new assets. Implementing resilience-building strategies offers several benefits, such as:

- Improved ability for assets to withstand future climate change impacts
- Sustainability of the services provided
- Potential reduction in lifecycle costs and associated carbon footprints for assets capable of enduring climate change effects.

2.5 Risk Management Strategy

The City's key asset management principle is to deliver required LOS and manage risks, including growth and climate change, while minimizing lifecycle costs.

The relative importance of the assets to support service delivery, referred to as asset criticality, is a key driver in the selection of the most appropriate AM strategy for each asset. Critical assets include assets that are key contributors to performance, expensive in terms of lifecycle costs, and most prone to deterioration or in need of ongoing maintenance investment.

Risk events, such as an asset's failure to have sufficient capacity, function, or reliability, are events that may compromise the delivery of the City's strategic objectives.

Lifecycle activities are used to manage the risk of failure by reducing the chance of asset failure to acceptable levels. The impact of asset failure on the City's ability to meet its strategic objectives, dictates the type and timing of lifecycle activities.

The City uses a risk framework for quantifying the risk exposure of its assets to enable prioritization of lifecycle activities across asset classes and services. Risk exposure is the multiplication of the criticality or consequence of failure (CoF), which is the direct and indirect impact on the City if an asset failure were to occur, by the Likelihood of failure (LoF), which is the likelihood or chance that an asset failure may occur:

Risk Exposure = Consequence of Failure x Probability of Failure

Figure 2-5 shows that as Consequence or Likelihood increase, the City's risk exposure increases. The highest level of risk exposure occurs where an event of Extreme consequence has an Almost Certain likelihood. Risk treatments are prioritised to address risks with the highest overall risk exposure (closest to the top-right corner of the chart).

Figure 2-5 Risk Exposure as a Function of Consequence and Likelihood

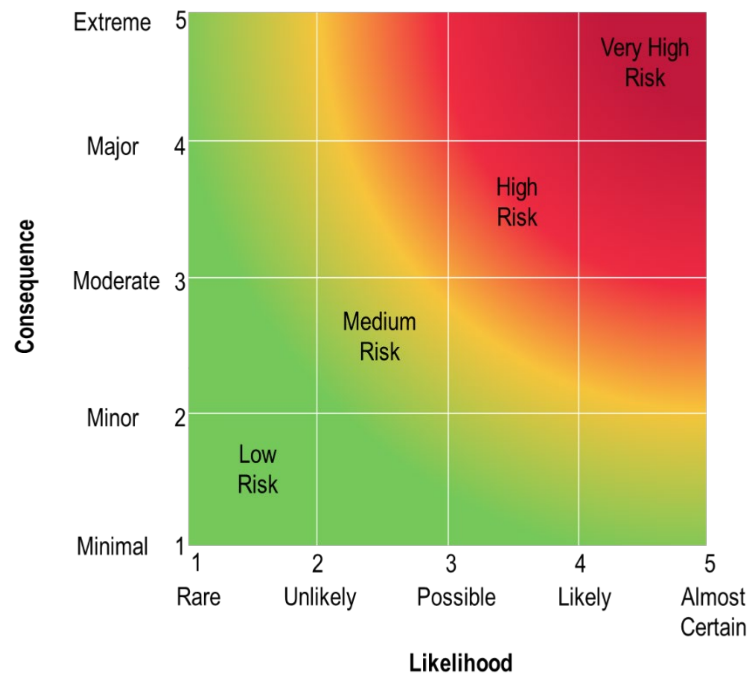


Table 2-3 that likelihood scores of 1 to 5 are assigned based on a qualitative description of likelihood or on an estimated likelihood of an event happening. Likelihood of asset failure due to deterioration is assigned based on the current asset condition.

Table 2-3 Likelihood Scores

Likelihood Grade	Description	Likelihood of Event Occurring in a Year	Asset Condition associated with Likelihood of Asset Failure
5	Almost Certain	>= 90%	Very Poor
4	Likely	65% - 90%	Poor
3	Possible	35% - 65%	Fair
2	Unlikely	10% - 35%	Good
1	Rare	< 10%	Very Good

Asset criticality or CoF reflects the importance of an asset to the City's delivery of services. Table 2-4 lists the consequence categories considered in this AM Plan, and Table 2-5 lists the consequence scoring definitions.

Each of the following sections includes a consequence of failure table tailored to the specific service area's assets.

Table 2-4 Consequence Categories

Consequence Category	Criteria	Definition
Financial	Replacement Cost	The financial expenditure required for the replacement of the asset or remediation of the asset failure
	Indirect Financial Impact	The revenue loss due to service closure or other direct cost not related to asset repair
Social	Health & Safety	The potential for injuries or death
	Legal Liability	The exposure to third party liability of potential for lawsuits
	Service Disruption	The duration of impact to customers or the criticality of customers
	Impacted Customers	The number of critical customers that would be impacted if the asset fails
Environmental	Environmental Compliance	Environmental impacts as a result of failure including remediation and potential charges
	Environmental Impact	The adverse impact to the natural environment

Table 2-5 Consequence Scoring Definitions

Criteria	1 - Minimal	2 - Minor	3 - Moderate	4 - Major	5 – Extreme
		Financial			
Capital Expenditure (Replacement of Asset)	No significant one-time capital expenditure for emergency repair or replacement (less than $100,000)	One-time unplanned capital expenditure ($100,000 - $250,000)	One-time unplanned capital expenditure ($250,000 - $1,000,000)	One-time unplanned capital expenditure ($1,000,000 - $2,000,000)	One-time unplanned capital expenditure in excess of $2,000,000
Revenue loss due to service closure or other direct cost not related to asset repair (Operating)	No significant impact to operating budget (less than $50,000)	Moderate impact to operating budget ($50,000 to $100,000)	Significant impact to operating budget (less than $100,000 - 250,000).	Significant impact to operating budget (more than $250,000, less than $500,000)	Significant increase to operating budget ($500,000 or more)
		Social			
Health & Safety	No injuries	Minor injuries	Moderate Injuries	Serious Injuries	Death
Legal Liability	Very limited exposure to Third Party Liability - limited potential for lawsuits, very localized impacts	Some exposure to Third Party Liability - potential for one or more lawsuits	Potential for one or more lawsuit, for a total in excess of City's self-insurance limit ($50k)	Potential for multiple lawsuits, in excess of City's self-insurance limit ($50k)	Potential for multiple lawsuits, in excess of City's self-insurance limit ($50k), or class action lawsuit
Service Disruption	Minimal service disruption	Some impact to non-critical service delivery (1-2 days)	Some interruption to critical service delivery (one day or less) or non-critical service delivery (one week or less)	Some interruption to critical service delivery (less than one week) or non-critical service delivery (more than one week)	Interruptions to critical service delivery for one week or more, or non-critical service delivery for more than one month
Impacted Customers	Impacts less than 100 customers.	Impacts up to 500 customers	Impacts up to 1,000 customers	Impacts up to 10,000 customers	Impacts 10,000 customers or more
		Environmental			
Environmental Compliance	Does not result in breach of Environmental Compliance Obligations	Moderate Breach of Environmental Compliance Obligations. City remedies without Statutory repercussions.	Moderate Breach of Environmental Compliance Obligations. Collaboration with Ministry staff to remedy, and no Statutory repercussions	Breach of Environmental Compliance Obligation resulting in a Ministry Order to Comply and/or minor penalties	Breach of Environmental Compliance Obligation resulting in a Ministry Order to Comply and/or significant penalties
Environmental Impact	No negative impact or insignificant impact on natural environment	Minor Impact on the environment, adverse effects can be fully reversed within one month	Moderate Impact on the environment, adverse effects can be fully reversed within six months	Significant impact to natural environment, requiring restoration lasting one year	Significant impact to natural environment, requiring extensive restoration lasting two years or more

2.6 Lifecycle Management Strategy

The Lifecycle Management Strategy defines the set of planned activities that will enable the assets to provide their proposed level of service in a sustainable way while mitigating risks and reducing costs throughout their life. Table 2-6 provides an overview and examples of the lifecycle activity types that are defined by the Province's Building Together Guide for Municipal Asset Management Plans. The table also lists cost assumptions used in the AM Plan for these activity types.

For each service function, lifecycle strategies are documented as a table that provide the City's current practices and frequencies for each Lifecyle activity type. The City uses the lifecycle strategies to analyze various options of level of service, and associated costs and risks throughout the assets life.

A 10-year expenditure needs forecast has been developed for each service function to estimate the capital and operational needs to support various levels of service.

Table 2-6 Lifecyle Activity Types and Cost Assumptions

Lifecycle Activity Type	Definition	Examples	Cost Assumptions in this AM Plan
Non-Infrastructure Solutions	Actions or policies that can lower costs, extend useful lives or address capacity and function needs.	- Completing condition assessments - Completing Master Servicing Plans (MSP) or Master Servicing Strategies (MSS) - Achieving tree canopy targets by protect privately owned trees and promoting planting of trees on private property	Estimated cost of recommended or planned activities, applied to forecast years based on recommended or planned frequency
Operations and Maintenance	Including regularly scheduled inspection and maintenance or more significant repair and activities associated with unexpected events.	- Regular asset inspections - Filter and oil changes - Watermain repair after a break - Pothole filling - Vaccination of trees against pests and disease	Based on 2025 operating budget
Growth	Planned activities required to extend services to previously unserved areas or expand services to meet growth demands to maintain LOS	- Construction of a park in a new location - Widening of a road - Addition of a snow plow to the fleet - Expansion of a building	Growth assets are based on Master Servicing Plan recommendations or other strategy documents. If these do not exist, then growth assets are based on 5-year historical average

Lifecycle Activity Type	Definition	Examples	Cost Assumptions in this AM Plan
		- Assumption of developer-constructed assets	annual capital allocation to growth-related projects purchases. Asset assumptions are based on 5-year historical average annual amount of developer-constructed assets assumed by City
Upgrade	Planned activities to meet a higher level of customer need than previously provided or to limit health, safety, security, environmental and heritage impacts	- Establishing condition assessment program for assets that were not previously assessed - Increasing the cleaning and maintenance frequency - Transitioning to green fleet (hybrid and electric vehicles) - Separating combined sewers	Estimated cost of recommended or planned activities and timing
Renewal (Rehabilitation and Replacement)	Significant repairs designated to extend the life of the asset. Activities that are expected to occur once an asset has reached the end of its useful life and renewal/rehab is no longer an option.	- Renovation of a building - Resurfacing of a road - Reconstruction of a road - Re-lining of a pipe - Replacement of a vehicle - Restoration of public art	Annual cost for anticipated budget were provided by City staff after reviewing the most recently approved capital budget (2024-2026). Cost to maintain LOS and optimal LOS analysis were calculated using the performance and investment forecasting model
Disposal	Activities associated with disposing of an asset once it has reached the end of its useful life or is otherwise no longer needed by the City.	- Sale or disposal of a vehicle - Decommissioning and demolition of a building	Generally, disposal activities have been incorporated within the replacement and renewal costs for most assets. For assets not being replaced, recommended and planned disposal would be identified in Master Servicing Plan recommendations or other strategy documents..

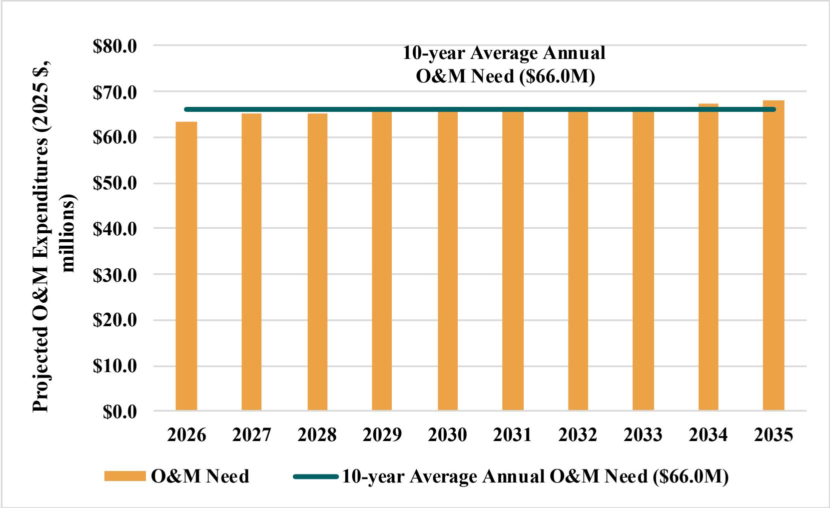
2.6.1 Operations & Maintenance Forecast

Figure 2-6 shows the forecast for operations and maintenance costs over the next 10 years to meet the Proposed LOS. Operations and maintenance costs were increased in proportion with the growth in the asset portfolio. Regular increases due to inflation were not included in the following forecast.

While costs are currently assumed to remain steady, the future implementation of Cityworks will offer better insights into asset performance and maintenance needs. This will help determine whether the budget is sufficient and enable more informed financial decisions.

To ensure the long-term sustainability of infrastructure assets, it is imperative that maintenance funding is appropriately aligned with the replacement rates. As essential assets reach the end of their service life, timely reinvestment is essential to mitigate service disruptions and escalating repair costs. An increasing project backlog due to inadequate funding heightens the risk of system failures, resulting in costly emergency interventions and operational inefficiencies.

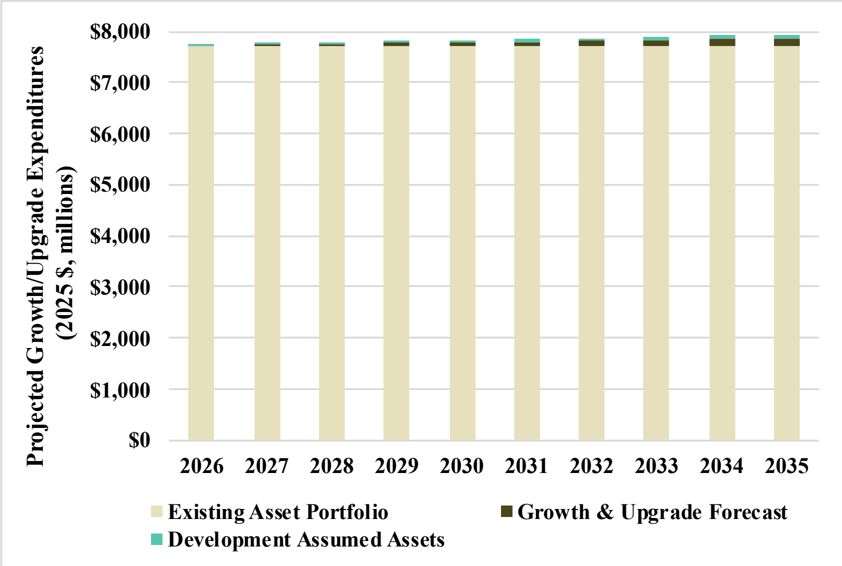
Figure 2-6 Operations and Maintenance Summary



2.6.2 Growth, Upgrade, and Disposal Forecast

Growth reflects the acquisition of assets that did not previous exist within the asset portfolio. Upgrades result from improves asset performance (i.e., environmental, safety, accessibility, etc.). Disposals are when assets are removed from the portfolio. Figure 2-7 shows the forecasted growth and upgrades to meet the Proposed LOS. The City anticipates. The City anticipates assuming approximately $8.0 million per year from developers and spending approximately $15.3 million per year (based on historical trends and available master planning documents) on growth and upgrade of assets and over the next 10 years. City teams are working to develop a more accurate assessment of future growth requirements for each asset portfolio.

Figure 2-7 Growth & Upgrade Summary



2.6.3 Renewal & Condition Forecast

This sub-section combines the City's lifecycle strategy with the LOS and risk management strategies to analyse various forecasting scenarios for the renewal lifecycle activity type. These scenarios are a snapshot in time, based on best available data. Decision Optimization Technology software (DOT) was used to forecast renewal needs for water, wastewater, stormwater, and facilities and the City is in the process of configuring DOT to support the other services in the future. As the City continues to invest in maintenance management and decision support software, these scenarios will be available on an on-going basis to better inform decisions as new data becomes available.

The following scenarios focused on renewal spending:

- **Scenario A: Anticipated Budget** – Evaluates asset performance under the current budget that the City anticipates allocating towards that service function for a 10-year forecast period.
- **Scenario B: Maintain Current LOS** – Determines the cost to maintain LOS at current levels over a 10-year forecast period.
- **Scenario C: Proposed LOS** – This scenario presents the lifecycle activities and costs recommended to balance service, risk, and financial considerations.

The renewal forecasting scenarios, within the Service area specific sections, also provide the average annual renewal cost over the lifecycle of the asset. This cost represents the optimal lifecycle cost to sustain the assets over their full-service lives. This value provides a benchmark to assess if the anticipated budget is sufficient or not to meet the long-term needs of the assets.

Scenario A: Anticipated Budget

Figure 2-8 shows the forecast condition distribution of all rated based City assets (Water and Wastewater) based on an average annual anticipated funding of $41.1 million per year. The graph shows that the renewal backlog (assets in Very Poor condition) decreases from at 16% in 2025 to 8% in 2035 and the percentage of assets in Fair or better condition increased from 73% in 2025 to 82% in 2035.

Figure 2-8 Condition Forecast – Scenario A: Anticipated Funding (Rate Based – Waster & Wastewater)

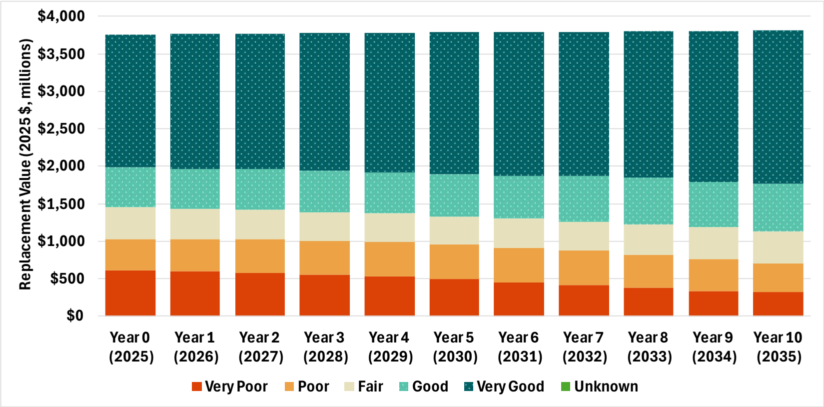
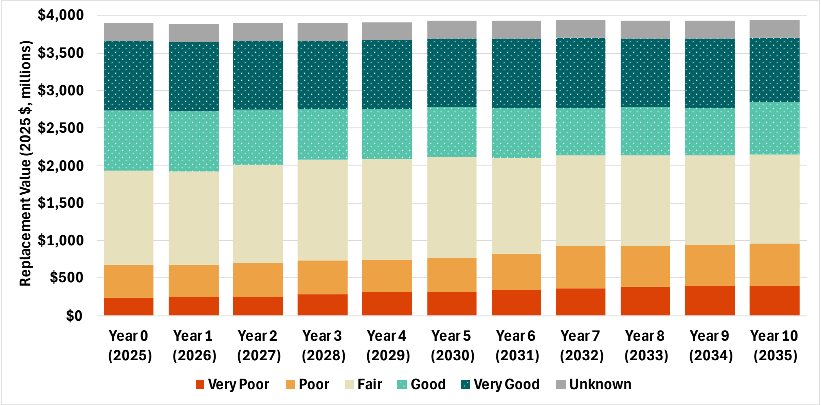


Figure 2-9 shows the forecast condition distribution of all tax-based City assets based on an average annual anticipated funding of $37.3 million per year. The graph shows that the renewal backlog (assets in Very Poor condition) increases from at 6% in 2025 to 9% in 2035 and the percentage of assets in Fair or better condition decreased from 77% in 2025 to 71% in 2035.

Figure 2-9 Condition Forecast – Scenario A: Anticipated Funding (Tax Based – Remaining Assets)



Scenario B: Maintain Current LOS

Figure 2-10 shows the forecast condition distribution of all rated based City assets (Water and Wastewater) based on an average annual renewal spend of $12.0 million per year to maintain the renewal backlog (% of assets in Very Poor condition). Under this funding option, the percentage of assets in Fair or better condition is maintained at 73%.

Figure 2-10 Condition Forecast – Scenario B: Maintain Current LOS (Rate Based – Waster & Wastewater)

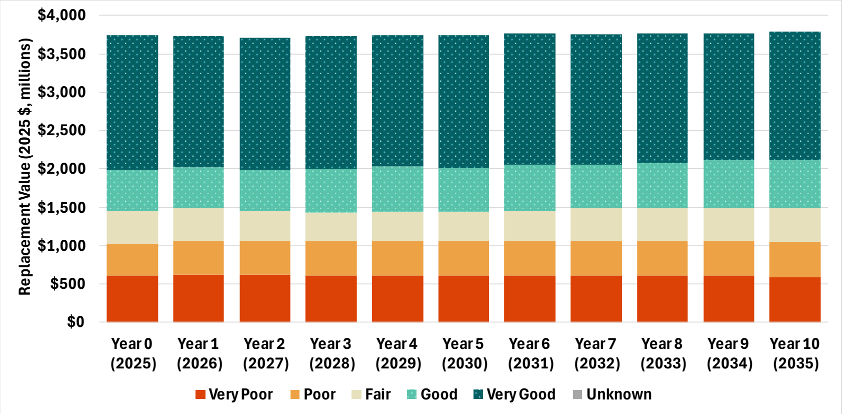
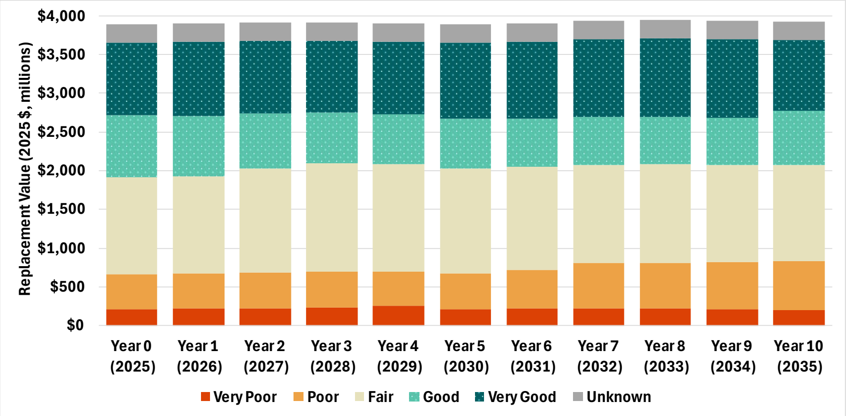


Figure 2-11 shows the forecast condition distribution of all tax-based City assets based on an average annual renewal spend of $39.0 million per year to maintain the renewal backlog (% of assets in Very Poor condition).

Figure 2-11 Condition Forecast – Scenario B: Maintain Current LOS (Tax Based – Remaining Assets)



Scenario C: Proposed LOS

Figure 2-12 shows the forecast condition distribution of all rated based City assets (Water and Wastewater) based on an average annual renewal spend of $40.9 million per year. The graph shows that the renewal backlog (assets in Very Poor condition) decreases from 16% in 2025 to 8% in 2035 and the percentage of assets in Fair or better condition increased from 73% in 2025 to 82% in 2035.

Figure 2-12 Condition Forecast – Scenario C: Proposed LOS (Rate Based – Waster & Wastewater)

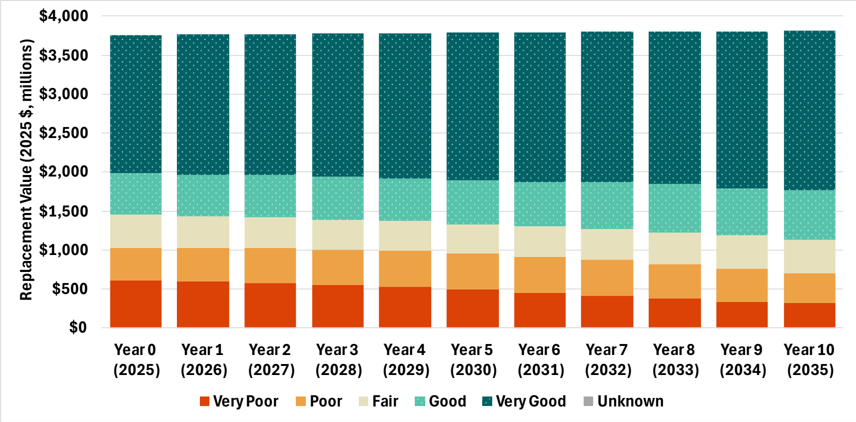
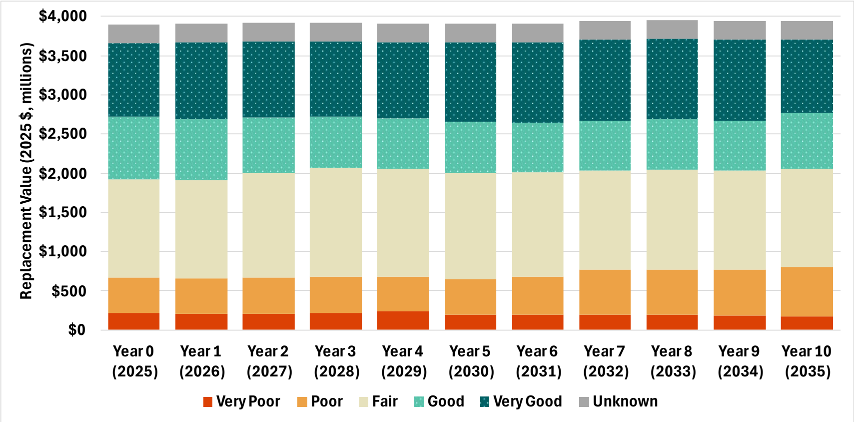


Figure 2-13 shows the forecast condition distribution of all tax-based City assets based on an average annual renewal spend of $47.1 million per year. The graph shows that the renewal backlog (assets in Very Poor condition) decreases from 5% in 2025 to 4% in 2035 and the percentage of assets in Fair or better condition decreased from 77% in 2025 to 74% in 2035

Figure 2-13 Condition Forecast – Scenario C: Proposed LOS (Tax Based – Remaining Assets)



2.7 Financial Strategy

The financial strategy is informed by the preceding sections of the AM Plan: the state or condition of the assets, the proposed levels of service, the risks to service delivery, and the lifecycle activities needed to reduce the risks to service delivery to acceptable levels. The financial strategy considers how the City will fund the planned asset management actions to meet the current service levels.

Financial sustainability within the municipal government context can be defined as "a government's ability to manage its finances so it can meet its spending commitments, both now and in the future. It ensures future generations of taxpayers do not face an unmanageable bill for government services provided to the current generation".

A municipality is in a financially sustainable position if it:

- Provides a level of service commensurate with willingness and ability to pay.
- Can adjust service levels in response to changes in economic conditions or transfer payments from other levels of government.
- 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 challenges to financial sustainability are:

- A discrepancy between level of service decisions and fiscal capacity
- The future cost of infrastructure investments
- Unforeseen impacts to revenue

Per O.Reg. 588/17, this section of the AM Plan identifies the annual funding projected to be available to undertake the planned lifecycle activities and discusses strategies to address potential funding shortfalls.

Based on the City's multi-year budget process, capital project and operating activity cost information has been gathered for each services area and compared with the forecast lifecycle costs. As required by O.Reg. 588/17, the AM Plan projects annual funding availability and needs for each of the next 10 years. The AM plan will provide a basis for future multi-year budgets.

2.7.1 City Services

The following table outlines the estimated lifecycle costs for each service area related to each scenario. The overall funding gap is also illustrated indicating that the City would require an additional $17.9 million/year to meet its proposed LOS.

Table 2-7 Financing Summary

Service Area	Average Annual Cost (2026-2035) (2025 $, millions) Scenario A: Anticipated Funding	Scenario B: Maintain Current LOS	Scenario C: Proposed LOS	Funding Gap
Water	$27.7	$17.2	$27.7	**N/A**
Wastewater	$27.2	$8.6	$27.2	**N/A**
Sub-total Rate-funded Services	**$54.9**	**$25.8**	**$54.9**	**N/A**
Stormwater	$6.8	$4.7	$6.8	**N/A**
Transportation	$23.3	$25.0	$29.8	**$6.5**
Structures	$1.4	$0.6	$2.1	**$0.7**
Buildings & Facilities	$19.9	$25.8	$25.9	**$6.0**
Culture	$1.3	$1.5	$1.5	**$0.2**
Fleet	$5.0	$4.3	$5.9	**$0.9**
Fire	$6.2	$3.9	$6.3	**$0.1**
IT	$8.7	$8.1	$8.7	**N/A**
Natural Assets	$5.8	$5.9	$7.2	**$1.4**
Parking	$1.1	$2.9	$2.9	**$1.8**
Parks	$18.5	$18.3	$18.8	**$0.3**
Sub-total Tax-funded Services	**$98.0**	**$101.0**	**$115.9**	**$17.9**
TOTAL All City Services	**$152.9**	**$126.8**	**$170.8**	**$17.9**

2.7.2 City-Funded Organization Summary

The City funds three organizations that operate with their own boards and governance structure. The St. Catharines Public Library has completed their own AM Plan and it is available upon request. The Niagara District Airport is in the process of completing their AM Plan and once completed, will be available upon request. The Canada Summer Games Park outlined their capital needs directly as this is a joint-owned facility.

The following table summarizes the financial strategy and impact for each organization.

Table 2-8 City-Funded Organization Summary

Organization	Average Annual Cost (2026-2035) (2025 $, millions) Available Funding	Financing Needed to Meet Proposed LOS	Funding Gap
St. Catharines Public Library	$9.1	$10.0	$0.9
Niagara District Airport	To be finalized	To be finalized	To be finalized
Canada Summer Games Park	$1.0	$1.0	--
TOTAL	**$10.1**	**$11.1**	**$0.9**

The St. Catharines Public Library is planning to eliminate the funding gap and meet the proposed LOS by receiving the Green and Inclusive Community Buildings grant ($3M), City support ($4.9M), and fundraising ($1.4M) to fund the Centennial Branch renovation.

Canada Games Park is a multi-use sport, and recreation facility in the Niagara Region; a community infrastructure and a lasting legacy of the Canada Summer Games. The venue is managed by ASM Global, an independent operator following the guiding principles set forth from the Consortium Partnership consisting of the Niagara Region, the City of St.

Catharines, Brock University and the City of Thorold, with the goal of benefitting the entire Niagara community fostering the spirit of recreation for all individuals. The City provides an average annual capital contribution of $1 million, with no anticipated gap in sustainable funding.

2.7.3 Investment Gap Management

The funding gap is $17.9 million per year across 13 City services. If the investment gap is not funded or managed sufficiently, the City can expect the following impacts.

- Increased unplanned maintenance and repairs.
- Increase of renewal backlog over future planning horizons, increasing the long-term cost to the City.
- Safety, compliance, reputation, and financial (insurance) risks.
- Increased traffic congestion due to unplanned repairs and poor road conditions.
- Increased operational costs
- Delayed response times from outdated fleet and Increased emissions and inefficiencies from aging fleet and transportation systems
- Lower community satisfaction due to deteriorating public spaces and services

The City plans to explore the following strategies to reduce the funding gap and associated impacts:

- Reduce near term renewal needs by deferring capital renewal projects on lower risk assets, thereby lengthening the period in which the backlog is addressed beyond the 10 years. This may result in increased maintenance costs and risks to service delivery. If this occurs, it is recommended to increase the frequency of inspections on these assets to ensure safety is maintained.
- Increase available funds through property tax increases and leveraging third party grants.
- Increase available funds by exploring the use of alternative funding models.
- Reduce renewal needs by divesting of assets. This may reduce service levels related to capacity.
- Invest and incorporate a robust predictive maintenance program that uses inspections to prevent failures before they occur. This includes the ongoing work with the Asset and Resource Management System (ARMS) project.
- Optimize lifecycle interventions, especially for larger asset classes (roads, water, wastewater, facilities, parks) and integrate into long-term budgeting.
- Increase the use of non-infrastructure solutions to manage the funding gap through management strategies and policies to allocate funds to the most critical assets and coordinating capital projects (where possible) to receive the most value for service.

Debt funding and reserve funding may also be used; however, these are not sustainable solutions, since the debt funding needs to eventually be paid back, and reserves need to be replenished.

2.8 Asset Management Plan Assumptions and Limitations

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

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

Background information and reports related to this Asset Management Plan are available to the public upon request through the City.

3 Water Service

The City provides safe drinking water to its residents, businesses, and other consumers. The City owns and operates a Class II residential water distribution system. Drinking water is supplied by the Region of Niagara's Decew Water Treatment Plant which draws water indirectly from Lake Erie.

3.1 State of the Local Infrastructure

3.1.1 Asset Valuation

The City's water distribution system obtains potable water from the Region of Niagara and supplies it to consumers including residents, institutions and businesses, and uses it for fire protection and to support City services. The City's water system consists of three pressure zones within the urban boundary.

In general, the valuation of the water distribution system is intended for the replacement of a similar asset (like-for-like). These were calculated based on historical costs that the City has incurred as part of previous replacements of similar assets.

For certain pipe materials (e.g., Ductile Iron), the replacement values that were applied assumed a more modern material (PVC) would be used in the event of a replacement and thus do not align with the "like-for-like" scenario described above.

The estimated value for water facilities was calculated from a bottom-up approach based on the component assets located within each facility and industry standard costing for these assets.

The overall distribution of replacement values by asset type for the entire water distribution system is shown in Table 3-1. The water mains (including valves and hydrants) have the highest replacement value in the portfolio, totaling 99% of the entire system. Table 3-2 provides a summary of the distribution of replacement values on the water mains based on material type.

Table 3-1 Inventory Valuation – Water Service

Asset Category	Asset Sub-Category	Count	Unit	Replacement Value (millions, 2025 $)	Replacement Value (% Total)
Water Distribution	Watermains	593,540	metres	$1,758.7	99%
	Hydrants	3,595	each		
	Valves	5,590	each		
	Water Meters	42,720	each	$25.8	1%
	Bulk Water Station	1	each	$0.1	< 0.1%
	Water Booster Station	1	each	$0.1	< 0.1%
	Overall Replacement Value			**$1,784.7**	**100%**

Table 3-2 Inventory Valuation – Watermains by Material

Material Type	Quantity (meters)	Replacement Value (millions, 2025 $)	Replacement Value (% Total)
Asbestos Cement (AC)	64,143	$187.20	11%
Cast Iron	137,086	$406.44	23%
Ductile Iron	52,651	$154.90	9%
Polyvinyl Chloride (PVC)	335,141	$994.20	56%
Other	5,760	$15.91	1%
Overall Replacement Value	593,540	**$1,758.7**	**100%**

3.1.2 Asset Age

Comparing the average age of the assets with the average Estimated Service Life (ESL) provides a representation of the average overall portfolio remaining life. As shown in Figure 3-1, the average age of watermains is approximately half the average estimated service life.

Water meters are an average age of 9 years and have an average service life of 15.7 years. More specifically, residential water meters have a service life of 15 years, while commercial water meters have a service life of 20 years.

The components of the water booster station have an average estimated service life of 43.1 years. The concrete structure has a service life of 100 years, and accounts for 25% of the water booster station's replacement value. The maintenance hole / entrance and ladder each have a service life of 75 years, and accounts for 5% of the water booster station's replacement value. The remainder of the components have service life values of 25 or 30 years. The booster station was built in 1981 and component upgrades have been made periodically, so the overall average age is 36.9 years.

The components of the bulk water station have an average service life of 50.0 years. Forty-one percent (41%) of the components, by replacement value, were installed in 2006 or later. As such, the average age of the bulk water station is 17.6 years.

Figure 3-2 shows the average age of watermains by material type. Asbestos cement, cast iron and ductile iron watermains will be replaced by with PVC when they reach end of life.

Figure 3-1 Asset Age – Water Service

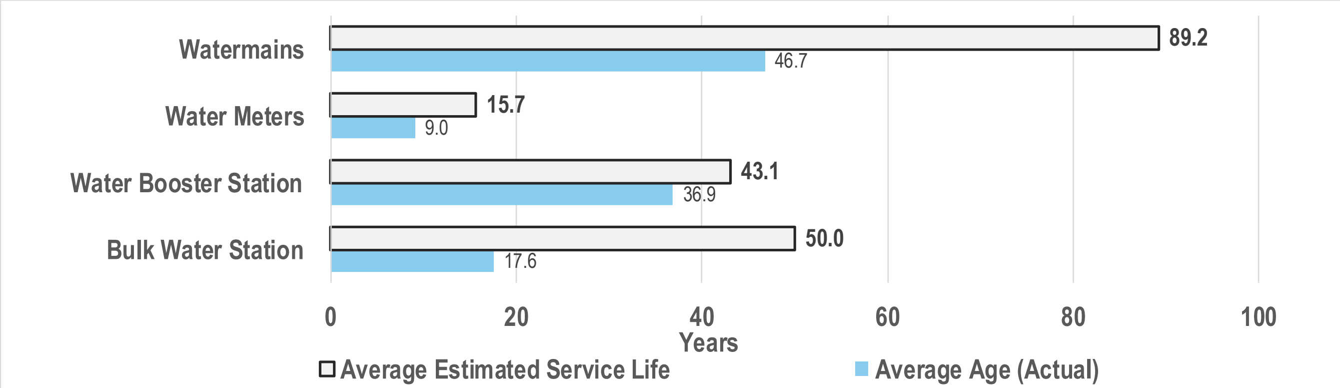
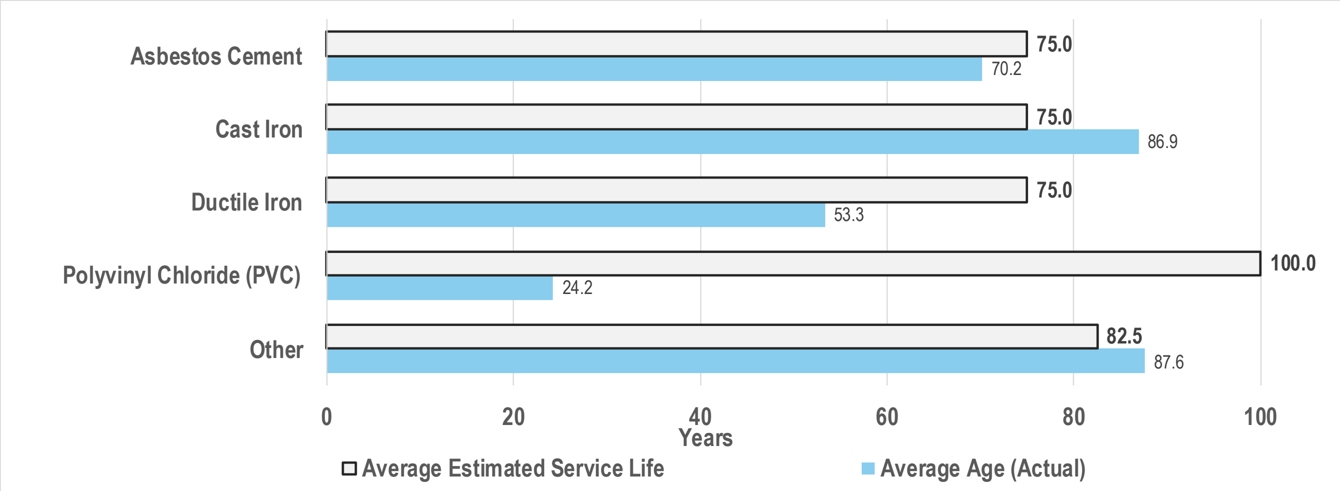


Figure 3-2 Asset Age – Watermains by Material Type



3.1.3 Asset Condition

The asset condition distribution is shown in Figure 3-3 for water service assets. Overall, $457.4 million (25.6%) of water assets are in very poor condition and $211.0 million (11.8%) are in poor condition. Assets in very poor condition are considered to be due or overdue for replacement. As shown in the Figure, those assets consist of watermains, components of the water booster station and components of the bulk water station.

Figure 3-3 Asset Condition – Water Service

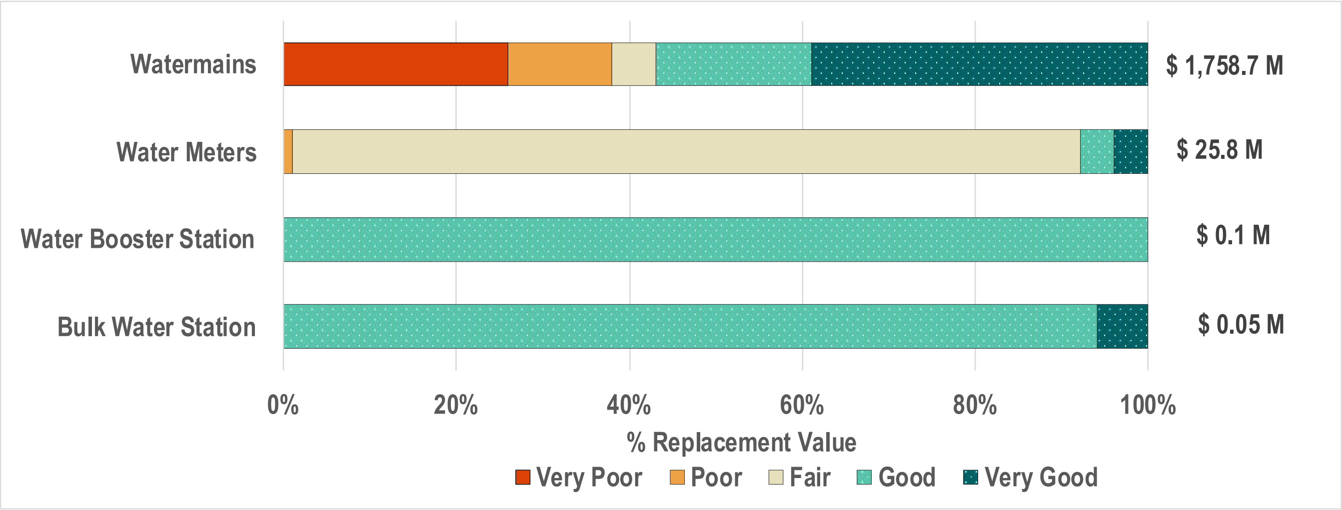
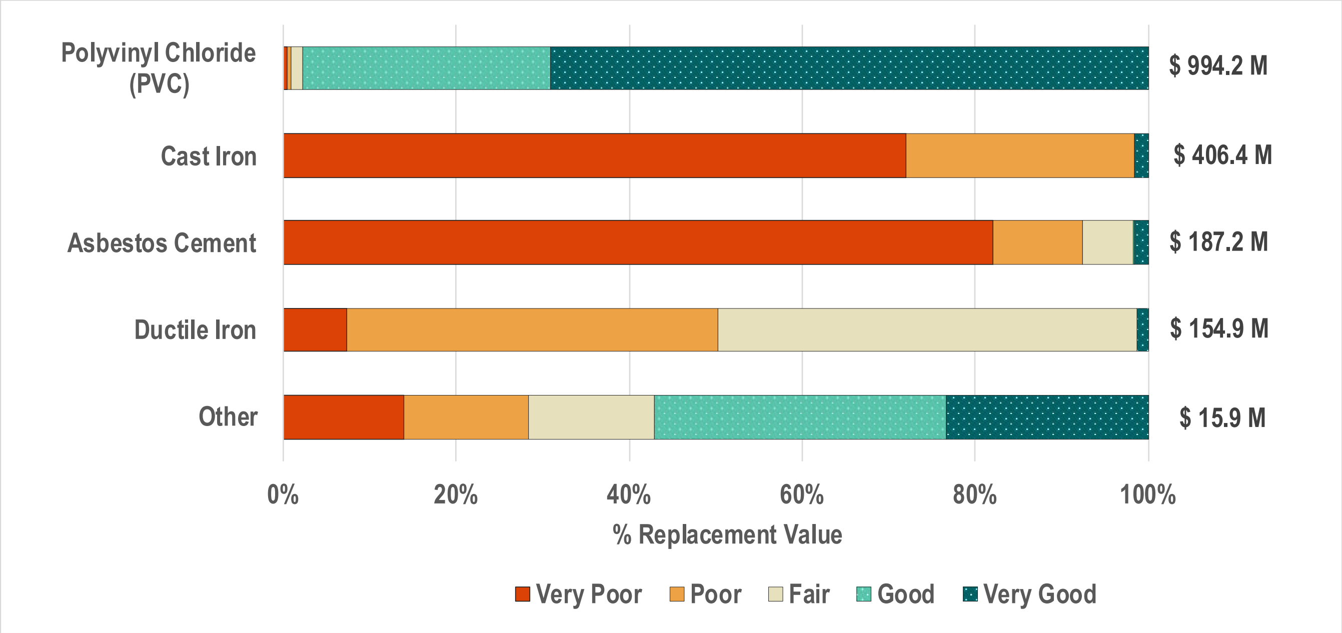


Figure 3-4 shows the asset condition distributions for watermains. The condition bars are listed by material type in decreasing order of replacement value.

The methods used to estimate asset condition are explained in Sections 3.1.3.1 to 3.1.3.5.

Figure 3-4 Asset Condition – Watermains by Material Type



3.1.3.1 Watermains

For watermains, the historical number of breaks was used to define a Break History Index that is based on:

- 5-year Break Frequency
  = Number of breaks / km in past five years
- Whole Life Break Frequency
  = Number of breaks / km over since main was installed

Each Break Frequency is then converted into a Break History Rating in accordance with Table 3-3.

Table 3-3 Watermain Break History Rating

Break History Rating	5-year Break Frequency	Whole Life Break Frequency
1	0	0
2	1 to 2	1 to 2
3	3 to 4	3 to 5
4	6 to 8	6 to 9
5	9 or more	10 or more

The Break Condition Index is then calculated based on a weighted average of the 5-year and Whole Life Break History Ratings, as follows:

Break Condition Index
= (0.7 x 5-year Break History Rating)
+ (0.3 x Whole Life Break History Rating)

The Break Condition Rating is then mapped to a Watermain Condition score in accordance with Table 3-4.

Table 3-4 Break-based Condition Score – Watermains

Break-based Condition Score	Break Condition Index
1	0 to 1
2	1 to 2.5
3	2.5 to 3.5
4	3.5 to 4.5
5	4.5 to 5

Table 3-5 shows how remaining service life is mapped to the Watermain Condition score.

Table 3-5 Age-based Condition Score – Watermains

Age-based Condition Score	Remaining Service Life (%)
1	80 to 100
2	60 to 80
3	40 to 60
4	20 to 40
5	0 to 20

The overall Watermain Condition score is the higher value (poorer condition) between the Break Condition Index and the Remaining Service Life. In other words,

Watermain Condition
= maximum (Break-based Condition,
Age-based Condition)

Condition was assigned this way to all segments in the network individually.

Upon completion of the master servicing plans and availability of relevant data, capacity considerations should be integrated into the likelihood of failure assessment. This ensures that projected demand and hydraulic capacity constraints are factored alongside existing condition parameters (Break-based Condition and Age-based Condition).

3.1.3.2 Hydrants and Valves

Hydrants and valves are renewed and replaced with their attached watermain, so the condition of these assets is being reported with the watermains. However, these assets are inspected and maintained regularly to ensure reliable operation. Broken hydrants and valves are repaired or replaced through operation and maintenance budgets. In uncommon instances, when newer hydrants are replaced as part of a watermain replacement project funded by the capital budget, they will be salvaged.

3.1.3.3 Meters

The condition of water meters is estimated based on age, where residential meters have a service life of 15 years and commercial meters have a service life of 20 years.

3.1.3.4 Water Booster Station

The water booster station is divided into building and process components. The condition was assessed for most components in 2011 and for one component in 2023. The current condition was estimated by modeling the deterioration of those assets linearly to year 2025 based on their service life values, which range from 25 to 100

3.1.3.5 Bulk Water Station

The condition of the bulk water station is estimated based on the age of its components. Components have service life values of 18 to 50 years and components may be replaced at different times.

3.2 Levels of Service

The City is committed to providing a sustainable and reliable supply of safe, high quality drinking water in accordance with regulatory requirements.

The Ontario Ministry of Environment, Conservation and Parks (MECP) conducts extensive annual inspections of the City's water distribution system to verify the compliance of the system with requirements under the Safe Drinking Water Act and associated regulations.

The defined Levels of Service (LOS) for the City's water system are a key driver for the consistent performance that the City delivers to its residents as these provide the planned outcome from a functional perspective.

3.2.1 O.Reg. 588/17 Qualitative LOS

The following provides a summary of the qualitative Community LOS required to be reported by O.Reg. 588/17 for water service assets.

Table 3-6 O.Reg. 588/17 Qualitative LOS – Water Service

Service Attribute	Community Levels of Service	Qualitative Description
Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal water system.	The City owns and operates a Class II residential water distribution system, that receives its drinking water from the Regional Municipality of Niagara's Decew Water Treatment Plant. The distribution system is comprised of 594.8 km of watermains, 3,595 hydrants, a booster station and a bulk water facility servicing, which service a total of 42,645 customers including 94 bulk water customers.
	Description, which may include maps, of the user groups or areas of the municipality that have fire flow.	Fire flow is provided by 3,595 hydrants within the serviced area.
Reliability	Description of boil water advisories and service interruptions	There have been no boil water advisories in the years 2020 – 2024.

3.2.2 Technical Metrics including O.Reg. 588/17 LOS

Table 3-7 outlines the LOS that are driving current and future decision-making and expenditure needs for Water Service assets. The City's Customer LOS statements and Technical LOS indicators document performance from a service user's and service provider's perspective, respectively. Performance scores from the most recent five years (2020 – 2024) are listed. The table also lists the desired or "aspirational" performance for each metric to support the long-term vision for the City. This column indicates the direction of desired performance for the period outside of this AM Plan, and does not represent the City's target, proposed or expected LOS that is represented in this AM Plan. Projected performance is presented for different scenarios in Section 3.6.2 (Table 3-11), including one scenario presented as the Proposed LOS.

Table 3-7 LOS Metrics and Performance – Water Service

Service Attribute	Customer LOS Statement (CLOS)	Technical LOS Indicator (TLOS)	Historical Performance					Desired (Aspirational) Performance[a]
			2020	2021	2022	2023	2024	
Capacity and Use	System has capacity to provide current and future serviced customers with uninterrupted access to treated water at an adequate pressure	Percentage of properties connected to the municipal water system[b]	94.2%	96.5%	96.5%	96.5%	97.4% Inside urban boundary: 98.9% Outside urban boundary: 14.9%	For monitoring only
		Percentage of properties where fire flow is available[b]	98.6%	98.6%[c]	98.6%[c]	98.6%[c]	98.6%[c]	Maximize
Function	Services are provided prioritizing safety	The number of connection-days per year where a boil water advisory notice is in place compared to the total number of properties connected to the municipal water system[b]	Zero (0)	Zero (0)	Zero (0)	Zero (0)	Zero (0)	Minimize
		Percentage of water sampling meeting Safe Drinking Water Standards	100%	100%	100%	100%	100%	Maintain
		Water loss as a percentage of Water Purchased	14%	4%	14%	13.8%	14.7%	Minimize
		Number of lead water service connections	No data	No data	No data	239	232	Minimize
		Number of complaints due to rusty / discoloured water	29	18	20	18	35	Minimize
Reliability	Assets are kept in a state of good repair	The number of connection-days per year due to watermain breaks compared to the total number of properties connected to the municipal water system[b]	Not calculated	Not calculated	Not calculated	0.0577	0.0580	Minimize

Service Attribute	Customer LOS Statement (CLOS)	Technical LOS Indicator (TLOS)	Historical Performance 2020	2021	2022	2023	2024	Desired (Aspirational) Performance[a]
		Percentage of water assets due or overdue for replacement	17%	20%	Not calculated	Not calculated	26%	Minimize
		Total number of watermain breaks	115	100	89	62	74	Minimize
		Number of watermain breaks per 100 km	15	17	15	10.4	12.5	Minimize
		5 year rolling average watermain breaks per 100km	16.2	17	17	15	14.5	Minimize
	Maintenance is proactive	Preventative maintenance as a percentage of total maintenance	Future metric	Future metric	Future metric	Future metric	Future metric	Optimal balance TBD
Affordability	Services are affordable and provided at lowest cost for both current and future customers	Annual Capital investment as a % of cost to sustain assets over their lifecycles (replacement value / estimated service life = $22.0M/yr)	37%	37%	38%	54%	63%	100%

(a) Shows direction of preferred performance. This does not represent the City's target, proposed or expected performance.

(b) Required by O.Reg. 588/17.

(c) Based on 2020 hydraulic model estimation.

3.3 Future Demand

As explained in Section 2.3, the City's population is projected to increase from 141,481 in 2025 to 153,177 in 2035. The represents an increase of 11,696 (8.3%), which may require additional capacity in the water network.

The City is planning to complete a Master Servicing Plan (MSP) for Water Service in 2026, which will establish how the City will support long-term demand for water service. The MSP's infrastructure recommendations will be incorporated into future updates of the AM Plan.

For the current AM Plan, it is assumed that expansion of the water network will continue at the same rate as the previous five years. Specifically, this includes ownership assumption of $1.95M /year of developer-constructed watermains (approximately 1.5 km/year).

Over the past five years, there has been no City-led construction of new or expanded water infrastructure, so none are included in the lifecycle forecast.

3.4 Climate Change

The City completed a Climate Change Risk Assessment in 2022, which reviewed the likelihood extreme climate events and their impacts on water and wastewater infrastructure. Extreme climate events included:

- Extreme precipitation
- Extreme dry conditions
- Extreme precipitation and extreme cold
- Extreme cold
- Extreme heat
- Freeze-thaw events
- High lake levels
- High lake temperatures
- High winds

Impacts to the water system include:

- Water use restrictions and lower pressure due to flooding, power failures, and loss of communications
- Increased water demand and stress on distribution system due to dry conditions
- Watermain breaks due to increased demand or colder water in main
- Frozen services
- Loss of access to hydrants and valves due to flooding or snowdrifts

An internal workshop was held with subject matter experts from the City to:

- Identify potential impacts of climate events on municipal services and assets.
- Assess current strategies for responding to these events and explore opportunities for improvement.

The strategies discussed included:

- Asset Management (AM) Strategies: A proactive method emphasizing rehabilitation or replacement initiatives, typically executed through the Capital Budget.
- Design/Operating Modifications: Adjustments to design or operational specifications, incorporated into new infrastructure or upgrades during asset replacement or rehabilitation.

- Reactive/Emergency Response Procedures: Intended for scenarios with a very low likelihood of occurrence or prohibitively high adaptation costs; these procedures are to be implemented only when the impact or event takes place.
- Other/No Response: Indicates either the municipality does not encounter this asset impact, or the chosen response mechanism does not align with the aforementioned three strategies.

As the Decision Support System (DSS) continues to be implemented, the City will enhance its capacity for scenario planning, enabling a more thorough evaluation of the costs and benefits associated with these strategies.

3.5 Risk Management Strategy

As explained in Section 2.5, the City uses a risk-based approach to prioritize renewal needs. Likelihood of failure is estimated based on condition (refer to Table 2-3). The consequence of failure is estimated based on the scoring criteria and weights shown in Table 3-8 for watermains. (Hydrants and valves are replaced with watermains).

Consequence of failure scores and scoring criteria have not been established for water meters, the bulk water station and the water booster station. Those will be established in future AM planning improvement initiatives.

Table 3-8 Consequence Scoring – Watermains

Consequence Category	Criteria	Parameter	Weight	Consequence Score: 1 - Minimal	2 - Minor	3 - Moderate	4 - Major	5 – Extreme
Financial	Capital Expenditure (Replacement of Assets)	Replacement Cost + Emergency Premium (20%) Normalized for length, based on diameter.	13%	<$100k	$100k - <$250k	$250k - <$1M	$1M - $2M	>$2M
	Revenue loss due to service closure or other direct cost not related to asset repair	N/A - failure will not result in revenue loss as there are alternative ways to supply water	Not included	N/A	N/A	N/A	N/A	N/A
Social	Impact to Health and Safety	Average Annual Daily Traffic (AADT) – If the failure happens near a higher traffic road, there is the potential for health and safety impacts to more road users. If AADT values not available, use Road Classification to determine traffic levels.	10%	0 – 500	501 – 3,000	3,001 – 5,000	5,001 – 10,000	≥ 10,001
		Pipe Diameter (mm) - with a larger pipe diameter, there is a likelihood of more catastrophic failure	13%	0 – 125 mm	126 – 200 mm	201 – 400 mm	401 – 1000 mm	≥ 1001 mm
		Critical water user	13%	No	N/A	Yes	N/A	N/A
		In road that is used by hospital, schools or Region's long-term care facilities (break would impede access)	13%	Everything else	N/A	Schools and long-term care within 400m	N/A	Hospital with 400m

Consequence Category	Criteria	Parameter	Weight	Consequence Score: 1 - Minimal	2 - Minor	3 - Moderate	4 - Major	5 – Extreme
		Feedmain into main area (redundancy for fire flow)	13%	No	N/A	N/A	Yes	N/A
		Water quality impacts	13%	Vacant Land, Parking Lots, Environmental Protection, Transportation / Public Utilities	Recreational, Private Recreational, Rural Residential, Nursery Stock, Greenhouses, Vineyards, Orchards, Intensive Livestock, Field Crops, Idle Agriculture, Agricultural Commercial, Agricultural Industrial, Mixed Agricultural, Agricultural Commercial	Commercial, Commercial/Residential, Single Detached, Double Detached, Multiple Attached (townhouses), Multiple < 3 Storeys >3 units, Triplex, Churches	Schools, Long-term Care, Group Homes, Multiple >3 Storeys, Industrial	Hospitals
	Legal liability	Disruption to significant businesses						
	Service Disruption	Land Use Parcel - land use provides a representation of number and type of affected customers, which would be proportional to service disruption.						
	Customer Impact	In road that is used by hospital, schools or Region's long-term care facilities (break would impede access)	Included above	Everything else	N/A	Schools and long-term care within 400m	N/A	Hospital with 400m
		Pipe Diameter (mm) - pipe diameter is generally proportional to number of impacted customers.	Included above	0 – 125 mm	126 – 200 mm	201 – 400 mm	401 – 1000 mm	≥ 1001 mm
Environmental	Environmental Compliance	Shapefiles - Distance (m) to ESA, Watercourse or Habitat. Distance to environmental features will indicate if environmental issues will occur as a result of a failure.	10%	> 100 m	50 – 100m	≤ 50 m	N/A	N/A
	Environmental Impact							

3.6 Lifecycle Management Strategy

3.6.1 Lifecycle Management Activities

The levels of service presented in the previous section are supported by a variety of lifecycle activities in accordance with the activity types presented in Table 3-9. These activities are targeted to extend the asset life, ensure levels of service are being met, and reduce overall lifecycle costs.

Table 3-9 Lifecycle Activities – Planned and Recommended – Water Service

Lifecyle Activity Type	Planned Activities (within Anticipated Funding)	Risks of not continuing the Planned Activities	Additional Recommended Activities	Risks of not Adopting Recommended Activities
Non-Infrastructure Solutions	– Water MSP will be completed in 2026 to identify capacity needs, based on hydraulic analysis, to support growth. – The City supports public information, education and outreach on water conservation and sustainable water use to manage demand for water infrastructure.	– Without the Water MSP, the City will not know the most efficient way to meet the City's water needs. – Without water conservation activities, future demand may be higher, resulting in a need for more costly infrastructure expansion	– Water MSP to be updated every 10 years (Estimated cost $250k). – Between Water MSP updates, conduct hydraulic analysis to evaluate the capacity of the linear water system and identify areas that require improvements. (Estimated cost $50k, every 10 years). – Regular condition assessments of the booster station and bulk water station (estimated cost $75k). - Water booster station was last assessed in 2011. Next assessment recommended in 2026, and every 5 years thereafter. - Bulk water station was last assessed in 2022. Assess with Water booster station.	– Without regular updates of the Water MSP and hydraulic analysis, City will be relying on a Water MSP whose assumptions may be out-of-date and incorrect – Without condition assessments, asset deterioration could be overestimated or underestimated based on age. Assets may fail unexpectedly

Lifecyle Activity Type	Planned Activities (within Anticipated Funding)	Risks of not continuing the Planned Activities	Additional Recommended Activities	Risks of not Adopting Recommended Activities
Operations and Maintenance Activities	**Linear Assets** – Routine maintenance program including flushing of watermains, exercise in-line valves, seasonal maintenance of hydrants. – Leak detection program and break repairs as needed. – Repair program for valves and hydrants as required. **Vertical Assets** – Routine maintenance program including inspection and equipment checks.	– Increased lifecycle cost if maintenance is done improperly or without scheduled frequency. – Insufficient maintenance could lead to unplanned and urgent work when there are inadequate resources available (labour, materials, etc.). – Insufficient maintenance may contribute to asset failure resulting in service disruptions.	– O&M needs will increase as assets are added to accommodate growth. – O&M needs may also change as a result of asset upgrades.	– If inventory changes are not considered, O&M funding may not be sufficient to deliver the required LOS.

Lifecyle Activity Type	Planned Activities (within Anticipated Funding)	Risks of not continuing the Planned Activities	Additional Recommended Activities	Risks of not Adopting Recommended Activities
Renewal, Rehabilitation and Replacement	– Replacement and rehabilitation of deteriorated assets. – For watermains, needs are identified based on break history and age. PVC is the current standard pipe material. Renewal is also coordinated with other corridor activities. – For vertical assets, needs are identified based on condition assessment and maintenance inspection findings – City may considering watermain relining as a renewal option.	– Disruption of service – Watermain breaks and water loss to the environment. – Increased lifecycle cost if renewal/rehab are deferred. – Increased watermain breaks and associated risk of contaminants entering the water supply if renewal/rehab are deferred.	– Replacement and rehabilitation activities could be increased to reduce the renewal backlog (assets in Very Poor condition) more quickly.	– Disruption of service – Watermain breaks and water loss to the environment. – Increased lifecycle cost if renewal/rehab are deferred.

Growth Activities	– Assumption of $1,95M / year of developer-constructed assets (approximately 1.5 km/year of watermains) to homes and businesses. This estimate is based on the annual average of asset assumptions 2019-2023 – For the estimated population growth of 11,696 over 10 years and an average household size of 2.6 people (per 2021 census), it is projected that approximately 4,498 new water meters will be installed by developers at residential properties, or approximately 450 new meters per year, adding approximately $265,500/year of value to the asset inventory. Initial purchase and installation are funded by developers, but on-going operations, maintenance and renewal are the responsibility of the City. – New commercial meters have not been included. These may be included as	– The City is required to assume developer-constructed assets once new development has been constructed and assets are connected to the City's network. – Assumption of assets results in increased operations, maintenance and renewal costs to the City. – If future assumptions differ from the historical average, the estimated impact on O&M costs will be inaccurate.	– No specific growth-related needs have been identified. Growth-related construction needs will be identified in the upcoming MSP for Water.	– N/A

Lifecyle Activity Type	Planned Activities (within Anticipated Funding)	Risks of not continuing the Planned Activities	Additional Recommended Activities	Risks of not Adopting Recommended Activities
	a future improvement to the AM Plan. – The City has not constructed new water assets or expanded water assets in the last 5 years.			
Upgrade Activities	– Adding Storz connections to existing hydrants (approximately $0.5M/year planned from 2025-29) – Water service connection improvements are conducted during watermain replacement projects, or at the request of a customer based on pipe diameter and/ or material type to copper or plastic. – Adding loops to add redundancy to the watermain network	– Storz connections make it easier to attach hoses to hydrants, thus improving emergency response and reducing leakage.	– Upgrade needs will be identified in the upcoming MSP for Water. This may include watermain looping to minimize dead ends in the water network.	– N/A
Disposal Activities	– There are currently no plans to dispose of any assets without replacement.	– N/A	– Disposal needs may be identified in the upcoming MSP for Water.	– N/A

3.6.2 Lifecycle Management Scenario Forecasts

This section presents lifecycle forecasts for:

- Scenario A: Anticipated Budget (in accordance with the Council-approved Water and Wastewater Financial Plan report FMS-050-2025)
- Scenario B: Maintain Current LOS
- Scenario C: Proposed LOS

Table 3-10 compares the lifecycle activities included in each scenario.

Table 3-10 Lifecycle Activities – Scenario Comparison – Water Service

Lifecycle Activity Type	Scenario A: Anticipated Funding	Scenario B: Maintain Current LOS	Scenario C: Proposed LOS
Non-Infrastructure Solutions	– Update MSP for Water by end of 2026 (funded and procured in 2025) – Continue to support public information and education on water conservation to manage demand for water infrastructure.	– Include activities in Scenario A – Update of MSP ($250k, allocated in 2035) – Update of hydraulic model ($50k, 2030)	– Include activities in Scenario A – Update of MSP ($250k, allocated in 2035) – Update of hydraulic model ($50k, 2030) – Condition assessments of the booster station and bulk water station ($75k in 2027 and 2032)
Operations and Maintenance Activities	**Linear Assets** – Routine maintenance program including flushing of watermains, exercise in-line valves, sampling for lead in service connections, seasonal maintenance of hydrants. – Leak detection program and break repairs as needed. – Repair program for valves and hydrants as required. **Vertical Assets** – Routine maintenance program including inspection and equipment checks.	– Same as Scenario A – Increase resources in proportion with growth of asset inventory	– Same as Scenario A – Increase resources in proportion with growth of asset inventory

Lifecycle Activity Type	Scenario A: Anticipated Funding	Scenario B: Maintain Current LOS	Scenario C: Proposed LOS
Renewal, Rehabilitation and Replacement	– Replace and renew assets up to amounts approved in the Water and Wastewater Financial Plan (2024) to reduce the backlog. Average annual amount is $20.5M/year for the period 2026-35.	– Replace and renew assets as needed to maintain current backlog (projected cost of $9,958,249 / year) – Growth assets will not require renewal within the 10-year forecast period	– Similar to Scenario A, but with some funds reallocated to Non-Infrastructure Solutions and O&M needs of growth assets. Average annual amount remaining for renewal is $20.4M/year for the period 2026-35 to reduce the backlog. – Growth assets will not require renewal within the 10-year forecast period
Growth Activities	– Assumption of $1,951,910 of developer-constructed assets each year (2026-2035) – $265,500/year of net new residential water meters are installed each year (2026-2035)	– Same as Scenario A	– Same as Scenario A
Upgrade Activities	– Continue installing Storz connections on hydrants that require them (approximately $0.5M/year 2025-29) – Continue upgrading water service connection (diameter and material) as part of watermain replacement projects, or as requested by customers	– Same as Scenario A	– Same as Scenario A
Disposal Activities	– - None	– None	– None

Table 3-11 compares the projected LOS performance of each scenario. Scenario A provides the best LOS in most categories, including reducing the proportion of assets due or overdue for replacement from 26% to 15% over the 10-year period at an average annual renewal cost of $27.8M/year. However, this does not provide O&M funding for growth assets. This Scenario is thus likely to result in deferral of maintenance activities, an increase in reactive repairs, and reduction of asset service lives.

Scenario C is similar to Scenario A but re-allocates a small amount ($0.1M/year) from the renewal budget to support non-infrastructure solutions (MSP updates, hydraulic modeling and condition assessments) and O&M for growth assets. These activities will allow the City to better plan for future capacity and deterioration needs, and to ensure that O&M budgets keep up with growth. The impact on the LOS metric for assets due or overdue for replacement is not noticeably different from the projected performance for Scenario A. Specifically, the renewal backlog is expected to drop from 26% to 15% over the 10-year period under both scenarios/

Scenario B was designed to maintain the current LOS and holds the renewal backlog between 26 and 23%. Within the 10-year planning period, only $10.0M/year of renewals and replacements are needed to maintain this LOS; however, this level of renewal backlog results in a high number of breaks, which impact service delivery and maintenance costs.

Table 3-11 LOS Projected Performance – Scenario Comparison – Water Service

Service Attribute	Customer LOS Statement (CLOS)	Technical LOS Indicator (TLOS)	Actual Performance 2024	Projected Performance		
				Scenario A: Anticipated Budget	Scenario B: Maintain Current LOS	Scenario C: Proposed LOS
Capacity and Use	System has capacity to provide current and future serviced customers with uninterrupted access to treated water at an adequate pressure	Percentage of properties connected to the municipal water system[a]	97.4% Inside urban boundary: 98.9% Outside urban boundary: 14.9%	Within urban boundary: Slight increase due to development Outside urban boundary: No change from 2024		
		Percentage of properties where fire flow is available[a]	98.6%[b]	Slight increase due to development		
Function	Services are provided prioritizing safety	The number of connection-days per year where a boil water advisory notice is in place compared to the total number of properties connected to the municipal water system[a]	Zero (0)	Zero (0)		

Service Attribute	Customer LOS Statement (CLOS)	Technical LOS Indicator (TLOS)	Actual Performance 2024	Projected Performance		
				Scenario A: Anticipated Budget	Scenario B: Maintain Current LOS	Scenario C: Proposed LOS
		Percentage of water sampling meeting Safe Drinking Water Standards	99.93%	Similar to 2024. Decreases due O&M funding not increasing with asset inventory growth is balanced with increase due to reduction in amount of assets in Very Poor condition	Similar to 2024. O&M funding increases with asset inventory growth and amount of assets in Very Poor condition remains unchanged	**Best:** Better than 2024 (O&M funding increases with asset inventory growth and amount of assets in Very Poor condition is reduced
		Water loss as a percentage of Water Purchased	14.7%	**Best:** Decreases annually from 2024 due to reduction of assets in Very Poor condition	Similar to 2024	**Best:** Decreases annually from 2024 due to reduction of assets in Very Poor condition
		Number of lead water service connections	232	**Best:** Decreases more quickly than in Scenario B and slightly more quickly than in Scenario C due to higher rate of watermain replacements	Decreases more slowly than in Scenarios A and C due to lower rate of watermain replacements	**Second Best:** Similar to Scenario A, but decrease is slightly slower because renewal and replacement budget is slightly lower
		Number of complaints due to rusty / discoloured water	35			
Reliability	Assets are kept in a state of good repair	The number of connection-days per year due to watermain breaks compared to the total number of properties connected to the municipal water system[a]	0.0580			

Service Attribute	Customer LOS Statement (CLOS)	Technical LOS Indicator (TLOS)	Actual Performance 2024	Projected Performance		
				Scenario A: Anticipated Budget	Scenario B: Maintain Current LOS	Scenario C: Proposed LOS
		Percentage of water assets due or overdue for replacement	26%	**Best:** Decreases from 26% in 2025 to 15% in 2035. Averages 21% over the 10-year period.	Fluctuates between 26% and 23%. Averages 24% over the 10-year period.	**Second Best:** Decreases from 26% in 2025 to 15% in 2035. Averages 21% over the 10-year period. Similar to Scenario A, but renewal and replacement budget is slightly lower
		Total number of watermain breaks	74	**Best:** Decreases more quickly than in Scenario B and slightly more quickly than in Scenario C due to higher rate of watermain replacements	Similar to current performance (2024)	**Second Best:** Similar to Scenario A, but decrease is slightly slower
		Number of watermain breaks per 100 km	12.5			
		5 year rolling average watermain breaks per 100km	14.8			
		5-year average number of watermain breaks	88			
	Maintenance is proactive	Preventative maintenance as a percentage of total maintenance	Future metric	Fewer assets in Very Poor condition, resulting in fewer failures, but O&M funding not increasing with growth as needed to support preventive maintenance	Similar to current performance (2024)	**Best:** Fewer assets in Very Poor condition, resulting in fewer failures; O&M funding increases with growth, enabling more preventive maintenance

Service Attribute	Customer LOS Statement (CLOS)	Technical LOS Indicator (TLOS)	Actual Performance 2024	Projected Performance		
				Scenario A: Anticipated Budget	Scenario B: Maintain Current LOS	Scenario C: Proposed LOS
Affordability	Services are affordable and provided at lowest cost for both current and future customers	Annual capital investment as a % of cost to sustain assets over their lifecycles (replacement value / estimated service life = $22.0M/yr)	63%/year	**Best:** Annual average 93%/year	Annual average 45%/year	**Second Best:** Annual average 93%/year

[a] Required by O.Reg. 588/17.

[b] Based on 2020 hydraulic model estimation.

Figure 3-5 shows the forecast condition distribution of water assets under Scenario A: Anticipated Funding. This scenario applies the renewal budget identified in the Water and Wastewater Financial Plan (2024). The graph shows that the renewal backlog (assets in Very Poor condition) decreases from 26% in 2025 to 17% in 2035. The average for the 10-year period is 21%.

Figure 3-5 Condition Forecast – Water Service Scenario A: Anticipated Funding

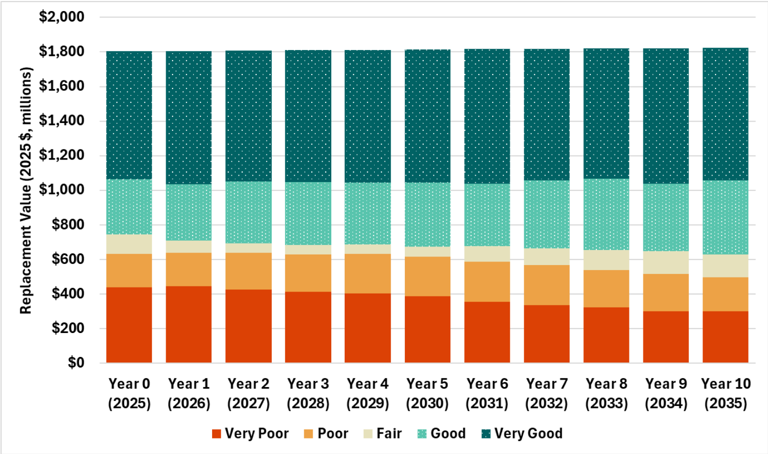


Figure 3-6 shows the forecast condition distribution of water assets under Scenario B: Maintain Current LOS. In this scenario, the renewal backlog fluctuates between 23% and 26% over the 10-year period, and averages 24%.

Figure 3-7 shows the forecast condition distribution of water assets under Scenario C: Proposed LOS. The renewal funding in this scenario is slightly lower than Scenario A (Figure 3-5), so the difference in the renewal backlogs is not visible in the graphs.

Figure 3-6 Condition Forecast – Water Service Scenario B: Maintain Current LOS

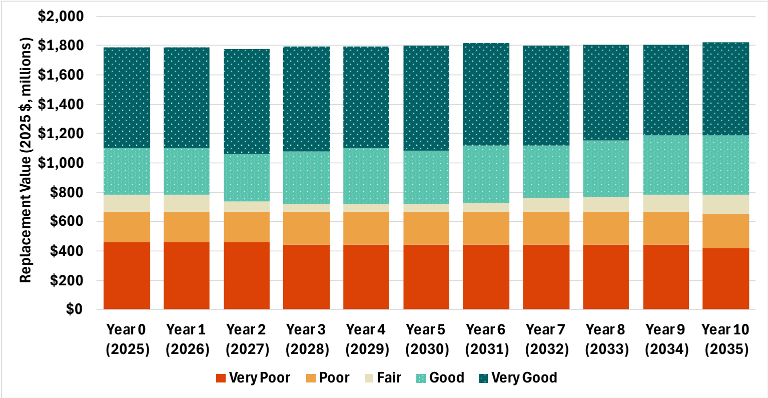


Figure 3-7 Condition Forecast – Water Service Scenario C: Proposed LOS

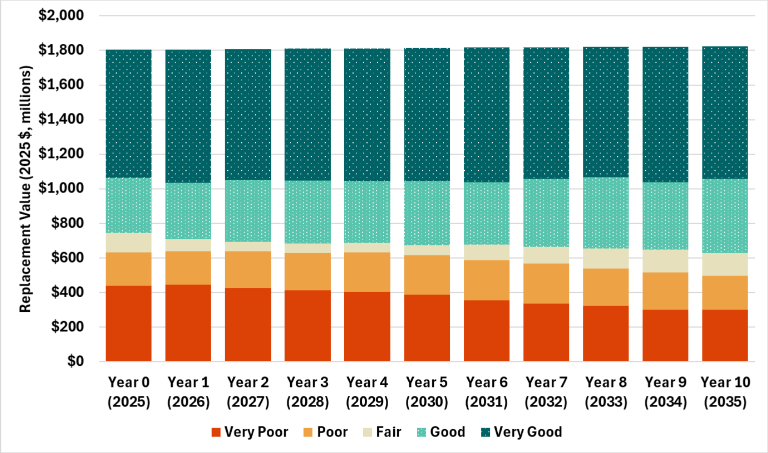


Figure 3-8 shows the year-by-year renewal needs for the recommended scenario, Scenario C: Proposed LOS. The average annual renewal needs for Scenario C are $20.4M/year, which is slightly lower than the average annual anticipated renewal funding of $20.5M/year. The renewal funding amount is based on the amount that was approved in the Water and Wastewater Financial Plan (2024).

This average annual renewal need for Scenario C ($20.4M/year) is higher than the renewal needs to maintain current LOS ($10.0M/yr) because Scenario C reduces the renewal backlog instead of maintaining it. Scenario C's average annual renewal need is also higher than the renewal needs associated with the lowest life cycle cost to sustain the assets ($21.9M/yr), because the current backlog is high.

Figure 3-8 Renewal Needs for Scenario C: Proposed LOS

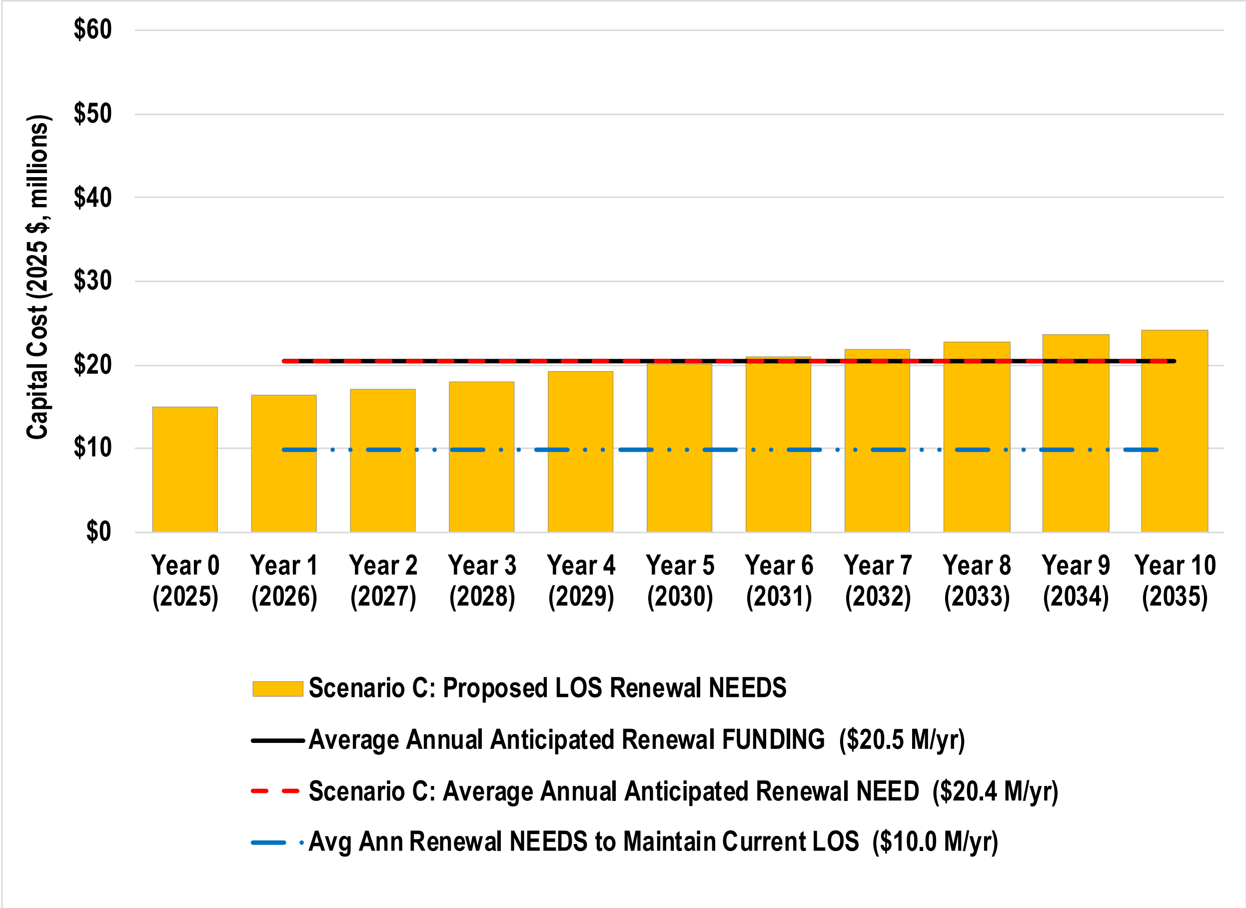


Table 3-12 shows the annual cost forecast for Scenario A: Anticipated Funding. This Scenario includes the current operating budget (year 2025 budget), which is sufficient to support O&M activities on the current asset inventory. It also includes funds for upgrade of hydrants to Storz connections, as well as design for future construction projects (a non-infrastructure solution). These amounts are approved in the Water and Wastewater Financial Plan (2024).

This scenario does not include funds for O&M or renewal of growth and upgrade assets (watermains and meters installed by developers), nor does it include funds for other non-infrastructure solutions, such as condition assessments and the 2035 MSP update for Water. Note however, that the MSP for Water that will be completed in 2026 received funding in 2025. No disposal activities have been identified or funded.

The cost forecast is shown graphically in Figure 3-9.

Table 3-12 Annual Cost Forecast – Water Service – Scenario A

Lifecycle Activity Type	Annual Cost Forecast (2025 $, millions)										
	Year 1 (2026)	Year 2 (2027)	Year 3 (2028)	Year 4 (2029)	Year 5 (2030)	Year 6 (2031)	Year 7 (2032)	Year 8 (2033)	Year 9 (2034)	Year 10 (2035)	Average Annual
Non-Infrastructure Solutions	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	**0.05**
O&M – Existing Assets	6.90	6.90	6.90	6.90	6.90	6.90	6.90	6.90	6.90	6.90	**6.90**
Renewal – Existing Assets	16.39	17.19	18.04	19.1	20.24	21.09	21.94	22.79	23.64	24.49	**20.50**
Growth & Upgrade Activities	0.50	0.54	0.54	0.24	0.04	0.04	0.04	0.04	0.04	0.04	**0.21**
O&M – Growth & Upgrade Assets	--	--	--	--	--	--	--	--	--	--	**--**
Renewal – Growth & Upgrade Assets	--	--	--	--	--	--	--	--	--	--	**--**
Disposal Activities	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
TOTAL	**23.84**	**24.68**	**25.53**	**26.29**	**27.23**	**28.08**	**28.93**	**29.78**	**30.63**	**31.48**	**27.65**

Figure 3-9 Annual Cost Forecast – Water Service – Scenario A

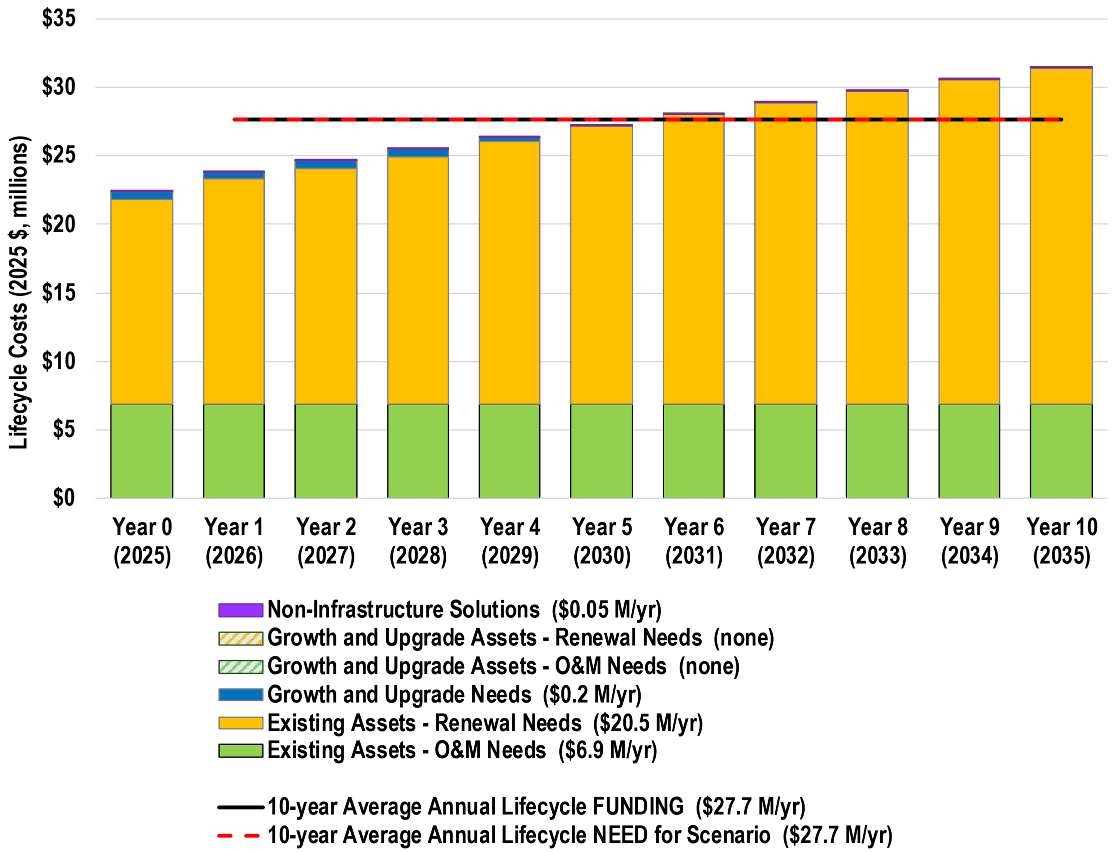


Table 3-13 shows the annual cost forecast for Scenario B: Maintain Current LOS. As with Scenario A, this Scenario includes the current operating budget (year 2025 budget) to support O&M activities on the current asset inventory. However, the renewal costs reflect the amount needed to maintain the current renewal backlog at approximately 26%. This renewal cost is lower than in Scenario A.

This scenario includes funds for O&M of growth and upgrade assets, including assets assumed from development. Funds are not included for renewal of growth and upgrade assets, since these will not require replacement within the 10-year planning period. This scenario also includes funds for non-infrastructure solutions that were funded in Scenario A, as well as updates of the hydraulic model in Year 5 and the MSP in Year 10 to maintain capacity LOS but does not establish regular condition assessments for the bulk water station and booster pumping station. No disposal activities have been identified or funded.

The cost forecast is shown graphically in Figure 3-10.

Table 3-13 Annual Cost Forecast – Water Service – Scenario B

Lifecycle Activity Type	Annual Cost Forecast (2025 $, millions)										
	Year 1 (2026)	Year 2 (2027)	Year 3 (2028)	Year 4 (2029)	Year 5 (2030)	Year 6 (2031)	Year 7 (2032)	Year 8 (2033)	Year 9 (2034)	Year 10 (2035)	Average Annual
Non-Infrastructure Solutions	0.05	0.05	0.05	0.05	0.10	0.05	0.05	0.05	0.05	0.30	**0.08**
O&M – Existing Assets	6.90	6.90	6.90	6.90	6.90	6.90	6.90	6.90	6.90	6.90	**6.90**
Renewal – Existing Assets	22.32	20.85	8.22	11.56	3.34	2.60	0.73	8.54	10.72	10.70	**9.96**
Growth & Upgrade Activities	0.50	0.54	0.54	0.24	0.04	0.04	0.04	0.04	0.04	0.04	**0.21**
O&M – Growth & Upgrade Assets	0.01	0.02	0.03	0.03	0.04	0.05	0.06	0.07	0.08	0.09	**0.05**
Renewal – Growth & Upgrade Assets	--	--	--	--	--	--	--	--	--	--	**--**
Disposal Activities	--	--	--	--	--	--	--	--	--	--	**--**
TOTAL	**29.78**	**28.36**	**15.74**	**18.78**	**10.42**	**9.64**	**7.78**	**15.60**	**17.79**	**18.03**	**17.19**

Figure 3-10 Annual Cost Forecast – Water Service – Scenario B

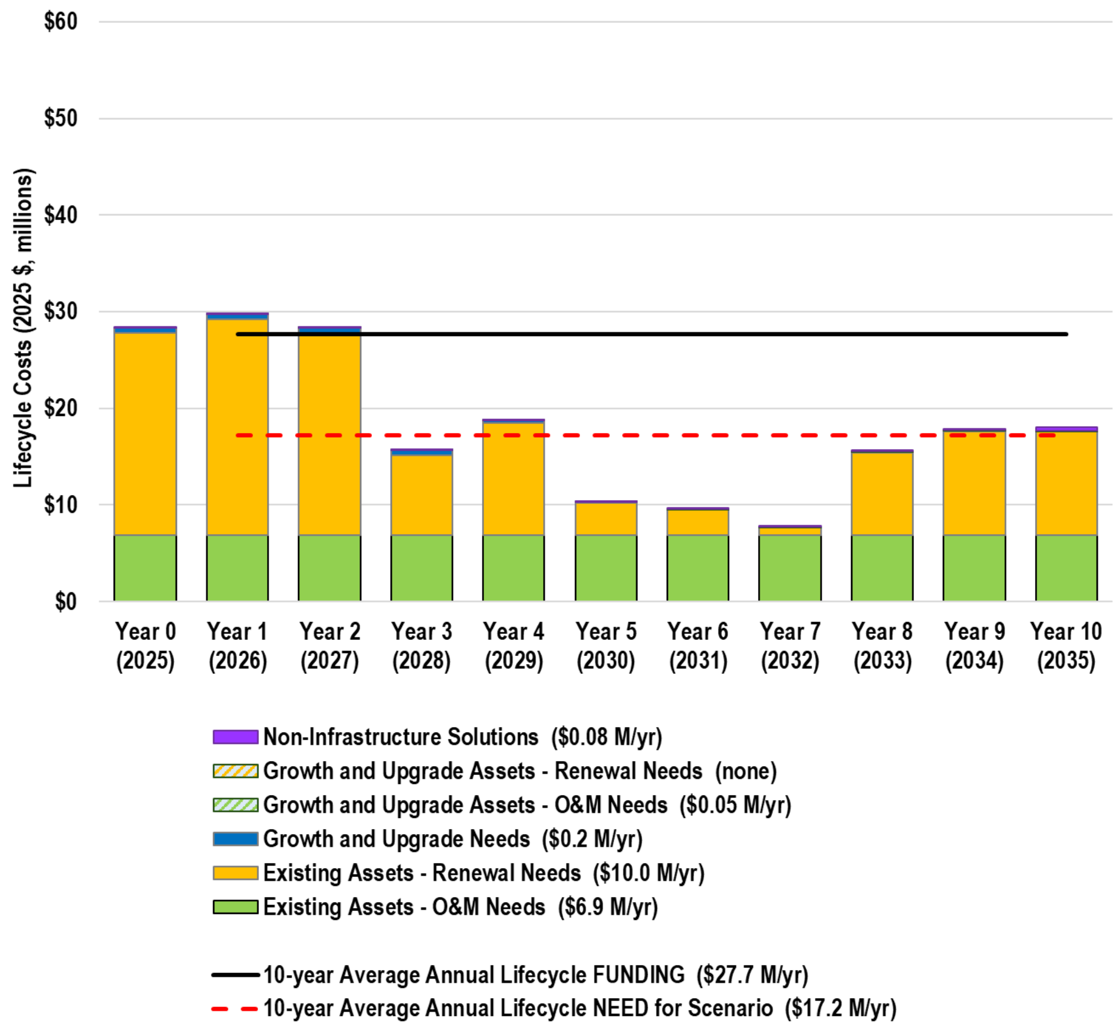


Table 3-14 shows the annual cost forecast for Scenario C: Proposed LOS. As with Scenario A, this Scenario includes the current operating budget (year 2025 budget) to support O&M activities on the current asset inventory, as well as the renewal funding identified in the Water and Wastewater Financial Plan (2024).

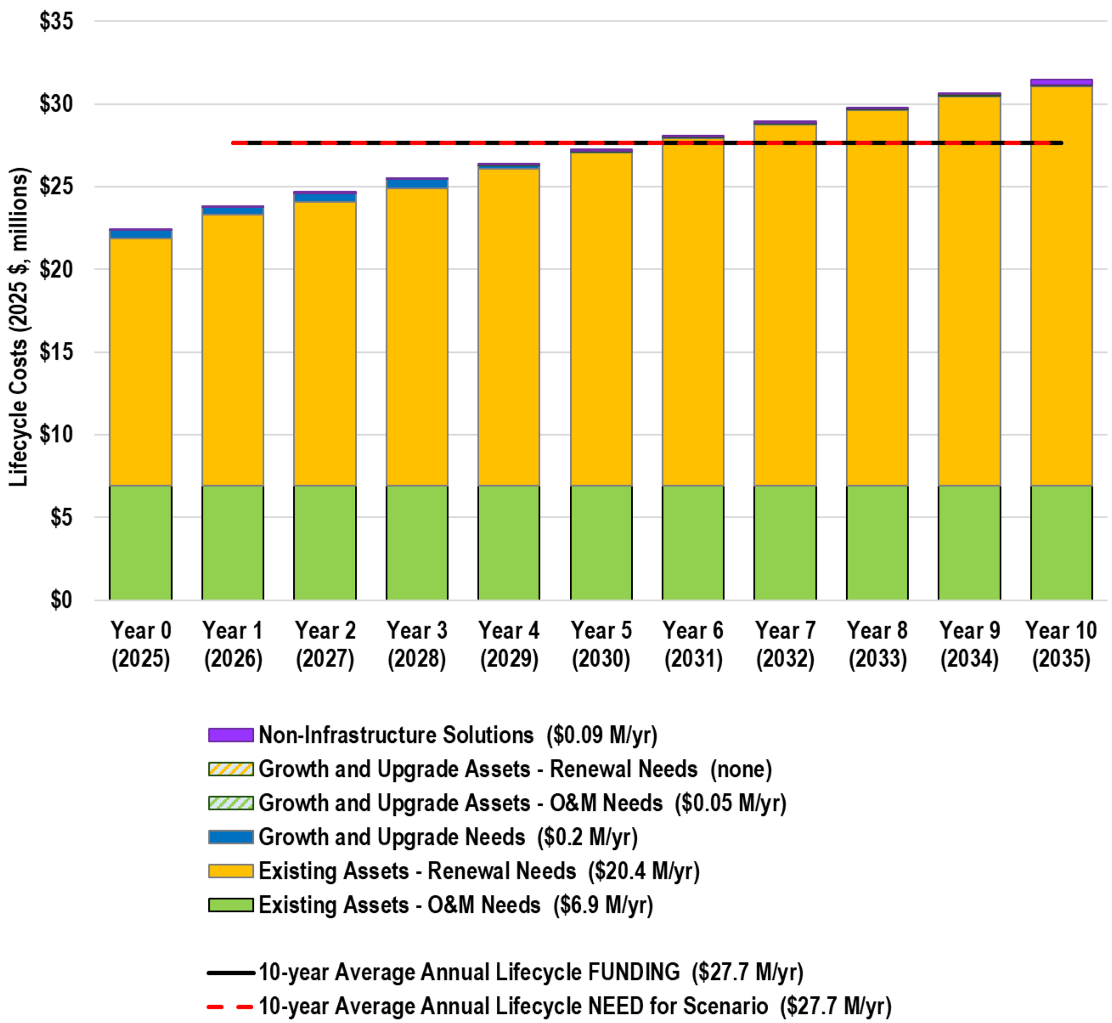
As in Scenario B, this scenario includes funds for O&M of growth and upgrade assets, including assets assumed from development. This scenario also includes funds for non-infrastructure solutions that were funded in Scenario A, as well as condition assessments in Years 2 and 7, as well as updates of the hydraulic model in Year 5 and MSP in Year 10. Funds are not included for renewal of growth and upgrade assets, since these will not require replacement within the 10-year planning period. No disposal activities have been identified or funded.

The cost forecast is shown graphically in Figure 3-11.

Table 3-14 Annual Cost Forecast – Water Service – Scenario C

Lifecycle Activity Type	Annual Cost Forecast (2025 $, millions)										
	Year 1 (2026)	Year 2 (2027)	Year 3 (2028)	Year 4 (2029)	Year 5 (2030)	Year 6 (2031)	Year 7 (2032)	Year 8 (2033)	Year 9 (2034)	Year 10 (2035)	Average Annual
Non-Infrastructure Solutions	0.05	0.13	0.08	0.05	0.05	0.10	0.13	0.08	0.05	0.05	**0.08**
O&M – Existing Assets	6.90	6.90	6.90	6.90	6.90	6.90	6.90	6.90	6.90	6.90	**6.90**
Renewal – Existing Assets	16.38	17.10	18.02	19.16	20.15	21.04	21.80	22.72	23.56	24.15	**20.42**
Growth & Upgrade Activities	0.50	0.54	0.54	0.24	0.04	0.04	0.04	0.04	0.04	0.04	**0.21**
O&M – Growth & Upgrade Assets	0.01	0.02	0.03	0.03	0.04	0.05	0.06	0.07	0.08	0.09	**0.05**
Renewal – Growth & Upgrade Assets	--	--	--	--	--	--	--	--	--	--	**--**
Disposal Activities	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
TOTAL	**23.84**	**24.69**	**25.57**	**26.38**	**27.18**	**28.13**	**28.93**	**29.81**	**30.63**	**31.23**	**27.64**

Figure 3-11 Annual Cost Forecast – Water Service – Scenario C



3.6.3 Rationale for Proposed LOS

The Proposed LOS, as defined in Scenario C is recommended because it reduces the renewal backlog (assets in Very Poor condition) at the rate approved by Council through the Water and Wastewater Financial Plan deliberations. This scenario also includes funds to support O&M needs for growth assets to ensure that O&M LOS can be sustained over the 10-year period. Also included are funds to update condition assessments and the MSP for Water to ensure that the City is prepared for asset deterioration and capacity needs.

3.7 Financial Strategy

Table 3-15 shows a comparison of the average annual costs of the three scenarios. The table shows that there is no funding gap to achieve the Proposed LOS, provided the Council-approved Water and Wastewater Financial Plan (report FMS-050-2025) is followed. As explained in the Water and Wastewater Financial Plan, the funding levels of Scenarios A and C are expected to eliminate the backlog of water assets due and overdue for replacement in approximately 35 years.

Table 3-15 Average Annual Costs – Water Service – Scenario Comparison

Lifecyle Activity Type	Average Annual Cost (2025 $, millions)		
	Scenario A: Anticipated Funding	Scenario B: Maintain Current LOS	Scenario C: Proposed LOS
Non-Infrastructure Solutions	0.1	0.08	0.1
O&M – Existing Assets	6.9	6.9	6.9
Renewal – Existing Assets	20.5	10.0	20.4
Growth & Upgrade Activities	0.2	0.2	0.2
O&M – Growth & Upgrade Assets	--	0.05	0.05
Renewal – Growth & Upgrade Assets	--	--	--
Disposal Activities	--	--	--
Total	27.7	17.2	27.7
Funding Gap	n/a	none	none

4 Wastewater Service

The City collects wastewater from residential, industrial, commercial, and institutional facilities within its urban boundary to be treated at one of the Niagara Region's wastewater treatment plants. As a lower tier municipality, the City is responsible for the local wastewater collection system, maintenance holes, storage facilities and a sewage pumping station.

Portions of the system are combined and partially combined with stormwater, and the City is gradually separating those portions as assets are replaced. Assets in the combined and partially combined system are reported in this section of the AM Plan.

4.1 State of the Local Infrastructure

4.1.1 Asset Valuation

The City's wastewater collection system is divided into linear and vertical asset types. These serve to convey both wastewater and combined (wastewater and stormwater) flows. Linear assets represent the majority of the collection system and include mains, maintenance holes and service connections. Vertical assets include the facilities required to further pump or store wastewater in the system.

For the valuation of the wastewater collection system, the replacement values considered are intended for replacement of a similar asset (like-for-like) on a complete and standalone basis. These were calculated based on historical values that the City has incurred as part of previous projects for similar assets. Furthermore, the estimated value for the sewage pumping station was calculated using a bottom-up approach based on the assets located within the facility.

The overall distribution of replacement values by asset type for the wastewater collection system is as shown in Table 4-1. The wastewater gravity mains have the highest replacement value in the portfolio, totaling 98% of the entire system. Table 4-2 provides a summary of the distribution of replacement values on the mains based on material type.

Table 4-1 Inventory Valuation – Wastewater Service

Asset Category	Asset Sub-Category	Count	Unit	Replacement Value (millions, 2025 $)	Replacement Value (% Total)
Wastewater Collection	Wastewater Mains	564,495	metres	$1,895.6	98%
	Maintenance Holes	7,918	each		
	Storage Tanks	9	each	$33.88	2%
	Sewage Pumping Station	1	each	$0.96	<0.1%
	Overall Replacement Value			**$1,930.4**	**100%**

Table 4-2 Inventory Valuation – Wastewater Mains by Material

Material Type	Quantity (meters)	Replacement Value (millions, 2025 $)	Replacement Value (% Total)
Asbestos Cement	138,258	$453.49	24%
Clay	87,812	$292.42	15%
Concrete	206,909	$715.65	38%
Polyvinyl Chloride (PVC)	108,562	$358.22	19%
Other	22,954	$75.77	4%
Overall Replacement Value	564,495	**$1,895.6**	**100.0%**

4.1.2 Asset Age

Comparing the average age of the assets with the average Estimated Service Life (ESL) provides a representation of the average overall portfolio's remaining life. As shown in Figure 4-1, the average actual age of wastewater mains is about three quarters of the average service life. For sewer mains, effective life is also shown. The average effective age is much lower due, which suggests that pipes are deteriorating more slowly than expected. This may be because many of the PACP scores come from zoom camera. Relying solely on zoom camera inspections can sometimes lead to overestimated conditions, as they may not provide a complete picture of external pipe degradation or structural vulnerabilities. The City is undertaking more CCTV inspections, which will offer a much more detailed and reliable assessment in the future, allowing for better-informed decisions.

The material of the pipes adds another layer of complexity. Clay pipes, while often showing minimal defects on the inside, can suffer significant external deterioration. Over time, environmental factors like soil compaction or nearby construction activities can then cause pipe failures. Their susceptibility to breakage when disturbed underscores the importance of considering external conditions and material properties as AM practices are refined, not just internal appearances.

For other assets, actual and effective age are generally similar, so only actual age is shown. Storage tanks have an average service life of 80 years and an average age of 22.2 years. The tanks were installed between 1992 and 2020.

The sewage pumping station was installed in 2015 and so all its components are 10.0 years old. The average service life of the components is 28.8 years. The pumping station includes three grinder pumps, accounting for 92% of the value of the pumping station. The grinder pumps have a service life of 25. Access hatches and ladders have a service life of 75 years, and the precast chamber has a service life of 100 years.

Figure 4-2 shows the average and effective age of wastewater mains by material type. The “Other” category of materials includes plastic, polyethylene, high density polyethylene, ductile iron, steel, brick, corrugated steel and pipes of unknown material.

Figure 4-1 Asset Age – Wastewater Service

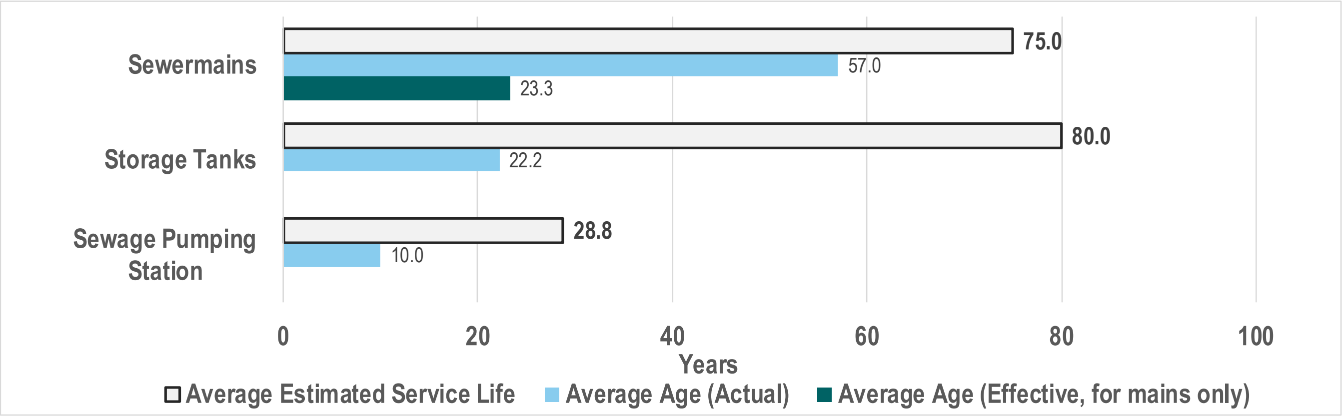
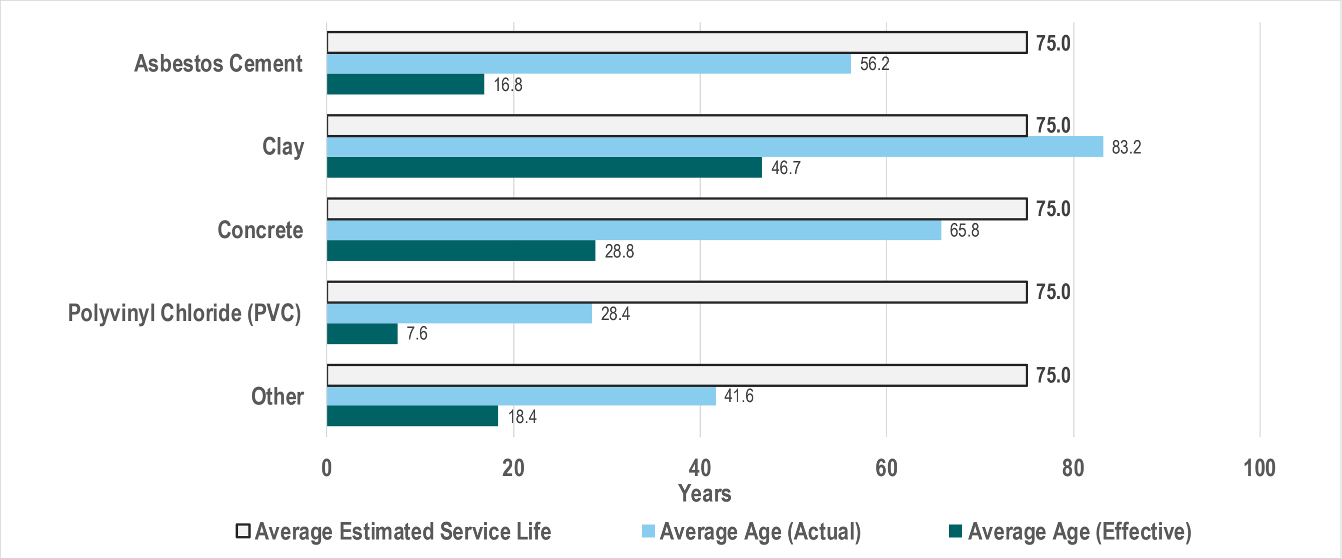


Figure 4-2 Asset Age – Wastewater Mains by Material Type



4.1.3 Asset Condition

The asset condition distribution is shown in Figure 4-3 for wastewater service assets. Overall, $170.6 million (8.8%) of wastewater assets are in very poor condition and $227.5 million (11.8%) are in poor condition. Assets in very poor condition are considered to be due or overdue for replacement. As shown in the Figure, assets in very poor or poor condition consist of wastewater mains. The storage tanks are in fair condition or better and the and sewage pumping station is in good condition.

Figure 4-3 Asset Condition – Wastewater Service

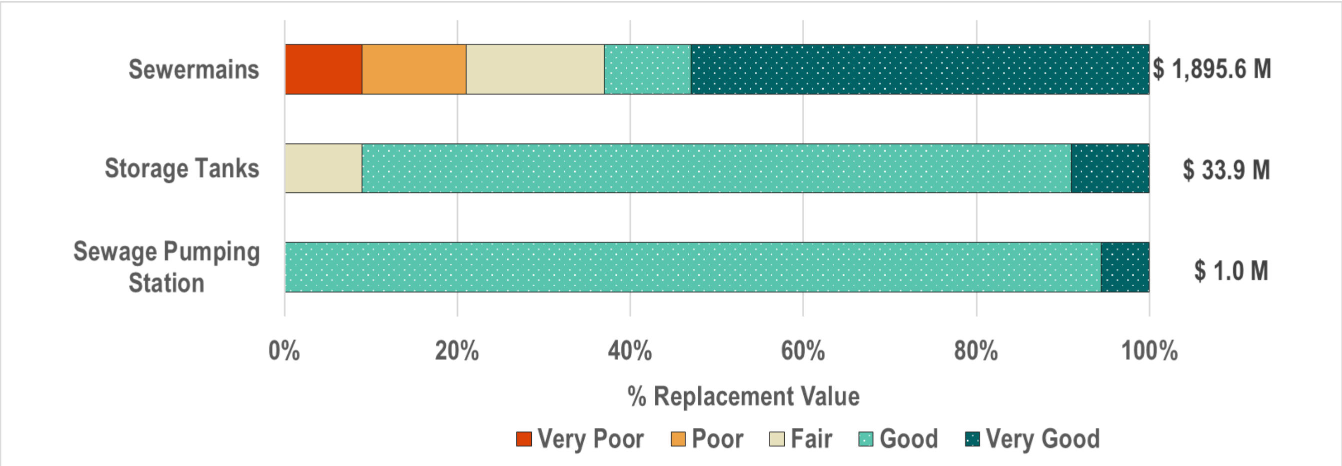
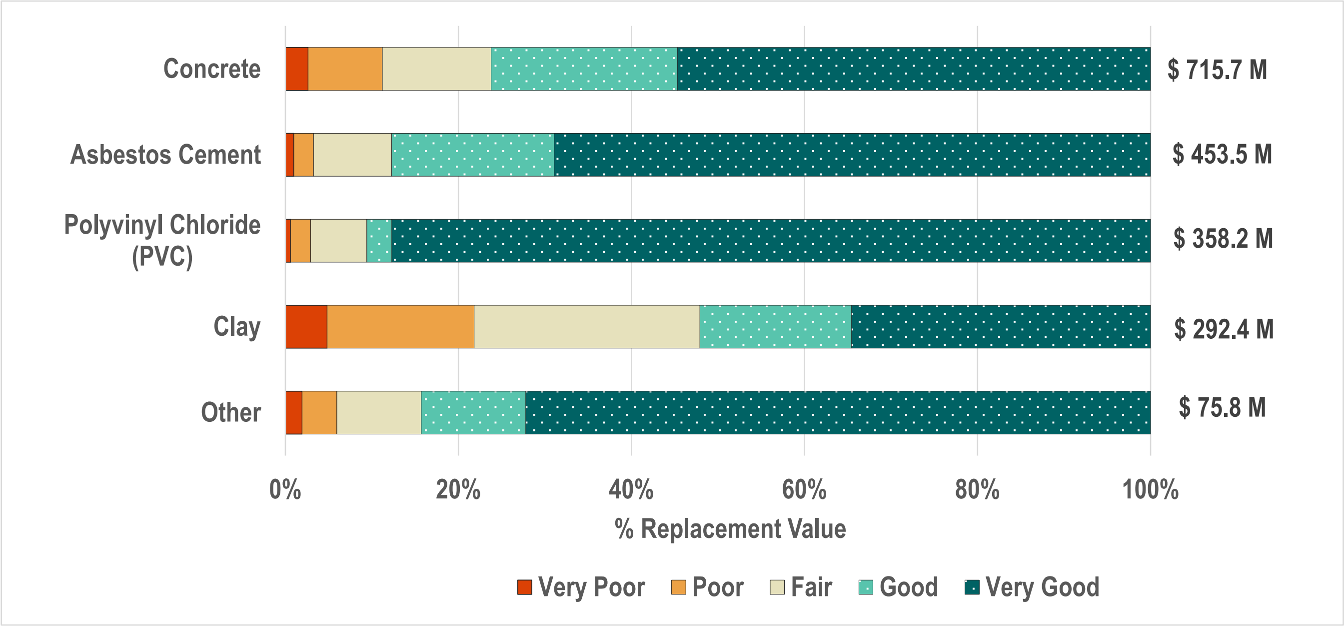


Figure 4-4 shows the asset condition distributions for wastewater mains. The condition bars are listed by material type in decreasing order of replacement value.

The methods used to estimate asset condition are explained in Sections 4.1.3.1 and 4.1.3.2.

Figure 4-4 Asset Condition – Wastewater Mains by Material Type



4.1.3.1 Wastewater Mains

As explained in Section 2.1, condition scores have been assigned to NASSCO's Pipe Assessment Certification Program (PACP) scores to most wastewater mains based on either CCTV or zoom camera images. While zoom camera inspections offer a cost-effective and rapid initial assessment, they are inherently limited in their ability to assess the full length of a pipe. The range of visibility depends on factors such as pipe diameter, lighting conditions, and the camera's zoom capabilities. Typically, zoom inspections are used to identify critical areas for follow-up with CCTV, which provides a more comprehensive evaluation.

The City has assessed over 93% of its wastewater pipes within the last decade, with approximately 15% evaluated using CCTV, 78% with zoom cameras.

Refer to Table 2-2 for mapping of PACP score to the AM Plan's five-point scale (very good to very poor).

For pipes without PACP scores, condition is estimated based on remaining service life in accordance with the mapping shown in Table 4-3.

Table 4-3 Age-based Condition Score – Wastewater Mains

Age-based Condition Score	Remaining Service Life (%)
1	80 to 100
2	60 to 80
3	40 to 60
4	20 to 40
5	0 to 20

4.1.3.2 Storage Tanks and Sewage Pumping Station

The condition of storage tanks and sewage pumping station components are estimated based on remaining service life in accordance with the mapping shown in Table 4-4.

Table 4-4 Age-based Condition Score – Storage Tanks and Sewage Pumping Station

Age-based Condition Score	Remaining Service Life (%)
1	80 to 100
2	60 to 80
3	20 to 60
4	5 to 20
5	0 to 5

4.2 Levels of Service

The City's wastewater services are based on providing sustainable and reliable collection of wastewater that minimizes basement flooding and environmental impacts.

The City follows the Ontario Ministry of Environment, Conservation and Parks (MECP) Design Guidelines for Sewage Works as minimum standard for the design, review, approval and installation of sewage works.

As part of the City's efforts to improve wastewater services, the City has implemented a program to separate combined sewers into individual wastewater and stormwater mains, improving the resiliency of the system. An additional benefit of separating storm and wastewater sewers is that it reduces the quantity of stormwater being treated at the wastewater treatment plants, therefore reducing costs.

The defined levels of service for the City's wastewater system are a key driver for the consistent performance that the City delivers to its residents as these provide the planned outcome from a functional perspective.

4.2.1 O.Reg. 588/17 Qualitative LOS

Table 4-5 provides a summary of the qualitative Community LOS required to be reported by O.Reg. 588/17 for wastewater service assets.

Table 4-5 O.Reg. 588/17 Qualitative LOS – Wastewater Service

Service Attribute	Community Levels of Service	Qualitative Description
Scope	Description, which may include maps, of the user groups or areas of the municipality that are connected to the municipal wastewater system.	Within the urban boundary there are 564 km of City-owned main sewers that drain to Region-owned trunk sewers which carry wastewater to one of the two sewage treatment plant. The system also has nine wastewater storage facilities to store sewage that cannot be accommodated in the existing sewers during wet weather.
Reliability	1. Description of how combined sewers in the municipal wastewater system are designed with overflow structures in place which allow overflow during storm events to prevent backups into homes.	75% of the City's collection system is combined or partially combined sewers. During large rainstorms, the volume of flow can exceed the capacity of the sewer system. When this happens, a portion of the flow is diverted away from the wastewater plant and untreated sewage, mixed with storm water, is released directly into the environment. The diversions occur at a series of overflow regulator chambers located along the combined sewer system. The strategically located overflow regulators are designed to prevent sewer backups. The system also has nine wastewater storage facilities to temporarily store sewage that cannot be accommodated in the existing sewers during wet weather. The stored sewage is then released into the sewer system at a favorable time when the sewers can accommodate the extra volume to reduce overflows to the environment.
	2. Description of the frequency and volume of overflows in combined sewers in the municipal wastewater system that occur in habitable areas or beaches.	There are 53 locations where combined sewers can outlet to the environment. The number of overflows incidences is directly related to the duration and intensity of wet weather. Based on a hydraulic model of the sewer system, in 2024 there were 92 overflow occurrences resulting in 211 ML discharged to the environment at 21 locations.
	3. Description of how stormwater can get into sanitary sewers in the municipal wastewater system, causing sewage to overflow into streets or backup into homes.	In areas with combined sewers, water may enter the system directly through catch basins. Other sources of inflow to the sewer main can result from: stairway drains, driveway drains, floor drains/basement sump pumps, uncapped yard cleanouts and downspouts. Groundwater infiltration can also enter from foundation drains. Even in areas that are fully separated, water can still flow into the sanitary sewers through maintenance hole covers or infiltrate through pipe defects such as cracks, or offset joints and poor service connections.
	4. Description of how sanitary sewers in the municipal wastewater system are designed to be resilient to avoid events described in paragraph 3.	Sanitary sewer design follows the Ontario Design Guidelines for Sewer Works and the St. Catharines Engineering Standards Manual. CCTV and smoke testing programs identify sources of infiltration and inflow and guide repairs.
	5. Description of the effluent that is discharged from sewage treatment plants in the municipal wastewater system.	This regulatory metric is not applicable to the City as the sewage treatment plants are owned and operated by the Regional Municipality of Niagara.

4.2.2 Technical Metrics including O.Reg. 588/17 LOS

Table 4-6 outlines the LOS that are driving current and future decision-making and expenditure needs for Wastewater Service assets. The City's Customer LOS statements and Technical LOS indicators document performance from a service user's and service provider's perspective, respectively. Performance scores from the most recent five years (2020 – 2024) are listed. The table also lists the desired or "aspirational" performance for each metric to support the long-term vision for the City. This column indicates the direction of desired performance for the period outside of this AM Plan, and does not represent the City's target, proposed or expected LOS that is represented in this AM Plan. Projected performance is presented for different scenarios in Section 4.6.2 (Table 4-11), including one scenario presented as the Proposed LOS.

Table 4-6 LOS Metrics and Performance – Wastewater Service

Service Attribute	Customer LOS Statement (CLOS)	Technical LOS Indicator (TLOS)	Historical Performance					Desired (Aspirational) Performance[a]
			2020	2021	2022	2023	2024	
Capacity and Use	System has capacity to provide current and future serviced customers with wastewater collection service	Percentage of properties connected to the municipal wastewater system[b]	94%	96%	96%	96%	96.6% Inside urban boundary: 98.4% Outside urban boundary: 41.4%	For monitoring only
		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[b]	0.0005	0.0021	0.0024	0.0019	0.0022	Minimize
		Total number of Wastewater Storage Facilities	9	9	9	9	9	For monitoring only
Function	System minimizes pollution and overflows into the environment	Length of fully separated sanitary sewer pipes	119.5 km (21%)		121.4 km (21%)	123.3 km (22%)	123.3 km (22%)	Maximize
		Length of combined sanitary and stormwater sewer pipes	66.8 km (12%)		67.1 km (12%)	67.3 km (12%)	65.5 km (12%)	Minimize

Service Attribute	Customer LOS Statement (CLOS)	Technical LOS Indicator (TLOS)	Historical Performance					Desired (Aspirational) Performance[a]
			2020	2021	2022	2023	2024	
		Length of partially separated sanitary and stormwater sewer pipes	359.3 km (63%)		358.2 km (63%)	356.4 km (63%)	354.7km (63%)	For monitoring
		Length of sanitary sewer pipe for which separation is unknown	23.0 km (4%)		21.3 km (4%)	21.1 km (4%)	21.3km (4%)	Minimize
Reliability	Assets are kept in a state of good repair	Percentage of wastewater assets due or overdue for replacement	9%	9%	10%	10%	9%	Minimize
		The number of connection-days per year due to wastewater backups compared to the total number of properties connected to the municipal wastewater system[b]	0.011	0.011	0.010	0.011	0.009	Minimize
	Maintenance is proactive	Preventative maintenance as a percentage of total maintenance	Future metric					Optimal balance TBD
Affordability	Services are affordable and provided at lowest cost for both current and future customers	Annual Capital investment as a % of cost to sustain assets over their lifecycles (replacement value / estimated service life = $32.3M/yr)	15%	15%	9%	19%	32%	100%

[a] Shows direction of preferred performance. This does not represent the City's target, proposed or expected performance.

[b] Required by O.Reg. 588/17.

4.3 Future Demand

As explained in Section 2.3, the City's population is projected to increase from 141,481 in 2025 to 153,177 in 2035. The represents an increase of 11,696 (8.3%), which may require additional capacity in the wastewater network.

The City is planning to complete a Master Servicing Strategy (MSS) for Wastewater Service in 2025-26, which will establish how the City will meet its long-term capacity needs for wastewater service. The MSS's infrastructure recommendations will be incorporated into future updates of the AM Plan.

For the current AM Plan, it is assumed that expansion of the wastewater network will continue at the at the same rate as the previous five years. Specifically, this includes ownership assumption of $2,483,293/year of developer-constructed wastewater mains (approximately 1,391m/year), as well as City-led construction of $487,676/year of new or expanded wastewater infrastructure.

4.4 Climate Change

The City completed a Climate Change Risk Assessment in 2022, which reviewed the likelihood extreme climate events and their impacts on water and wastewater infrastructure. Extreme climate events included:

- Extreme precipitation
- Extreme dry conditions
- Extreme precipitation and extreme cold
- Extreme cold
- Extreme heat
- Freeze-thaw events
- High lake levels
- High lake temperatures
- High winds

Impacts to the wastewater system include:

- Risk of overflow of storage tanks due to heavy precipitation
- High lake levels could cause reverse outflow where a low elevation outfall is overwhelmed with lake water and enters the sanitary combined system
- Basement flooding on private property due to higher rates of inflow and infiltration, as well as exceedance of combined sewer capacity
- Erosion of elevated sewer crossings
- Freezing and breakage of shallow pipes
- Instrumentation failures due to heat
- Power outages due to increased demands on electricity network
- Increase in H_2S formation resulting in increased corrosion

As was done for climate risks to the water assets, an internal workshop was held for wastewater assets, with subject matter experts from the City to:

- Identify potential impacts of climate events on municipal services and assets.
- Assess current strategies for responding to these events and explore opportunities for improvement.

The strategies discussed included:

- Asset Management (AM) Strategies: A proactive method emphasizing rehabilitation or replacement initiatives, typically executed through the Capital Budget.
- Design/Operating Modifications: Adjustments to design or operational specifications, incorporated into new infrastructure or upgrades during asset replacement or rehabilitation.
- Reactive/Emergency Response Procedures: Intended for scenarios with a very low likelihood of occurrence or prohibitively high adaptation costs; these procedures are to be implemented only when the impact or event takes place.
- Other/No Response: Indicates either the municipality does not encounter this asset impact, or the chosen response mechanism does not align with the aforementioned three strategies.

As the Decision Support System (DSS) continues to be implemented, the City will enhance its capacity for scenario planning, enabling a more thorough evaluation of the costs and benefits associated with these strategies.

4.5 Risk Management Strategy

As explained in Section 2.5, the City uses a risk-based approach to prioritize renewal needs. Likelihood of failure is estimated based on condition (refer to Table 2-3). The consequence of failure is estimated based on the scoring criteria and weights shown in Table 4-7 and Table 4-8 for wastewater mains and for the sewage pumping station, respectively.

Consequence of failure scores and scoring criteria have not been established for the storage tanks. Those will be established in future AM planning improvement initiatives.

Table 4-7 Consequence Scoring – Wastewater Mains

Consequence Category	Criteria	Parameter	Weight	Consequence Score: 1 - Minimal	2 - Minor	3 - Moderate	4 - Major	5 – Extreme
Financial	Capital Expenditure (Replacement of Assets)	Replacement Cost + Emergency Premium (20%) Normalized for length, based on diameter.	13%	<$100k	$100k - <$250k	$250k - <$1M	$1M - $2M	>$2M
	Revenue loss due to service closure or other direct cost not related to asset repair	N/A - failure will not result in revenue loss as there are alternative ways to supply water	Not included	N/A	N/A	N/A	N/A	N/A
Social	Impact to Health and Safety	Average Annual Daily Traffic (AADT) – If the failure happens near a higher traffic road, there is the potential for health and safety impacts to more road users. If AADT values not available, use Road Classification to determine traffic levels.	9%	0 – 500	501 – 3,000	3,001 – 5,000	5,001 – 10,000	≥ 10,001
		Customer Impact	13%	Everything else	N/A	Schools and long-term care within 400m	N/A	Hospital with 400m

Consequence Category	Criteria	Parameter	Weight	Consequence Score				
				1 - Minimal	2 - Minor	3 - Moderate	4 - Major	5 – Extreme
		Pipe Diameter (mm) - with a larger pipe diameter, there is a likelihood of more catastrophic failure	13%	0 – 200 mm	201– 300 mm	301 – 600 mm	601 – 1000 mm	≥ 1001 mm
	Legal liability	Potential for basement flooding - Land use	13%	Transportation / Public Utilities, Vacant Land, Parking Lots Environmental Protection, Rural Residential, Nursery Stock, Greenhouses, Vineyards, Orchards, Intensive Livestock, Field Crops, Idle Agriculture, Agricultural Commercial, Agricultural Industrial, Mixed Agricultural, Agricultural Commercial, Recreational, Private Recreational	Commercial, Commercial with Residential, Industrial	Multiple>3 Storeys, Single Detached, Double Detached, Multiple Attached(townhouses), Multiple<3 Storeys>3 units, Triplex, Churches	Schools, Long-term Care, Group Homes	Hospitals
		Combined Sewer Size. The larger pipe, the larger the catchment and resulting in higher customer impacts during wet weather events.	13%	Fully Separated	Partially Combined	Combined	N/A	N/A
		Disruption to industrial waste producer (Future criterion)	N/A	N/A	N/A	N/A	N/A	N/A

Consequence Category	Criteria	Parameter	Weight	Consequence Score				
				1 - Minimal	2 - Minor	3 - Moderate	4 - Major	5 – Extreme
	Service Disruption	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Customer Impact	Customer Impact	Included above	Everything else	N/A	Schools and long-term care within 400m	N/A	Hospital with 400m
		Pipe Diameter (mm) - pipe diameter is generally proportional to number of impacted customers.	Included above	0 – 200 mm	201– 300 mm	301 – 600 mm	601 – 1000 mm	≥ 1001 mm
		Potential for basement flooding - Land use	Included above	See above	See above	See above	See above	See above
		Combined Sewer Size. The larger pipe, the larger the catchment and resulting in higher customer impacts during wet weather events.	Included above	See above	See above	See above	See above	See above
Environmental	Environmental Compliance	Shapefiles - Distance (m) to ESA, Watercourse or Habitat. Distance to environmental features will indicate if environmental issues will occur as a result of a failure.	13%	N/A	> 100 m	50 – 100 m	≤ 50 m	0 m (suspended sewers)

Consequence Category	Criteria	Parameter	Weight	Consequence Score				
				1 - Minimal	2 - Minor	3 - Moderate	4 - Major	5 – Extreme
		Pipe within Valley or flood plain (Future criterion)	N/A	No	N/A	Valley	Flood Plain	N/A
	Environmental Impact	Shapefiles - Distance (m) to ESA, Watercourse or Habitat. Distance to environmental features will indicate if environmental issues will occur as a result of a failure.	13%	N/A	> 100 m	50 – 100 m	≤ 50 m	0 m (suspended sewers)
		Forcemain (Future criterion)	N/A	No	N/A	Yes	N/A	N/A

Table 4-8 Consequence Scoring – Sewage Pumping Station

Consequence Category	Criteria	Parameter	Weight	Consequence Score				
				1 - Minimal	2 - Minor	3 - Moderate	4 - Major	5 – Extreme
Financial	Capital Expenditure (Replacement of Assets)	Replacement Cost + Emergency Premium (20%) Normalized for length, based on diameter.	25%	<$100k	$100k - <$250k	$250k - <$1M	$1M - $2M	>$2M
	Revenue loss due to service closure or other direct cost not related to asset repair	N/A - failure will not result in revenue loss as there are alternative ways to supply water	Not included	N/A	N/A	N/A	N/A	N/A
Social	Impact to Health and Safety	Pipe Diameter (mm) of inlet - the diameter of the inlet pipe provides a general representation of number of affected customers, which is representative of severity of issue.	N/A	0 – 200 mm	201– 300 mm	301 – 600 mm	601 – 1000 mm	≥ 1001 mm

Consequence Category	Criteria	Parameter	Weight	Consequence Score				
				1 - Minimal	2 - Minor	3 - Moderate	4 - Major	5 – Extreme
	Legal liability	Land Use Parcel - land use provides a representation of number of affected customers as well as critical customers, which would be proportional to number and severity of legal claims.	25%	Transportation / Public Utilities, Vacant Land, Parking Lots Environmental Protection, Rural Residential, Nursery Stock, Greenhouses, Vineyards, Orchards, Intensive Livestock, Field Crops, Idle Agriculture, Agricultural Commercial, Agricultural Industrial, Mixed Agricultural, Agricultural Commercial, Recreational, Private Recreational	Commercial, Commercial/Residential, Industrial	Multiple>3 Storeys, Single Detached, Double Detached, Multiple Attached(townhouses), Multiple<3 Storeys>3 units, Triplex, Churches	Schools, Long-term Care, Group Homes	Hospitals
	Customer Impact	Land Use Parcel -	Included above	See above	See above	See above	See above	See above
		Pipe Diameter (mm) of inlet -	Included above	0 – 200 mm	201– 300 mm	301 – 600 mm	601 – 1000 mm	≥ 1001 mm
Environmental	Environmental Compliance	Shapefiles - Distance (m) to ESA, Watercourse or Habitat. Distance to environmental features will indicate if environmental issues will occur as a result of a failure.	25%	N/A	N/A	> 100 m	50 – 100 m	≤ 50 m

Consequence Category	Criteria	Parameter	Weight	Consequence Score				
				1 - Minimal	2 - Minor	3 - Moderate	4 - Major	5 – Extreme
	Environmental Impact	Shapefiles - Distance (m) to ESA, Watercourse or Habitat. Distance to environmental features will indicate if environmental issues will occur as a result of a failure.	25%	N/A	N/A	> 100 m	50 – 100 m	≤ 50 m

4.6 Lifecycle Management Strategy

4.6.1 Lifecycle Management Activities

The levels of service presented in the previous section are supported by a variety of lifecycle activities in accordance with the activity types presented in Table 4-9. These activities are targeted to extend the asset life, ensure levels of service are being met, and reduce overall lifecycle costs.

Table 4-9 Lifecycle Activities – Planned and Recommended – Wastewater Service

Lifecyle Activity Type	Planned Activities (within Anticipated Funding)	Risks of not continuing the Planned Activities	Additional Recommended Activities	Risks of not Adopting Recommended Activities
Non-Infrastructure Solutions	– MSS for Wastewater will be developed in 2025-26 to identify capacity needs to support growth. – City currently conducts CCTV and maintenance hole inspections on wastewater mains ($300k / year) – City monitors flows to calibrate and confirm estimates related to hydraulic model	– Without the MSS for Wastewater, the City will not know the most efficient way to meet the City's future capacity needs.	– MSS for Wastewater to be updated every 10 years (estimated cost $250k). This includes hydraulic analysis – Between MSS updates, conduct hydraulic analysis to evaluate the capacity of the linear wastewater system and identify areas that require improvements. (Estimated cost $50k, every 10 years).	– Without regular updates of the MSS and hydraulic analysis, City will be relying on an MSS whose assumptions may be out-of-date and incorrect – Without condition assessments, asset deterioration will be overestimated or underestimated based on age. Assets may fail unexpectedly and result in

Lifecyle Activity Type	Planned Activities (within Anticipated Funding)	Risks of not continuing the Planned Activities	Additional Recommended Activities	Risks of not Adopting Recommended Activities
	– Extraneous flow program to identify sources of inflow and infiltration (I&I)		– Regular condition assessments of the sewage pumping station and storage tanks. (Estimated cost $50k, 5-year frequency) – Starting in 2030 increase CCTV budget by approximately $105k/year (average) to execute condition-based program	more expensive emergency repairs.
Operations and Maintenance Activities	**Linear Assets** – Routine maintenance program including sewer flushing, reaming and spot repairs – Clearing of blocked lateral connections **Vertical Assets** – Routine maintenance program including inspection and equipment checks.	– Increased lifecycle cost if maintenance is done improperly or without scheduled frequency. – Insufficient maintenance could lead to unplanned and urgent work when there are inadequate resources available (labour, materials, etc.). – Insufficient maintenance may contribute to asset failure resulting in service disruptions.	– O&M needs will increase as assets are added to accommodate growth. – O&M needs may also change as a result of asset upgrades.	– If inventory changes are not considered, O&M funding may not be sufficient to deliver the required LOS.
Renewal, Rehabilitation and Replacement	– Reline sewers – Replace deteriorated sewers segments – Replace deteriorated storage tanks and sewage pumping station components	– Deteriorated sewers may result in leakage to the environment, as well as inflow and infiltration into the wastewater system – Deteriorated sewers may collapse due to structural	– Replacement and rehabilitation activities could be increased to reduce the renewal backlog (assets in Very Poor condition) more quickly.	– Deteriorated mains may result in leakage to the environment, as well as inflow and infiltration – Increased lifecycle cost if renewal/rehab are deferred.

Lifecyle Activity Type	Planned Activities (within Anticipated Funding)	Risks of not continuing the Planned Activities	Additional Recommended Activities	Risks of not Adopting Recommended Activities
	– Install plastic maintenance hole inserts if maintenance hole is identified as a major source of infiltration through pick holes	failures, causing sink holes or damage to surrounding infrastructure. – Sewer back ups may result in exposure to untreated wastewater, which can be a public health hazard and can cause property damage. – Deteriorated sewers may allow I&I which can overload the system, reduce capacity and reduce system efficiency – Increased lifecycle cost if renewal/rehab are deferred.		
Growth Activities	– Assumption of $2,483,293 / year of developer-constructed assets (approximately 1,391m/year of wastewater mains). This estimate is based on the annual average of asset assumptions 2019-2023 – Construction of $487,676 / year of growth assets, based on annual average 2020-2024.	– The City is required to assume developer-constructed assets once new development has been constructed and assets have passed maintenance period and final inspection. – Assumption and construction of assets results in increased operations, maintenance and renewal costs to the City.	– No specific growth-related needs have been identified. Growth-related construction needs will be identified in the upcoming MSS for Wastewater.	– N/A

Lifecyle Activity Type	Planned Activities (within Anticipated Funding)	Risks of not continuing the Planned Activities	Additional Recommended Activities	Risks of not Adopting Recommended Activities
		– If future assumptions differ from the historical average, the estimated impact on O&M costs will be inaccurate.		
Upgrade Activities	– Separation of combined sewers when they reach end of life. – Sewer main upsizing/downsizing based on design standard compliance and flow requirements.	– Combined sewers can release untreated or inadequately treated wastewater into the environment during heavy rainfall, posing public health and environmental risks.	– Upgrade needs will be identified in the upcoming MSS for Wastewater.	– N/A
Disposal Activities	– There are currently no plans to dispose of any assets without replacement.	– N/A	– Disposal needs may be identified in the upcoming MSS for Wastewater.	– N/A

4.6.2 Lifecycle Management Scenario Forecasts

This section presents lifecycle forecasts for:

- Scenario A: Anticipated Budget (in accordance with the Council-approved Water and Wastewater Financial Plan report FMS-050-2025)
- Scenario B: Maintain Current LOS
- Scenario C: Proposed LOS

Table 4-10 compares the lifecycle activities included in each scenario.

Table 4-10 Lifecycle Activities – Scenario Comparison – Wastewater Service

Lifecyle Activity Type	Scenario A: Anticipated Funding	Scenario B: Maintain Current LOS	Scenario C: Proposed LOS
Non-Infrastructure Solutions	– Complete MSS for Wastewater in 2025-26 (funds already allocated) – Continue existing CCTV ($300k/year), flow monitoring smoke testing programs	– Include activities in Scenario A – Update of MSS ($250k, allocated in 2034) – Update of hydraulic model ($50k, 2029)	– Include activities in Scenario A – Update of MSS ($250k, allocated in 2034) – Update of hydraulic model ($50k, 2029) – Condition assessments of sewage pumping station and storage tanks ($50k in 2026 and 2031) – Increase CCTV inspections by an average of $105k/year starting in 2030
Operations and Maintenance Activities	**Linear Assets** – Routine maintenance program including sewer flushing, reaming and spot repairs – Clearing of blocked lateral connections **Vertical Assets** – Routine maintenance program including inspection and equipment checks.	– Same as Scenario A – Increase resources in proportion with growth of asset inventory	– Same as Scenario A – Increase resources in proportion with growth of asset inventory
Renewal, Rehabilitation and Replacement	– Replace and renew assets up to amounts approved in the Water and Wastewater Financial Plan (2024) to reduce the backlog. Average annual amount is $11,592,052 / year.	– Replace and renew assets as needed to maintain current backlog (projected cost of $2,007,774 / year) – Growth assets will not require renewal within the 10-year forecast period	– Similar to Scenario A, but with some funds reallocated to Non-Infrastructure Solutions and O&M needs of growth assets. Average annual amount remaining for renewal is $11,477,632 / year to reduce the backlog. – Growth assets will not require renewal within the 10-year forecast period
Growth Activities	– Assume ownership of $2,483,293 of developer-constructed assets each year (2026-2035)	– Same as Scenario A	– Same as Scenario A

Lifecycle Activity Type	Scenario A: Anticipated Funding	Scenario B: Maintain Current LOS	Scenario C: Proposed LOS
	– Construction of $487,676 / year of growth assets		
Upgrade Activities	– Separate combined sewers when they reach end of life. The resulting separated stormwater mains are added to the stormwater inventory as growth assets. – Sewer main upsizing/downsizing based on design standard compliance and flow requirements.	– Same as Scenario A	– Same as Scenario A
Disposal Activities	– - None	– None	– None

Table 4-11 compares the projected LOS performance of each scenario. Scenario A provides the best LOS in most categories, including reducing the proportion of assets due or overdue for replacement from 9% to 3% over the 10-year period at an average annual renewal cost of $11.6M/year. However, this does not provide O&M funding for growth assets. This Scenario is thus likely to result in deferral of maintenance activities, an increase in reactive repairs, and reduction of asset service lives.

Scenario C is similar to Scenario A but re-allocates a small amount ($0.1M/year) from the renewal budget to support non-infrastructure solutions (MSS updates, hydraulic modeling and condition assessments) and O&M for growth assets. These activities will allow the City to better plan for future capacity and deterioration needs, and to ensure that O&M budgets keep up with growth. The impact on the LOS metric for assets due or overdue for replacement is not noticeably different from the projected performance for Scenario A. Specifically, the renewal backlog is expected to drop from 9% to 3% over the 10-year period under both scenarios.

Scenario B was designed to maintain the current LOS, in other words, to hold the renewal backlog at 9%. Within the 10-year planning period, only $2.0M/year of renewals and replacements are needed to maintain this LOS; however, beyond the 10-year planning period a significant wave of renewals will be needed, which may be overwhelming if existing needs are not addressed in the current planning period, as they are in Scenarios A & C.

Table 4-11 LOS Metrics and Projects Performance – Wastewater Service

Service Attribute	Customer LOS Statement (CLOS)	Technical LOS Indicator (TLOS)	Actual Performance 2024	Projected Performance		
				Scenario A: Anticipated Budget	Scenario B: Maintain Current LOS	Scenario C: Proposed LOS
Capacity and Use	System has capacity to provide current and future serviced customers with wastewater collection service	Percentage of properties connected to the municipal wastewater system(b)	96.6% Inside urban boundary: 98.4% Outside urban boundary: 41.4%	Within urban boundary: Slight increase due to development Outside urban boundary: No change from 2024		
		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(a)	0.0022	**Best:** Decreases more quickly than in Scenario B due to higher rate of asset replacements. Replacements result in less inflow and infiltration, as well as combined sewer separation.	Ok: Decreases more slowly than in Scenario A and C due to lower rate of watermain replacements	**Second Best:** Similar to Scenario A, but decrease is slightly slower because renewal and replacement budget is slightly lower.
		Total number of Wastewater Storage Facilities	9	No additions currently planned. Additional storage needs may get identified in the currently ongoing MSS for Wastewater.		
Function	Services are provided prioritizing safety	Length of fully separated sanitary sewer pipes	123.0km	**Best:** Decreases more quickly than in Scenario B and slightly more quickly than in Scenario C due to higher rate of asset replacements. Combined sewers	Ok: Decreases more slowly than in Scenario A and C due to lower rate of watermain replacements	**Second Best:** Similar to Scenario A, but decrease is slightly slower because renewal and replacement budget is slightly lower.
		Length of combined sanitary and stormwater sewer pipes	65.5km			
		Length of partially separated sanitary and stormwater sewer pipes	354.7km			
		Length of sanitary sewer pipe for which separation is unknown	21.3km			

Service Attribute	Customer LOS Statement (CLOS)	Technical LOS Indicator (TLOS)	Actual Performance 2024	Projected Performance		
				Scenario A: Anticipated Budget	Scenario B: Maintain Current LOS	Scenario C: Proposed LOS
				are separated as part of replacement projects.		
Reliability	Assets are kept in a state of good repair	Percentage of wastewater assets due or overdue for replacement	9%	**Best:** Decreases from 9% in 2025 to 3% in 2035. Average is 6% over the 10-year period.	Holds steady at 9% from 2025-35.	**Second Best:** Decreases from 9% in 2025 to 3% in 2035. Average is 6% over the 10-year period. Result is similar to Scenario A, but renewal and replacement budget is slightly lower.
		The number of connection-days per year due to wastewater backups compared to the total number of properties connected to the municipal wastewater system[b]	0.0022	**Best:** Decreases more quickly than in Scenario B and slightly more quickly than in Scenario C due to higher rate of watermain replacements. Root causes of blockages and backups will be addressed during watermain replacements.	Decreases more slowly than in Scenarios A and C due to lower rate of watermain replacements	**Second Best:** Similar to Scenario A, but decrease is slightly slower because renewal and replacement budget is slightly lower

Service Attribute	Customer LOS Statement (CLOS)	Technical LOS Indicator (TLOS)	Actual Performance 2024	Projected Performance		
				Scenario A: Anticipated Budget	Scenario B: Maintain Current LOS	Scenario C: Proposed LOS
	Maintenance is proactive	Preventative maintenance as a percentage of total maintenance	Future metric	Fewer assets in Very Poor condition, resulting in fewer failures, but O&M funding not increasing with growth as needed to support preventive maintenance	More assets in Very Poor condition, resulting in fewer failures; however O&M funding increases with growth, enabling more preventive maintenance	**Best:** Fewer assets in Very Poor condition, resulting in fewer failures; O&M funding increases with growth, enabling more preventive maintenance
Affordability	Services are affordable and provided at lowest cost for both current and future customers	Annual capital investment as a % of cost to sustain assets over their lifecycles (replacement value / estimated service life = $32.3M/yr)	32%/year	**Best:** Annual average 37.3%/year	Annual average 6.2%/year	**Second Best:** Annual average 37.0%/year

(a) Required by O.Reg. 588/17.

(b) Based on 2020 hydraulic model estimation.

Figure 4-5 shows the forecast condition distribution of wastewater assets under Scenario A: Anticipated Funding. This scenario applies the renewal budget identified in the Water and Wastewater Financial Plan (2024). The graph shows that the renewal backlog (assets in Very Poor condition) decreases from 9% in 2025 to 0% (none) in 2035. The average for the 10-year period is 5%.

Figure 4-5 Condition Forecast – Wastewater Service Scenario A: Anticipated Funding

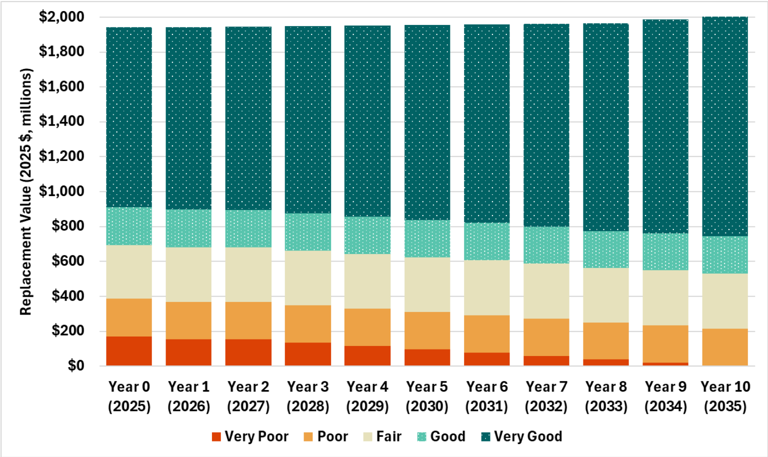


Figure 4-6 shows the forecast condition distribution of wastewater assets under Scenario B: Maintain Current LOS. In this scenario, the renewal backlog holds steady at 9% over the 10-year period.

Figure 4-7 shows the forecast condition distribution of wastewater assets under Scenario C: Proposed LOS. The renewal funding in this scenario is slightly lower than Scenario A (Figure 4-5), so the difference in the renewal backlogs is not visible in the graphs.

Figure 4-6 Condition Forecast – Water Service Scenario B: Maintain Current LOS

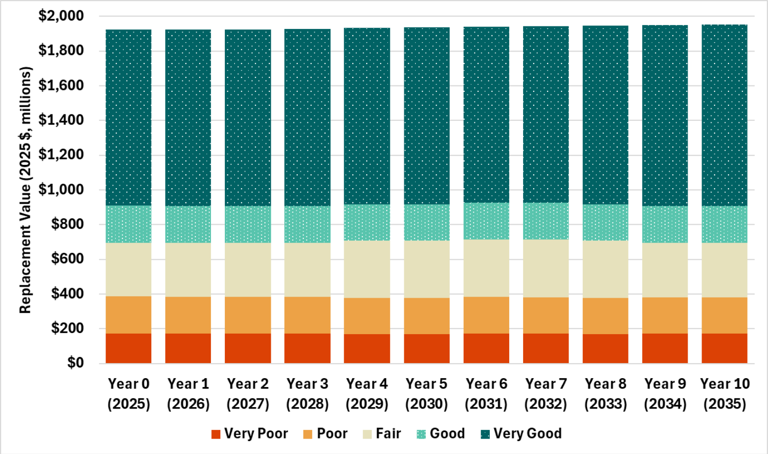


Figure 4-7 Condition Forecast – Wastewater Service Scenario C: Proposed LOS

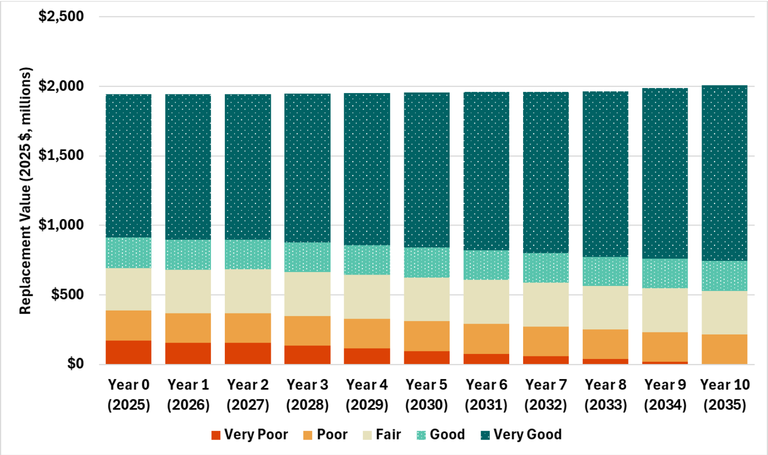
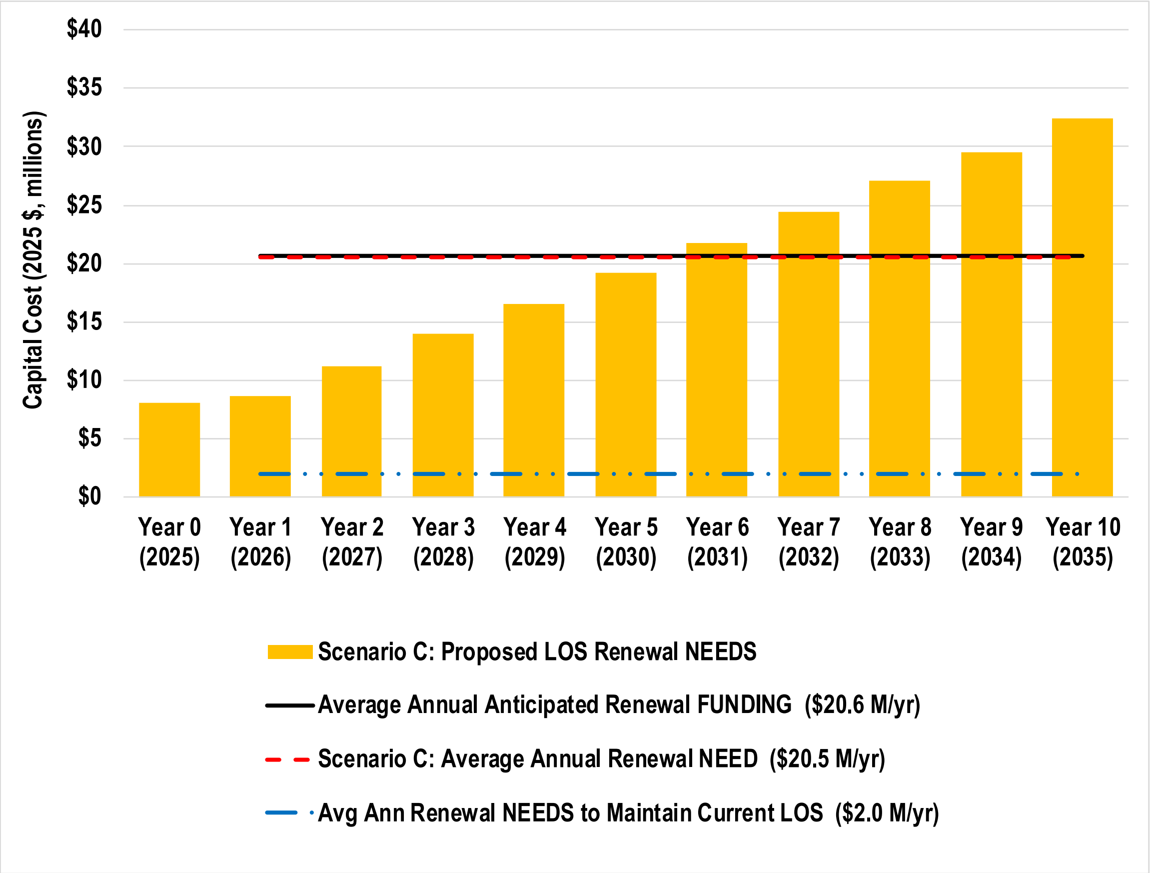


Figure 4-8 shows the year-by-year renewal needs for the recommended scenario, Scenario C: Proposed LOS. The average annual renewal needs for Scenario C are $20.5M/year, which is slightly lower than the average annual anticipated renewal funding of $20.6M/year, because Scenario C re-allocates some funds to non-infrastructure solutions that will enable the City to better plan for future growth and renewal needs. The renewal funding amount is based on the capital amount that was approved in the Water and Wastewater Financial Plan (2024).

This average annual renewal need for Scenario C ($20.5M/year) is much higher than the renewal needs to maintain current LOS ($2.0M/yr) because Scenario C reduces the renewal backlog instead of maintaining it. It is also important to note that in the scenario that maintains the current LOS, there are large peaks of renewal needs just beyond 2035, so renewal costs in that scenario would increase significantly after 2035. Although Scenario C's renewal cost is much higher than Scenario B, Scenario C's average annual amount for asset renewals is 80% of the renewal cost to achieve the lowest lifecycle cost to sustain the assets over their lifetime ($25.7M/yr[1]).

Figure 4-8 Renewal Needs for Scenario C: Proposed LOS



[1] The service lives are in the process of being reviewed for wastewater assets. The average annual replacement need for wastewater assets is estimated to be $25.7M/year based on a 75 year sewer main service life.

Table 4-12 shows the annual cost forecast for Scenario A: Anticipated Funding. This Scenario includes the current operating budget (year 2025 budget), which is sufficient to support O&M activities on the current asset inventory. The growth & upgrade funding is estimated based on historical construction cost sharing with development and pollution control improvements, such as combined sewer separation. Non-infrastructure solutions include CCTV inspections, design for construction projects, extraneous flow elimination and sewer shed analysis. These amounts are approved in the Water and Wastewater Financial Plan (2024).

This scenario does not include funds for O&M or renewal of growth and upgrade assets, nor does it include funds for certain non-infrastructure solutions such as 2034 MSS update for Wastewater, updates of the hydraulic model or condition assessment of the pump station and storage tank. Note however, that the MSS for Wastewater that will be completed in 2025-26 has already been funded. No disposal activities have been identified or funded.

The cost forecast is shown graphically in Figure 4-9.

Table 4-12 Annual Cost Forecast – Wastewater Service – Scenario A

Lifecycle Activity Type	Annual Cost Forecast (2025 $, millions)										
	Year 1 (2026)	Year 2 (2027)	Year 3 (2028)	Year 4 (2029)	Year 5 (2030)	Year 6 (2031)	Year 7 (2032)	Year 8 (2033)	Year 9 (2034)	Year 10 (2035)	Average Annual
Non-Infrastructure Solutions	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	**0.41**
O&M – Existing Assets	5.18	5.18	5.18	5.18	5.18	5.18	5.18	5.18	5.18	5.18	**5.18**
Renewal – Existing Assets	8.69	11.32	13.98	16.64	19.30	21.96	24.62	27.28	29.94	32.60	**20.63**
Growth & Upgrade Activities	1.00	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	**1.02**
O&M – Growth & Upgrade Assets	--	--	--	--	--	--	--	--	--	--	**--**
Renewal – Growth & Upgrade Assets	--	--	--	--	--	--	--	--	--	--	**--**
Disposal Activities	--	--	--	--	--	--	--	--	--	--	**--**
TOTAL	**15.28**	**17.94**	**20.60**	**23.26**	**25.92**	**28.58**	**31.24**	**33.90**	**36.56**	**39.22**	**27.25**

Figure 4-9 Annual Cost Forecast – Wastewater Service – Scenario A

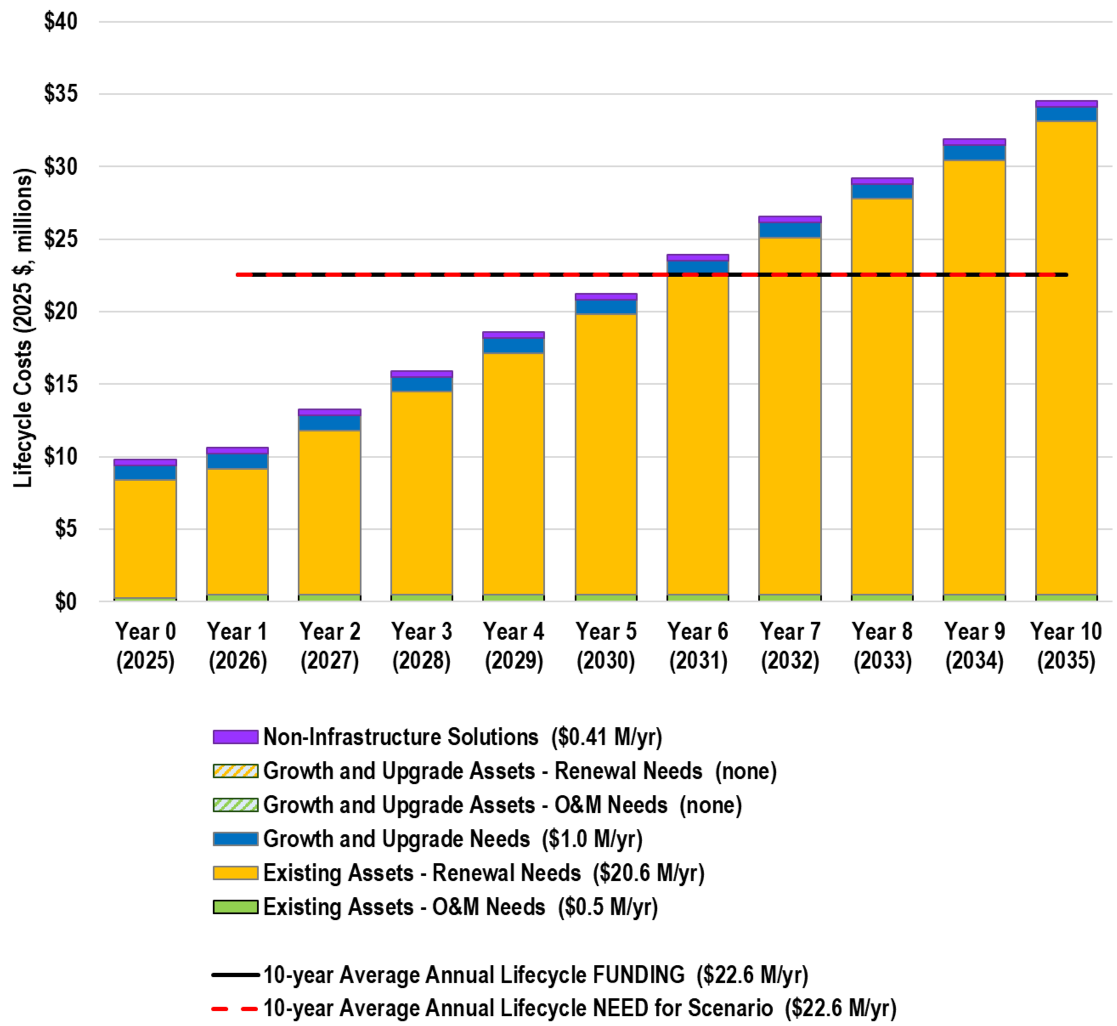


Table 4-13 shows the annual cost forecast for Scenario B: Maintain Current LOS. As with Scenario A, this Scenario includes the current operating budget (year 2025 budget) to support O&M activities on the current asset inventory, along with growth needs based on the historical annual average amounts from 2020-24. However, the renewal costs reflect the amount needed to maintain the current renewal backlog at approximately 9%. This renewal cost is lower than in Scenario A.

This scenario includes funds for O&M of growth and upgrade assets, including City-constructed assets and assets assumed from development. Funds are not included for renewal of growth and upgrade assets, since these will not require replacement within the 10-year planning period. This scenario also includes funds for non-infrastructure solutions that were funded in Scenario A, as well as update of the hydraulic model in Year 4 and the MSS for Wastewater in Year 9. However, no funds are included for condition assessments. Moreover, no disposal activities have been identified or funded.

The cost forecast is shown graphically in Figure 4-10.

Table 4-13 Annual Cost Forecast – Wastewater Service – Scenario B

Lifecyle Activity Type	Annual Cost Forecast (2025 $, millions)										
	Year 1 (2026)	Year 2 (2027)	Year 3 (2028)	Year 4 (2029)	Year 5 (2030)	Year 6 (2031)	Year 7 (2032)	Year 8 (2033)	Year 9 (2034)	Year 10 (2035)	Average Annual
Non-Infrastructure Solutions	0.41	0.41	0.41	0.46	0.41	0.41	0.41	0.41	0.66	0.41	**0.44**
O&M – Existing Assets	5.18	5.18	5.18	5.18	5.18	5.18	5.18	5.18	5.18	5.18	**5.18**
Renewal – Existing Assets	0.34	0.38	0.83	-	0.27	0.00	0.25	4.06	6.66	7.27	**2.01**
Growth & Upgrade Activities	1.00	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	**1.02**
O&M – Growth & Upgrade Assets	0.01	0.01	0.02	0.02	0.03	0.04	0.04	0.05	0.05	0.06	**0.03**
Renewal – Growth & Upgrade Assets	--	--	--	--	--	--	--	--	--	--	**--**
Disposal Activities	--	--	--	--	--	--	--	--	--	--	**--**
TOTAL	**6.94**	**7.01**	**7.47**	**6.69**	**6.92**	**6.66**	**6.91**	**10.72**	**13.58**	**13.95**	**8.69**

Figure 4-10 Annual Cost Forecast – Wastewater Service – Scenario B

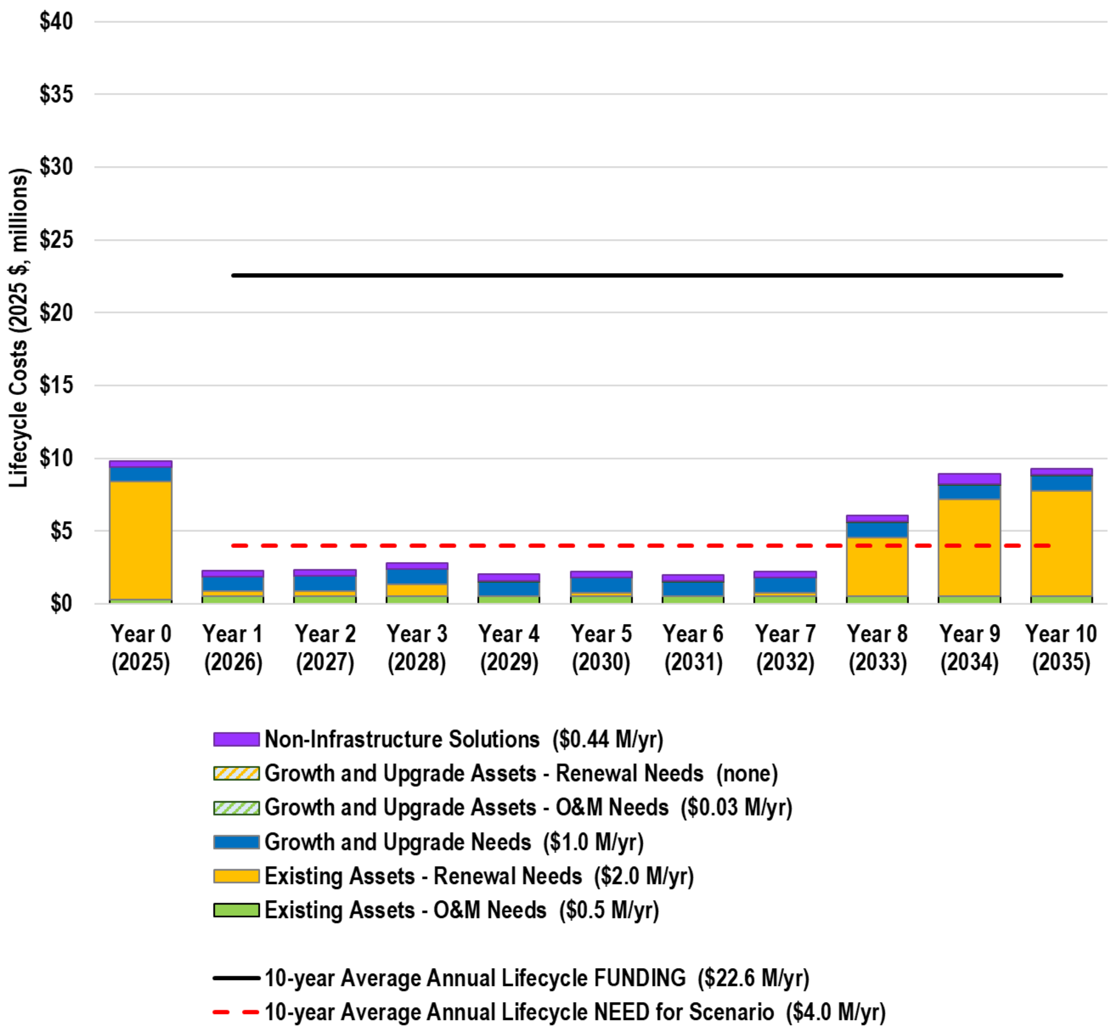


Table 4-14 shows the annual cost forecast for Scenario C: Proposed LOS. As with Scenario A, this Scenario includes the current operating budget (year 2025 budget) to support O&M activities on the current asset inventory, as well as the capital funding identified in the Water and Wastewater Financial Plan (2024).

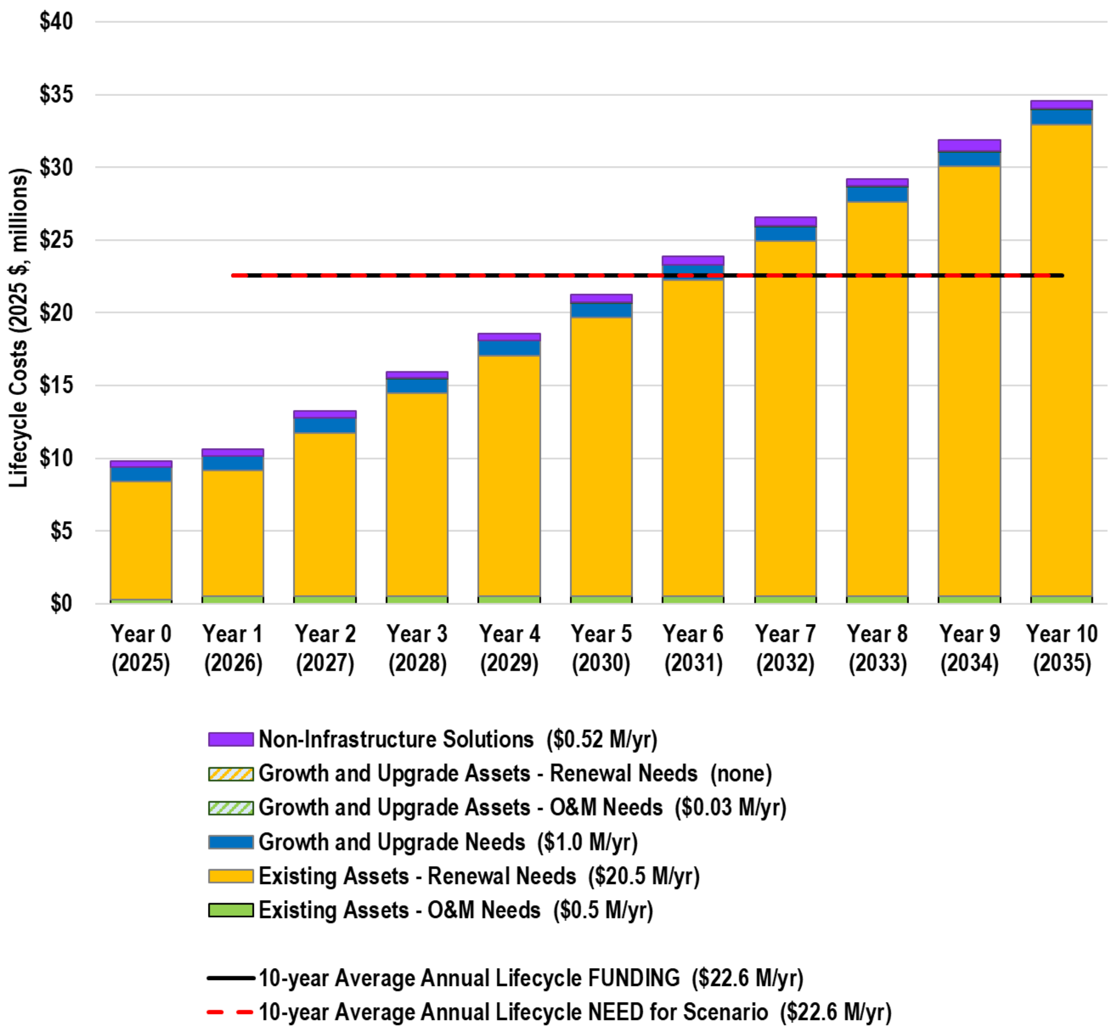
As in Scenario B, this scenario includes funds for O&M of growth and upgrade assets, including City-constructed assets and assets assumed from development. This scenario also includes funds for non-infrastructure solutions that were funded in Scenario A, as well as update of the hydraulic model in Year 4 and the MSS for Wastewater in Year 9, as well as condition assessments in Years 2 and 7. Funds are not included for renewal of growth and upgrade assets, since these will not require replacement within the 10-year planning period. No disposal activities have been identified or funded.

The cost forecast is shown graphically in Figure 4-11.

Table 4-14 Annual Cost Forecast – Wastewater Service – Scenario C

Lifecycle Activity Type	Annual Cost Forecast (2025 $, millions)										
	Year 1 (2026)	Year 2 (2027)	Year 3 (2028)	Year 4 (2029)	Year 5 (2030)	Year 6 (2031)	Year 7 (2032)	Year 8 (2033)	Year 9 (2034)	Year 10 (2035)	Average Annual
Non-Infrastructure Solutions	0.41	0.46	0.41	0.46	0.52	0.58	0.57	0.51	0.74	0.52	**0.52**
O&M – Existing Assets	5.18	5.18	5.18	5.18	5.18	5.18	5.18	5.18	5.18	5.18	**5.18**
Renewal – Existing Assets	8.68	11.26	13.96	16.57	19.16	21.75	24.42	27.14	29.56	32.43	**20.49**
Growth & Upgrade Activities	1.00	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	**1.02**
O&M – Growth & Upgrade Assets	0.01	0.01	0.02	0.02	0.03	0.04	0.04	0.05	0.05	0.06	**0.03**
Renewal – Growth & Upgrade Assets	--	--	--	--	--	--	--	--	--	--	**--**
Disposal Activities	--	--	--	--	--	--	--	--	--	--	**--**
TOTAL	**15.28**	**17.94**	**20.60**	**23.26**	**25.92**	**28.58**	**31.24**	**33.90**	**36.56**	**39.22**	**22.57**

Figure 4-11 Annual Cost Forecast – Wastewater Service – Scenario C



4.6.3 Rationale for Proposed LOS

The Proposed LOS, as defined in Scenario C is recommended because it reduces the renewal backlog (assets in Very Poor condition) at the rate approved by Council through the Water and Wastewater Financial Plan deliberations. This scenario also includes funds to support O&M needs for growth assets to ensure that O&M LOS can be sustained over the 10-year period. Also included are funds to update condition assessments and the MSS for Wastewater to ensure that the City is prepared for asset deterioration and capacity needs.

4.7 Financial Strategy

Table 4-15 shows a comparison of the average annual costs of the three scenarios. The table shows that there is a no funding gap to achieve the Scenario C: Proposed LOS as this is the rate approved by Council through the Water and Wastewater Financial Plan deliberations. This scenario's average annual amount for renewals ($20.5M/year) is nearly 80% of the lowest life cycle cost to sustain the assets ($25.7M/year). This means that many renewals will be needed beyond 2035 so renewal costs will increase in the future.

Table 4-15 Average Annual Costs – Wastewater Service – Scenario Comparison

Lifecycle Activity Type	Average Annual Cost (2025 $, millions)		
	Scenario A: Anticipated Funding	Scenario B: Maintain Current LOS	Scenario C: Proposed LOS
Non-Infrastructure Solutions	$0.4	$0.4	$0.5
O&M – Existing Assets	$5.2	$5.2	$5.2
Renewal – Existing Assets	$20.6	$2.0	$20.5
Growth & Upgrade Activities	$1.0	$1.0	$1.0
O&M – Growth & Upgrade Assets	--	$0.03	$0.03
Renewal – Growth & Upgrade Assets	--	--	--
Disposal Activities	--	--	--
Total	$27.2	$8.6	$27.2
Funding Gap	n/a	none	none

5 Stormwater Service

The City collects, conveys and stores rainwater runoff from wet weather events, minimizing flooding and erosion. As we see more frequent and greater intensity storms, the importance of the stormwater collection system is ever increasing.

The City manages stormwater from within its boundary to be released directly or indirectly to Lake Ontario. Stormwater collection is generally the responsibility of the City except in situations where the primary purpose is to drain a Regional right-of-way. Therefore, all stormwater mains with a diameter of 675 mm or less along Regional roads are the responsibility of the Region.

Portions of the City's stormwater management system are combined and partially combined with the wastewater system, and the City is gradually separating those portions as assets are replaced. In combined pipes, all wastewater and storm flows are collected within the same sewer pipe. In partially separated pipes, wastewater flows are combined with stormwater from weeping tiles and roof leaders; however, stormwater from roadways is collected in separated storm sewers. In fully separated pipes, all wastewater flows are collected within the wastewater sewers, and all stormwater is collected within storm sewer pipes. Fully separated sewers are mandatory for all new developments, such that no new storm connections to the sanitary sewer are allowed.

Combined and partially combined sewers are reported within the Stormwater Service in Section 5 of the AM Plan.

The management of stormwater associated with Provincial Highways is outside of the scope of this report; however, some flows from the QEW corridor are conveyed through the City's Eastchester Drain and stored in the City's Cushman Road dry pond. Also, it is the MTO's plan to route additional flows through those facilities when the new Skyway bridge is built.

5.1 State of the Local Infrastructure

5.1.1 Asset Valuation

The City's stormwater management system is comprised of collection, treatment and control, discharge and storage infrastructure that includes stormwater mains, maintenance holes, catch basins, oil and grit separators, open channels and ditches, ponds and wetlands. For this assessment, service connections were considered components of the stormwater mains.

For the valuation of the stormwater management system, the replacement values are developed based on replacement with similar assets (like-for-like) on a complete and standalone basis. These were calculated based on historical values and market replacement costs for the similar specification assets.

The overall distribution of replacement values by asset type for the Stormwater collection system is as shown in Table 5-1. The Stormwater gravity mains have the highest replacement value in the portfolio, totaling 97% of the entire system. Table 5-2 provides a summary of the distribution of replacement values on the mains based on material type.

Table 5-1 Inventory Valuation – Stormwater Service

Asset Category	Asset Sub-Category	Count	Unit	Replacement Value (millions, 2025 $)	Replacement Value (% Total)
Stormwater Collection	Stormwater Mains	406,103	metres	$1,156.7	97.0%
	Maintenance Holes	6,572	each		
	Catch Basins	13,587	each		
Treatment & Control	Oil & Grit Separators	43	each	$1.5	0.1%
Stormwater Discharge	Ditches	104,366	metres	$26.1	2.2%
	Open Channels	3,575	metres	$2.7	0.2%
Storage Facilities	Constructed Wetland (1 wetland)	6,694	sq. metres	$3.5	0.3%
	Stormwater Pond - Dry (1 pond)	7,666	sq. metres	$1.2	0.1%
	Stormwater Ponds - Wet (3 ponds)	2,610	sq. metres	$1.4	0.1%
	Overall Replacement Value			**$1,193.1**	**100%**

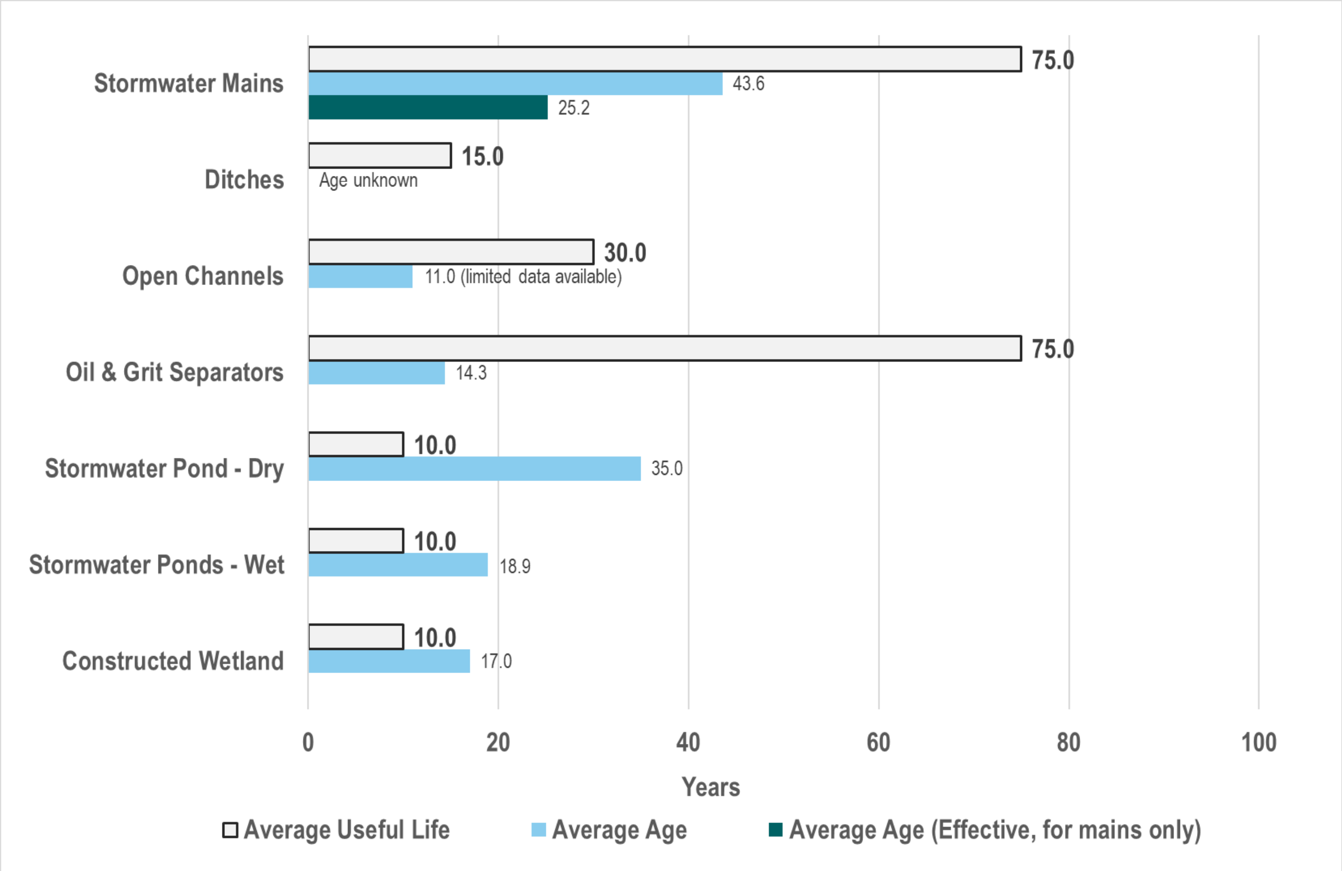
Table 5-2 Inventory Valuation – Stormwater Mains by Material

Material Type	Quantity (meters)	Replacement Value (millions, 2025 $)	Replacement Value (% Total)
Concrete	236,990	$694.14	60.0%
Plastic, Polyethylene, High density polyethylene	719	$1.93	0.2%
Polyvinyl Chloride (PVC)	30,797	$76.54	6.6%
Steel, Iron, Other Metal	1,248	$3.63	0.3%
Other Material	1,149	$2.88	0.2%
Unknown Material	135,201	$377.62	32.6%
Overall Replacement Value		**$1,156.7**	**100%**

5.1.2 Asset Age

Comparing the average age of the assets with the average Estimated Service Life (ESL) provides a representation of the average overall portfolio remaining life. As shown in Figure 5-1, the average actual age of Stormwater mains is 58% of the average service life; however, the average effective age, which is based on observed condition, is much lower. This may indicate that ESL may be shorter than being experienced. Effective age is only shown for mains because observed condition data is not available for the other asset types. For other assets, actual and effective age are generally similar.

Figure 5-1 Asset Age – Stormwater Service



For open channels, the average service life of 30 years reflects the frequency of required dredging. Data on past dredging was available only for the Eastchester Drain channel, which was last dredged in 2014. As such, the average age of open channels appears in the figure as 11.0 years; however, data for the other channels was not available.

Oil and grit separators have an average service life of 80 years and an average age of 14.3 years. These assets were installed between 2004 and 2021.

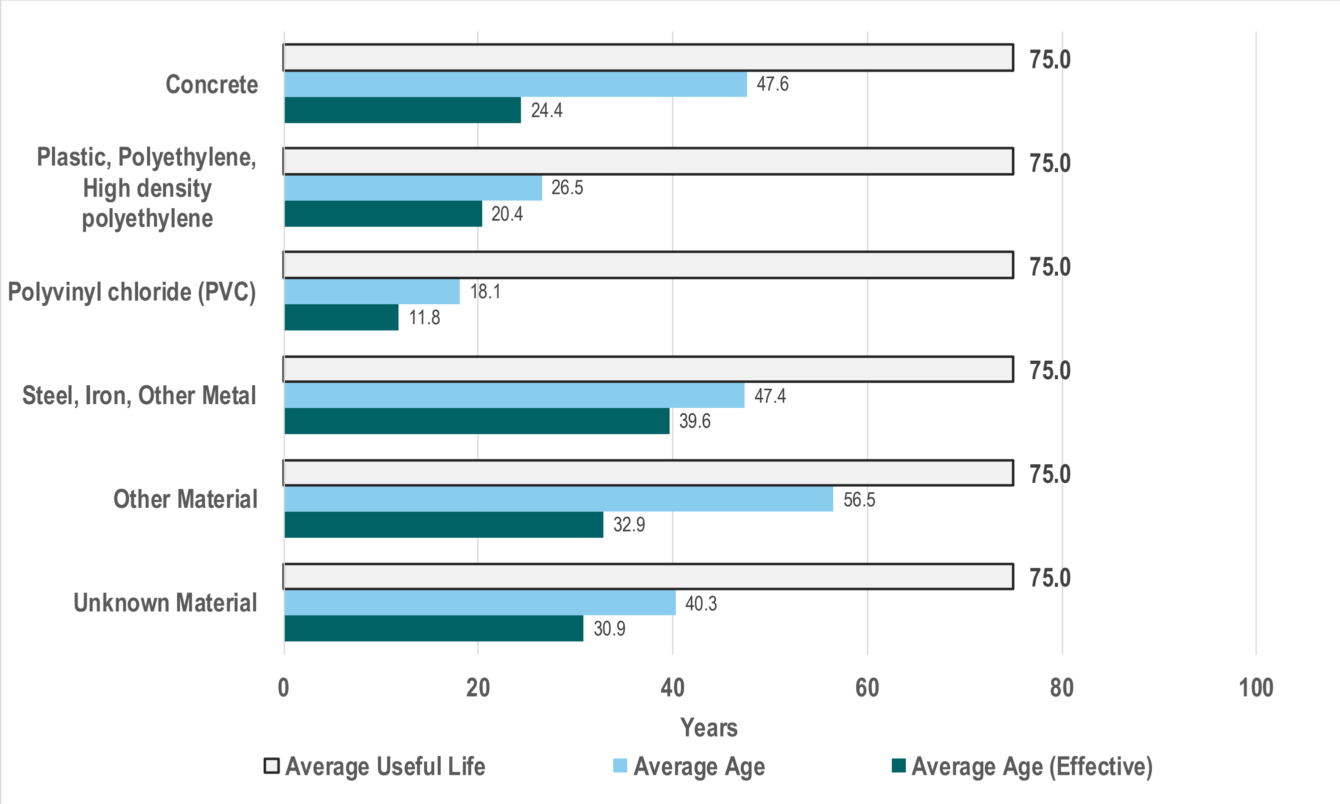
For ditches, the service life values reflect the time required between re-grading. The last date that assets were re-graded is not available in the City's data. As such, current age is not shown in the figure.

For stormwater ponds and the constructed wetland, the service life values reflect the time required between dredging and cleaning. It is generally recommended that ponds be inspected and cleaned every 10 years. Stormwater ponds are designed to manage runoff and sediment, but over time, without proper cleaning and sediment removal, they can begin to resemble natural wetlands. This could lead to regulatory challenges when attempting to dredge them, as conservation authorities may impose restrictions to protect what they now consider a natural habitat. Regular inspection and maintenance are crucial to ensure that stormwater ponds continue functioning as intended and do not inadvertently transition into protected natural features. In addition, there is a potential risk that if stormwater ponds are not regularly maintained, they could be considered naturalized by regulatory agencies, which may complicate future maintenance and dredging efforts.

Most ponds and wetland have not been cleaned since they were constructed, and they are thus overdue for cleaning. It should be noted that although the constructed wetland underwent significant repairs in 2018, it was not dredged or cleaned at that time. Without regular dredging and cleaning, the ponds and wetlands have reduced capacity to accommodate stormwater. This increases the risk of flooding and environmental impacts.

Figure 5-2 shows the average and effective age of stormwater mains by material type. Other Material and Unknown Material reflect the material types listed in the City's data.

Figure 5-2 Asset Age – Stormwater Mains by Material Type



5.1.3 Asset Condition

The asset condition distribution is shown in Figure 5-3 for stormwater service assets. Overall, $50.5 million (4.3%) of stormwater assets are in very poor condition and $143.2 million (12.0%) are in poor condition. As shown in the figure, assets in very poor condition consist of stormwater mains, open channels, ponds and the constructed wetland. The stormwater mains in very poor condition are due or overdue for replacement, the open channel in very poor condition requires re-grading and cleaning, and the ponds and wetland require dredging and cleaning. The figure shows that condition data is not available for some asset types; however, the gap in condition data represents only 6.9% ($82.3 million) of stormwater assets.

Figure 5-3 Asset Condition – Stormwater Service

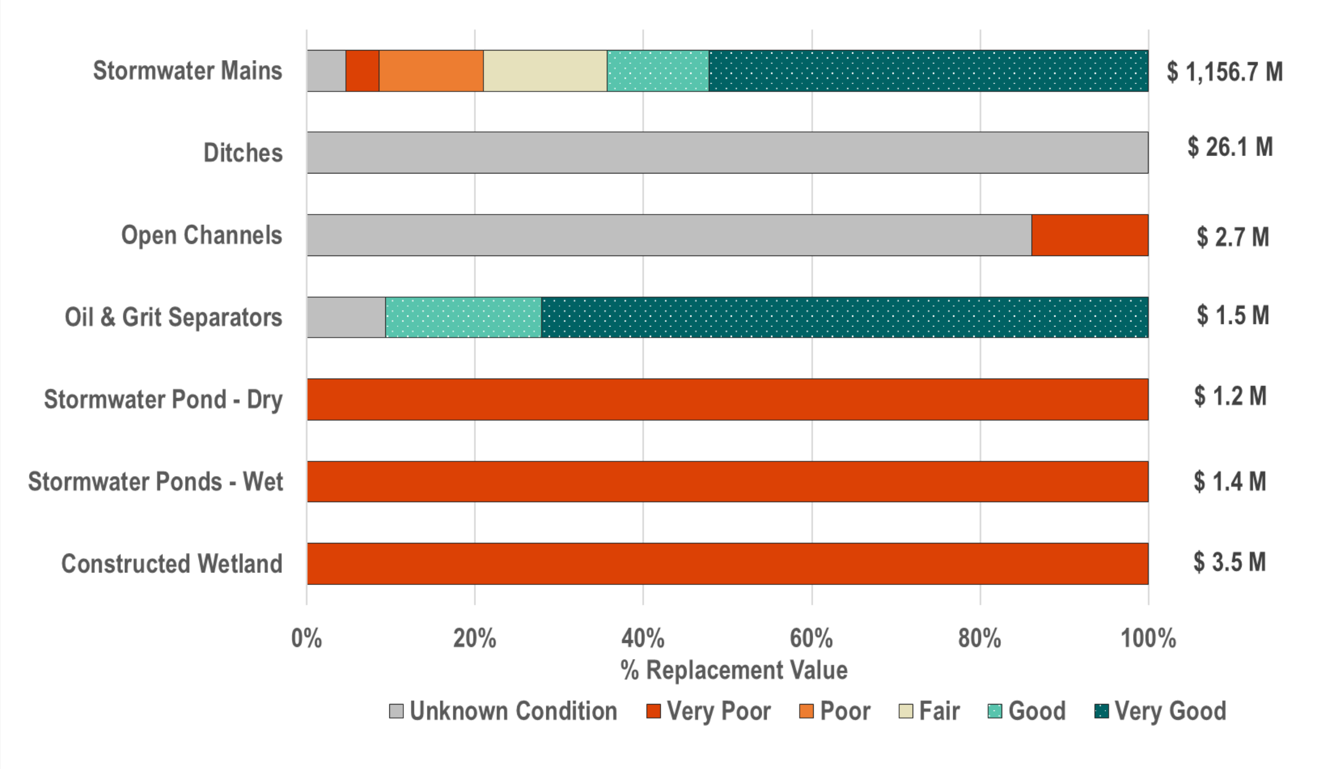
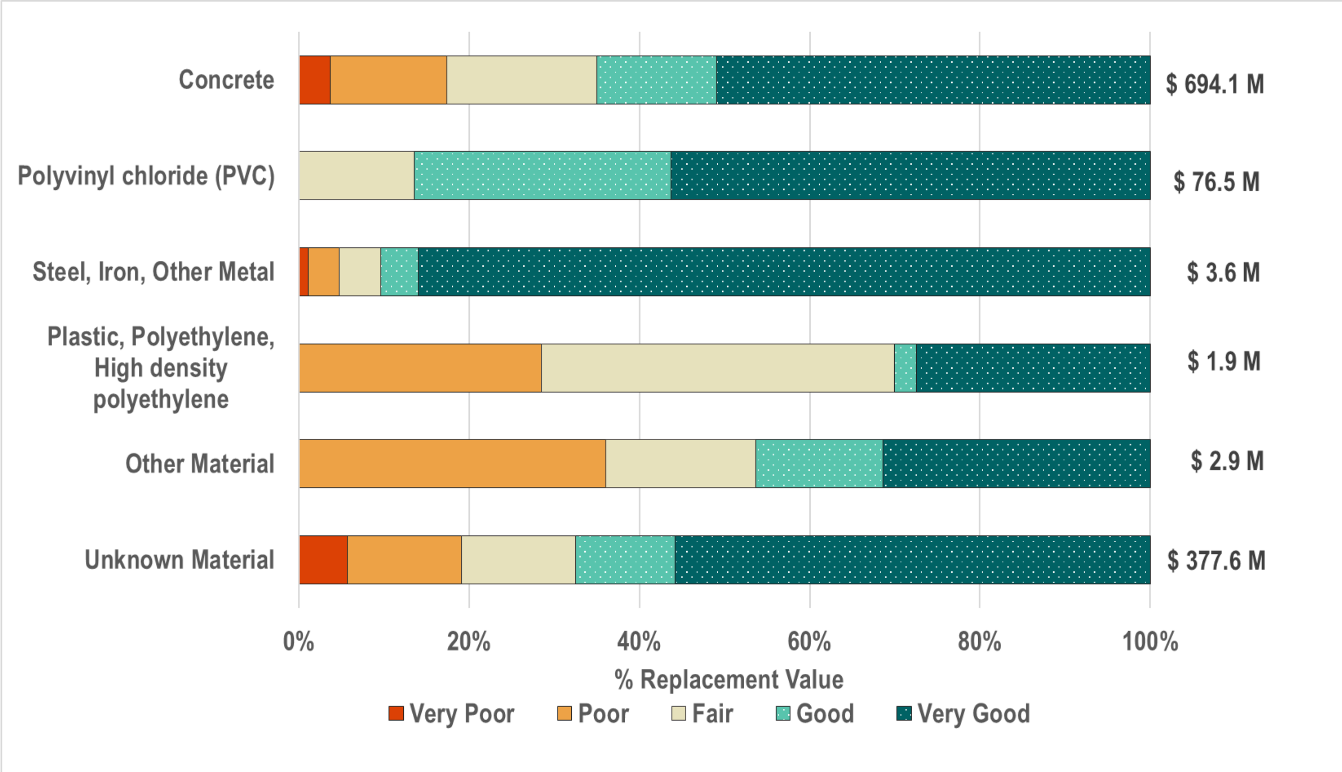


Figure 5-4 shows the asset condition distributions for stormwater mains. The condition bars are listed by material type in decreasing order of replacement value.

The methods used to estimate asset condition are explained in Sections 5.1.3.1 to 5.1.3.3.

Figure 5-4 Asset Condition – Stormwater Mains by Material Type



5.1.3.1 Stormwater Mains

As explained in Section 2.1, condition scores have been assigned to Pipe Assessment Certification Program (PACP) scores to most stormwater mains based on CCTV or zoom camera assessments. Refer to Table 2-2 for mapping of PACP score to the AM Plan's five-point scale (very good to very poor).

For pipes without PACP scores, condition is estimated based on remaining service life in accordance with the mapping shown in Table 5-3.

Table 5-3 Age-based Condition Score – Stormwater Mains

Age-based Condition Score	Remaining Service Life (%)	PACP Score
1	80 to 100	0 to 1.1
2	60 to 80	1.1 to 2.1
3	40 to 60	2.1 to 3.1
4	20 to 40	3.1 to 4.1
5	0 to 20	4.1 to 5

5.1.3.2 Oil and Grit Separators and Open Channels

The condition of oil and grit separators and open channels has been estimated based on remaining service life, as shown in Table 5-4.

Table 5-4 Age-based Condition Score – Oil and Grit Separators

Age-based Condition Score	Remaining Service Life (%)
1	75 to 100
2	50 to 75
3	25 to 50
4	0 to 25
5	Beyond service life

5.1.3.3 Other Stormwater Asset Types

For other stormwater asset types, data was not available on observed condition or remaining service life, so condition has not been reported.

5.2 Levels of Service

The City stormwater services are based on providing effective, sustainable, and reliable management of stormwater to both benefit the community and minimize environment impacts.

As part of the City's efforts to improve both wastewater and stormwater services, the City has implemented a program to separate combined sewers into individual wastewater and stormwater mains, improving the resiliency of the system. This program will reduce the quantity of stormwater being treated at the wastewater treatment plants, therefore reducing costs.

The defined levels of service for the City's stormwater system are a key driver for the consistent performance that the City delivers to its residents as these provide the planned outcome from a functional perspective.

5.2.1 O.Reg. 588/17 Qualitative LOS

Table 5-5 provides a summary of the qualitative Community LOS required to be reported by O.Reg. 588/17 for Stormwater service assets.

Table 5-5 O.Reg. 588/17 Qualitative LOS – Stormwater Service

Service Attribute	Community Levels of Service	Qualitative Description
Scope	Description, which may include maps, of the user groups or areas of the municipality that are protected from flooding, including the extent of the protection provided by the municipal stormwater management system.	To protect areas from flooding, storm water is conveyed across the City though 406 km of storm water pipes as well as along overland drainage routes, ditches, and natural watercourses. Some older established areas utilize combined sewers to drain stormwater; these assets are considered as part of the wastewater system. Oil and grit separators, stormwater ponds and a constructed wetlands help control the quantity and quality of the storm water.

5.2.2 Technical Metrics including O.Reg. 588/17 LOS

Table 5-6 outlines the LOS that are driving current and future decision-making and expenditure needs for stormwater assets. The City's Customer LOS statements and Technical LOS indicators document performance from a service user's and service provider's perspective, respectively. Performance scores from the most recent five years (2020 – 2024) are listed. The table also lists the desired or "aspirational" performance for each metric to support the long-term vision for the City. This column indicates the direction of desired performance for the period outside of this AM Plan, and does not represent the City's target, proposed or expected LOS that is represented in this AM Plan. Projected performance is presented for different scenarios in Section 5.6.1 (Table 5-11), including one scenario presented as the Proposed LOS.

Table 5-6 LOS Metrics and Performance – Stormwater Service

Service Attribute	Customer LOS Statement (CLOS)	Technical LOS Indicator (TLOS)	Historical Performance					Desired (Aspirational) Performance[a]
			2020	2021	2022	2023	2024	
Capacity and Use	System has capacity to provide current and future serviced customers with stormwater collection service	Percentage of properties in municipality resilient to a 100-year storm[b]	Pending Stormwater Servicing Study					Maximize
		Percentage of the municipal stormwater management system resilient to a 5-year storm[b] [c]	41%	41%	42%	42%	42%	Maximize

Service Attribute	Customer LOS Statement (CLOS)	Technical LOS Indicator (TLOS)	Historical Performance 2020	2021	2022	2023	2024	Desired (Aspirational) Performance[a]
		Total length of stormwater network (km) – • Pipes • Ditches	404 km no data	404 km no data	404 km no data	404 km no data	406 km 104 km	For monitoring only
Reliability	Assets are kept in a state of good repair	Percentage of Stormwater assets due or overdue for replacement	5%	5%	5%	5%	4.3%	Minimize
	Maintenance is proactive	Preventative maintenance as a percentage of total maintenance	Future metric					Optimal balance TBD
Affordability	Services are affordable and provided at lowest cost for both current and future customers	Annual Capital investment as a % of cost to sustain assets over their lifecycles (replacement value / estimated service life = $18.4M/yr)	24%	15%	13%	16%	21%	100%

[a] Shows direction of preferred performance. This does not represent the City's target, proposed or expected performance.

[b] Required by O.Reg. 588/17.

[c] Based on installation year. All stormwater assets installed after 1980 met a 5-year storm standard.

5.3 Future Demand

As explained in Section 2.3, the City's population is projected to increase from 141,481 in 2025 to 153,177 in 2035. The represents an increase of 11,696 (8.3%), which may result in an increase in paved roads and other impermeable surfaces throughout the City.

The City is planning to complete a Stormwater Master Servicing Strategy (MSS) in 2027-28, which will establish how the City will meet its long-term capacity needs for stormwater management. The MSS's infrastructure recommendations will be incorporated into future updates of the AM Plan.

For the current AM Plan, it is assumed that expansion of the stormwater network will continue at the at the same rate as the previous five years. Specifically, this includes ownership assumption of $2,092,795/year of developer-constructed stormwater mains (approximately 1,332m/year), as well as City-led construction of $2,753,668/year of new or expanded stormwater infrastructure.

5.4 Climate Change

While the stormwater collection system is essential for conveying excess runoff, it is also essential to change the way we think about rainwater. In the past, stormwater systems were primarily designed to carry runoff quickly away to the nearest waterbody. It is generally now recognized that rainwater should be considered a valuable resource that is best managed as close to its source as possible to replicate the hydrologic system that was in place prior to development. As municipalities develop and lands are paved, there is less available ground for runoff to infiltrate and recharge groundwater levels.

Furthermore, it is understood that the intensity of rainfall events is likely to increase in the future; this further increases the capacity requirements of both natural and constructed stormwater drainage systems.

The upcoming MSS for Stormwater Service will forecast the City's long-term stormwater capacity, considering anticipated changes in rainfall quantities and intensities. The MSS's infrastructure recommendations will be incorporated into future updates of the AM Plan.

Low impact development and green infrastructure policies will also contribute to reducing the peak flows of runoff which can lead to flooding issues. As storm system infrastructure is maintained and replaced over time, opportunities for implementing these policies can be encouraged as they can incorporate many social and environmental benefits to the City.

5.5 Risk Management Strategy

As explained in Section 2.5, the City uses a risk-based approach to prioritize renewal needs. Likelihood of failure is estimated based on condition (refer to Table 2-3). The consequence of failure is estimated based on the scoring criteria and weights shown in Table 5-7, Table 5-8 and Table 5-9 for stormwater mains, open channels and ponds, respectively. Consequence of failure scores and scoring criteria for other asset types will be established in future AM planning improvement initiatives.

Table 5-7 Consequence Scoring – Stormwater Mains

Consequence Category	Criteria	Parameter	Consequence Score				
			1 - Minimal	2 - Minor	3 - Moderate	4 - Major	5 – Extreme
Financial	Capital Expenditure (Replacement of Assets)	Replacement Cost + Emergency Premium (20%) Normalized for length, based on diameter.	<$100k	$100k - <$250k	$250k - <$1M	$1M - $2M	>$2M
	Revenue loss due to service closure or other direct cost not related to asset repair	N/A - failure will not result in revenue loss as there are alternative ways to supply water	N/A	N/A	N/A	N/A	N/A
Social	Impact to Health and Safety	Average Annual Daily Traffic (AADT) – If the failure happens near a higher traffic road, there is the potential for health and safety impacts to more road users. If AADT values not available, use Road Classification to determine traffic levels.	0 – 500	501 – 3,000	3,001 – 5,000	5,001 – 10,000	≥ 10,001
		Pipe Diameter (mm) - with a larger pipe diameter, there is a likelihood of more catastrophic failure	0 – 200 mm	201– 300 mm	301 – 600 mm	601 – 1000 mm	≥ 1001 mm
	Legal liability	Potential for basement flooding - Land use	Transportation / Public Utilities, Vacant Land, Parking Lots, Environmental Protection, Rural Residential, Nursery Stock, Greenhouses Vineyards, Orchards, Intensive Livestock, Field Crops, Idle Agriculture, Agricultural Commercial,	Commercial, Commercial/ Residential, Industrial, Churches	Multiple>3 Storeys, Single Detached, Double Detached, Multiple Attached (townhouses), Multiple<3 Storeys>3 units, Triplex, Schools, Long-term Care, Group Homes, Hospitals	Residential with a storm lateral (possibly a future measure)	N/A

Consequence Category	Criteria	Parameter	Consequence Score				
			1 - Minimal	2 - Minor	3 - Moderate	4 - Major	5 – Extreme
			Agricultural Industrial, Mixed Agricultural, Agricultural Commercial, Recreational, Private Recreational				
	Service Disruption	N/A	N/A	N/A	N/A	N/A	N/A
	Customer Impact	Pipe Diameter - pipe diameter is generally proportional to number of impacted customers.	0 – 300 mm	301– 450 mm	451 – 600 mm	601 – 1000 mm	≥ 1001 mm
		Potential for basement flooding - Land use	See above	See above	See above	See above	See above
		Average Annual Daily Traffic (AADT)	See above	See above	See above	See above	See above
Environmental	Environmental Compliance	Shapefiles - Distance (m) to ESA, Watercourse or Habitat. Distance to environmental features will indicate if environmental issues will occur as a result of a failure.	N/A	N/A	N/A	N/A	N/A
		Oil and Grit Separator	N/A	N/A	Yes	N/A	N/A
	Environmental Impact	Shapefiles - Distance (m) to ESA, Watercourse or Habitat. Distance to environmental features will indicate if environmental issues will occur as a result of a failure.	>= 25m	< 25 m	N/A	N/A	N/A

Table 5-8 Consequence Scoring – Open Channels

Consequence Category	Criteria	Parameter	Consequence Score				
			1 - Minimal	2 - Minor	3 - Moderate	4 - Major	5 – Extreme
Financial	Capital Expenditure (Replacement of Assets)	Replacement Cost + Emergency Premium (20%) Normalized for length, based on diameter.	<$100k	$100k - <$250k	$250k - <$1M	$1M - $2M	>$2M
	Revenue loss due to service closure or other direct cost not related to asset repair	N/A - failure will not result in revenue loss as there are alternative ways to supply water	N/A	N/A	N/A	N/A	N/A
Social	Impact to Health and Safety	Average Annual Daily Traffic (AADT) – If the failure happens near a higher traffic road, there is the potential for health and safety impacts to more road users. If AADT values not available, use Road Classification to determine traffic levels.	0 – 5000	5,001 – 10,000	≥ 10,001	N/A	N/A
	Legal liability	Land Use Parcel - land use provides a representation of number of affected customers as well as critical customers, which would be proportional to number and severity of legal claims.	Vacant Land, Parking Lots, Environmental Protection, Rural Residential, Transportation / Public Utilities	Single Detached, Double Detached, Multiple Attached(townhouses), Multiple<3 Storeys>3 units, Triplex, Triplex, Multiple>3 Storeys, Churches, Recreational Private, Recreational	Commercial, Commercial/Residential, Industrial, Nursery Stock, Greenhouses, Vineyards, Orchards, Intensive Livestock, Field Crops, Idle Agriculture, Agricultural Commercial, Agricultural Industrial, Mixed Agricultural, Agricultural Commercial	Schools, Long-term Care, Group Homes, Hospitals	N/A
	Service Disruption	N/A	N/A	N/A	N/A	N/A	N/A
	Customer Impact	Land Use Parcel -	See above	See above	See above	See above	See above
Environmental	Environmental Compliance Environmental Impact	N/A - failure will not result in environmental impact	N/A	N/A	N/A	N/A	N/A

Table 5-9 Consequence Scoring – Ponds

Consequence Category	Criteria	Parameter	Consequence Score				
			1 - Minimal	2 - Minor	3 - Moderate	4 - Major	5 – Extreme
Financial	Capital Expenditure (Replacement of Assets)	Replacement Cost + Emergency Premium (20%) Normalized for length, based on diameter.	<$100k	$100k - <$250k	$250k - <$1M	$1M - $2M	>$2M
	Revenue loss due to service closure or other direct cost not related to asset repair	N/A - failure will not result in revenue loss as there are alternative ways to supply water	N/A	N/A	N/A	N/A	N/A
Social	Impact to Health and Safety	Average Annual Daily Traffic (AADT) – If the failure happens near a higher traffic road, there is the potential for health and safety impacts to more road users. If AADT values not available, use Road Classification to determine traffic levels.	0 – 5000	5,001 – 10,000	≥ 10,001	N/A	N/A
	Legal liability	Land Use Parcel - land use provides a representation of number of affected customers as well as critical customers, which would be proportional to number and severity of legal claims.	Vacant Land, Parking Lots, Environmental Protection, Rural Residential, Transportation / Public Utilities	Single Detached, Double Detached, Multiple Attached (townhouses), Multiple<3 Storeys>3 units, Triplex, Multiple>3 Storeys, Churches, Recreational Private, Recreational	Commercial, Commercial/Residential, Industrial, Nursery Stock, Greenhouses, Vineyards, Orchards, Intensive Livestock, Field Crops, Idle Agriculture, Agricultural Commercial, Agricultural Industrial, Mixed Agricultural, Agricultural Commercial	Schools, Long-term Care, Group Homes, Hospitals	N/A
	Service Disruption						
	Customer Impact						
Environmental	Environmental Compliance	N/A - failure will not result in environmental impact	>100m	51m - 100m	<50m	N/A	N/A
	Environmental Impact						

5.6 Lifecycle Management Strategy

5.6.1 Lifecycle Management Activities

The levels of service presented in the previous section are supported by a variety of lifecycle activities in accordance with the activity types presented in Table 5-10. These activities are targeted to extend the asset life, ensure levels of service are being met, and reduce overall lifecycle costs.

Table 5-10 Lifecycle Activities – Planned and Recommended – Stormwater Service

Lifecyle Activity Type	Planned Activities (within Anticipated Funding)	Risks of not continuing the Planned Activities	Additional Recommended Activities	Risks of not Adopting Recommended Activities
Non-Infrastructure Solutions	– MSS for Stormwater will be updated in 2027-28 to identify long-term capacity needs – City currently conducts CCTV inspections on stormwater mains each year ($300k of inspections/year). – City monitors flows to calibrate and confirm estimates related to hydraulic model	– Without the MSS for Stormwater, the City will not know the most efficient way to manage drainage needs as the City grows and as the climate changes	– MSS for Stormwater to be updated every 10 years (estimated cost $250k). This includes hydraulic analysis – Between MSS updates, conduct hydraulic analysis to evaluate the capacity of the linear stormwater system and identify areas that require improvements. (estimated cost $50k, every 10 years). – Engineering assessment and bathymetric survey of stormwater ponds every 5 years ($25k/pond for 7 wet ponds) – Engineering assessment of open channels every 10 years ($30k/location for 7 locations: - Bunting Rd. - Welland Canals Parkway	– Without regular updates of the MSS and hydraulic analysis, City will be relying on an MSS whose assumptions may be out-of-date and incorrect – Without engineering inspections and bathymetric surveys, it is not possible to know the remaining capacity of the ponds and to determine whether they need to be dredged.

Lifecyle Activity Type	Planned Activities (within Anticipated Funding)	Risks of not continuing the Planned Activities	Additional Recommended Activities	Risks of not Adopting Recommended Activities
			- Eastchester Ave. - Seapark Dr. - Burleigh Hill Dr. - Cushman Rd. - Fourth Ave.) – Engineering assessment of the constructed wetland every 10 years ($20k) – Additional $100k/year of CCTV and zoom camera inspection needed beginning in 2030	
Operations and Maintenance Activities	– Routine maintenance program including pipe flushing, reaming and spot repairs – Clearing of blocked lateral connections – Regular inspection of maintenance holes – Annual inspection and cleaning of catch basins – Cleaning ditches and regular removal of vegetation – Reactive re-grading of ditches – Street cleaning to reduce sediment from entering stormwater system	– Increased lifecycle cost if maintenance is done improperly or without scheduled frequency. – Insufficient maintenance could lead to unplanned and urgent work when there are inadequate resources available (labour, materials, etc.). – Insufficient maintenance result in naturalization of channels, ditches and ponds,	– O&M needs will increase as assets are added to accommodate growth. – O&M needs may also change as a result of asset upgrades.	– If inventory changes are not considered, O&M funding may not be sufficient to deliver the required LOS.

Lifecyle Activity Type	Planned Activities (within Anticipated Funding)	Risks of not continuing the Planned Activities	Additional Recommended Activities	Risks of not Adopting Recommended Activities
Renewal, Rehabilitation and Replacement	– Reline sewers and laterals – Replace deteriorated stormwater main segmentsInstall plastic maintenance hole inserts if maintenance hole is identified as a major source of infiltration through pick holes	– Deteriorated mains may result in leakage to the environment, as well as inflow and infiltration into the Stormwater system – Increased lifecycle cost if renewal/rehab are deferred.	– Replacement and rehabilitation activities could be increased to reduce the renewal backlog (assets in Very Poor condition) more quickly. – Wet pond and wetland cleanouts $525/m^2$ every 10 years – Dry pond cleanouts $160/m^2$ every 10 years – Open channel cleaning $750/m every 10 years	– Deteriorated mains may result in leakage to the environment, as well as inflow and infiltration – Increased lifecycle cost if renewal/rehab are deferred – Lack of capacity in ponds, wetland and open channel may result in flooding
Growth Activities	– Assumption of $2,092,795/year of developer-constructed assets (approximately 1,332m/year of stormwater mains). This estimate is based on the annual average of asset assumptions 2019-2023 – Construction of $2,753,668 / year of growth assets, based on annual average 2020-2024, for example through separation of stormwater and wastewater infrastructure	– The City is required to assume developer-constructed assets once new development has been constructed and assets have completed a maintenance period. – Assumption and construction of assets results in increased operations, maintenance and renewal costs to the City. – If future assumptions differ from the historical average, the estimated impact on O&M costs will be inaccurate.	– No additional specific growth-related needs have been identified. Growth-related construction needs will be identified in the upcoming MSS for Stormwater. – There is a risk that the new Skyway will result in additional flow into the Eastchester drain. City to monitor potential need for more capacity.	– Separating combined sewers, and adding new storm sewers, will modernize the City's infrastructure and make it more resilient to future climate impacts.

Lifecyle Activity Type	Planned Activities (within Anticipated Funding)	Risks of not continuing the Planned Activities	Additional Recommended Activities	Risks of not Adopting Recommended Activities
		– If wastewater assets are replaced at a higher rate, this may result in accelerated growth of the stormwater network through pipe separation ($2,753,668/year is based on historical annual average). –		
Upgrade Activities	– Sewer main upsizing/downsizing based on design standard compliance and flow requirements.	– Combined sewers can release untreated or inadequately treated Stormwater into the environment during heavy rainfall, posing public health and environmental risks.	– Upgrade and upsizing needs to meet current storm standards will be identified in the upcoming MSS for Stormwater.	– N/A
Disposal Activities	– There are currently no plans to dispose of any assets without replacement.	– N/A	– Disposal needs may be identified in the upcoming MSS for Stormwater.	– N/A

5.6.2 Lifecycle Management Scenario Forecasts

This section presents lifecycle forecasts for:

- Scenario A: Anticipated Budget
- Scenario B: Maintain Current LOS
- Scenario C: Proposed LOS

Table 5-11 compares the lifecycle activities included in each scenario.

Table 5-11 Lifecycle Activities – Scenario Comparison – Stormwater Service

Lifecycle Activity Type	Scenario A: Anticipated Funding	Scenario B: Maintain Current LOS	Scenario C: Proposed LOS
Non-Infrastructure Solutions	– Update MSS for Stormwater in 2027-28 (funds already allocated) – Continue existing CCTV ($300k/year) and flow monitoring	– Include activities in Scenario A – Update of MSS (beyond 10-year planning period) – Update of hydraulic model ($50k, 2032)	– Include activities in Scenario A – Update of MSS (beyond 10-year planning period) – Update of hydraulic model ($50k, 2032) – Engineering assessments and bathymetric surveys of 4 stormwater ponds ($100k to complete all ponds in 2026, 2031) – Engineering assessment and bathymetric survey of constructed wetland ($20k to complete all ponds in 2026) – Engineering assessments of 7 open channel locations ($210k to complete all ponds in 2027) – Additional $100k/year of CCTV inspections beginning in 2030
Operations and Maintenance Activities	– Routine maintenance program including pipe flushing, reaming and spot repairs – Clearing of blocked lateral connections – Regular inspection of maintenance holes – Regular inspection and cleaning of catch basins – Cleaning ditches and removal of vegetation – Reactive re-grading of ditches – Street cleaning to reduce sediment from entering stormwater system	– Same as Scenario A – Increase street cleaning budget in proportion with growth of road inventory – Increase drainage budget in proportion with growth of stormwater asset inventory	– Same as Scenario B

Lifecyle Activity Type	Scenario A: Anticipated Funding	Scenario B: Maintain Current LOS	Scenario C: Proposed LOS
	– Watercourse cleaning		
Renewal, Rehabilitation and Replacement	– Replace and renew assets up to anticipated annual average budget $2.1M / year (average annual 2024-26)	– No renewal activities within the 10-year forecast period	– Replace and renew assets up to anticipated annual average budget $1.9M / year (average annual 2024-26)
Growth Activities	– Assumption of $2.0M / year developer-constructed assets each year (2026-2035) – Construction of $2.75M / year of growth assets	– Same as Scenario A	– Same as Scenarios A & B
Upgrade Activities	– Upsizing/downsizing of sewer mains and culverts based on design standard compliance and flow requirements. (See 2015 Watercourse Study for culvert upsizing needs.)	– Same as Scenario A	– Same as Scenario A & B
Disposal Activities	– None	– None	– None

Table 5-12 compares the project LOS performance of each scenario. The Table shows that Scenario A provides the best LOS in most categories, including reducing the proportion of assets due or overdue for replacement from 4.3% to 3.81% over the 10-year period. This performance comes at an average annual renewal cost of $2.1M/year, which is the current anticipated renewal funding based on average annual renewal funding for the years 2024-26.

Scenario C is similar to Scenario A but re-allocates renewal funds to support non-infrastructure solutions (MSS updates, hydraulic modeling and condition assessments) and O&M for growth assets. These activities will allow the City to better plan for future capacity and deterioration needs, and to ensure that O&M budgets keep up with growth. As a result, the proportion of assets due or overdue for replacement is slightly higher at an annual average of 3.86% in Scenario C than Scenario B, which is a small trade-off for better planning and maintenance.

As previously explained, Scenario B maintains the current LOS but does not improve it.

Table 5-12 LOS Metrics and Projects Performance – Stormwater Service

Service Attribute	Customer LOS Statement (CLOS)	Technical LOS Indicator (TLOS)	Actual Performance 2024	Projected Performance		
				Scenario A: Anticipated Budget	Scenario B: Maintain Current LOS	Scenario C: Proposed LOS
Capacity and Use	System has capacity to provide current and future serviced customers with stormwater collection service	Percentage of properties in municipality resilient to a 100-year storm[a]	Pending Stormwater MSS	Pending Stormwater MSS		
		Percentage of the municipal stormwater management system resilient to a 5-year storm[a] [b]	43%	**Best** Increases more quickly than in Scenario B and C due to higher rate of asset replacements. Assets are replaced with current 5-yr storm standard Second Best	No improvement from current	Aligned to Scenario A.
		Total length of stormwater network (km) – • Pipes • Ditches	406 km 104 km	No difference across scenarios. Stormwater network will increase due to separation of stormwater pipes from the wastewater network, and assumption of developer-constructed assets.		
Reliability	Assets are kept in a state of good repair	Percentage of Stormwater assets due or overdue for replacement	4.3%	**Best** Average annual renewal backlog is 3.81% over the 10-year period.	No improvement from current.	Aligned to Scenario A. Average annual renewal backlog is 3.86% over the 10-year period.
	Maintenance is proactive	Preventative maintenance as a percentage of total maintenance	Future metric	**Best** Fewer assets in Very Poor condition, resulting in fewer	No improvement from current.	Aligned to Scenario A, but includes funding for

Service Attribute	Customer LOS Statement (CLOS)	Technical LOS Indicator (TLOS)	Actual Performance 2024	Projected Performance		
				Scenario A: Anticipated Budget	Scenario B: Maintain Current LOS	Scenario C: Proposed LOS
				failures than Scenarios B & C		O&M of growth and upgrade assets.
Affordability	Services are affordable and provided at lowest cost for both current and future customers	Annual capital investment as a % of cost to sustain assets over their lifecycles (replacement value / estimated service life = $18.4M/yr)	21%/year	**Best** Annual average 12%/year	0%	2nd Best Annual average 11%/year

(a) Required by O.Reg. 588/17.

(b) Based on 2020 hydraulic model estimation.

Figures 5-5 to 5-7 show the forecast condition distribution of stormwater assets for the three scenarios. The graphs appear similar because the differences in condition distribution are subtle. In Scenario A: Anticipated Funding the renewal backlog (assets in Very Poor condition) from 4.3% to 3.3% over the 10-year period. In Scenario B: Maintain Current LOS, the renewal backlog holds steady at 4.3% throughout the 10-year period. In Scenario C: Proposed LOS, the renewal backlog decreases from 4.3% to 3.5% over the 10-year period.

Figure 5-5 Condition Forecast – Stormwater Service Scenario A: Anticipated Funding

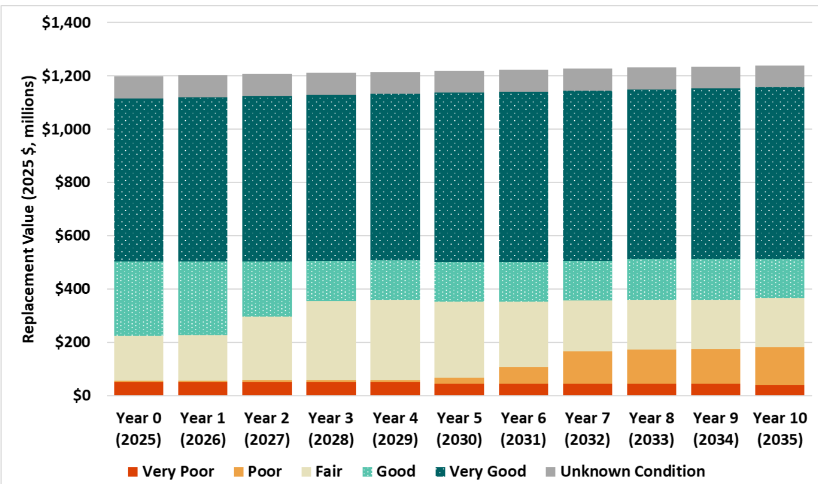


Figure 5-6 Condition Forecast – Stormwater Service Scenario B: Maintain Current LOS

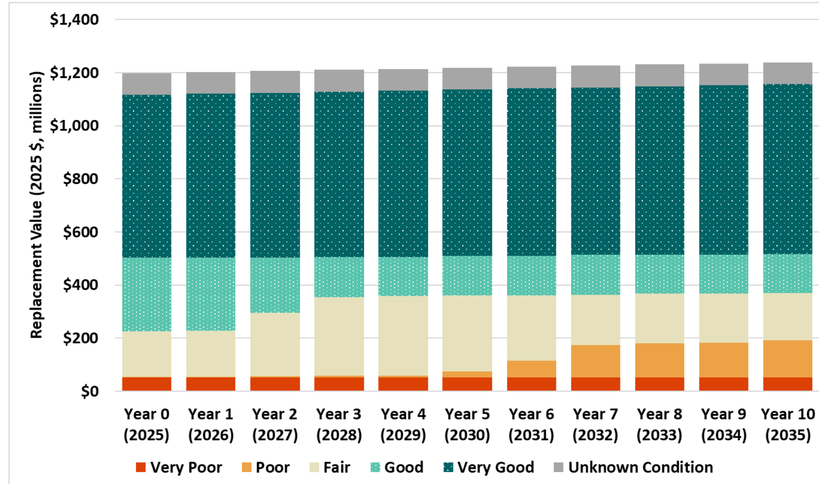


Figure 5-7 Condition Forecast – Stormwater Service Scenario C: Proposed LOS

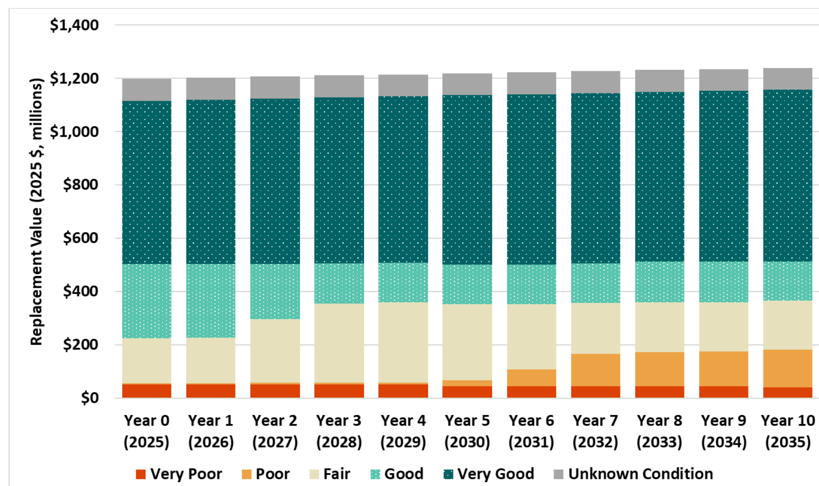


Figure 5-8 shows the year-by-year renewal needs for the recommended scenario, Scenario C: Proposed LOS. The average annual renewal needs for Scenario C are $1.9M/year, which is slightly lower than the anticipated funding of $2.1M/year, allowing for non-infrastructure activities and O&M for growth assets.

Scenario C's average annual amount for asset renewals is 11% of the renewal cost to achieve the lowest lifecycle cost to sustain the assets over their lifetime ($18.4M/yr). This means that many renewals will be needed beyond 2035, so renewal costs will increase in the future.

Figure 5-8 Renewal Needs for Scenario C: Proposed LOS

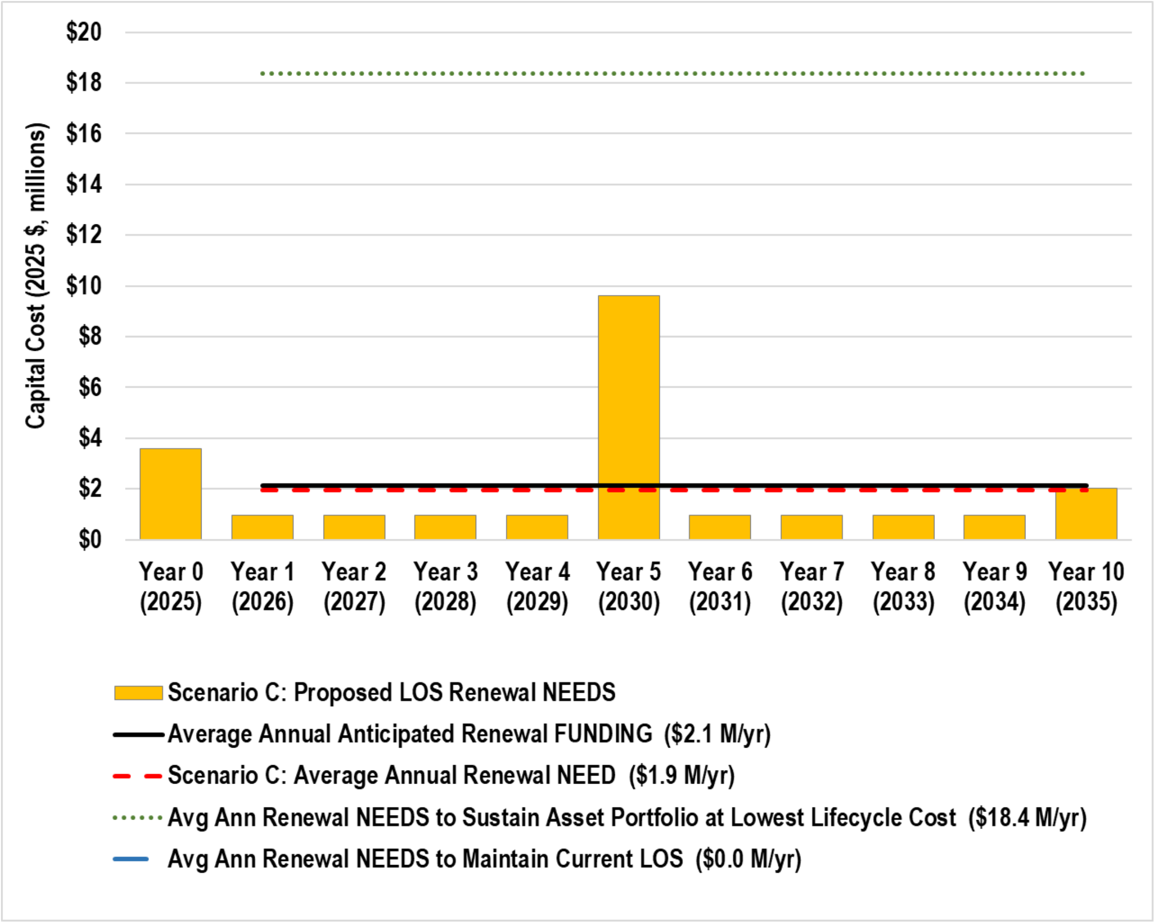


Table 5-13 shows the annual cost forecast for Scenario A: Anticipated Funding. This Scenario includes the current operating budget, which is sufficient to support O&M activities on the current asset inventory. The growth & upgrade funding is estimated based on the average annual historical capital allocation from 2020-24. The renewal budget is based on the average annual capital renewal allocation for the years 2024-26.

This scenario does not include funds for O&M or renewal of growth and upgrade assets, nor does it include funds for non-infrastructure solutions, such as condition assessments and the 2034 MSS update for Stormwater. Note however, that the MSS for Stormwater that will be completed in 2027-28 and has already been funded. No disposal activities have been identified or funded.

The cost forecast is shown graphically in Figure 5-9.

Table 5-13 Annual Cost Forecast – Stormwater Service – Scenario A

Lifecycle Activity Type	Annual Cost Forecast (2025 $, millions)										
	Year 1 (2026)	Year 2 (2027)	Year 3 (2028)	Year 4 (2029)	Year 5 (2030)	Year 6 (2031)	Year 7 (2032)	Year 8 (2033)	Year 9 (2034)	Year 10 (2035)	Average Annual
Non-Infrastructure Solutions	0.17	--	--	--	--	--	--	--	--	--	--
O&M – Existing Assets	2.73	2.73	2.73	2.73	2.73	2.73	2.73	2.73	2.73	2.73	2.73
Renewal – Existing Assets	2.36	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.13
Growth & Upgrade Activities	2.23	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	2.00
O&M – Growth & Upgrade Assets	--	--	--	--	--	--	--	--	--	--	--
Renewal – Growth & Upgrade Assets	--	--	--	--	--	--	--	--	--	--	--
Disposal Activities	--	--	--	--	--	--	--	--	--	--	--
TOTAL	**7.49**	**6.82**	**6.82**	**6.82**	**6.82**	**6.82**	**6.82**	**6.82**	**6.82**	**6.82**	**6.88**

Figure 5-8 Annual Cost Forecast – Stormwater Service – Scenario A

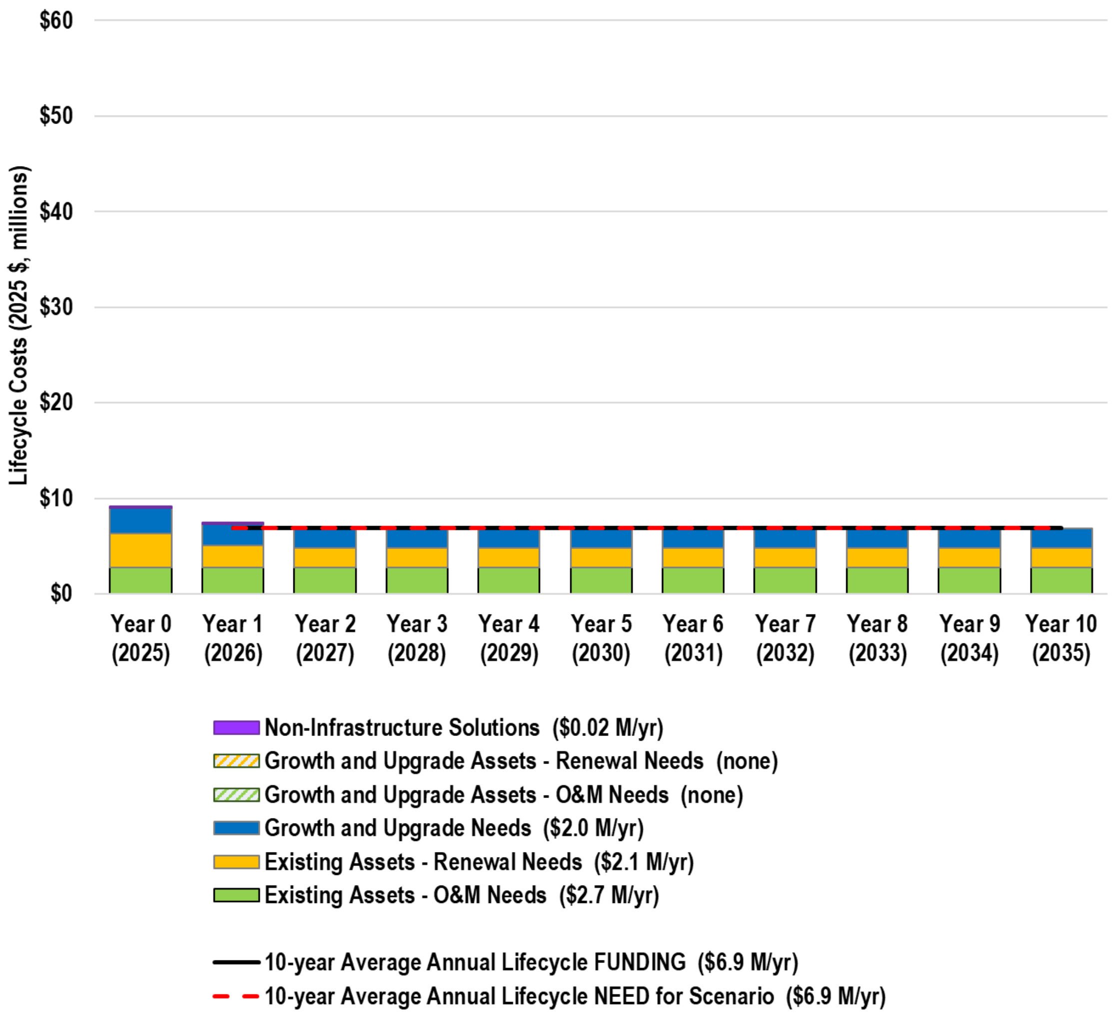


Table 5-14 shows the annual cost forecast for Scenario B: Maintain Current LOS. As with Scenario A, this Scenario includes the current operating budget (year 2025 budget) to support O&M activities on the current asset inventory, along with growth needs based on the historical annual average amounts from 2020-24. There are no planned renewal activities to maintain the backlog which is why the renewal spending is zero.

This scenario also includes funds for O&M of growth and upgrade assets, specifically, street cleaning costs for new roads and drainage costs for new stormwater assets. New assets include growth and expansion assets constructed by the City, as well as assets assumed from development. Funds are not included for renewal of growth and upgrade assets, since these will not require replacement within the 10-year planning period. This scenario also includes funds for non-infrastructure solutions, specifically update of the hydraulic model in Year 7. However, no funds are included for condition assessments. Moreover, no disposal activities have been identified or funded. The cost forecast is shown graphically in Figure 5-10.

Table 5-14 Annual Cost Forecast – Stormwater Service – Scenario B

Lifecycle Activity Type	Annual Cost Forecast (2025 $, millions)										
	Year 1 (2026)	Year 2 (2027)	Year 3 (2028)	Year 4 (2029)	Year 5 (2030)	Year 6 (2031)	Year 7 (2032)	Year 8 (2033)	Year 9 (2034)	Year 10 (2035)	Average Annual
Non-Infrastructure Solutions	0.17	--	--	--	--	--	0.05	--	--	--	**0.02**
O&M – Existing Assets	2.73	2.73	2.73	2.73	2.73	2.73	2.73	2.73	2.73	2.73	**2.73**
Renewal – Existing Assets	--	--	--	--	--	--	--	--	--	--	**--**
Growth & Upgrade Activities	2.23	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	**2.00**
O&M – Growth & Upgrade Assets	0.00	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.03	**0.02**
Renewal – Growth & Upgrade Assets	--	--	--	--	--	--	--	--	--	--	**--**
Disposal Activities	--	--	--	--	--	--	--	--	--	--	**--**
TOTAL	**5.13**	**4.72**	**4.72**	**4.72**	**4.72**	**4.73**	**4.78**	**4.73**	**4.74**	**4.74**	**4.77**

Figure 5-9 Annual Cost Forecast – Stormwater Service – Scenario B

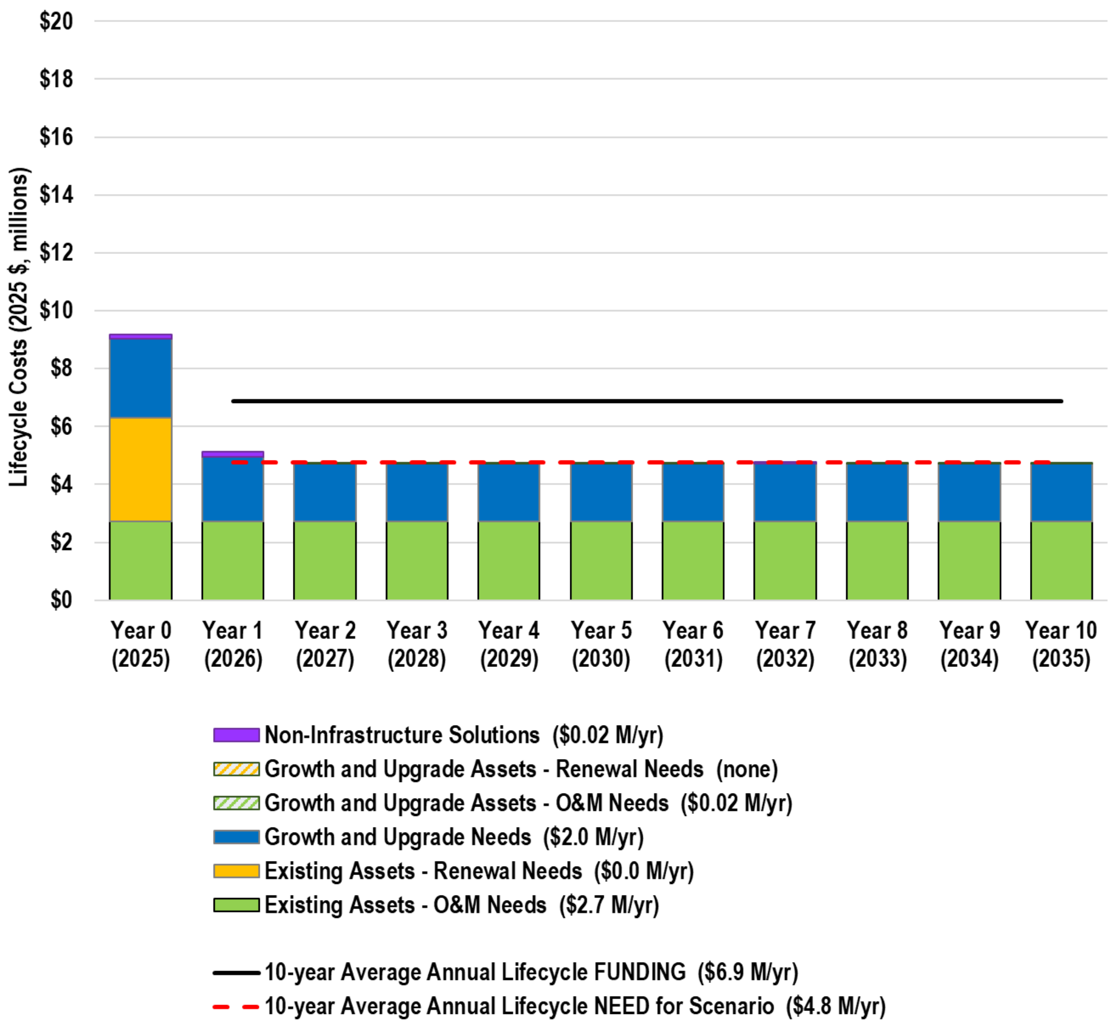


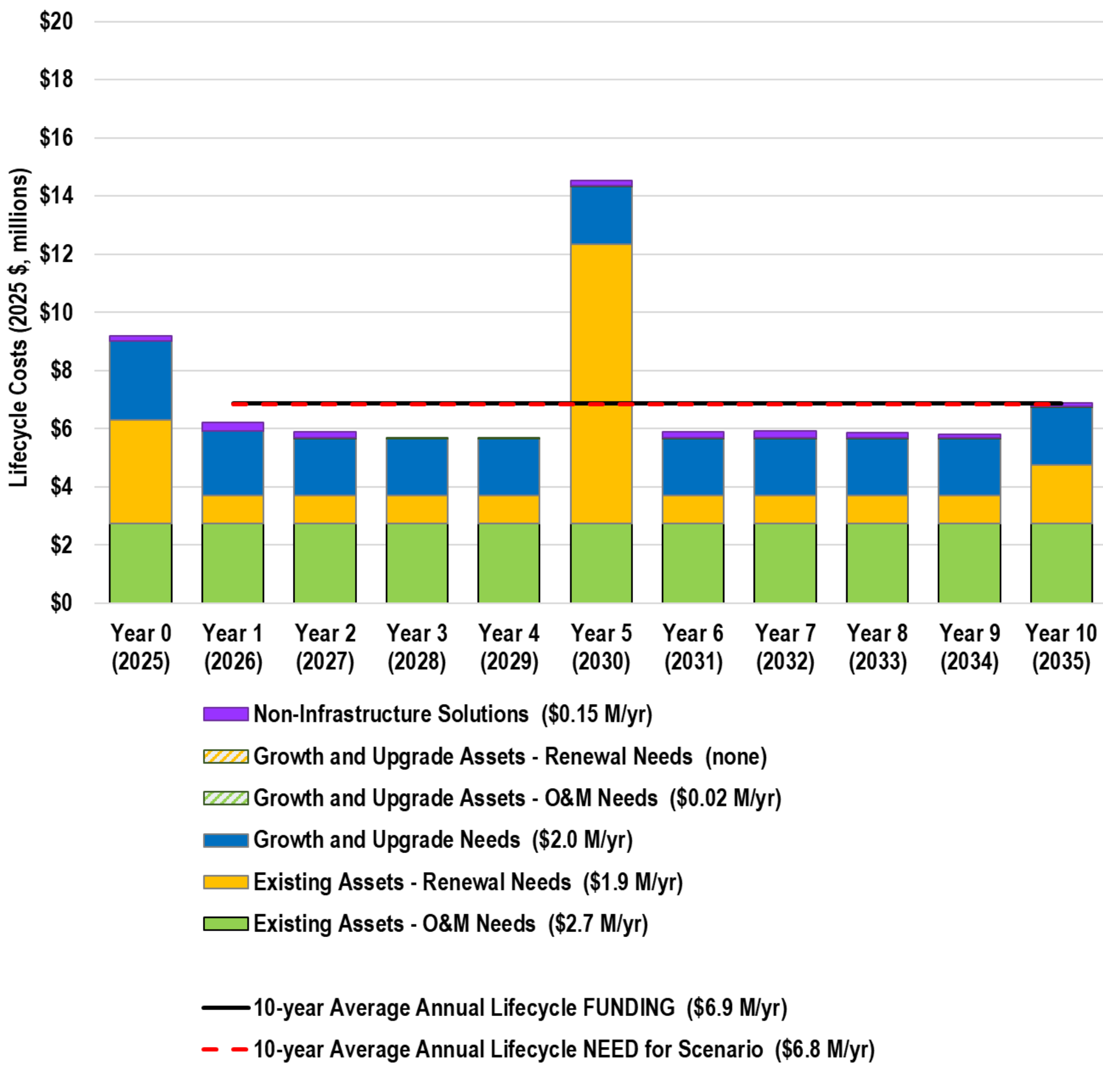
Table 5-15 shows the annual cost forecast for Scenario C: Proposed LOS. As with Scenario A, this Scenario includes the current operating budget (year 2025 budget) to support O&M activities on the current asset inventory, along with growth needs based on the historical annual average amounts from 2020-24. This scenario also includes the same renewal costs as in Scenario A, with some funds re-allocated to non-infrastructure solutions and O&M of growth and upgrade assets. Non-infrastructure activities include condition assessments of stormwater ponds (Years 1 and 6), assessment of the constructed wetland (Year 1), assessment of the open channels (Year 2), and update of the hydraulic model (Year 7). O&M of growth and upgrade assets includes street cleaning costs for new roads and drainage costs for new stormwater assets. New assets include growth and expansion assets constructed by the City, as well as assets assumed from development. No disposal activities have been identified or funded. Moreover, funds are not included for renewal of growth and upgrade assets, since these will not require replacement within the 10-year planning period.

The cost forecast is shown graphically in Figure 5-11.

Table 5-15 Annual Cost Forecast – Stormwater Service – Scenario C

Lifecycle Activity Type	Annual Cost Forecast (2025 $, millions)										
	Year 1 (2026)	Year 2 (2027)	Year 3 (2028)	Year 4 (2029)	Year 5 (2030)	Year 6 (2031)	Year 7 (2032)	Year 8 (2033)	Year 9 (2034)	Year 10 (2035)	Average Annual
Non-Infrastructure Solutions	0.29	0.21	-	-	0.17	0.21	0.24	0.16	0.10	0.12	**0.15**
O&M – Existing Assets	2.73	2.73	2.73	2.73	2.73	2.73	2.73	2.73	2.73	2.73	**2.73**
Renewal – Existing Assets	0.96	0.96	0.96	0.96	9.63	0.96	0.96	0.96	0.96	2.03	**1.94**
Growth & Upgrade Activities	2.23	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	**2.00**
O&M – Growth & Upgrade Assets	0.00	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.03	**0.02**
Renewal – Growth & Upgrade Assets	--	--	--	--	--	--	--	--	--	--	**--**
Disposal Activities	--	--	--	--	--	--	--	--	--	--	**--**
TOTAL	**6.22**	**5.89**	**5.68**	**5.68**	**14.52**	**5.90**	**5.93**	**5.85**	**5.80**	**6.89**	**6.84**

Figure 5-10 Annual Cost Forecast – Stormwater Service – Scenario C



5.6.3 Rationale for Proposed LOS

The Proposed LOS, as defined in Scenario C is recommended because it allows the City to prevent the renewal backlog from growing, as well as to conduct condition and capacity assessments on its stormwater ponds, constructed wetland and open channels. These assets have not been assessed since they were constructed, and there is a need to determine whether dredging is required. By completing these assessments in 2026 and 2027, the data may be used to inform the update to the MSS for Stormwater. Work on the MSS is planned for 2027-28.

This scenario also includes funds to support O&M needs for growth assets to ensure that O&M LOS can be sustained over the 10-year period.

5.7 Financial Strategy

Table 5-16 shows a comparison of the average annual costs of the three scenarios. There is no funding gap as the current budget is sufficient to meet the proposed LOS outlined in Scenario C.

This scenario's average annual amount for renewals ($1.9M/year) is only 11% of the lowest life cycle cost to sustain the assets ($18.4M/year). This means that many renewals will be needed beyond 2035 so renewal costs will increase in the future.

Table 5-16 Average Annual Costs – Stormwater Service – Scenario Comparison

Lifecycle Activity Type	Average Annual Cost (2025 $, millions)		
	Scenario A: Anticipated Funding	Scenario B: Maintain Current LOS	Scenario C: Proposed LOS
Non-Infrastructure Solutions	--	$0.02	$0.2
O&M – Existing Assets	$2.7	$2.7	$2.7
Renewal – Existing Assets	$2.1	--	$1.9
Growth & Upgrade Activities	$2.0	$2.0	$2.0
O&M – Growth & Upgrade Assets	--	$0.02	$0.02
Renewal – Growth & Upgrade Assets	--	--	--
Disposal Activities	--	--	--
Total	$6.8	$4.7	$6.8
Funding Gap	n/a	none	none

6 Transportation Service

The movement of people, goods and services is a key component in ensuring quality of life and supporting the daily needs of the City's customers.

The City's local transportation network is connected to the Provincial highways via the Queen Elizabeth Way (north end) and 406 (downtown area and South end) which are under the jurisdiction of the Ministry of Transportation. The local system also provides linkage to various regional roads that are under the jurisdiction of the Niagara Region.

6.1 State of the Local Infrastructure

6.1.1 Asset Valuation

The City's transportation network is comprised of the following roads and right-of-way assets:

- Road assets include all road classes as per the Ministry of Transportation (arterial, collector, and local) and sub classifications as identified in the City's Transportation Master Plan. It must be highlighted that attributes recorded against the road indicate those that include bike lanes, and bus routes.
- Right-of-Way Assets include those that provide support to other transportation assets, such as traffic signals, signs, guiderails, and streetlights.
- Active Transportation include those assets that provide multiple uses (walkways, off-road cycling) associated with transportation assets like sidewalks, pathways, and multi-use trails.

The overall distribution of replacement values by asset type for the transportation network is shown in Table 6-1. Table 6-2 provides a further breakdown of the Roads asset class. Within this category, Local Community roads account for the largest share, representing 65.6% of the total replacement value for the Roads network.

Table 6-1 Inventory Valuation – Transportation Service

Asset Category	Asset Sub-Category	Count	Unit	Replacement Value (millions, 2025 $)	Replacement Value (% Total)
Roads	Arterial	77,772	metres	$203.9	13.6%
	Collector	49,260	metres	$119.9	8.0%
	Local	447,274	metres	$984.2	65.6%
Right-of-Way Assets	Guiderails	13,780	metres	$12.2	0.8%
	Guiderail end treatments	303	each	$3.0	0.2%
	Streetlights	14,717	each	$12.6	0.8%
	Streetlight Poles	3,966	each	$6.0	0.4%
	Streetlight Wiring	14,557	each	$29.9	2.0%
	Signalized Intersections	54	each	$21.2	1.4%

Asset Category	Asset Sub-Category	Count	Unit	Replacement Value (millions, 2025 $)	Replacement Value (% Total)
	Signs	18,868	each	$5.3	0.4%
Active Transportation	Sidewalks and Pathways	566,037	metres	$100.5	6.7%
	Trail	18,483	meters	$2.5	0.2%
	Overall Replacement Value			**$1,501.2**	**100.0%**

Table 6-2 Inventory Valuation – Roads

Asset Category	Asset Sub-Category	Count	Unit	Replacement Value (millions, 2025 $)	Replacement Value (% Total)
Local	Local Community	412,896	metres	$933.7	71.4%
	Rural Community	25,339	metres	$28.8	2.2%
	Downtown Community	8,900	metres	$21.5	1.7%
Arterial	Main Mixed Use	40,181	meters	$110.4	8.4%
	Main Residential	19,114	meters	$51.0	3.9%
	Rural Corridor	12,449	meters	$25.8	2.0%
	Downtown Corridor	6,029	meters	$16.8	1.3%
Collector	Collector Residential	18,012	meters	$43.4	3.3%
	Collector Industrial	15,953	meters	$39.4	3.0%
	Collector Mixed Use	15,295	meters	$37.0	2.8%
	Overall Replacement Value			**$1,307.8**	**100.0%**

For the valuation of the transportation network, the replacement values are based on the replacement of similar assets (like-for-like) on a complete and standalone basis. These have been calculated based on historical costs and market values.

6.1.2 Asset Age

Estimated Service Life of Road Infrastructure

The longevity of a roadway is influenced by a range of factors, including the composition of the road structure, traffic volumes, and subgrade strength. To assess the service life of road assets, deterioration curves have been developed, capturing the expected progression of wear under varying conditions.

Typical Service Life and Rehabilitation Interventions

Roadways generally exhibit a predictable pattern of aging and distress. Without intervention, service life can range from 35 to 60 years before full reconstruction becomes necessary. However, proactive rehabilitation strategies significantly enhance the lifespan of pavements.

A major rehabilitation treatment, such as resurfacing, is typically applied around 20 years into the asset's life. This intervention extends serviceability on average 10 to 15 years, delaying the need for full reconstruction.

Furthermore, multiple resurfacing treatments are strategically employed over the pavement's lifetime to maximize durability. However, each successive resurfacing cycle tends to have a diminishing return, as the effectiveness and longevity of these interventions progressively decrease.

Impact of Deferred Rehabilitation

Roadways that do not receive timely interventions tend to experience accelerated deterioration, ultimately leading to the need for more extensive reconstruction efforts. By maintaining a structured rehabilitation schedule, municipalities can optimize lifecycle costs and ensure prolonged usability of their transportation network.

An evaluation of the average age of assets relative to their average estimated service life (ESL) provides insight into the overall remaining service capacity of the transportation portfolio. Figure 6-1 shows the asset age analysis for the City's road assets. The estimated service life values applied within the road rehabilitation model represent the expected time until the next required intervention, rather than the absolute end of life of the asset. These values are derived from empirically validated deterioration curves that account for road classification, construction type, and estimated traffic volumes. These assumptions are critical for optimizing timing and investment strategies across the road network. As shown in the Figure, the average age of roads assets are beginning to approach the need for rehabilitation.

Figure 6-2 shows the asset age analysis for the remaining transportation assets. The average age data for Streetlight, Heads, Poles & Wiring, Signalized Intersections, Guiderails & End Treatments and Signs is unavailable or unrecorded at the time of analysis, resulting in an average age value of 0.0 years being displayed in Figure 6-2. These assets are excluded from portfolio-wide average age calculations.

Figure 6-1 Asset Age – Roads Assets

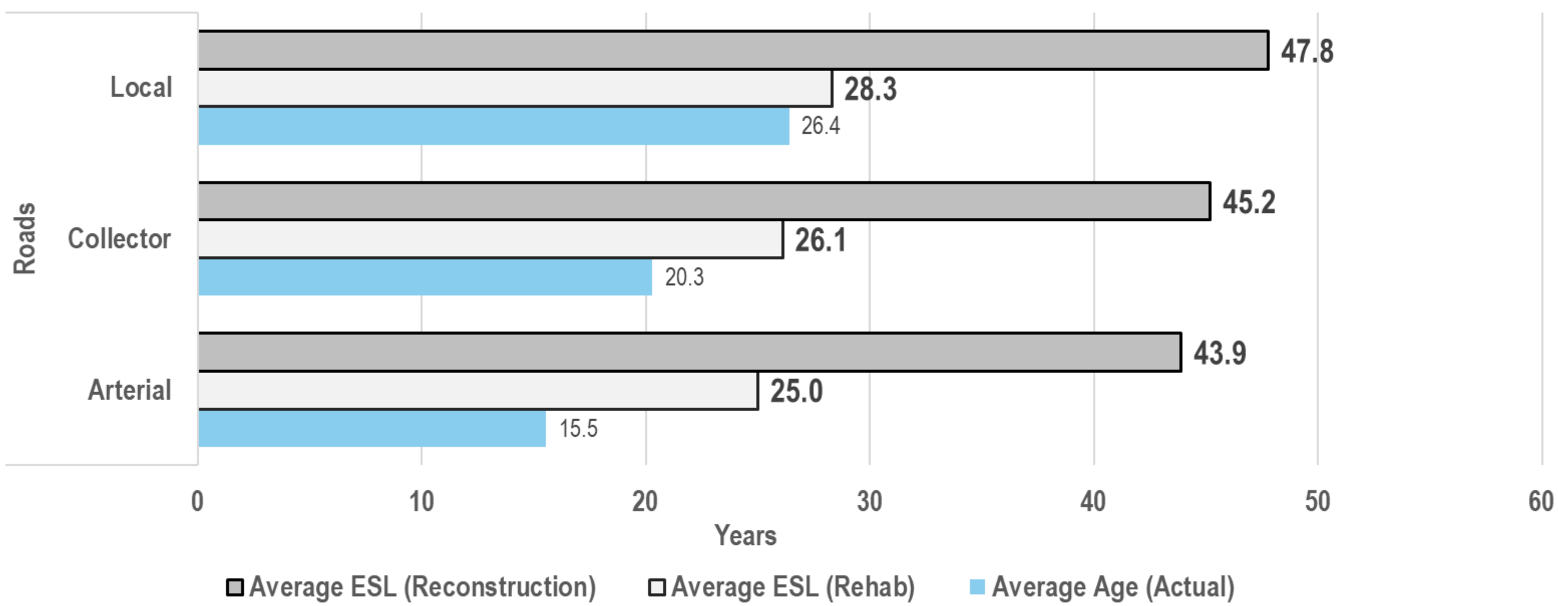
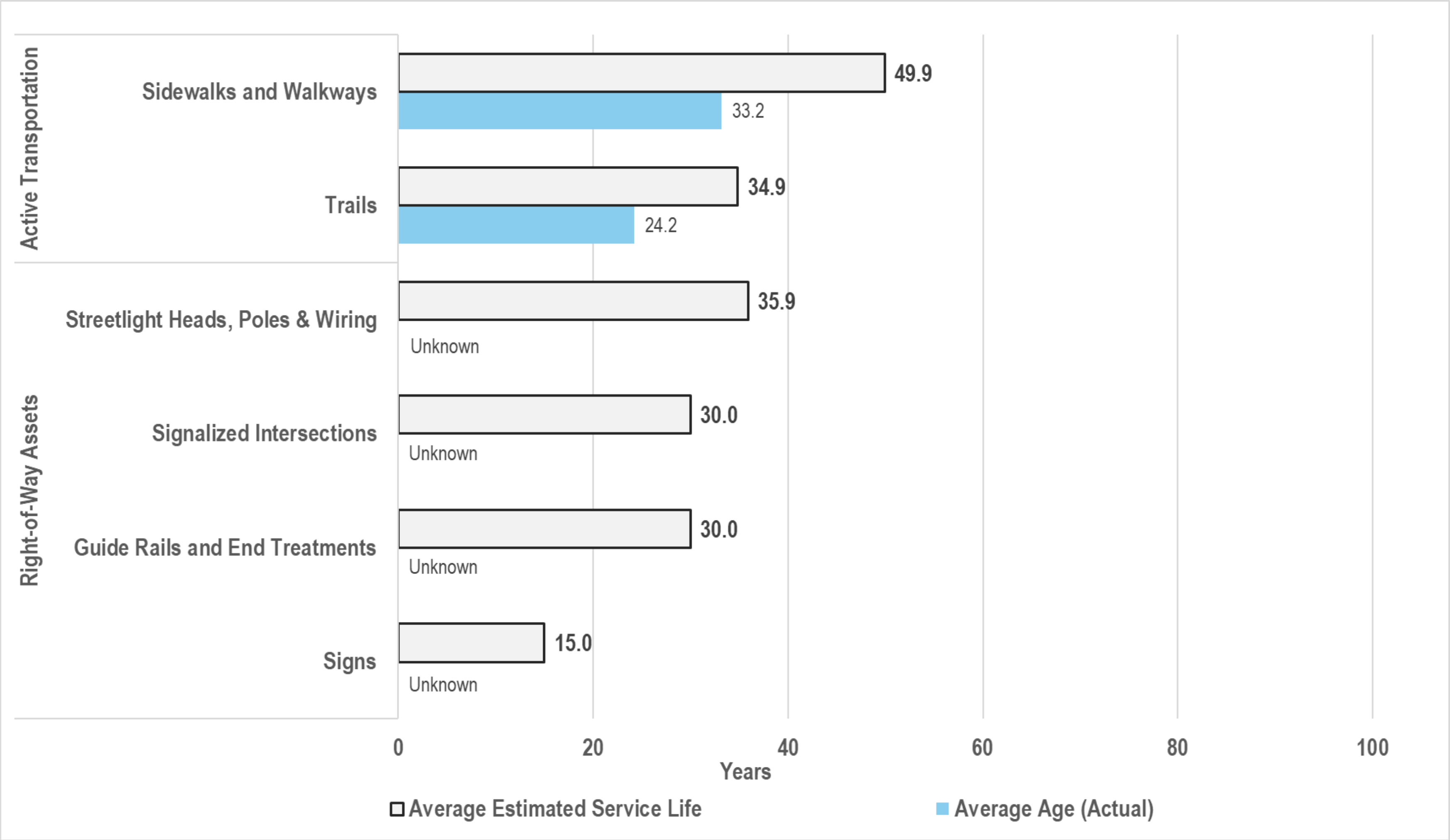


Figure 6-2 Asset Age – Remaining Transportation Assets



6.1.3 Asset Condition

Condition was assigned to transportation network assets using diverse approaches depending on the asset category. Using deterioration curves based on estimated remaining life and the condition provided as pavement quality index (PQI), a condition score was computed for each asset into five rating categories ranging from Very Good to Very Poor. Table 6-3 provides a summary of the scale for roads.

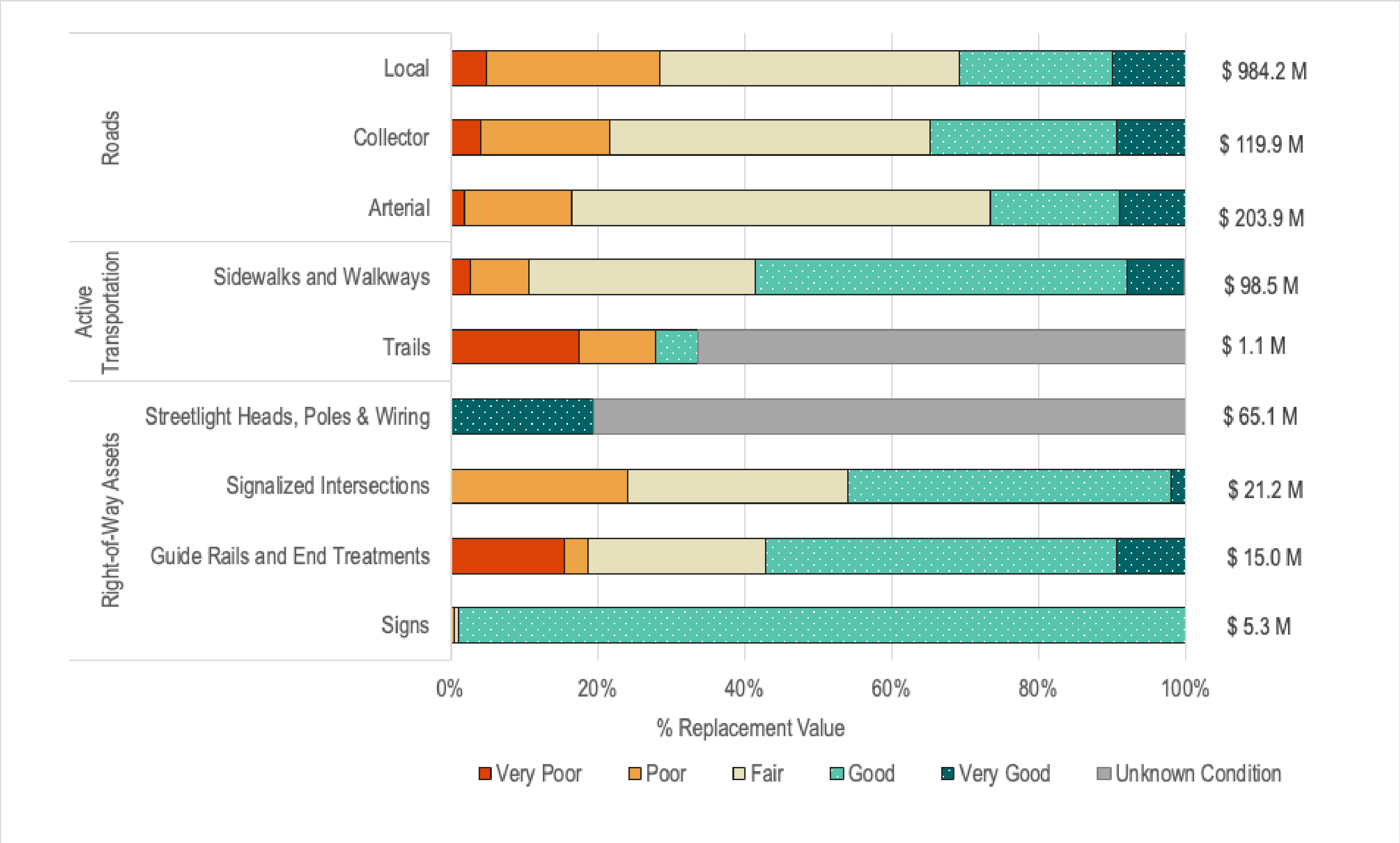
Table 6-3 Transportation Asset Condition Scale

Condition Score	Condition Rating	PQI: Concrete and Gravel	PQI: Composite and Flexible	Remaining Life All other assets
1	Very Good	81-100	81-100	75 to 100%
2	Good	61-80	61-80	50% to 75%
3	Fair	41-60	41-60	25% to 50%
4	Poor	21-40	21-40	0% to 25%
5	Very Poor	0-20	0-20	Beyond Service Life

The condition of streetlights was calculated based on the estimated service life of the full structure as one asset; and no discretization was made to separate the condition of the pole and fixtures due to limited data. This approach may result in condition being based partly on the lamp fixture which is the lowest cost portion of the asset. A pole condition assessment that will be completed in the future will provide updated condition estimates with a higher degree of confidence. Only those that have recently have fixture replacement have been included as part of the assessment. All other transportation assets condition is based on Table 6-2.

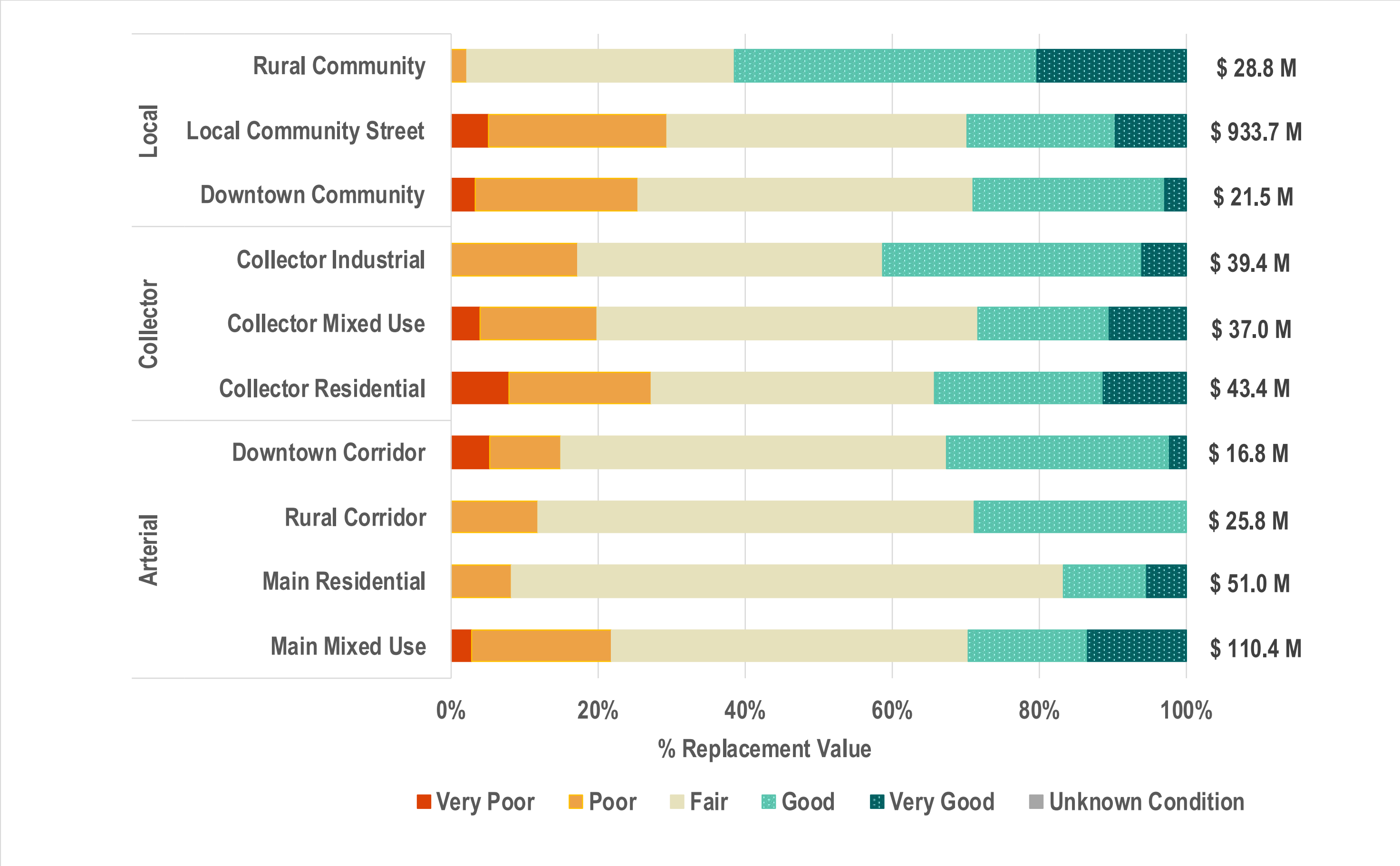
The current condition of all transportation assets has been summarized and weighted by replacement value in Figure 6-3. Overall, 4.1% of transportation assets are in the very poor rating category (based on replacement value) and 72.7% are in fair to very good condition. This indicates that the majority of the transportation network remains in a serviceable or better state, supporting continued functionality with moderate maintenance and rehabilitation needs.

Figure 6-3 Condition Distribution by Replacement Value



The current condition of road assets, weighted by replacement value, is presented in Figure 6-4. 4.4% of assets are rated as Very Poor with 74.1% of the network is in Fair to Very Good condition, reflecting a generally serviceable network. While Local Community Streets and Downtown Community roads show concentrations of Fair-rated assets requiring attention, arterial assets such as Main Residential, Main Mixed Use, and Rural Corridors demonstrate comparatively strong condition profiles. These results highlight the importance of ongoing maintenance programs to sustain asset performance and avoid costly future rehabilitation.

Figure 6-4 Condition Distribution by Replacement Value – Roads



6.2 Levels of Service

The City is committed to delivering a transportation network that is safe, efficient, accessible, and sustainable for all users. This includes accommodating a range of modes such as walking, cycling, transit, and vehicular travel, in alignment with both provincial regulations and community expectations.

Levels of Service (LOS) are a fundamental component of the City's transportation asset management strategy. They define the performance standards that guide the planning, maintenance, and investment in transportation infrastructure. These standards are informed by technical criteria (such as road condition ratings, traffic volume, and safety performance) as well as community outcomes (such as accessibility, connectivity, and user satisfaction).

Guided by the City's Transportation Master Plan and Active Transportation Master Plan, The City has adopted a complete streets approach, aiming to create a transportation network that is inclusive of all users, promotes active transportation, and supports sustainable urban growth. LOS targets are aligned with these objectives to ensure that infrastructure investment decisions reflect both functional performance and broader community values.

As the City advances its AM practices, it is essential to further integrate the principles of Complete Streets into AM planning to ensure that infrastructure investments align with the broader goals of inclusivity, active transportation, and sustainable urban growth.

Recognizing that Complete Streets provide safe and accessible transportation options for all users—including pedestrians, cyclists, transit riders, and motorists—the City should incorporate these principles into AM decision-making as its asset management framework matures. This approach will ensure that long-term planning, maintenance strategies, and capital investments reflect not only functional performance but also evolving community needs and urban design priorities.

By establishing clear LOS, the City ensures transparency, consistency, and accountability in its asset management practices. These service levels support evidence-based decision-making, enabling the City to balance affordability, risk, and long-term sustainability while delivering a high-performing transportation network that meets the needs of residents today and into the future.

6.2.1 O.Reg. 588/17 Qualitative LOS

Table 6-4 provides a summary of the qualitative Community LOS required to be reported by O.Reg. 588/17 for Transportation service assets. The City aims to maintain a road network that supports safe, reliable, and comfortable travel for residents and visitors. Pavement condition is one of the most visible and experienced indicators of transportation service quality, directly impacting driver satisfaction, road safety, and public perception of infrastructure upkeep

Table 6-4 O.Reg. 588/17 Qualitative LOS – Transportation Service

Service Attribute	Customer LOS Statement (CLOS)	Qualitative Description
Scope	Description, which may include maps, of the road network in the municipality and its level of connectivity.	The City's road network consists of provincial, regional, and municipal roads. Municipal roads are categorized into arterial, collector, and local roads, based on their function within the transportation system. Arterial roads primarily facilitate high-volume traffic movement and connectivity, while collector roads balance traffic flow and local access. Local roads focus on providing direct access to residences and businesses, supporting neighborhood circulation.
Quality	Description or images that illustrate the different levels of road class pavement condition	The City adheres to and follows the American Society for Testing Materials Pavement Condition Index (PCI) rating system model when defining pavement condition. Where a PCI of 100 indicates a perfect surface and zero indicates a surface that has completely deteriorated. The Pavement Quality Index (PQI) is a measure that is based on either condition alone or a combination of condition and the Ride Comfort Index (RCI). These standards are followed by the third-party consultants engaged by the City to perform pavement inspections. Table 6-6 provides additional CLOS metrics for the City transportation services.

Effective asset management ensures that transportation infrastructure remains functional, safe, and aligned with community expectations. To support this, road conditions across the network have been assessed using Pavement Condition Index (PCI) scores, a standardized metric that reflects surface quality and structural integrity.

To translate technical data into meaningful insights, deterioration curves were applied based on the estimated remaining life of each asset. This analysis used Pavement Quality Index (PQI) scores to determine a condition rating for each road segment. Assets were categorized into five condition grades: Very Good, Good, Fair, Poor, and Very Poor.

Table 6-5 provides a summary of this condition scale, and accompanying images illustrate typical examples of each rating to help communicate the condition levels clearly to the public.

Table 6-5 – Condition Scale - Transportation Service

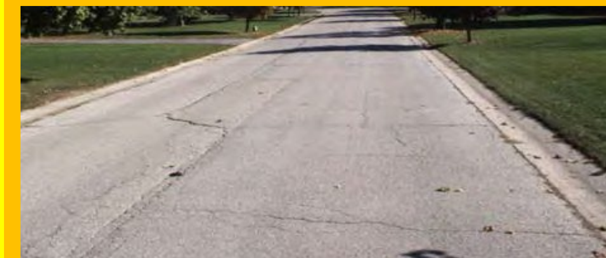
Road Class	Good Condition (Community Description)	Fair Condition (Community Description)	Poor Condition (Community Description)
Arterial Roads	Smooth surface with no bumps or potholes; lane markings are clear; driving is quiet and uninterrupted.	Some visible cracking or patching; occasional rough areas; road is still safe and functional.	Frequent bumps, potholes, or rough patches; markings may be faded; driving is uncomfortable or noisy.
Collector Roads	Mostly smooth driving with some signs of wear; safe and predictable surface with minor defects.	Noticeable surface wear or cracking; occasional repairs; road remains passable and safe for daily use.	Surface appears aged or uneven; cracks and patching more common; driving may be rougher or less comfortable.
Local Roads	Quiet and smooth; minor or no cracks; comfortable for residential driving, or biking.	Surface has some wear, fading, or cracking; still safe to use; may feel uneven in places.	Surface is visibly deteriorated; potholes, cracks, or patched areas are common; reduced comfort even at low speeds.

Very Good (PCI = 81 to 100)

Good (PCI = 61 to 80)

Fair (PCI = 41 to 60)

Poor (PCI = 21 to 40)



Very Poor (PCI = 0 to 20)

6.2.2 Technical Metrics including O.Reg. 588/17 LOS

Table 6-6 outlines the levels of service (LOS) that are guiding current and future decision-making and investment planning for the City's transportation assets. The City's Community LOS statements reflect the perspective of service users, while the Technical LOS indicators represent how performance is measured from an asset management and service provider standpoint. Performance results from the past five years (2020–2024) are summarized in the table. A target / proposed performance column is included to show the direction of improvement for each metric that the City has chosen.

Table 6-6 LOS Metrics and Performance – Transportation Service

Service Attribute	Customer LOS Statement (CLOS)	Technical LOS Indicator (TLOS)	Historical Performance					Target / Proposed Performance
			2020	2021	2022	2023	2024	
Capacity and Use	Network has capacity to provide current and future serviced customers	Number of lane-kilometres of arterial roads (Class 1 and Class 2 highways) as a portion of square kilometres of land area of the City[(a),(b)]	0.1	0.1	Not calculated	Not calculated	1.84	For monitoring only
		Number of lane-kilometres of collector roads (Class 3 and Class 4 highways) as a portion of square kilometres of land area of the City[(a),(b)]	2.7	2.6	Not calculated	Not calculated	0.99	For monitoring only
		Number of lane-kilometres of local roads means (Class 5 and Class 6 highways) as a portion of square kilometres of land area of the City[(a),(b)]	9.0	9.1	Not calculated	Not calculated	8.95	For monitoring only
Function	Meet customer needs while limiting safety impacts	Number of complaints that action a by-law ticket related to snow removal on residential areas	26	90	71	12	6	Minimize
		Number of complaints about snow removal in downtown core	0	5	N/A	N/A	3	Minimize
		Number of complaints about leaf/debris obstructions in cycling facilities or sidewalks	429	417	78	234	N/A	Minimize
		Percentage of streetlights owned by the City with LED or low energy fixtures	93%	Not calculated	Not calculated	Not calculated	93%	Maximize

Service Attribute	Customer LOS Statement (CLOS)	Technical LOS Indicator (TLOS)	Historical Performance					Target / Proposed Performance
			2020	2021	2022	2023	2024	
Reliability	Assets are kept in a state of good repair	For paved roads in the municipality, the average pavement condition index value (PCI)[b]	47	49	49	50	52	Maximize
		For unpaved roads in the municipality, the average surface condition[b]	Good	Good	Fair[c]	Fair[c]	Fair[c]	Maintain
		Percentage of transportation assets due or overdue for replacement	No data	7%	Not calculated	Not calculated	4%	
		Percentage of Minimum Maintenance Standard Inspections completed on time as per MMS O. Reg 239/02	99%	99%	90% (not fully completed)	99%	99%	100%
		Percentage of Minimum Maintenance Standard Repairs completed on time as per MMS O. Reg 239/02	92%	85%	Not calculated	98%	95%	Maximize
Affordability	Services are affordable and provided at lowest cost for both current and future customers	Annual Capital investment as a % of cost to sustain assets over their lifecycles (replacement value / estimated service life = $30.6M/yr)	33%	37%	36%	50%	53%	100%

[a] Shows direction of preferred performance. This does not represent the City's target, proposed or expected performance.

[b] Required by O.Reg. 588/17.

[c] Assumed condition – these roads are all Class 6 road, not inspected under MMS but evaluated on a complaint basis. Assumed to be in fair condition.

6.3 Climate Change

The City recognizes that climate change poses significant and evolving challenges to its transportation infrastructure. Rising average temperatures, more frequent extreme weather events, and shifting precipitation patterns are already impacting the performance, safety, and longevity of roads, sidewalks, and related transportation assets.

As climate hazards intensify, roads and sidewalks are experiencing increased deterioration, operational disruption, and higher maintenance demands. Key impacts identified through the City's climate risk assessment and asset review include:

- **Extreme precipitation** is contributing to the flooding of low-lying roads, soil instability along embankments, and increased debris on roadways, all of which result in higher maintenance costs and potential service disruptions.
- **Extreme heat** accelerates pavement deterioration and shortens the life cycle of asphalt-based surfaces, while also increasing the potential for greater usage of active transportation infrastructure during milder winters.
- **Freeze-thaw cycles** continue to be a concern, contributing to the formation of potholes and overall pavement fatigue, increasing the need for ongoing rehabilitation.
- **Extreme cold and icy conditions** require more frequent salting and brining operations, leading to increased operational costs and potential downstream environmental impacts.
- **High winds** have the potential to obstruct roadways with fallen trees or utility poles, necessitating emergency maintenance and temporary closures.
- **High lake levels**, particularly near shoreline roads, increase the risk of flooding and erosion, which can result in structural damage or asset loss.

In response, the City has incorporated a range of adaptation measures into its transportation planning and asset management practices. These include:

- **Preventative Maintenance Programs**: Inspection and maintenance practices are being implemented to proactively manage wear and tear caused by heat, precipitation, and freeze-thaw cycles.
- **Emergency Response Planning**: Protocols are being refined to support rapid response and recovery following major weather events, minimizing service disruptions and safety risks.

In addition to the ongoing City initiatives, the following improvements could be made to support climate resilience.

- **Resilient Infrastructure Design**: New and replacement road assets are being designed using climate-resilient materials and updated standards to improve performance under extreme weather conditions.
- **Monitoring and Data Collection**: The City continues to invest in systems to monitor how transportation infrastructure performs under varying climate conditions, supporting evidence-based decision-making and capital planning.

These efforts align with the City's Climate Adaptation Plan and reinforce the City's commitment to building a resilient, safe, and sustainable transportation network. As climate conditions continue to evolve, integrating adaptive strategies into the Asset Management Plan will ensure long-term service reliability, protect infrastructure investments, and support community well-being.

6.4 Risk Management Strategy

As outlined in Section 2.5, the City employs a risk-based approach to support the prioritization of renewal and rehabilitation needs within its transportation asset portfolio. This methodology ensures that investment decisions are informed by an understanding of both the likelihood and consequence of asset failure.

The likelihood of failure is primarily determined through asset condition assessments derived from regular inspections and performance data. These assessments reflect the physical state of assets and their expected deterioration patterns over time.

The consequence of failure is evaluated using a structured scoring system that considers the financial, social, and environmental impacts associated with asset failure. Scoring criteria and weightings have been developed for key transportation asset types and are presented in Table 6-7, Table 6-8 and Table 6-9.

This risk-based framework supports evidence-driven asset management planning by identifying assets that pose the highest risk to service delivery, safety, and cost-efficiency, allowing the City to prioritize interventions that deliver the greatest value.

Table 6-7 Transportation Asset Criticality Assessment Parameters: Roads

Consequence Category	Criteria	Parameter	Consequence Score				
			1 - Minimal	2 - Minor	3 - Moderate	4 - Major	5 – Extreme
Financial	Capital Expenditure (Replacement of Assets)	Reconstruction Cost + Emergency Premium (10%). Normalize roads based on 54 m length	<$100k	$100k - <$250k	$250k - <$1M	$1M - $2M	>$2M
	Revenue loss due to service closure or other direct cost not related to asset repair	Paid on-street parking - typical revenue to be provided as well as on-street parking areas.	TBC	TBC	TBC	TBC	TBC
Social	Impact to Health and Safety	AADT - If the failure happens near a higher traffic road, there is the potential for health and safety impacts to more road users. IF AADT VALUES NOT AVAILABLE: Road Classification - Road Class used to determine traffic levels.	AADT: 0 - 500	AADT: 501 - 3,000	AADT: 3,001 - 5,000	AADT: 5,001 - 10,000	AADT: > 10,000,
		Access to emergency facilities (hospitals, fire halls)	No	N/A	N/A	N/A	Yes
		Single access points to subdivisions for emergency vehicles (# of homes impacted)	TBC	TBC	TBC	TBC	TBC
	Legal liability	AADT - If the failure happens on a higher traffic road, there is	AADT: 0 - 500	AADT: 501 - 3,000	AADT: 3,001 - 5,000	AADT: 5,001 - 10,000	AADT: > 10,000,

Consequence Category	Criteria	Parameter	Consequence Score				
			1 - Minimal	2 - Minor	3 - Moderate	4 - Major	5 – Extreme
		increased chance of number and value of claims due to accidents. IF AADT VALUES NOT AVAILABLE: Road Classification - Road Class used to determine traffic levels.					
		Disruption to significant businesses - Scale TBC	Everything else	N/A	Commercial, Commercial/Residential, Industrial	N/A	Hospitals
	Service Disruption	Land Use Parcel - land use provides a representation of number and type of affected customers, which would be proportional to service disruption.	Vacant Land, Parking Lots, Environmental Protection, Rural Residential, Nursery Stock, Greenhouses, Vineyards, Orchards, Intensive Livestock, Field Crops, Idle Agriculture, Agricultural Commercial, Agricultural Industrial, Mixed Agricultural, Agricultural Commercial, Transportation / Public Utilities	Single Detached, Double Detached, Multiple Attached(townhouses), Multiple<3 Storeys>3 units, Triplex, Churches, Recreational, Private Recreational	Commercial, Commercial/Residential, Industrial, Multiple>3 Storeys, Long-term Care, Group Homes, Schools	N/A	Hospitals
		Bus route	No	N/A	Yes	N/A	N/A
		TMP Road Functional Class of Roadway	Community Street, Rural Community Street	Collector residential	Downtown Community Street, Rural Corridor, Collector Industrial	Downtown Corridor, Main Mixed-Use Corridor, Main Residential Corridor	N/A

Consequence Category	Criteria	Parameter	Consequence Score 1 - Minimal	2 - Minor	3 - Moderate	4 - Major	5 – Extreme
					corridor, Collector Mixed-use Corridor		
		Cycle lane (on-road)	No	Yes	N/A	N/A	N/A
	Customer Impact	AADT - provides value for the number of affected customers. IF AADT VALUES NOT AVAILABLE: Road Classification - Road Class used to determine traffic levels.	AADT: 0 - 100	AADT: 101 - 500	AADT: 501 - 1,000	AADT: 1,001 - 10,000	AADT: > 10,000,
		Streets with access to Critical Facilities - Schools, Museums, Arena	No	N/A	N/A	Yes	N/A
		Escarpment crossings	No	N/A	N/A	Yes	N/A
		Single access points to subdivisions for emergency vehicles (# of homes impacted)	# of homes impacted - to be scaled accordingly	N/A	N/A	N/A	N/A
Environmental	Environmental Compliance	N/A - failure will not result in environmental impact	All	N/A	N/A	N/A	N/A
	Environmental Impact	N/A - failure will not result in environmental impact	All	N/A	N/A	N/A	N/A

Table 6-8 Transportation Asset Criticality Assessment Parameters: Sidewalks

Consequence Category	Criteria	Parameter	Consequence Score				
			1 - Minimal	2 - Minor	3 - Moderate	4 - Major	5 – Extreme
Financial	Capital Expenditure (Replacement of Assets)	Reconstruction Cost + Emergency Premium (10%).	<$100k	$100k - <$250k	$250k - <$1M	$1M - $2M	>$2M
	Revenue loss due to service closure or other direct cost not related to asset repair	N/A - failure will not result in revenue loss	All	N/A	N/A	N/A	N/A
Social	Impact to Health and Safety	Proximity to critical customers (Schools, Long-term Care Facilities, Hospitals, Recreation Facilities). Ensure alignment with existing priority rating system.	No	N/A	Yes within 1600m	N/A	N/A
	Legal Liability	Functional Class of Roadway	rural	Local	Collectors	Arterial	N/A
	Service Disruption	Land Use Parcel - land use provides a representation of number and type of affected customers, which would be proportional to service disruption.	Vacant Land, Parking Lots, Environmental Protection, Rural Residential, Nursery Stock, Greenhouses, Vineyards, Orchards, Intensive Livestock, Field Crops, Idle Agriculture, Agricultural Commercial, Agricultural	Single Detached, Double Detached, Multiple Attached(townhouses), Multiple<3 Storeys>3 units, Triplex_ Triplex, Churches, Recreational, Private Recreational	Commercial, Commercial/Residential, Industrial, Multiple>3 Storeys, Long-term Care, Group Homes, Schools, Hospital	N/A	N/A

Consequence Category	Criteria	Parameter	Consequence Score				
			1 - Minimal	2 - Minor	3 - Moderate	4 - Major	5 – Extreme
			Industrial, Mixed Agricultural, Agricultural Commercial, Transportation / Public Utilities				
		Streets with access to Critical Facilities - Schools, Museums, Arena	No	N/A	Yes within 1600m	N/A	N/A
	Customer Impact	Streets with access to Critical Facilities - Schools, Museums, Arena	No	N/A	N/A	Yes	N/A
Environmental	Environmental Compliance	N/A - failure will not result in environmental impact	All	N/A	N/A	N/A	N/A
	Environmental Impact	N/A - failure will not result in environmental impact	All	N/A	N/A	N/A	N/A

Table 6-9 Transportation Asset Criticality Assessment Parameters: Traffic Signals

Consequence Category	Criteria	Parameter	Consequence Score				
			1 - Minimal	2 - Minor	3 - Moderate	4 - Major	5 – Extreme
Financial	Capital Expenditure (Replacement of Assets)	Replacement Cost + Emergency Premium (10%).	<$100k	$100k - <$250k	$250k - <$1M	$1M - $2M	>$2M
	Revenue loss due to service closure or other direct cost not related to asset repair	Asset Type - Certain assets will require police presence if failure	All	N/A	N/A	N/A	N/A

Consequence Category	Criteria	Parameter	Consequence Score				
			1 - Minimal	2 - Minor	3 - Moderate	4 - Major	5 – Extreme
Social	Impact to Health and Safety	AADT - If the failure happens near a higher traffic road, there is the potential for health and safety impacts to more road users. IF AADT VALUES NOT AVAILABLE: Road Classification - Road Class used to determine traffic levels.	AADT: 0 - 500	AADT: 501 - 3,000	AADT: 3,001 - 5,000	AADT: 5,001 - 10,000	AADT: > 10,000,
		Access to emergency facilities (hospitals, fire halls)	No	N/A	N/A	N/A	Yes
	Legal Liability	AADT - If the failure happens on a higher traffic road, there is increased chance of number and value of claims due to accidents. IF AADT VALUES NOT AVAILABLE: Road Classification - Road Class used to determine traffic levels.	AADT: 0 - 500	AADT: 501 - 3,000	AADT: 3,001 - 5,000	AADT: 5,001 - 10,000	AADT: > 10,000,
		Bus route	No	N/A	Yes	N/A	N/A
		Cycle lane (on-road)	No	Yes	N/A	N/A	N/A
	Service Disruption	All signals scored the same	N/A	All	N/A	N/A	N/A

Consequence Category	Criteria	Parameter	Consequence Score				
			1 - Minimal	2 - Minor	3 - Moderate	4 - Major	5 – Extreme
	Customer Impact	AADT - provides value for the number of affected customers. IF AADT VALUES NOT AVAILABLE: Road Classification - Road Class used to determine traffic levels.	AADT: 0 - 100	AADT: 101 - 500	AADT: 501 - 1,000	AADT: 1,001 - 10,000	AADT: > 10,000,
Environmental	Environmental Compliance	N/A - failure will not result in environmental impact	All	N/A	N/A	N/A	N/A
	Environmental Impact	N/A - failure will not result in environmental impact	All	N/A	N/A	N/A	N/A

6.5 Lifecycle Management Strategy

6.5.1 Lifecycle Management Activities

The levels of service presented in the previous section are supported by a variety of lifecycle activities in accordance with the activity types presented in Table 6-10. These activities are targeted to extend the asset life, ensure levels of service are being met, and reduce overall lifecycle costs.

Table 6-10 Lifecycle Activities – Planned and Recommended – Transportation

Lifecycle Activity Type	Planned Activities (within Anticipated Funding)	Additional Recommended Activities to Meet Proposed LOS
Non-Infrastructure Solutions	– Master Plans are developed and updated to provide a baseline for future growth projections in the transportation network (every 10 years for $500K) – Traffic studies and counts are conducted to evaluate the capacity and flow efficiency of the transportation network (every 5 years for $300K) – Road condition assessments every 4 years ($200K each)	– Streetlight pole condition assessment ($100K in 2027) – Guiderail condition assessments every 2 years ($50K each year)
Operations and Maintenance Activities	– Inspections are conducted in accordance with the Minimum Maintenance Standards and the necessary maintenance activities are triggered based on findings[2]. – Sweeping of roads is conducted four times per year to reduce dust and pollutant loadings (all roads swept in spring, curbed roads swept twice in summer, fall leaf pickup all roads in fall). Downtown is swept weekly. – Completion of winter maintenance such as snow plowing and salting. – Grinding, roller patching, crack sealing, spot repairs, and mud jacking.	– O&M needs will increase as assets are added to accommodate growth. – O&M needs may also change as a result of asset upgrades.
Renewal, Rehabilitation and Replacement	– Scheduled rehabilitation activities such as resurfacing. – Repair of shoulders and sidewalks. – Replacement of deteriorated assets.	– Maintain condition for Roads, Guiderails, Streetlights, Signals, Signs and follow available budget for Sidewalks.
Growth Activities	– Additions to support changes in demand and as per developments in the area.	– Incorporate future projects identified in a future Transportation Master Plan.

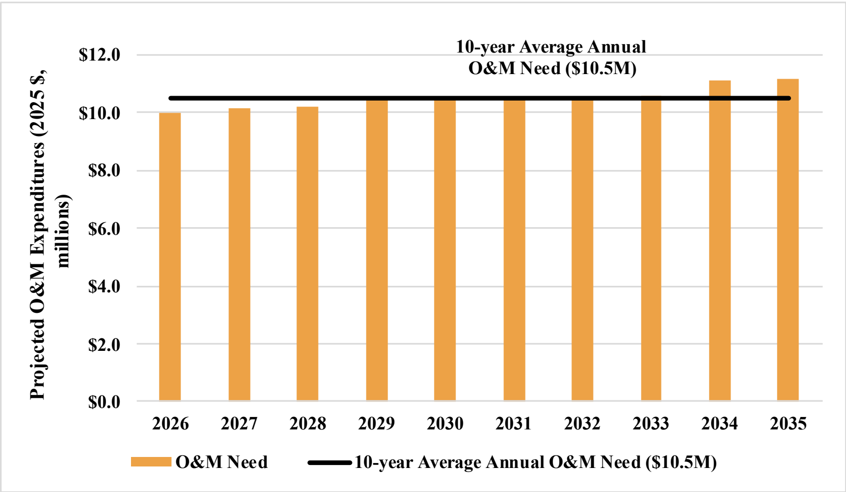
[2] Note that Signal inspections and maintenance is completed by the Region.

Lifecyle Activity Type	Planned Activities (within Anticipated Funding)	Additional Recommended Activities to Meet Proposed LOS
Upgrade Activities	– Retrofit of transportation network to include active transportation facilities. – City is implementing a replacement program to convert streetlight heads to energy efficient components. – Sidewalks program is intended to replace them for AODA compliant ones to improve accessibility in the network based on network condition. – Granular trails maybe converted to hard surfaces. – Fish habitat additions to include fish crossings.	– Upgrade needs will be identified in a future Transportation Master Plan.
Disposal Activities	– Decommissioning assets at the end of their useful life. – Disposal of abandoned or obsolete infrastructure during construction projects. – Contaminated soils are disposed in accordance with regulation based on Geotechnical reviews conducted in construction projects.	– Disposal needs may be identified in a future Transportation Master Plan.

6.5.2 Operations & Maintenance Forecast

Figure 6-5 shows the forecast for operations and maintenance costs over the next 10 years to meet the Proposed LOS. Operations and maintenance costs were increased in proportion with the growth in the asset portfolio. Regular increases due to inflation were not included in the following forecast.

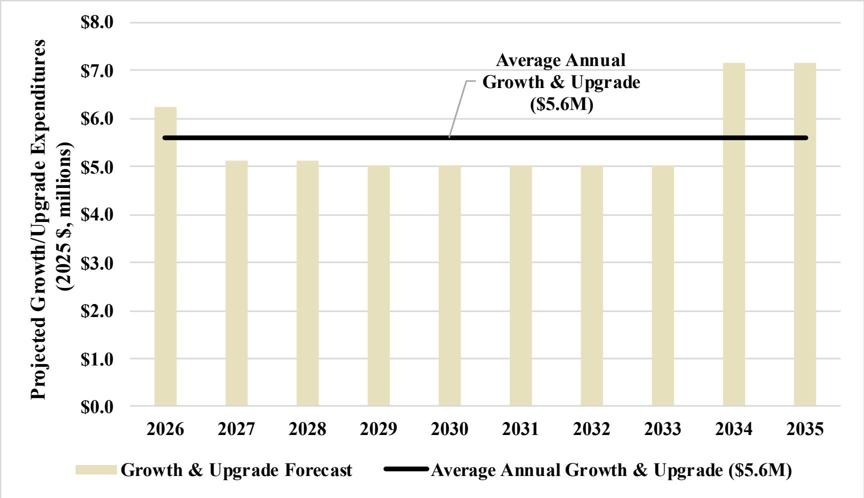
Figure 6-5 Operations and Maintenance Summary



6.5.3 Growth, Upgrade, and Disposal Forecast

Growth reflects the acquisition of assets that did not previously exist within the asset portfolio. The growth reflected here includes projects recommended in the Active Transportation Master Plan and incorporates ~$3 million per year (based on historical spending) to accomplish the other recommendations from the Transportation Master Plan. Upgrades result from improves asset performance (i.e., environmental, safety, accessibility, etc.). Disposals are when assets are removed from the portfolio. Figure 6-6 shows the forecasted growth and upgrades to meet the Proposed LOS. City teams are working to develop a more accurate assessment of future growth requirements for each asset portfolio.

Figure 6-6 Growth & Upgrade Summary



6.5.4 Renewal & Condition Forecast

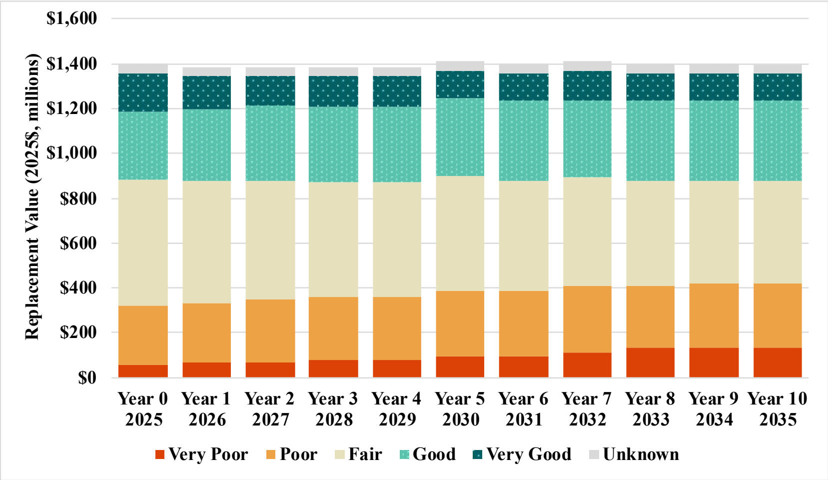
This section presents renewal lifecycle forecasts for:

- Scenario A: Anticipated Budget
- Scenario B: Maintain Current LOS
- Scenario C: Proposed LOS

Scenario A: Anticipated Budget

Figure 6-7 shows the forecast condition distribution of transportation assets based on an average annual anticipated funding of $10.9 million per year (based on historical 5-year average renewal spending). The graph shows that the renewal backlog (assets in Very Poor condition) increases from 3% in 2025 to 9% in 2035.

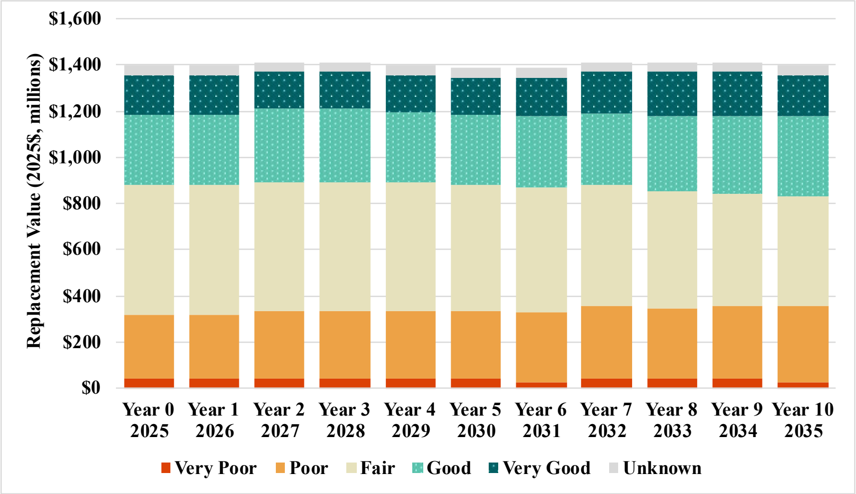
Figure 6-7 Condition Forecast – Transportation Scenario A: Anticipated Funding



Scenario B: Maintain Current LOS

Figure 6-8 shows the forecast condition distribution of transportation assets based on an average annual renewal spend of $12.1 million per year to maintain the renewal backlog (% of assets in Very Poor condition).

Figure 6-8 Condition Forecast – Transportation Scenario B: Maintain Current LOS



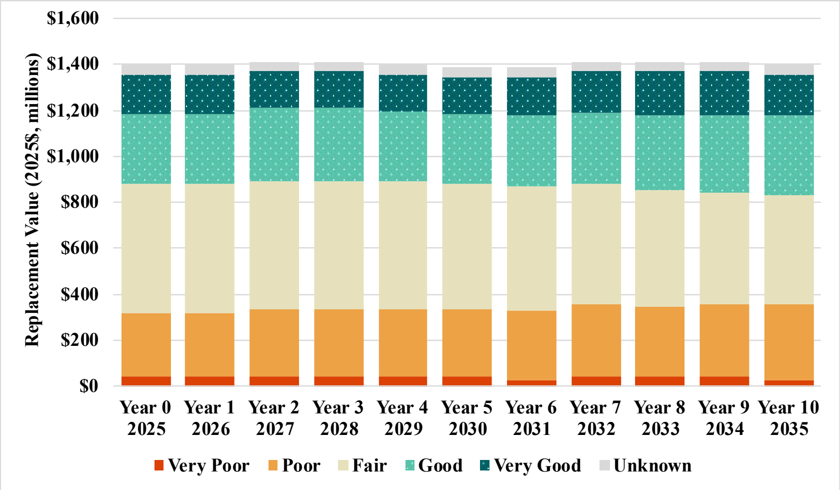
Scenario C: Proposed LOS

Figure 6-9 shows the forecast condition distribution of transportation assets based on an average annual renewal spend of $13.3 million per year which includes the anticipated budget for sidewalks and maintains the condition for all other transportation assets. The graph shows that the renewal backlog (assets in Very Poor condition) decreases from 3% in 2025 to 2% in 2035.

The asset management plan prioritizes resurfacing over reconstruction to optimize road conditions while efficiently managing available funds. This strategy focuses on extending the service life of roads through resurfacing, rather than immediately addressing the worst-condition roads through full reconstruction. While resurfacing enhances ride quality and maintains functionality at a lower cost, reconstruction remains necessary for roads that have reached the end of their service life and can no longer be maintained through surface treatments alone.

Recognizing the inevitability of reconstruction for select road segments, approximately 40% of the total road funding has been allocated to full reconstruction projects. This balanced approach ensures that critical infrastructure needs are addressed while maximizing the overall network's efficiency and performance through timely resurfacing. By directing resources toward proactive resurfacing strategies, the plan aims to improve travel conditions, maintain safety standards, and optimize traffic flow.

Figure 6-9 Condition Forecast – Transportation Scenario C: Proposed LOS



6.5.5 Rationale for Proposed LOS

The Proposed LOS, as defined in Scenario C is recommended because it provides a slight improvement to existing service levels (i.e., keeping the renewal backlog as a low percentage of the portfolio). This scenario incorporates feedback form Council members to follow the anticipated budget for sidewalk and maintain the existing condition of roads and all other transportation assets. This scenario also includes funds to support O&M needs for growth assets to ensure that O&M LOS can be sustained over the 10-year period.

6.6 Financial Strategy

Table 6-11 shows a comparison of the average annual costs of the three scenarios. The table shows that there is a funding gap of $6.4 million per year to achieve the Proposed LOS.

The financial projections within this Asset Management Plan do not account for potential renewal of existing trails and street light poles and wiring as there is currently no available data on their condition or age. Without this essential information, assessing maintenance and replacement needs remains uncertain, and associated costs cannot be accurately estimated. Future evaluations and data collection efforts will be necessary to determine funding requirements for trails, and any updates will be incorporated into subsequent revisions of the plan.

Table 6-11 Average Annual Costs – Transportation – Scenario Comparison

Lifecyle Activity Type	Average Annual Cost (2025 $, millions)		
	Scenario A: Anticipated Funding	Scenario B: Maintain Current LOS	Scenario C: Proposed LOS
Non-Infrastructure Solutions	$0.2	$0.2	$0.3
O&M – Existing Assets	$9.2	$9.2	$9.2
Renewal – Existing Assets	$10.9	$12.5	$13.3
Growth & Upgrade Activities	$3.0	$3.0	$5.6
O&M – Growth & Upgrade Assets	--	$0.1	$1.4
Renewal – Growth & Upgrade Assets	--	--	--
Disposal Activities	--	--	--
Total	**$23.3**	**$25.0**	**$29.8**
Funding Gap	**n/a**	**$1.7**	**$6.5**

7 Structures

The City owns and maintains a diverse portfolio of structural assets, including bridges, culverts, and retaining walls. These structures support the City's road network by spanning natural and man-made obstacles, managing surface water flow, and stabilizing embankments and roadways. The City's bridge and culvert inventory is subject to biennial inspections in accordance with Ontario's Structure Inspection Manual (OSIM), ensuring compliance with provincial regulations and supporting asset condition assessments, maintenance prioritization, and long-term capital planning.

7.1 State of the Local Infrastructure

7.1.1 Asset Valuation

The City's structures assets include a range of bridges, culverts, pedestrian bridges, and retaining walls that support the safe and efficient movement of people and vehicles across the transportation network. These assets span both major and minor crossings, accommodate stormwater conveyance, and provide structural support on sloped or constrained corridors.

The inventory includes 17 bridges and 17 culverts greater than 3 metres in span, as well as a substantial number of smaller structures, including 42 assets under 3 metres, 41 pedestrian bridges, and 18 retaining walls. Replacement values were estimated using a like-for-like methodology based on historical costs incurred by the City for similar asset renewals. The largest portion of the structure portfolio's replacement value is attributed to pedestrian bridges (29%), followed by larger-span bridges (25%) and culverts (22%) over 3 metres. Retaining walls comprise a relatively small share of the total value but remain essential to roadway integrity and safety. Table 7-1 summarizes the overall replacement value by sub-category, providing a basis for capital planning and long-term investment strategies.

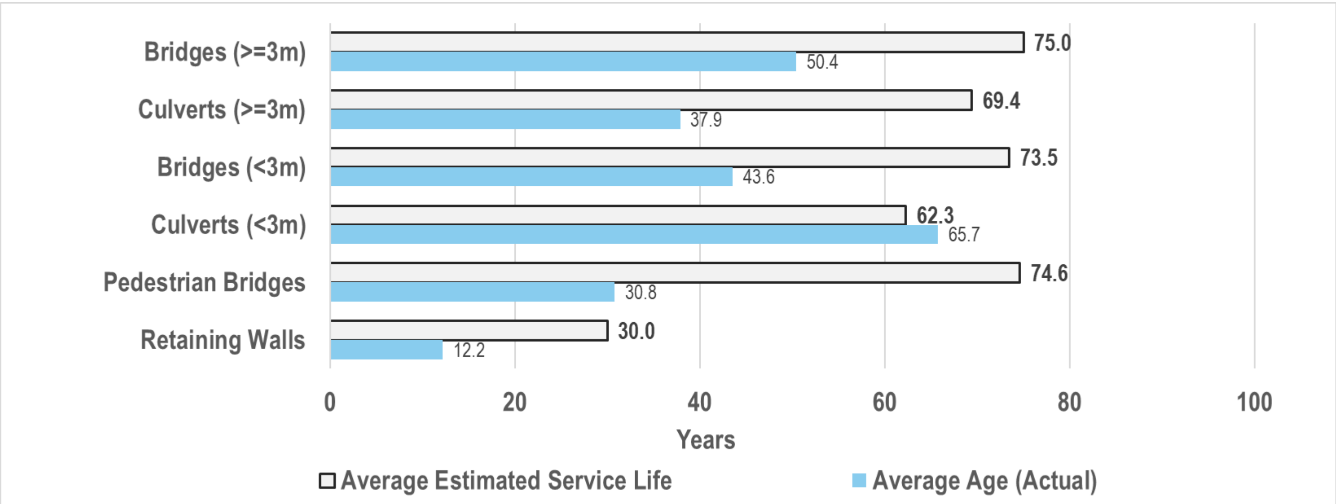
Table 7-1 Inventory Valuation – Structures

Asset Category	Asset Sub-Category	Count	Unit	Replacement Value (millions, 2025 $)	Replacement Value (% Total)
Bridges & Culverts >=3m	Bridges	17	each	$23.40	25%
	Culverts	17	each	$21.10	22%
Bridges & Culverts <3m	Bridges	11	each	$2.49	3%
	Culverts	31	each	$18.82	20%
Pedestrian Bridges	Pedestrian Bridges	41	each	$27.35	29%
Retaining Walls	Retaining Walls	18	each	$1.14	1%
	Overall Replacement Value			**$94.3**	**100%**

7.1.2 Asset Age

Comparing the average age of the structure assets to their estimated service life provides insight into the remaining useful life of the City's structural portfolio. As shown in Figure 7-1, the majority of bridges, culverts, pedestrian bridges, and retaining walls are within the mid-range of their lifecycle, with some sub-categories approaching end-of-life. This analysis supports long-term planning and renewal prioritization based on aging trends across asset sub-categories.

Figure 7-1 Asset Age – Structures



7.1.3 Asset Condition

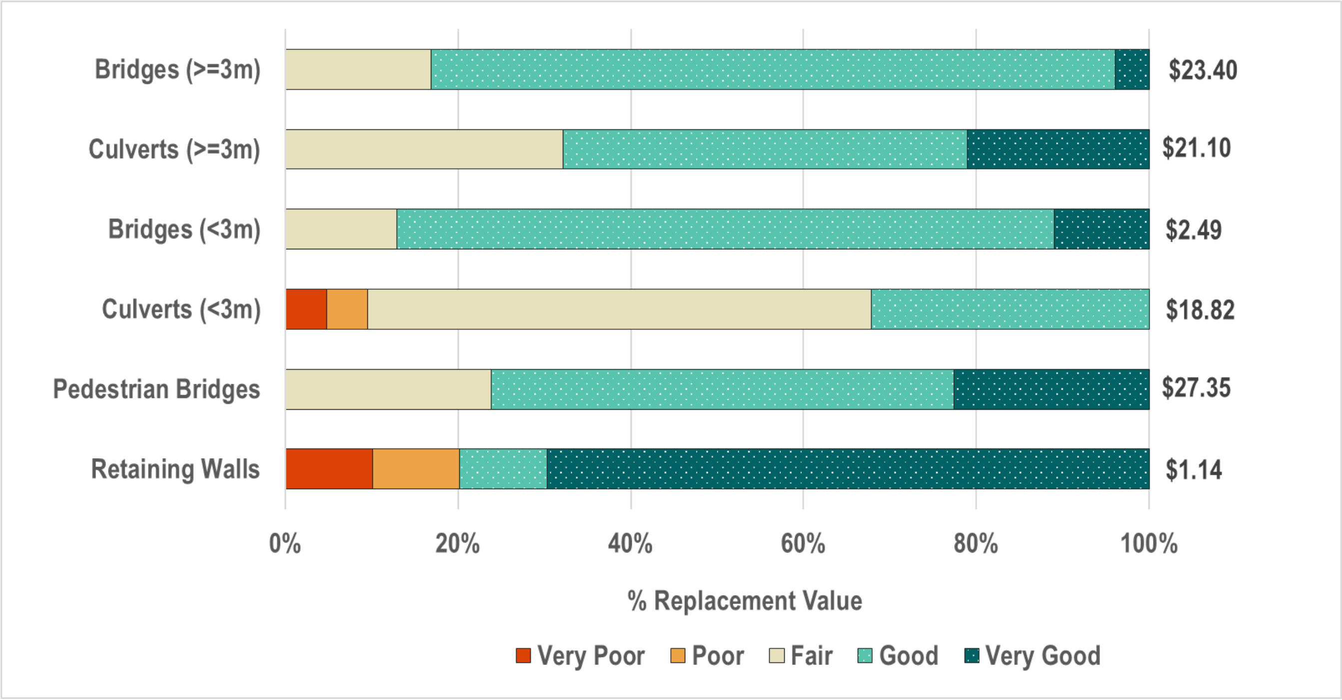
As explained in Section 2.1, Bridge Condition Index (BCI) scores from structural assessments are used to determine the condition of bridges and culverts. However, for retaining walls assets, the condition is determined using the age of each asset relative to its estimated service life. Refer to Table 7-2 for mapping of BCI score to the AM Plan's five-point scale (very good to very poor).

Table 7-2 BCI based Condition Score – Bridges & Culverts

Condition Score	Condition Rating	BCI Range
1	Very Good	80 to 100
2	Good	70 to 79
3	Fair	60 to 69
4	Poor	40 to 59
5	Very Poor	0 to 39

The asset condition distribution is shown in Figure 7-2 for structures assets. Overall, $1.0 million (1.1%) of structures assets are in very poor condition and $1.0 million (1.0%) are in poor condition. Assets in very poor condition are considered to be due or overdue for replacement. As shown in the Figure, those assets consist of smaller culverts (<3m) and retaining walls.

Figure 7-2 Asset Condition – Structures



7.2 Levels of Service

The City is committed to maintaining a safe, functional, and reliable network of structural assets—including bridges, culverts, pedestrian bridges, and retaining walls—that support the City's transportation system and protect public safety. These assets are essential for ensuring connectivity across watercourses and other physical barriers, managing stormwater flow, and stabilizing roadways and embankments.

The City conducts regular inspections in accordance with the Ontario Structure Inspection Manual (OSIM) to evaluate the condition and safety of bridge and culvert infrastructure, ensuring compliance with provincial requirements. Defined Levels of Service (LOS) for structures assets guide investment decisions and asset interventions, ensuring that these critical components of the transportation network continue to perform as intended and meet the needs of the community.

7.2.1 O. Reg. 588/17 Qualitative LOS

Table 7-3 provides a summary of the qualitative Community LOS required to be reported by O. Reg. 588/17 for structures assets.

Table 7-3 O. Reg. 588/17 Qualitative LOS – Structures

Service Attribute	Community Levels of Service	Qualitative Description
Scope	Description of the traffic that is supported by municipal bridges (e.g., heavy transport vehicles, motor vehicles, emergency vehicles, pedestrians, cyclists).	Municipal bridges and culverts support a wide range of users, including motor vehicles, heavy transport trucks, buses, emergency services, cyclists, and pedestrians. Pedestrian bridges provide essential connectivity for active transportation users, and some also accommodate maintenance vehicles. One structure is dedicated to supporting a sanitary sewer, and several other bridges support attached utilities such as water and sewer lines.
Reliability	Description or images of the condition of bridges and how this would affect use of the bridges.	The condition of municipal bridges is assessed biennially using the Ontario Structure Inspection Manual (OSIM). As of the most recent assessments, most bridges are in good condition with an average BCI above 70 for bridges with spans ≥3m. Bridges in very poor condition are typically prioritized for renewal. Deteriorated bridges may be subject to load restrictions or temporary closures, which could limit access for emergency and heavy vehicles and affect network connectivity. Load postings currently apply to four pedestrian bridges to ensure user safety.
	Description or images of the condition of culverts and how this would affect use of the culverts.	Culverts are also inspected under OSIM protocols and play a critical role in maintaining drainage and preventing flooding. Some culverts, especially those under 3 metres, are reaching or have exceeded capacity due to increased peak flows and more extreme storm events. Deteriorated culverts may cause localized flooding or road washouts, particularly in areas with constrained capacity. Several culverts were identified as being in very poor condition, including those at Rosedale Avenue, Orchard Creek, Secord Creek, and Rockwood Avenue, with budget allocated for their renewal.

7.2.2 Technical Metrics including O. Reg. 588/17 LOS

Table 7-4 outlines the LOS that are driving current and future decision-making and expenditure needs for Structures assets. The City's Customer LOS statements and Technical LOS indicators document performance from a service user's and service provider's perspective, respectively. Performance scores from the most recent five years (2020 – 2024) are listed. The table also lists the target or proposed performance for each metric as selected by the City.

Table 7-4 LOS Metrics and Performance – Structures

Service Attribute	Customer LOS Statement (CLOS)	Technical LOS Indicator (TLOS)	Historical Performance					Target / Proposed Performance
			2020	2021	2022	2023	2024	
Capacity and Use	Structures have capacity to provide for	Description of the traffic that is supported by municipal bridges	Bridges & Culverts on roads support all classes of vehicles including motor vehicles, heavy transport vehicles, buses, and					Same as current

Service Attribute	Customer LOS Statement (CLOS)	Technical LOS Indicator (TLOS)	Historical Performance 2020	2021	2022	2023	2024	Target / Proposed Performance
	current and future customers	(e.g., heavy transport vehicles, motor vehicles, emergency vehicles, pedestrians, cyclists)[a]	emergency vehicles, as well as pedestrians and cyclists. Pedestrian bridges support both pedestrians and cyclists					
Function	Meet customer needs while limiting safety impacts	Percentage of bridges in the municipality with loading or dimensional restrictions[a]	6%	5%	5%	3.4%	3.4%	Same as current
Reliability	Assets are safe and reliable.	Description or images of the condition of bridges and/or culverts and how this would affect their use[a]	City follows the standards and best practices outlined in the Ontario Structure Inspection Manual (OSIM) to determine the condition of the bridges and culverts. Third party consultants who are experts in the design and assessment of bridges are engaged to complete these assessments.					Same as current
		Average BCI (bridges >=3m)	69.5	70.0	70.0	71.4	71.4	Repair and maintain structures as recommended in biennial OSIM reports.
		Average BCI (culverts >=3m)	60.3	68.1	68.1	69.2	69.2	
		Average BCI (pedestrian bridges >=3m)	No data*			70.1	70.1	
		Average BCI (bridges <3m)	72.2	71.0	71.0	67.0	67.0	
		Average BCI (culverts <3m)	60.3	58.5	58.5	54.8	54.8	
		Average BCI (pedestrian bridges <3m)	No data*			41.1	41.1	
		Percentage of structures due or overdue for replacement	1.0%	2%	2%	2.0%	2.0%	Reduce
Affordability	Services are affordable and provided at lowest cost for both current and future customers	Annual Capital investment as a % of cost to sustain assets over their lifecycles (replacement value / estimated service life = $1.3M/yr)	180%	96%	145%	288%	126%	100%

[a] Required by O. Reg. 588/17.

*In 2020-2022 performance, pedestrian bridges were included in “Bridges”

7.3 Climate Change

The City completed a Climate Change Risk Assessment in 2022 to evaluate the vulnerability of infrastructure assets to extreme weather events. For structures assets, the most significant risks are associated with extreme precipitation and freeze-thaw cycles.

Bridges and pedestrian bridges are susceptible to flooding closures and potential structural damage during periods of intense rainfall, while freeze-thaw events may lead to ice-related deterioration. Culverts face the risk of capacity exceedance and structural damage during heavy precipitation, which may result in service disruption. Retaining walls are vulnerable to soil instability, ground movement, and slope failure, especially during prolonged wet conditions, which may lead to erosion, landslides, or asset failure. In areas near water bodies, increased water levels may require more frequent inspections of retaining walls.

Other climate stressors such as extreme heat, cold, or wind were assessed to have minimal impact on structures assets. The City should continue to monitor these risks and incorporate appropriate treatment and response strategies into future asset management and infrastructure planning efforts.

7.4 Risk Management Strategy

As explained in Section 2.5, the City uses a risk-based approach to prioritize renewal needs. The likelihood of failure is primarily estimated based on asset condition ratings obtained through regular inspections, consistent with the Ontario Structure Inspection Manual (OSIM). The consequence of failure is estimated based on the scoring criteria shown in Table 7-5 for structures assets.

Table 7-5 Consequence Scoring – Structures

Consequence Category	Criteria	Parameter	Consequence Score				
			1 - Minimal	2 - Minor	3 - Moderate	4 - Major	5 – Extreme
Financial	Capital Expenditure (Replacement of Assets)	Replacement Cost + Emergency Premium (10%)	<$100k	$100k - <$250k	$250k - <$1M	$1M - $2M	>$2M
	Revenue loss due to service closure or other direct cost not related to asset repair	N/A - failure will not result in revenue loss	N/A	N/A	N/A	N/A	N/A

Consequence Category	Criteria	Parameter	Consequence Score				
			1 - Minimal	2 - Minor	3 - Moderate	4 - Major	5 – Extreme
Social	Impact to Health and Safety	Average Annual Daily Traffic (AADT) – If the failure happens near a higher traffic road, there is the potential for health and safety impacts to more road users. If AADT values not available, use Road Classification to determine traffic levels.	0 – 500	501 – 3,000	3,001 – 5,000	5,001 – 10,000	≥ 10,001
		Structure Span	Less than 3m	N/A	Above 3m	N/A	N/A
		Single access points to subdivisions for vehicles (# of homes impacted)	TBC	TBC	TBC	TBC	TBC
	Legal liability	AADT - If the failure happens on a higher traffic road, there is increased chance of number and value of claims due to accidents IF AADT VALUES NOT AVAILABLE: Road Classification - Road Class used to determine traffic levels.	0 – 500	501 – 3,000	3,001 – 5,000	5,001 – 10,000	≥ 10,001

Consequence Category	Criteria	Parameter	Consequence Score				
			1 - Minimal	2 - Minor	3 - Moderate	4 - Major	5 – Extreme
	Service Disruption	Land Use Parcel - land use provides a representation of number and type of affected customers, which would be proportional to service disruption.	Vacant Land, Parking Lots, Environmental Protection, Rural Residential, Nursery Stock, Greenhouses, Vineyards, Orchards, Intensive Livestock, Field Crops, Idle Agriculture, Agricultural Commercial, Agricultural Industrial, Mixed Agricultural, Agricultural Commercial, Transportation / Public Utilities	Single Detached, Double Detached, Multiple Attached(townhouses), Multiple<3 Storeys>3 units, Triplexes, Churches, Recreational, Private Recreational	Commercial, Commercial/Residential, Industrial, Multiple>3 Storeys, Long-term Care, Group Homes, Schools	N/A	Hospitals
		Bridge over Rail or Road	No	N/A	Yes - Road	N/A	Yes - Rail
		Bus Route	No	N/A	Yes	N/A	N/A
		Cycle lane (on-road)	No	Yes	N/A	N/A	N/A
	Customer Impact	AADT - provides value for the number of affected customers. IF AADT VALUES NOT AVAILABLE: Road Classification - Road Class used to determine traffic levels.	0 – 500	501 – 3,000	3,001 – 5,000	5,001 – 10,000	≥ 10,001
		Pedestrian Access Bridges to the Meridian Centre	N/A	N/A	Bridges ID BR089 and BR090	N/A	N/A

Consequence Category	Criteria	Parameter	Consequence Score				
			1 - Minimal	2 - Minor	3 - Moderate	4 - Major	5 – Extreme
Environmental	Environmental Impact	Proximity to waterbody or environmentally sensitive area	> 100 m	N/A	50 - 100 m	< 50 m	N/A

7.5 Lifecycle Management Strategy

7.5.1 Lifecycle Management Activities

The levels of service presented in the previous section are supported by a variety of lifecycle activities in accordance with the activity types presented in Table 7-6. These activities are targeted to extend the asset life, ensure levels of service are being met, and reduce overall lifecycle costs.

Table 7-6 Lifecycle Activities – Planned and Recommended – Structures

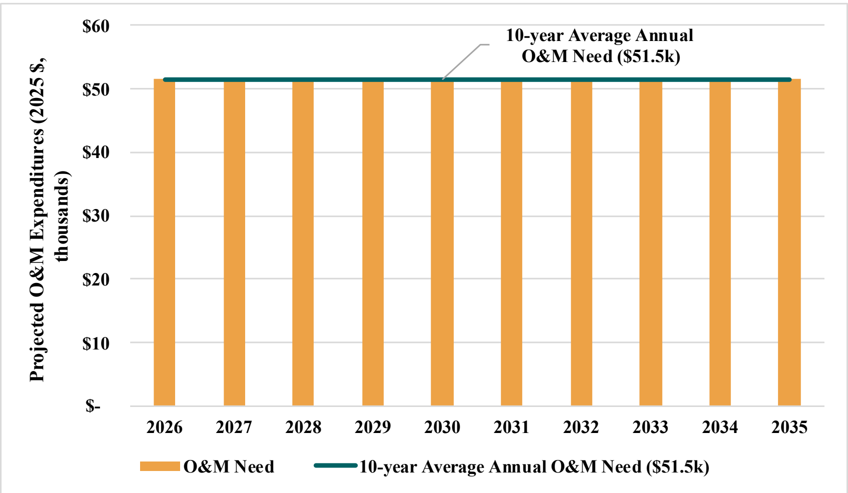
Lifecycle Activity Type	Planned Activities (within Anticipated Funding)	Additional Recommended Activities to Meet Proposed LOS
Non-Infrastructure Solutions	– Biennial OSIM inspections funded through annual operating budget ($60K)	– Develop Structure ID alignment between OSIM and Watercourse Study ($78K); explore feasibility for incorporating structural risks into watercourse planning (i.e., increasing culvert size to accommodate additional flow).
Operations and Maintenance Activities	– Minor maintenance funded through EFES ($51K/year).	– Increase funding for minor preventative maintenance beyond inspections in alignment with any future asset portfolio growth.
Renewal, Rehabilitation and Replacement	– Rehabilitation and replacements prioritized based on OSIM inspection results; work is budgeted but not always completed.	– Accelerate renewal of Very Poor assets (e.g., Walker's Creek pedestrian bridge, culverts at Rosedale, Orchard, Secord, and Rockwood).
Growth Activities	– No growth in planned forecast	– Incorporate OSIM recommended erosion control projects ($290K from 2026-2030) – Include structures planning in future TMP or other studies.
Upgrade Activities	– No upgrades in planned forecast	– Rebuild culverts and bridges to improved standards (e.g., capacity upgrades for more intense storms).

Lifecyle Activity Type	Planned Activities (within Anticipated Funding)	Additional Recommended Activities to Meet Proposed LOS
Disposal Activities	– No disposals in planned forecast	– Identify opportunities for asset rationalization or decommissioning during master plan updates.

7.5.2 Operations & Maintenance Forecast

Figure 7-3 shows the forecast for operations and maintenance costs over the next 10 years to meet the Proposed LOS. Operations and maintenance costs remained stable as the portfolio of assets was not planned to grow over the next 10 years (growth shown to follow relates to erosion control and is not expected to increase O&M spending). Regular increases due to inflation were not included in the following forecast.

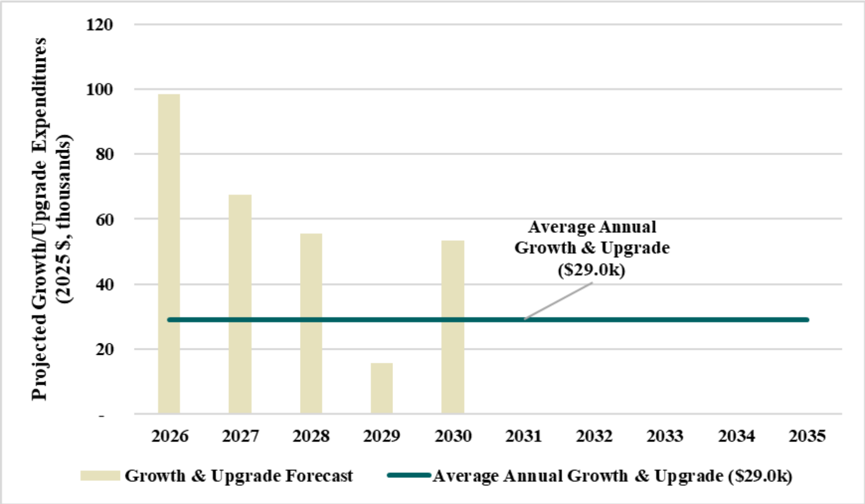
Figure 7-3 Operations and Maintenance Summary



7.5.3 Growth, Upgrade, and Disposal Forecast

Growth reflects the acquisition of assets that did not previously exist within the asset portfolio. Upgrades result from improves asset performance (i.e., environmental, safety, accessibility, etc.). Disposals are when assets are removed from the portfolio. Figure 7-4 shows the forecasted growth and upgrades to meet the Proposed LOS. City teams are working to develop a more accurate assessment of future growth requirements for each asset portfolio.

Figure 7-4 Growth and Upgrade Summary



7.5.4 Renewal & Condition Forecast

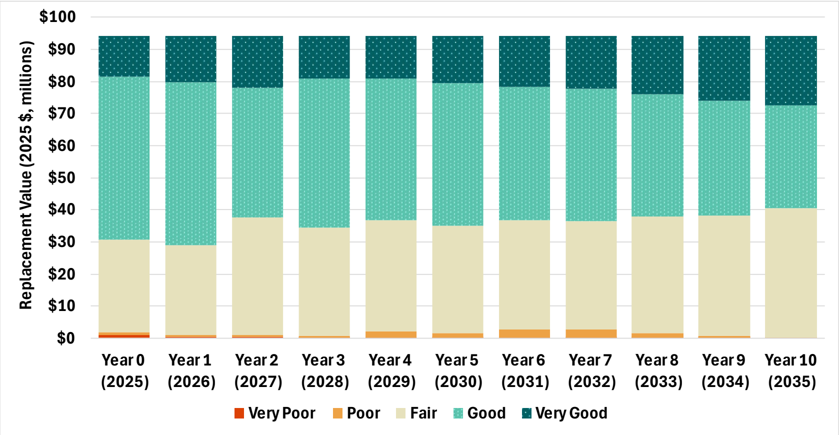
This section presents renewal lifecycle forecasts for:

- Scenario A: Anticipated Budget
- Scenario B: Maintain Current LOS
- Scenario C: Proposed LOS

Scenario A: Anticipated Budget

Figure 7-5 shows the forecast condition distribution of structure assets based on an average annual anticipated funding of $1.25 million per year (based on historical 5-year average renewal spending). The graph shows that the renewal backlog (assets in Very Poor condition) decreases from 1.1% in 2025 to 0.1% in 2035.

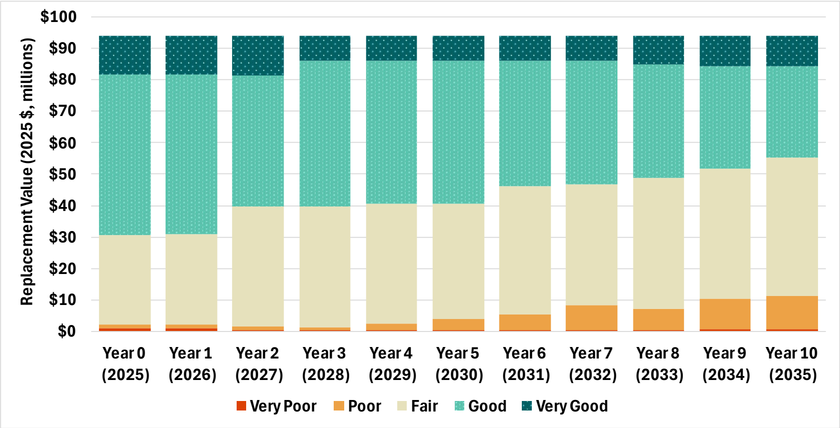
Figure 7-5 Condition Forecast – Structures Scenario A: Anticipated Funding



Scenario B: Maintain Current LOS

Figure 7-6 shows the forecast condition distribution of structure assets based on an average annual renewal spend of $0.45 million per year to maintain the renewal backlog (% of assets in Very Poor condition).

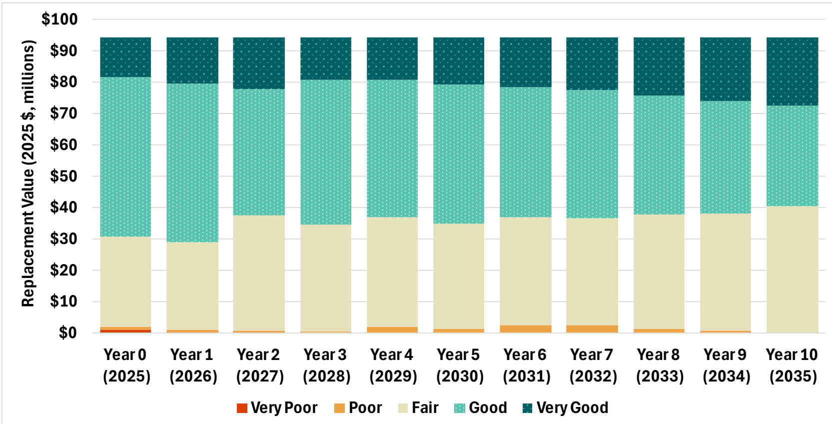
Figure 7-6 Condition Forecast – Structures Scenario B: Maintain Current LOS



Scenario C: Proposed LOS

Figure 7-7 shows the forecast condition distribution of structure assets based on an average annual renewal spend of $1.93 million per year to address the renewal recommendations in the 2022 OSIM report. The graph shows that the renewal backlog (assets in Very Poor condition) decreases from 1.1% in 2025 to 0% in 2035.

Figure 7-7 Condition Forecast – Structures Scenario C: Proposed LOS



7.5.5 Rationale for Proposed LOS

The Proposed LOS, as defined in Scenario C is recommended because it follows the recommendations in the 2022 OSIM report. This scenario also includes funds to support O&M needs for growth assets to ensure that O&M LOS can be sustained over the 10-year period.

7.6 Financial Strategy

Table 7-7 shows a comparison of the average annual costs of the three scenarios. The table shows that there is a funding gap of $0.7 million per year to achieve the Proposed LOS.

Table 7-7 Average Annual Costs – Structures – Scenario Comparison

Lifecyle Activity Type	Average Annual Cost (2025 $, millions)		
	Scenario A: Anticipated Funding	Scenario B: Maintain Current LOS	Scenario C: Proposed LOS
Non-Infrastructure Solutions	$0.03	$0.04	$0.04
O&M – Existing Assets	$0.1	$0.1	$0.1
Renewal – Existing Assets	$1.3	$0.5	$1.9
Growth & Upgrade Activities	--	--	$0.03
O&M – Growth & Upgrade Assets	--	--	--
Renewal – Growth & Upgrade Assets	--	--	--
Disposal Activities	--	--	--
Total	**$1.4**	**$0.6**	**$2.1**
Funding Gap	**n/a**	**none**	**$0.7**

8 Buildings and Facilities

Buildings and Facilities are important to providing staff with a safe and efficient space to carry out day-to-day operations necessary for effective service delivery, while also providing central locations for residents to seek services in-person.

8.1 State of the Local Infrastructure

The buildings and facilities currently owned and operated by the City include:

- Arenas
- Bandshell/Bandstand
- Carousel building
- Columbarium
- Community Centres & Seniors Centres
- Controls
- Dugout Bleacher or Stands
- Leasable
- Libraries
- Indoor Pool
- Market Square
- Mausoleum
- Municipal Office & Operation Facilities
- Museum
- Pavilions and Sun Shelters
- Performing Arts Centre
- Storage
- Washrooms and/or Changerooms

Table 8-1 provides a further breakdown of these assets into the various asset types.

8.1.1 Asset Valuation

For the valuation of assets for buildings and facilities, the replacement values considered are intended for the replacement of a similar asset (like-for-like) on a complete and standalone basis. These were calculated based on historical values that the City has incurred as part of previous replacements of similar assets. Recreation consist of 46% of the total replacement value of buildings and facilities assets, followed by Administration (24%), Culture (19%), Library (7%), Cemeteries (4%), and Coastal (<1%).

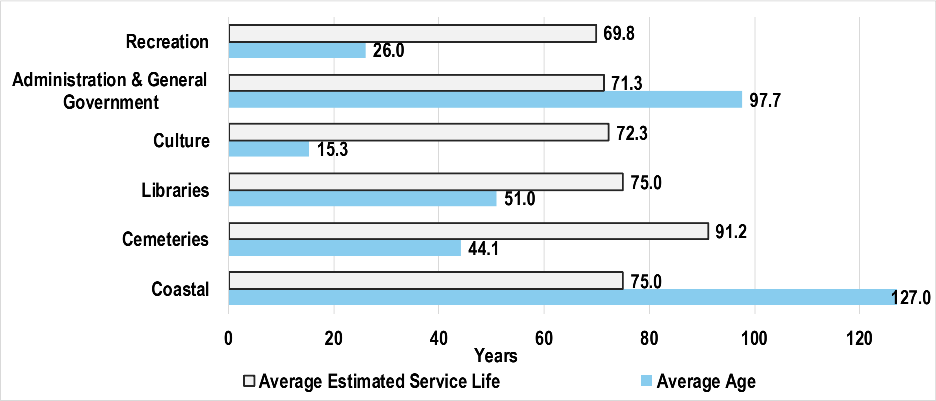
Table 8-1 Inventory Valuation – Buildings and Facilities

Asset Category	Asset Sub-Category	Count	Unit	Replacement Value (millions, 2025 $)	Replacement Value (% Total)
Buildings & Facilities	Recreation	99	buildings	$253.6	45%
	Administration	20	buildings	$136.0	24%
	Culture	12	buildings	$109.8	20%
	Library	2	buildings	$36.7	7%
	Cemeteries	18	buildings	$23.3	4%
	Coastal	1	buildings	$0.3	<1%
	Overall Replacement Value			**$559.7**	**100%**

8.1.2 Asset Age

Comparing the average age of the assets with the average estimated service life (ESL) provides a representation of the average overall portfolio remaining life. Figure 8-1 below summarizes the average ages of each asset type buildings and facilities. The City operates and maintains multiple heritage facilities which is why some categories have average facility ages that exceed the estimated service lives.

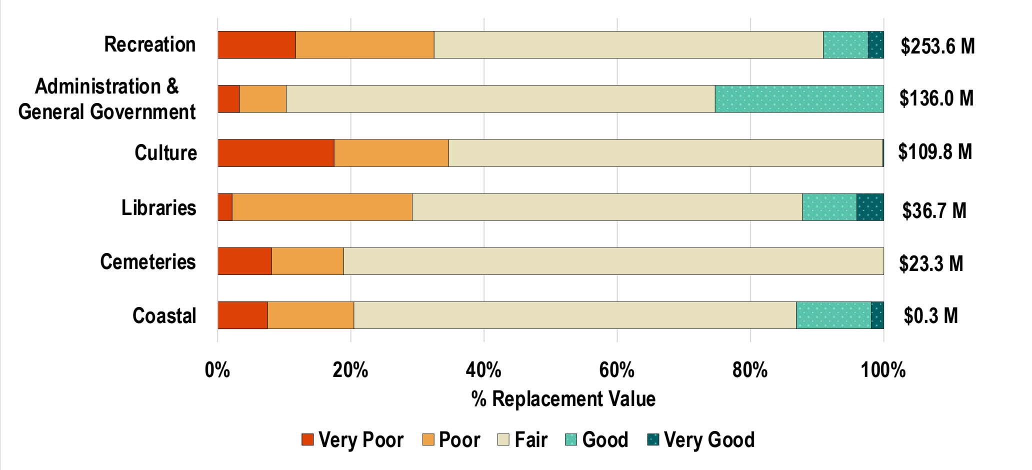
Figure 8-1 Asset Age – Buildings and Facilities



8.1.3 Asset Condition

The asset condition distribution is shown in Figure 8-2 for buildings and facilities components. Overall, $56.0 million (10%) of buildings and facilities components are in very poor condition and $93.8 million (17%) are in poor condition. Assets in very poor condition are considered to be due or overdue for replacement. As shown in the following, there are poor and very poor condition facility components in each of the categories.

Figure 8-2 Asset Condition – Buildings and Facilities [3]



Condition was assigned to building and facility assets on the basis of the remaining service life versus estimated service life, as per the following table. This assessment was completed based on a Uniformat assessment of building and facility components which included their remaining service life and estimated service life. The City is working to correlate the Asset IDs for each facility with the recommended repairs as per the Building Condition Assessments. Once this correlation is completed, the City plans to present condition information by number of buildings and by square footage of buildings.

[3] A portion of the library facilities are managed directly by the Library and the renewal costs are included in the Library AM Plan. The replacement value shown here is the estimated replacement value for the two library facilities (Centennial and Port Dalhousie)

Table 8-2 Age-based Condition Score – Buildings and Facilities

Age-based Condition Score	Remaining Service Life (%)
1	90 to 100
2	80 to 89
3	20 to 79
4	5 to 19
5	0 to 4

8.2 Levels of Service

The City is committed to providing safe, reliable, affordable, accessible, inclusive and sustainable buildings and facilities that reflect 'The City where everybody can play.' The buildings and facilities support a variety of activities and functions for recreation, business, arts and culture, historical, maintenance, and operations purposes.

The City has developed levels or service for its park assets based on Function, Reliability, and Affordability which provide a basis from which the City can determine whether the service area is performing as expected.

The City's LOS document the asset performance from a service provider's perspective and service user's perspective. These metrics outline the LOS that are currently driving decision-making/spending on assets and can be linked to financing consequences/demand. The following provides a summary of these LOS associated with the buildings and facilities in the City.

8.2.1 Technical Metrics LOS

Table 8-3 outlines the LOS that are driving current and future decision-making and expenditure needs for building and facility assets. The City's Customer LOS statements and Technical LOS indicators document performance from a service user's and service provider's perspective, respectively. Performance scores from the most recent five years (2020 – 2024) are listed. The table also lists the target or proposed performance for each LOS measure as selected by the City.

Table 8-3 LOS Metrics and Performance – Buildings and Facilities

Service Attribute	Customer LOS Statement (CLOS)	Technical LOS Indicator (TLOS)	Historical Performance					Target / Proposed Performance
			2020	2021	2022	2023	2024	
Function	Provide building and facility services that are safe in a sustainable manner	Annual energy consumption (electricity and natural gas combined) (ekWh)	33,539,000	38,089,000	36,845,000	33,469,000	Data incomplete	Improve relative to prior year
		Annual energy intensity (ekWh/ft^2)	24	27	26	25	Data incomplete	Improve relative to prior year
Reliability	Provide safe and reliable buildings and facilities	% of facility assets due or overdue for replacement (by replacement value)	NA	NA	NA	3.3%	7.5%	Minimize
		% of buildings with FCI scores of > 60% (Very Poor Condition)	Future					Minimize
		% of building sq.ft. with FCI scores of > 60% (Very Poor Condition)	Future					Minimize
Affordability	Services are affordable and provided at lowest cost for both current and future customers	Annual Capital investment as a % of cost to sustain assets over their lifecycles (replacement value / estimated service life = $14.6M/yr)	38%	29%	39%	95%	83%	100%

8.3 Climate Change

The City completed an internal Climate Change Risk Assessment which reviewed the likelihood extreme climate events and their impacts on buildings and facilities infrastructure. Extreme climate events included:

- Extreme precipitation
- Extreme dry conditions
- Extreme precipitation and extreme cold
- Extreme cold
- Extreme heat
- Freeze-thaw events
- High lake levels
- High lake temperatures
- High winds

Impacts to the buildings and facilities asset portfolio include:

- Increased damage or flooded facilities due to extreme precipitation.
- Increased frequency and duration of power outages due to ice storms and extreme wind events.
- Increased time required to clear critical access points due to extreme snow and ice storms.
- Increase heating needs and asset utilization due to longer and more severe cold events.
- Increased need for air conditioning and asset utilization due to extreme heat.

The City should develop risk treatment and response plans to address these climate change risks.

8.4 Risk Management Strategy

As explained in Section 2.5, the City uses a risk-based approach to prioritize renewal needs. Likelihood of failure is estimated based on condition (refer to Table 2-3). The consequence of failure is estimated based on the largest score from Table 8-4.

Table 8-4 Consequence Scoring – Buildings and Facilities

Consequence Category	Criteria	Parameter	Consequence Score				
			1 - Minimal	2 - Minor	3 - Moderate	4 - Major	5 – Extreme
Financial	Capital Expenditure (Replacement of Assets)	Replacement Cost	<$100k	$100k - <$250k	$250k - <$1M	$1M - $2M	>$2M
	Revenue loss due to service closure or other direct cost not related to asset repair	Lost revenue due to closure.	All remaining	Columbarium, Market Square Building, Dunlop Drive Seniors Centre, Port Weller Community Centre, Russel Avenue Community & Seniors Centre	Lock 3 Museum	Bill Burgoyne Arena, Merritton Arena	Parking garages, Victoria Lawn Cemetery Garden of Memories Mausoleum, Meridian Centre - Spectator Facility, Seymour-Hannah Centre, Kiwanis Centre - Indoor Pool and Library, Performing Arts Centre
Social	Impact to Health and Safety	Asset category	All Remaining	N/A	Parking Lots	Municipal Works Yards	Parking garages, arena refrigeration plant at all Arenas(Ice Rink - Gas Detection - Refrigerant, Ice Rink Chiller/Evaporator/Heat Exchangers (Cold Floor),Ice Rink Compressors (Motors) Ice Rink Circulation Pumps, Ice Rink Condenser (Cooling Tower), Ice Rink Controls)
	Legal liability	Asset category	All Remaining	Cemeteries, Parking Garages	N/A	Municipal Works Yards	N/A
	Service Disruption	Asset category	All Remaining	N/A	N/A	N/A	All major systems of buildings
	Customer Impact	Asset category	All Remaining	N/A	N/A	All Recreation Facilities, Buchanan House	City Hall and Municipal Works Yards
Environmental	Environmental Compliance	Asset category	All remaining	N/A	N/A	Fuel Storage Tanks - Aboveground Less than 10,000 L	Arenas(Ice Rink - Gas Detection - Refrigerant, Ice Rink Chiller/Evaporator/Heat Exchangers (Cold Floor),Ice Rink Compressors (Motors) Ice Rink Circulation Pumps, Ice Rink Condenser (Cooling Tower), Ice Rink Controls, Fuel stations

Consequence Category	Criteria	Parameter	Consequence Score				
			1 - Minimal	2 - Minor	3 - Moderate	4 - Major	5 – Extreme
	Environmental Impact	Asset category	All remaining	N/A	N/A	N/A	Fuel Storage Tanks - Aboveground Less than 10,000 L

8.5 Lifecycle Management Strategy

8.5.1 Lifecycle Management Activities

The levels of service presented in the previous section are supported by a variety of lifecycle activities in accordance with the activity types presented in Table 8-5. These activities are targeted to extend the asset life, ensure levels of service are being met, and reduce overall lifecycle costs.

Table 8-5 Lifecycle Activities – Planned and Recommended – Buildings and Facilities

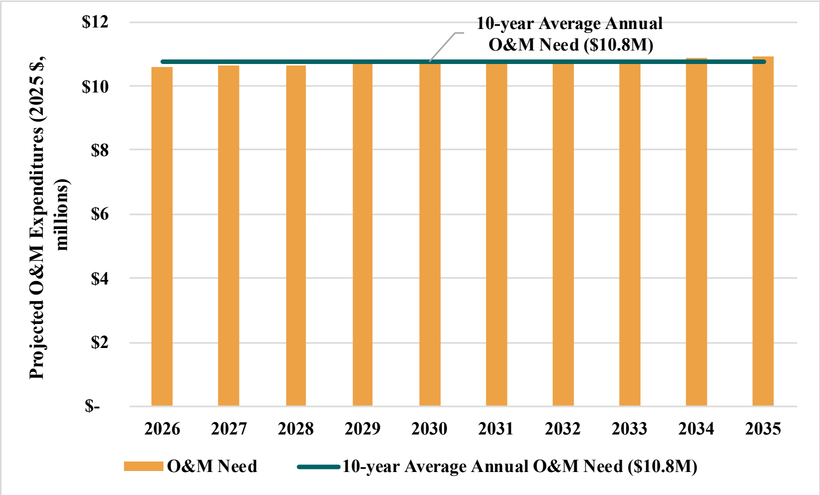
Lifecyle Activity Type	Planned Activities (within Anticipated Funding)	Additional Recommended Activities to Meet Proposed LOS
Non-Infrastructure Solutions	– Annual Inspection programs (i.e., Asbestos Condition Assessment, Crane/Hoist/Lifting device, Elevator Maintenance, Chemical Treatment Systems, HVAC Systems, TSSA - Elevators, TSSA - Refrigeration Systems, Gas Detection Systems, UPS Systems, Security System Monitoring, Fire Alarm System Monitoring, Electrical Inspections, Security Cameras/Doors Software Systems, Overhead Door Inspection, BAS Systems Service) – TSSA - Boilers/Pressure Vessels (Every 3 years) – Roofing System Inspections (Every 3-5 years) – Arena Roof Structure Inspection (Every 5 years) – OSPG - Post Tensioned Strand Monitoring (Every 2 years)	– Building Condition Assessments (Every 5 Years) – Climate Adaptation Plan (As required based on needs) – Energy Conservation and Demand Management (Every 5 years) – Accessibility Plan (As required) – Arena Strategy Report (As required) – Space Planning (As required) – Contingency Planning (As required) – Other technical studies and assessments (As required)
Operations and Maintenance Activities	– Planned Maintenance (PM) – Service Requested Maintenance – Reactive Maintenance – Purchase of small equipment and materials	– O&M needs will increase as assets are added to accommodate growth. – O&M needs may also change as a result of asset upgrades.

Lifecyle Activity Type	Planned Activities (within Anticipated Funding)	Additional Recommended Activities to Meet Proposed LOS
Renewal, Rehabilitation and Replacement	– Replacement of assets when they reach end of service life or are no longer fit for purpose. – Rehabilitation of some assets might occur at their mid-life or end-of-service life to extend their expected service life.	– Replacement and rehabilitation activities could be increased to reduce the renewal backlog (assets in Very Poor condition) more quickly.
Growth Activities	– As identified through future master and strategic plans (included in forecast as average of last 5 years of expansion).	– Incorporate future projects identified from future master or strategic plans.
Upgrade Activities	– There are currently no plans to upgrade any assets.	– Upgrade needs will be identified from future master or strategic plans.
Disposal Activities	– There are currently no plans to dispose of any assets without replacement.	– Disposal needs may be identified from future master or strategic plans.

8.5.2 Operations & Maintenance Forecast

Figure 8-3 shows the forecast for operations and maintenance costs over the next 10 years to meet the Proposed LOS. Operations and maintenance costs increased in alignment with the growth in the asset portfolio as described in the next section. Regular increases due to inflation were not included in the following forecast.

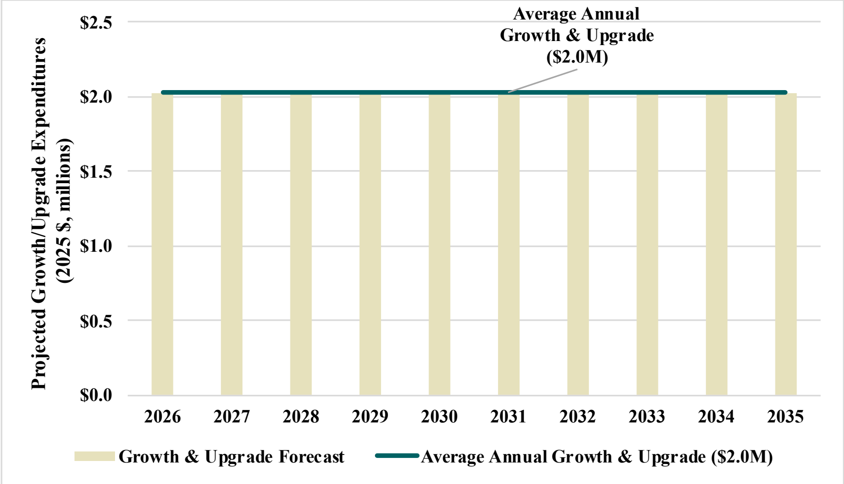
Figure 8-3 Operations & Maintenance Summary



8.5.3 Growth, Upgrade, and Disposal Forecast

Growth reflects the acquisition of assets that did not previously exist within the asset portfolio (estimated as the average of the past 5 years of asset acquisitions). Upgrades result from improves asset performance (i.e., environmental, safety, accessibility, etc.). Disposals are when assets are removed from the portfolio. Figure 8-4 shows the forecasted growth and upgrades to meet the Proposed LOS. City teams are working to develop a more accurate assessment of future growth requirements.

Figure 8-4 Growth, Upgrade, & Disposal Summary



8.5.4 Renewal & Condition Forecast

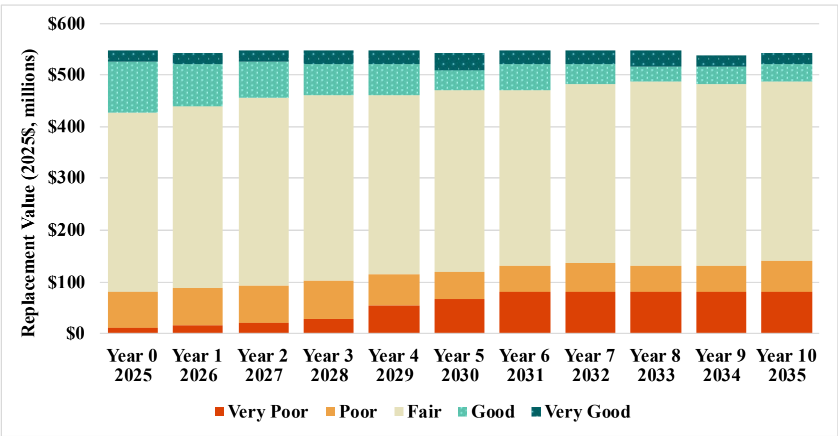
This section presents renewal lifecycle forecasts for:

- Scenario A: Anticipated Budget
- Scenario B: Maintain Current LOS
- Scenario C: Proposed LOS

Scenario A: Anticipated Budget

Figure 8-5 shows the forecast condition distribution of buildings and facilities assets based on an average annual anticipated funding of $7.4 million per year (based on historical 5-year average renewal spending). The graph shows that the renewal backlog (assets in Very Poor condition) increases from 2% in 2025 to 15% in 2035.

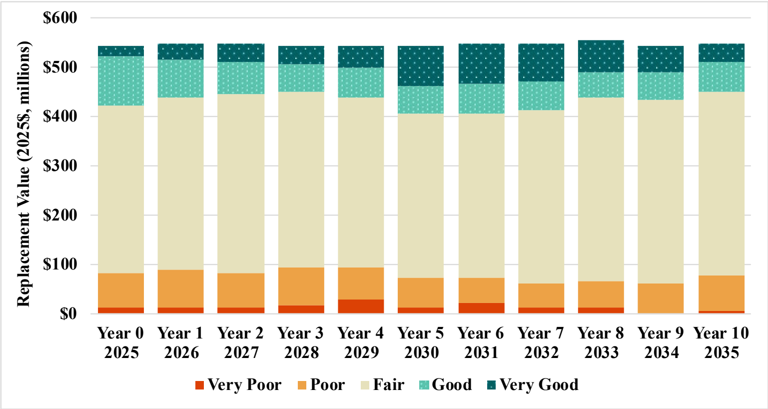
Figure 8-5 Condition Forecast – Buildings and Facilities
Scenario A: Anticipated Funding



Scenario B: Maintain Current LOS

Figure 8-6 shows the forecast condition distribution of buildings and facilities assets based on an average annual renewal spend of $13.1 million per year to maintain the renewal backlog (% of assets in Very Poor condition) over the forecasted period.

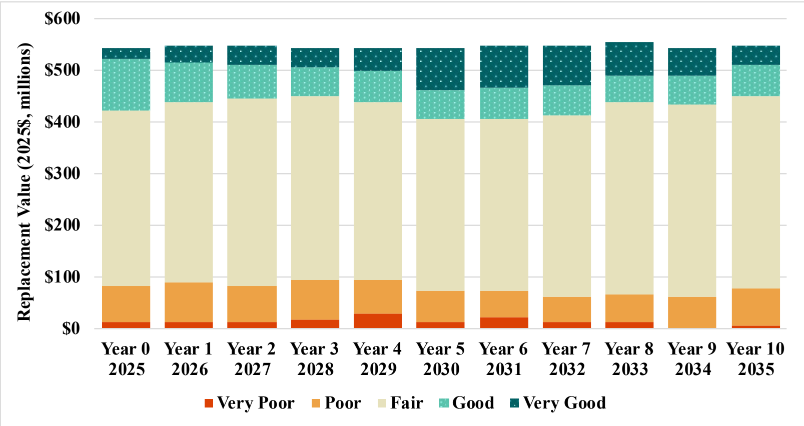
Figure 8-6 Condition Forecast – Buildings and Facilities
Scenario B: Maintain Current LOS



Scenario C: Proposed LOS

Figure 8-7 shows the forecast condition distribution of buildings and facilities assets based on an average annual renewal spend of $13.1 million per year which is estimated to be required to maintain the renewal backlog (assets in Very Poor condition) over the forecasted period.

Figure 8-7 Condition Forecast – Buildings and Facilities
Scenario C: Proposed LOS



8.5.5 Rationale for Proposed LOS

The Proposed LOS, as defined in Scenario C is recommended because it maintains the existing condition of building and facility assets. This scenario also includes funds to support O&M needs for growth assets to ensure that O&M LOS can be sustained over the 10-year period.

8.6 Financial Strategy

Table 8-6 shows a comparison of the average annual costs of the three scenarios. The table shows that there is a $6.0 million per year funding gap to meeting the proposed LOS.

Table 8-6 Average Annual Costs – Buildings and Facilities – Scenario Comparison

Lifecycle Activity Type	Average Annual Cost (2025 $, millions)		
	Scenario A: Anticipated Funding	Scenario B: Maintain Current LOS	Scenario C: Proposed LOS
Non-Infrastructure Solutions	--	--	$0.05
O&M – Existing Assets	$10.5	$10.5	$10.5
Renewal – Existing Assets	$7.4	$13.1	$13.1
Growth & Upgrade Activities	$2.0	$2.0	$2.0
O&M – Growth & Upgrade Assets	--	$0.2	$0.2
Renewal – Growth & Upgrade Assets	--	--	--
Disposal Activities	--	--	--
Total	**$19.9**	**$25.8**	**$25.9**
Funding Gap	**n/a**	**$5.9**	**$6.0**

9 Culture Service

The City is dedicated to fostering a vibrant cultural environment through the provision and maintenance of diverse cultural assets and facilities. These include venues such as the FirstOntario Performing Arts Centre and the St. Catharines Museum and Welland Canals Centre, which support a range of cultural programming, exhibitions, and events. Facilities associated with cultural services are included in the Buildings and Facilities section of this AM Plan.

These cultural assets play a crucial role in enhancing community identity, promoting social cohesion, and contributing to the city's economic development. The City actively monitors the condition and performance of these assets to ensure their sustainability and alignment with community needs.

Guided by the St. Catharines Culture Plan 2025–2030: Stay for the Culture, the City outlines strategic objectives to support and enhance its cultural infrastructure. This includes maintaining existing cultural spaces and exploring opportunities to develop new ones, ensuring that the cultural sector continues to thrive and serve the residents of the City.

9.1 State of the Local Infrastructure

Culture assets are essential to supporting a vibrant and inclusive community in the City. These assets—such as the historic Lakeside Park Carousel, public art installations, and the heritage lock walls—reflect the city's rich cultural identity and contribute to a strong sense of place.

Cultural infrastructure provides opportunities for engagement, education, and creative expression, while also supporting tourism, economic development, and quality of life. These spaces and landmarks host a variety of programming and serve as focal points for community gathering and celebration.

The City's investment in culture assets ensures they remain safe, accessible, and aligned with evolving community needs. Sustaining and renewing these assets will be key to maintaining cultural vitality and preserving the character that defines the City.

The overall distribution of replacement values by asset is shown in Table 9-1.

Table 9-1 Inventory Valuation – Culture Services

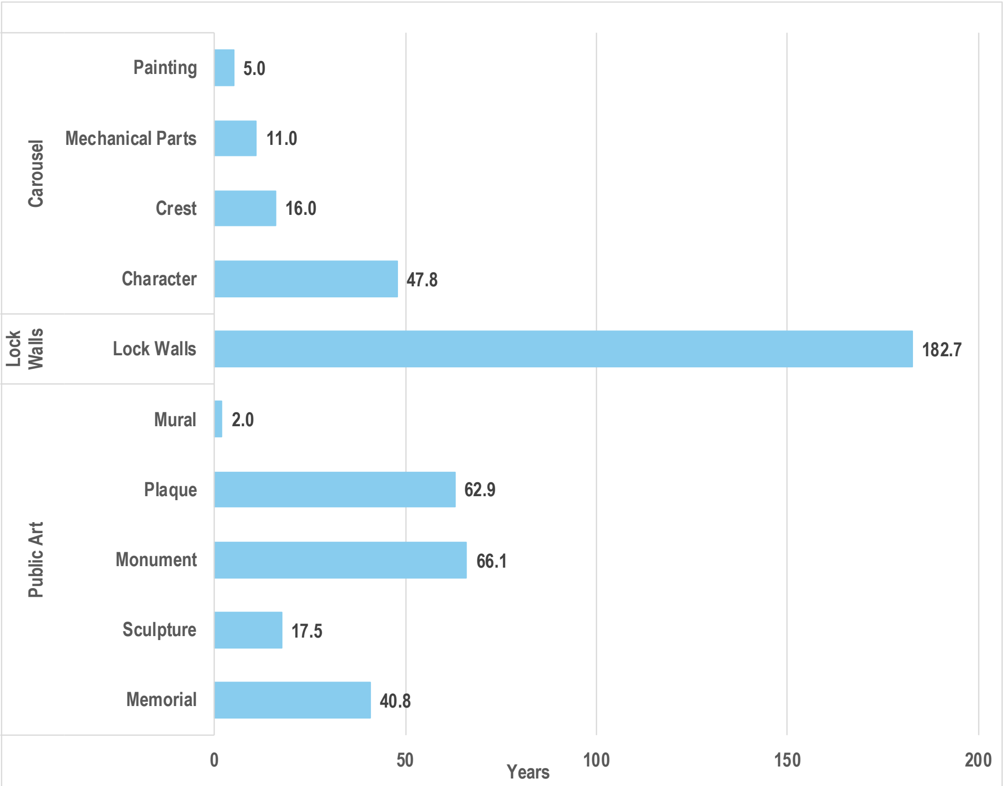
Asset Category	Asset Sub-Category	Count	Unit	Replacement Value (millions, 2025 $)	Replacement Value (% Total)
Carousel	Character	81	each	$1.63	15.9%
	Crest	20	each	$0.04	0.4%
	Mechanical Parts	1	each	$0.53	5.2%
	Painting	20	each	$0.04	0.4%
Lock walls	Lock walls	38[4]	each	$1.95	19.0%
Public Art	Memorial	16	each	$3.89	38.0%
	Sculpture	3	each	$0.37	3.6%
	Monument	20	each	$1.74	17.0%
	Plaque	13	each	$0.05	0.5%
	Mural	1	each	<$0.01	<0.1%
	Overall Replacement Value			**$10.2**	**100%**

9.1.1 Asset Age

Cultural assets differ from other, more typical asset classes, as these assets are historical in nature and do not have clear service lives. Typically, the City tries to maintain the cultural assets as long as possible so the focus is more on preservation as opposed to replacement. Conservation practices, including restoration, protection from environmental damage, and maintenance, are implemented to safeguard these cultural assets for future generations. Figure 9-1 shows the average age for the cultural assets and reflects the City's efforts to preserve these assets so that they are still functional even though the assets are old.

[4] 18 are acting as bank stabilization and the City actively monitors their condition. 4 are partially buried and 16 are fully buried with the City not planning to replace in the future (i.e., no replacement cost).

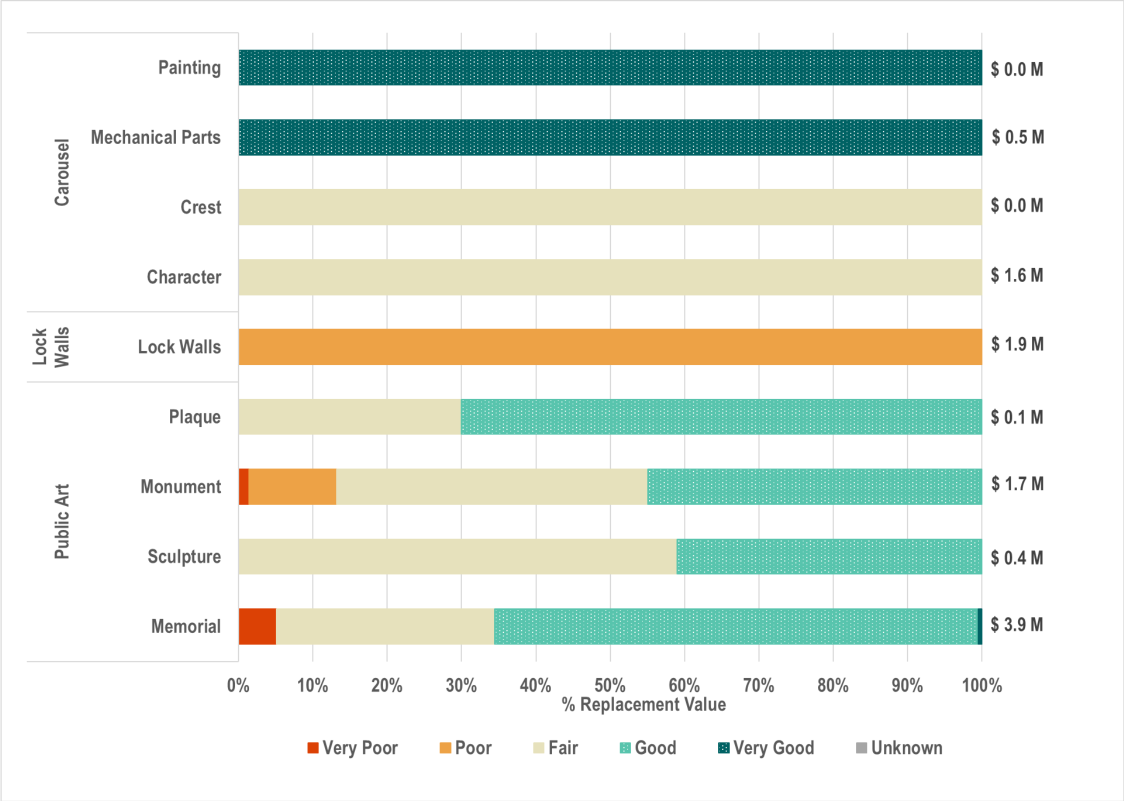
Figure 9-1 Average Asset Age – Culture



9.1.2 Asset Condition

Asset condition for cultural assets is assessed primarily by staff inspection and reporting. As shown in Figure 9-2, a small portion of memorials and monuments are in very poor condition, while the remaining assets identified in poor condition are the historic lock walls. Despite these ratings, all cultural assets continue to serve the community through ongoing maintenance and stewardship. These findings highlight the importance of sustained investment to preserve cultural heritage and ensure these assets remain safe, accessible, and valued into the future.

Figure 9-2 Asset Condition – Culture[5]



9.2 Levels of Service

The City is committed to maintaining a functional, accessible, and resilient network of cultural assets that support community engagement, celebrate local heritage, and enrich quality of life. These assets include public art, the visible historic lock walls,

[5] There are 9 unknown condition assets that did not have a replacement value noted in the asset inventory (6 plaques and 3 memorials).

the Lakeside Park Carousel, plaques, monuments, and other cultural features that contribute to the city's identity and vibrancy.

Defined Levels of Service (LOS) for cultural assets guide investment planning and asset management decisions, helping ensure that these valued resources continue to meet community expectations. Through ongoing monitoring and preservation, the City aims to sustain the condition, relevance, and accessibility of its cultural assets in alignment with both current and future needs.

9.2.1 Technical Metrics including O. Reg. 588/17 LOS

Table 9-2 outlines the LOS that are driving current and future decision-making and expenditure needs for Culture assets. The City's Customer LOS statements and Technical LOS indicators document performance from a service user's and service provider's perspective, respectively. Performance scores from the most recent five years (2020 – 2024) are listed. The table also lists the target or proposed performance for each metric as selected by the City.

Table 9-2 LOS Metrics and Performance – Culture

Service Attribute	Customer LOS Statement (CLOS)	Technical LOS Indicator (TLOS)	Historical Performance					Target / Proposed Performance
			2020	2021	2022	2023	2024	
Capacity and Use	Cultural assets are open, accessible, and available for public enjoyment	Carousel riders by count	Not calculated	Not calculated	151,432	150,765	137,186	Maintain
Function	Cultural assets are available with minimal service disruptions	# of vandalism/theft incidents per year						Future
		Cost of vandalism/theft incidents per year						Future
Reliability	Cultural assets are safe and reliable	% of Public Art & Carousel assets in Very Poor condition	Not calculated	Not calculated	Not calculated	0.3%	2.7%	Maintain
		% of Lock Wall assets in Very Poor condition	Not calculated	Not calculated	Not calculated	0%	0%	Maintain
		# of culture assets restored per year (excl. carousel characters and lock walls)	Not calculated	Not calculated	1	2	6	Maintain

Service Attribute	Customer LOS Statement (CLOS)	Technical LOS Indicator (TLOS)	Historical Performance					Target / Proposed Performance
			2020	2021	2022	2023	2024	
		# of carousel characters restored by Friends of the Carousel	Not calculated	Not calculated	Not calculated	8	6	Maintain
Affordability	Services are affordable and provided at lowest cost for both current and future customers	Annual Capital investment as a % of cost to sustain assets over their lifecycles (replacement value / estimated service life = $0.6M/yr)	0%	0%	41%	6%	48%	100%

9.3 Climate Change

The City recognizes the importance of addressing climate change impacts on cultural assets through proactive risk management and adaptation strategies. Various climate stressors, including extreme weather events, pose specific risks to these assets.

The carousel building may be susceptible to flooding during extreme rainfall events, which could result in temporary closures. Similarly, canals and lock walls face potential risks from soil instability, ground movement, and slope failure, leading to erosion, landslides, or asset damage, particularly during extended wet conditions. Public art installations are generally assessed to experience minimal impact from climate stressors. As climate change continues to evolve, the City will need to integrate adaptation and mitigation strategies to enhance resilience and longevity of public art and culture assets.

While extreme heat, cold, and high lake levels are not anticipated to significantly affect cultural assets, the City should continue to monitor these risks and integrate relevant climate resilience measures into its asset management and planning processes to ensure the long-term sustainability and preservation of cultural assets.

9.4 Risk Management Strategy

As outlined in Section 2.5, the City applies a risk-based approach to prioritize renewal needs for cultural assets. The likelihood of failure is primarily assessed through regular inspections and ongoing performance monitoring. The consequence of failure is evaluated using defined scoring criteria and weighting methodologies that consider potential impacts on public access, cultural programming, heritage value, and community well-being.

Consequence of failure criteria are still being refined for certain cultural asset types to ensure appropriate alignment with service objectives.

Table 9-3 Consequence Scoring – Culture

Consequence Category	Criteria	Parameter	Consequence Score				
			1 - Minimal	2 - Minor	3 - Moderate	4 - Major	5 – Extreme
Financial	Capital Expenditure (Replacement of Assets)	Replacement Cost + Emergency Premium (10%)	<$100k	$100k - <$250k	$250k - <$1M	$1M - $2M	>$2M
Social	Impact to Health and Safety		All Remaining	Carousel	Cenotaphs	Lock walls	N/A
	Legal liability		Outdoor Art, Carousel	N/A	N/A	Lock walls	N/A
	Service Disruption		N/A	N/A	N/A	Carousel, Lock walls	Outdoor Art
	Impacted Customers		Outdoor Art, Lock walls	N/A	N/A	N/A	Carousel
Environmental	Environmental Compliance		All	N/A	N/A	N/A	N/A
	Environmental Impact		Outdoor Art, Carousel, Lock walls Visible	N/A	N/A	Lock walls (bank stabilization)	N/A

9.5 Lifecycle Management Strategy

9.5.1 Lifecycle Management Activities

The levels of service presented in the previous section are supported by a variety of lifecycle activities in accordance with the activity types presented in Table 9-4. These activities are targeted to extend the asset life, ensure levels of service are being met, and reduce overall lifecycle costs.

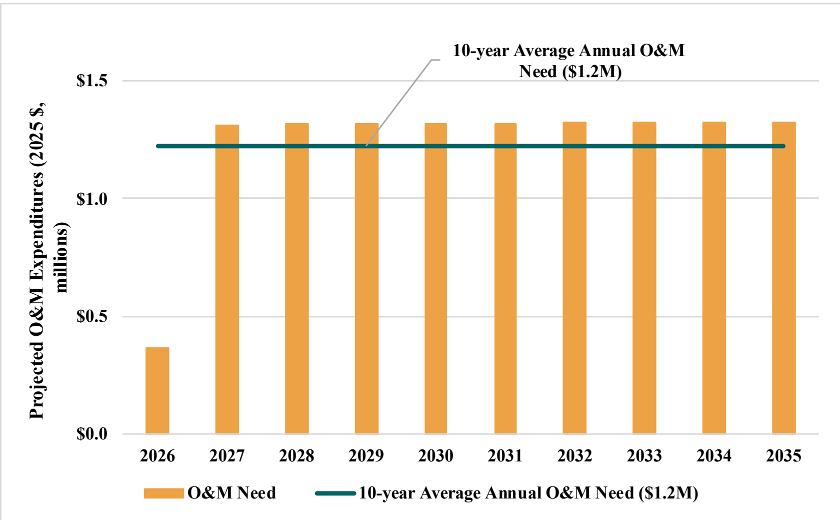
Table 9-4 Lifecycle Activities – Planned and Recommended – Culture

Lifecyle Activity Type	Planned Activities (within Anticipated Funding)	Additional Recommended Activities to Meet Proposed LOS
Non-Infrastructure Solutions	– Culture Plan (every 5 years) – Condition Assessments (as required) – Technical studies and assessments (as required)	– Implement 5-year inspection cycle for all Public Art (53 pieces at ~$1.5K per inspection) – Establish inspection protocol for Carousel (~$6K every 2 years); currently volunteer-led, but future support is uncertain
Operations and Maintenance Activities	– Planned, reactive, and service-requested maintenance (as required) – Equipment inspections (daily, monthly, annually) – Restoration of carousel characters (volunteer-led) – Restoration of Blood Sport paintings (as required by professionals)	– Increase funding for preventative maintenance in alignment with future asset portfolio growth – Formalize documentation and tracking of inspection activities for heritage and cultural assets – Establish contingency funding or partnership strategy in case volunteer support declines – Develop long-term conservation plan for high-value cultural assets
Renewal, Rehabilitation and Replacement	– Rehabilitation and replacement as required; preference for rehabilitation	– Develop prioritization framework for proactive renewal of aging or at-risk cultural assets
Growth Activities	– New assets identified through planning and studies	– Integrate cultural asset expansion into master plans and community development strategies
Upgrade Activities	– No upgrades in planned forecast	– Integrate any upgrades as specified in strategic or master plans
Disposal Activities	– Disposals coordinated with asset replacement	– Explore opportunities to sell indoor art where appropriate, supported by clear guidelines for removing items from the collection

9.5.2 Operations & Maintenance Forecast

Figure 9-3 shows the forecast for operations and maintenance costs over the next 10 years to meet the Proposed LOS. Operations and maintenance costs remained stable as the portfolio of assets was not planned to grow over the next 10 years (growth shown to follow relates to erosion control and is not expected to increase O&M spending). Regular increases due to inflation were not included in the following forecast.

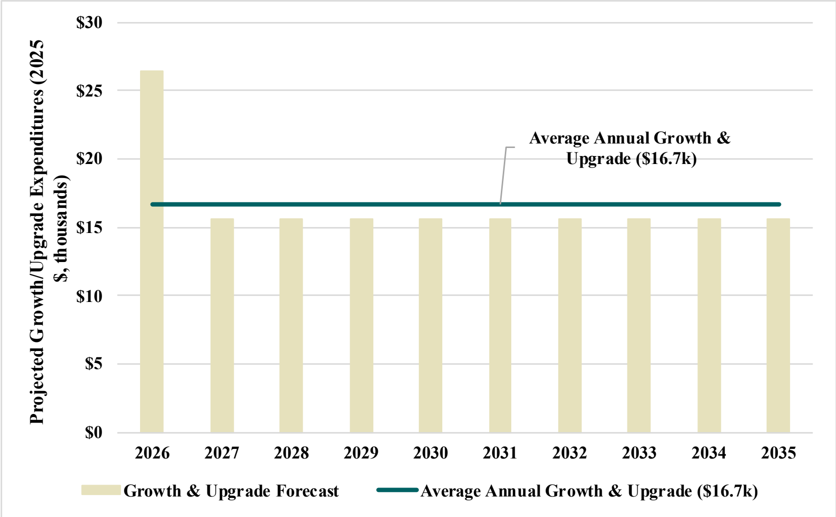
Figure 9-3 Operations & Maintenance Summary



9.5.3 Growth, Upgrade, and Disposal Forecast

Growth reflects the acquisition of assets that did not previously exist within the asset portfolio. Upgrades result from improves asset performance (i.e., environmental, safety, accessibility, etc.). Disposals are when assets are removed from the portfolio. Figure 9-4 shows the forecasted growth and upgrades to meet the Proposed LOS. City teams are working to develop a more accurate assessment of future growth requirements for each asset portfolio.

Figure 9-4 Growth & Upgrade Summary



9.5.4 Renewal & Condition Forecast

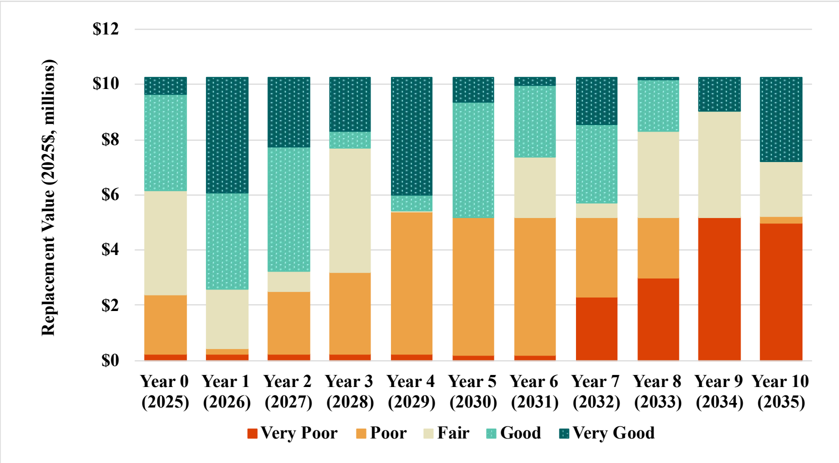
This section presents renewal lifecycle forecasts for:

- Scenario A: Anticipated Budget
- Scenario B: Maintain Current LOS
- Scenario C: Proposed LOS

Scenario A: Anticipated Budget

Figure 9-5 shows the forecast condition distribution of culture assets based on average annual anticipated funding of $0.1 million per year (based on historical 5-year average renewal spending). The renewal backlog (assets in Very Poor condition) was 2% in 2025 and grows to 49% by 2035.

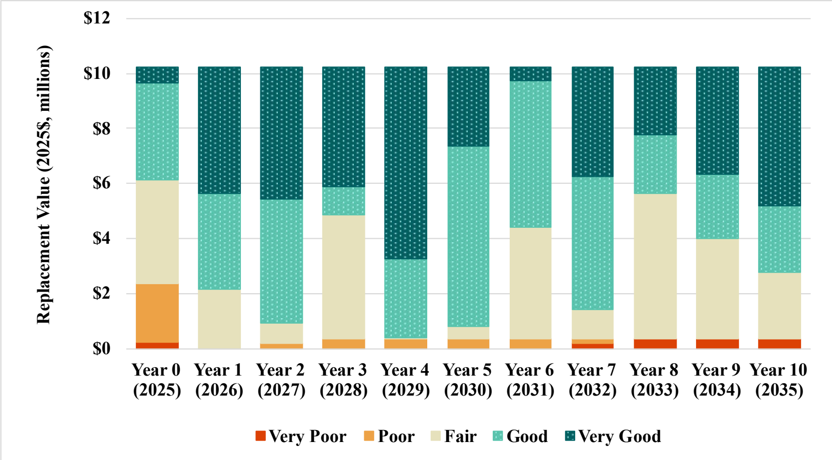
Figure 9-5 Condition Forecast – Culture Scenario A: Anticipated Funding



Scenario B: Maintain Current LOS

Figure 9-6 shows the forecast condition distribution of culture assets based on an average annual renewal spend of $0.3 million per year to maintain the renewal backlog (% of assets in Very Poor condition).

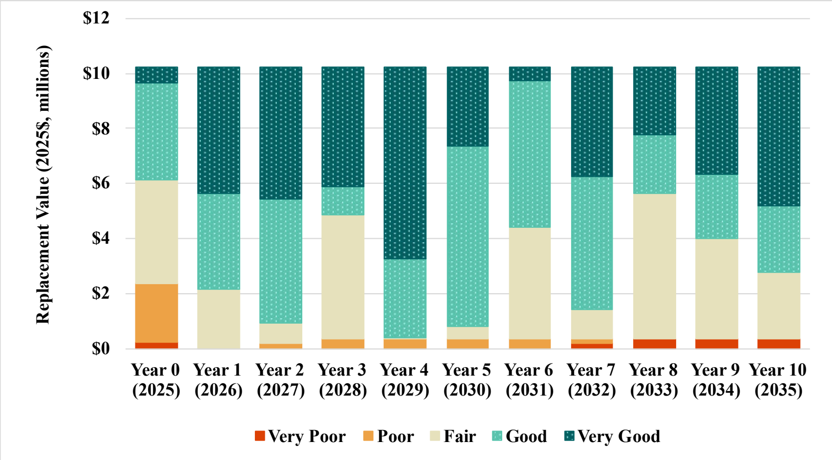
Figure 9-6 Condition Forecast – Culture Scenario B: Maintain Current LOS



Scenario C: Proposed LOS

Figure 9-7 presents the projected condition distribution of culture assets based on an average annual renewal investment of $0.3 million. The renewal backlog (assets in Very Poor condition) is to be maintained (% of assets in Very Poor condition) over the course of the forecasted period.

Figure 9-7 Condition Forecast – Culture Scenario C: Proposed LOS



9.5.5 Rationale for Proposed LOS

The Proposed LOS, as defined in Scenario C is recommended so that the condition of assets are maintained over the forecasted period.

9.6 Financial Strategy

Table 9-5 shows a comparison of the average annual costs of the three scenarios. The table shows that there is a funding gap of $0.2 million per year to achieve the Proposed LOS.

Table 9-5 Average Annual Costs – Culture – Scenario Comparison

Lifecycle Activity Type	Average Annual Cost (2025 $, millions)		
	Scenario A: Anticipated Funding	Scenario B: Maintain Current LOS	Scenario C: Proposed LOS
Non-Infrastructure Solutions	$0.01	$0.01	$0.02
O&M – Existing Assets	$1.2	$1.2	$1.2
Renewal – Existing Assets	$0.1	$0.3	$0.3
Growth & Upgrade Activities	$0.02	$0.02	$0.02
O&M – Growth & Upgrade Assets	--	$0.01	$0.01
Renewal – Growth & Upgrade Assets	--	--	--
Disposal Activities	--	--	--
Total	**$1.3**	**$1.5**	**$1.5**
Funding Gap	**n/a**	**$0.2**	**$0.2**

10 Fleet Service

The City is committed to providing vehicles and equipment to all city departments, so that required duties can be performed on a daily basis. Corporate fleet services support a variety of activities and functions for recreation, business, arts and culture, historical, maintenance and operations purposes so staff can perform required duties daily in a safe, reliable, and efficient manner.

Vehicles used for Fire Service are covered separately in Section 11. The fleet includes including vehicles, equipment, and tools, each tailored to meet the operational requirements of different departments. Regular preventative maintenance and scheduled replacements ensure vehicles remain safe, reliable, and cost-effective. The City's fleet strategy emphasizes operational efficiency, environmental responsibility, and long-term sustainability, with future planning aligned to policies promoting fuel efficiency, right-typing, and electrification where feasible.

10.1 State of the Local Infrastructure

10.1.1 Asset Valuation

The inventory consists of 269 pieces of equipment, 71 tools, and 159 vehicles under the tax-funded fleet, as well as 27 vehicles and 34 other assets supporting water and wastewater services. The fleet also includes six vehicles and one equipment asset used for parking services. Replacement values were estimated using a like-for-like approach based on the City's historical procurement and renewal costs. The largest portion of the fleet portfolio's replacement value is attributed to tax-funded vehicles (52.1%), followed by tax-funded equipment (34.3%) and water and wastewater vehicles (8.8%). Although parking and utility tools represent a smaller share of the overall value, they play important roles in supporting daily operations and specialized service delivery. Table 10-1 summarizes the replacement value by sub-category, providing a foundation for fleet renewal planning and long-term investment strategies.

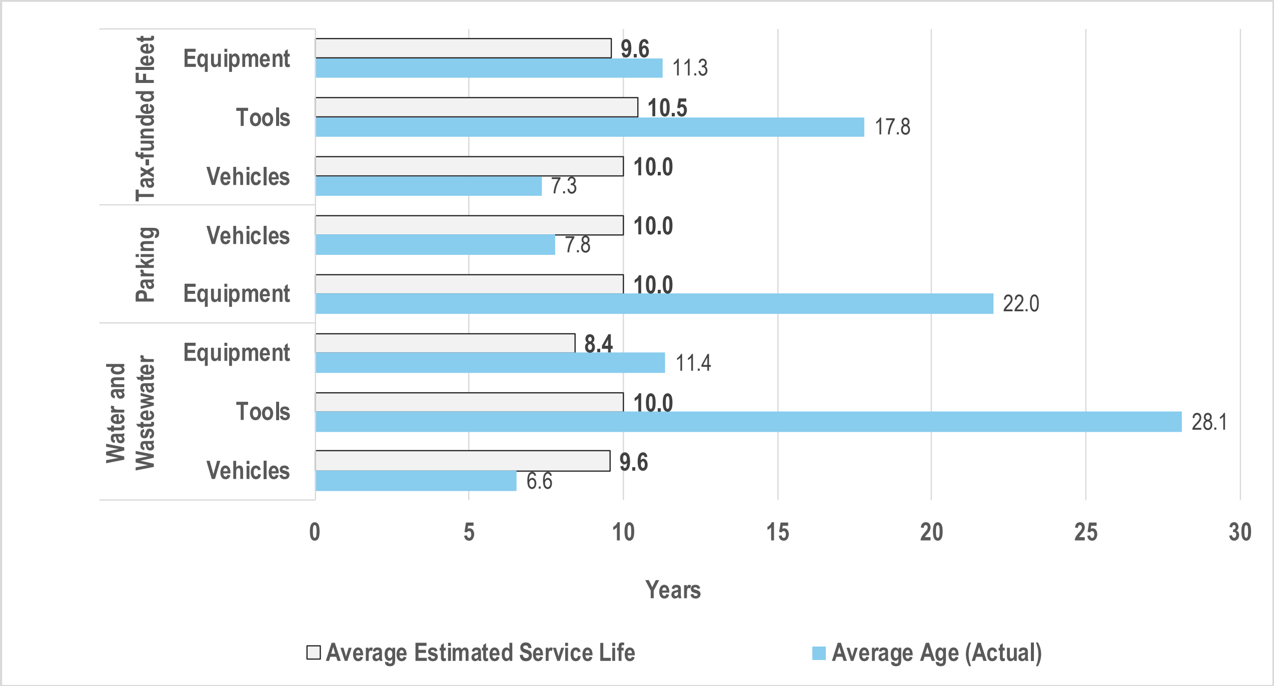
Table 10-1 Inventory Valuation – Fleet

Asset Category	Asset Sub-Category	Count	Unit	Replacement Value (millions, 2025 $)	Replacement Value (% Total)
Tax-funded Fleet (i.e., winter operation, forestry and park service etc.) (not including fire or service areas below)	Equipment	269	each	$11.61	34.3%
	Tools	71	each	$0.32	1.0%
	Vehicles	159	each	$17.62	52.1%
Parking	Vehicles	6	each	$0.29	0.8%
	Equipment	1	each	<$0.01	<0.1%
Water and Wastewater	Equipment	13	each	$0.90	2.6%
	Tools	21	each	$0.14	0.4%
	Vehicles	27	each	$2.97	8.8%
	Overall Replacement Value			**$33.8**	**100%**

10.1.2 Asset Age

Comparing the average age of the fleet assets to their expected service life helps determine how much useful life is left for the City's fleet. As shown in Figure 10 1, some asset categories show signs of aging and may need to be prioritized for renewal. Tax-funded fleet equipment, which makes up a large part of the inventory, has an average age of 11.3 years, which is higher than its expected service life of 9.6 years, indicating that many units have already outlived their planned lifespan. Tools in the tax-funded category are even older, with an average age of 17.8 years, well beyond their 10.5-year service life. On the other hand, tax-funded vehicles are newer, with an average age of 7.3 years, compared to a 10-year service life. Parking and water/wastewater fleet assets are generally younger, except for some tools, like wastewater tools, which have an average age of 28.1 years (nearly three times their expected lifespan). This analysis shows the need for targeted investment in older assets and helps with long-term planning for fleet renewal across all services.

Figure 10-1 Asset Age – Fleet

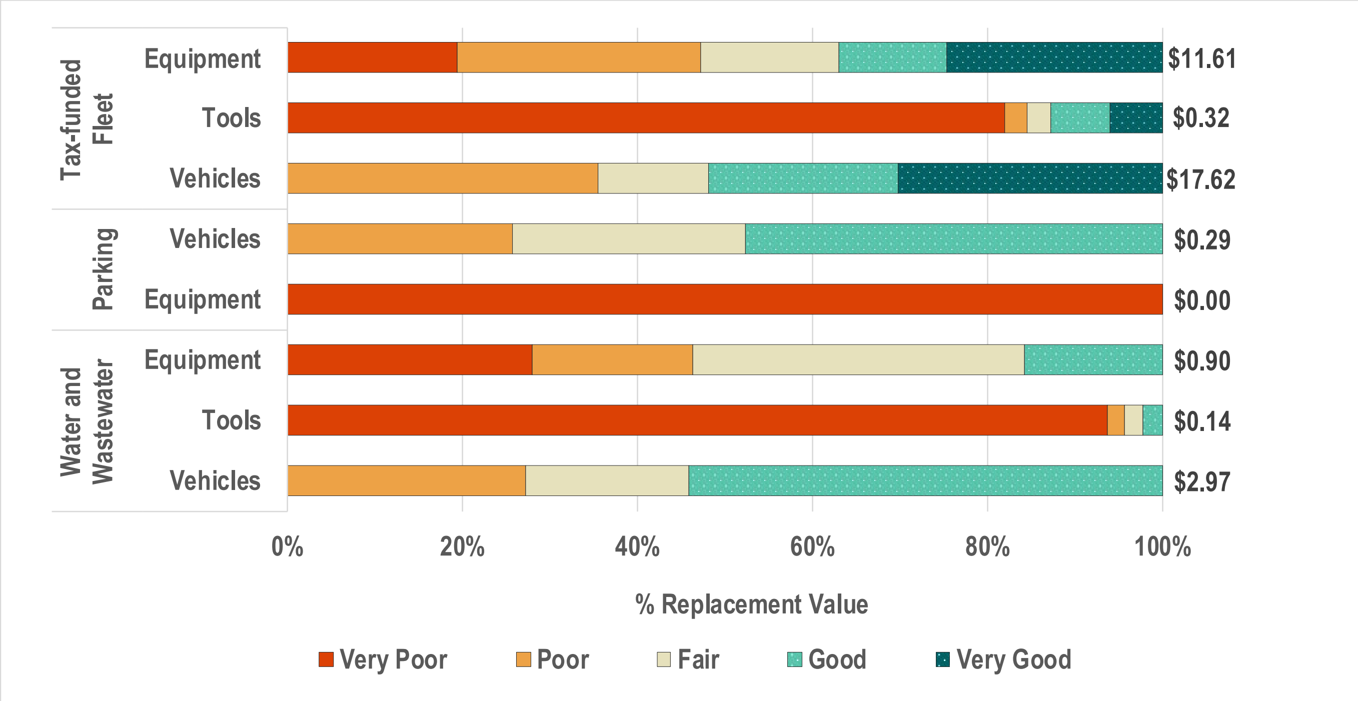


10.1.3 Asset Condition

The condition of fleet assets are determined using the age of each asset relative to its estimated service life. The asset condition distribution is shown in Figure 10-2 for fleet assets. Overall, $2.9 million (8.6%) of fleet assets are in very poor condition and $10.5 million (31.1%) are in poor condition. Assets in very poor condition are considered to be due or overdue for replacement. As shown in Figure 10-2, those assets consist of tax-funded fleet equipment and tools, parking equipment and water and wastewater equipment and tools.

To ensure effective asset management, it is recommended that actual asset condition be reviewed alongside age-based evaluations to better determine maintenance and replacement needs. For fleet assets, the city may want to consider including mileage as a key factor in future assessments. Additionally, anticipated service life estimates should be compared with actual age and performance data to refine projections and optimize lifecycle planning.

Figure 10-2 Asset Condition – Fleet



10.2 Levels of Service

The City is committed to maintaining a safe, efficient, and dependable fleet of vehicles, equipment, and tools that are essential for delivering a wide range of municipal services. Fleet assets support critical functions such as road and park maintenance, snow clearing, emergency response, and water and wastewater operations. To ensure reliability and cost-effectiveness, the City monitors its fleet through asset tracking and maintenance systems, enabling timely servicing, inspections, and lifecycle-based replacements. With the implementation of the new work order system, CityWorks, fleet management will see further improvements, enabling more efficient scheduling, streamlined maintenance processes, and enhanced operational oversight. Defined Levels of Service (LOS) for fleet assets will help guide investment decisions and ensure vehicles and equipment are available, fit-for-purpose, and in suitable condition to meet operational demands. This approach supports service continuity, safety, and sustainability across all departments that rely on fleet assets to serve the community.

10.2.1 Technical Metrics

Table 10-2 outlines the LOS that are driving current and future decision-making and expenditure needs for fleet assets. The City's Customer LOS statements and Technical LOS indicators document performance from a service user's and service provider's perspective, respectively. Performance scores from the most recent five years (2020 – 2024) are listed. The table also lists the target or proposed performance for each metric as selected by the City.

Table 10-2 LOS Metrics and Performance – Fleet

Service Attribute	Customer LOS Statement (CLOS)	Technical LOS Indicator (TLOS)	Historical Performance					Target / Proposed Performance
			2020	2021	2022	2023	2024	
Function	Providing secure fleet services	Annual fuel consumption	N/A	N/A	N/A	665,216 L	583,837 L	Minimize
		Percentage of light vehicles that are electric	N/A	N/A	10.6%	N/A	38%	Increase
Reliability	Provide fleet assets at the appropriate quality	Percentage of tax-funded fleet assets due or overdue for replacement	N/A	N/A	N/A	33%	9%	Minimize
		Percentage of parking fleet assets due or overdue for replacement	N/A	N/A	N/A	16%	1%	Minimize
		Percentage of water and wastewater fleet assets due or overdue for replacement	N/A	N/A	N/A	18%	10%	Minimize
Affordability	Services are affordable and provided at lowest cost for both current and future customers	Annual Capital investment as a % of cost to sustain assets over their lifecycles (replacement value / estimated service life = $3.5M/yr)	126%	155%	140%	121%	103%	100%

While formal Capacity & Use metrics have not yet been established for the City's fleet assets, several qualitative challenges have been identified that may impact future service delivery. As the City expands its trail network and introduces new service level expectations for trail maintenance, additional specialized equipment may be required to meet operational needs. Physical capacity constraints at existing fleet facilities, such as limited parking space at Lake Street and undersized maintenance shops also present operational challenges. In particular, the current shop space is insufficient, requiring outdoor work during warmer seasons, which can contribute to increased vehicle downtime. Additionally, a key constraint to maximizing fleet utilization is the limited availability of trained staff to operate and maintain equipment. These emerging issues highlight the need for ongoing monitoring and potential investment in fleet facility upgrades, staffing capacity, and specialized assets to ensure the City's fleet can continue to support evolving service demands.

10.3 Climate Change

The City completed an internal climate risk assessment to evaluate how extreme weather events may impact municipal infrastructure. For the corporate fleet, the most significant climate-related risks are associated with extreme cold and temperature extremes. Battery-operated equipment and tools may experience reduced functionality or performance during prolonged periods of cold weather. Vehicles are also impacted, with cold temperatures contributing to increased idling times as staff warm up vehicles, and potential reductions in electric vehicle (EV) efficiency.

Additionally, the combination of extreme precipitation and road salt can accelerate corrosion, leading to shortened vehicle lifespans. In hotter conditions, vehicles may idle longer to cool interiors for staff comfort, resulting in increased fuel consumption. While other climate stressors (e.g., wind, high water levels, or dry conditions) pose minimal direct risk to fleet assets, the cumulative impact of temperature extremes on vehicle longevity, fuel costs, and operational efficiency underscores the need for climate adaptation. Additionally, the ability of the City to respond to significant weather events may require more fleet to restore critical services fast. The City will continue to monitor these risks and consider facility upgrades, operational changes, and equipment investments as part of future fleet planning efforts.

Additionally, the City has been trying to reduce its fleet emissions with the use of hybrids, electric vehicles, and battery powered tools. To date this has focused on light duty vehicles as the City anticipated heavy duty vehicles to remain on conventional fuels for the foreseeable future. This is largely due to the limited availability of viable electric or alternative fuel options for heavy-duty applications, as well as infrastructure and operational constraints. Heavy-duty vehicles require significant power and range, which current battery technology and charging infrastructure may not yet fully support. Additionally, retrofitting or transitioning these vehicles would require substantial investment and logistical adjustments, making conventional fuels the more practical choice in the near term.

10.4 Risk Management Strategy

As explained in Section 2.5, the City uses a risk-based approach to prioritize renewal needs. The likelihood of failure is primarily estimated based on asset condition. The consequence of failure is estimated based on the scoring criteria shown in Table 10-3 for fleet assets.

Table 10-3 Consequence Scoring – Fleet

Consequence Category	Criteria	Parameter	Consequence Score				
			1 - Minimal	2 - Minor	3 - Moderate	4 - Major	5 – Extreme
Financial	Capital Expenditure (Replacement of Assets)	Replacement Cost	<$100k	$100k - <$250k	$250k - <$1M	$1M - $2M	>$2M
	Revenue loss due to service closure or other direct cost not related to asset repair	N/A - failure will not result in revenue loss	N/A	N/A	N/A	N/A	N/A
Social	Impact to Health and Safety	Asset Category	All remaining asset categories	N/A	Forestry	N/A	Winter Control
	Legal liability	Asset Category	All remaining asset categories	N/A	Forestry	Winter Control	N/A
	Service Disruption	Asset Category	All remaining asset categories	Winter Control	N/A	N/A	N/A
	Customer Impact	Asset Category	All remaining asset categories	N/A	Winter Control	N/A	N/A
Environmental	Environmental Compliance	Asset Category	All asset categories	N/A	N/A	N/A	N/A
	Environmental Impact	Asset Category	All remaining asset categories	N/A	Flushing Truck	N/A	N/A

10.5 Lifecycle Management Strategy

10.5.1 Lifecycle Management Activities

The levels of service presented in the previous section are supported by a variety of lifecycle activities in accordance with the activity types presented in Table 10-4. These activities are targeted to extend the asset life, ensure levels of service are being met, and reduce overall lifecycle costs.

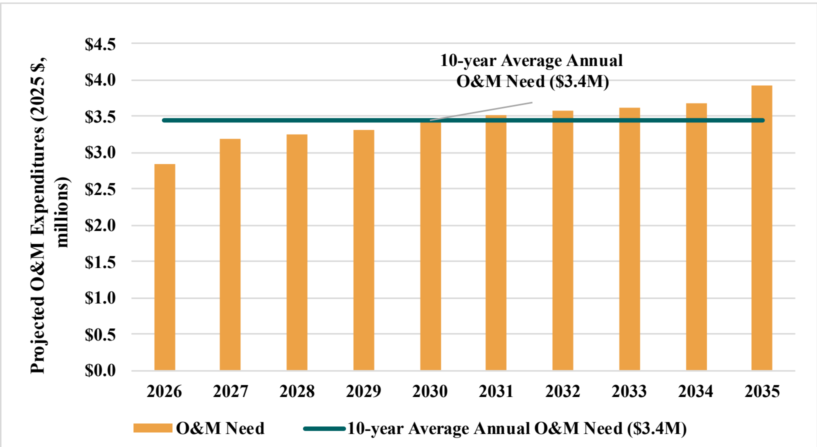
Table 10-4 Lifecycle Activities – Planned and Recommended – Fleet

Lifecyle Activity Type	Planned Activities (within Anticipated Funding)	Additional Recommended Activities to Meet Proposed LOS
Non-Infrastructure Solutions	– Continued use of existing service life assumptions and age-based condition reporting.	– Review and standardize vehicle service life values ($50k); incorporate mileage into deterioration models ($75k); implement condition scoring via ARMS ($100k).
Operations and Maintenance Activities	– Preventative and corrective maintenance managed through existing budgets and systems (e.g., WorkManager, in future CityWorks).	– Improve shop space and working conditions, particularly in winter; invest in additional staffing capacity to operate and maintain fleet assets.
Renewal, Rehabilitation and Replacement	– Replacement of assets based on average age exceeding service life and available funding, using updated replacement values.	– Accelerate replacement of overage assets, particularly tools and equipment with excessive age-to-service-life ratios.
Growth Activities	– Growth is forecasted according to the previous 5-year historical average.	– Procure new equipment to meet emerging trail and active transportation maintenance needs identified in the ATMP.
Upgrade Activities	– Not currently included in base capital forecast; most replacements are like-for-like.	– Continue to transition to hybrid/electric vehicles where feasible; establish eligibility tracking for vehicle electrification.
Disposal Activities	– Assets removed from inventory when declared obsolete or surplus.	– Improve data accuracy in WorkManager to ensure alignment of “in service” vs. actual asset disposition status.

10.5.2 Operations & Maintenance Forecast

Figure 10-3 shows the forecast for operations and maintenance costs over the next 10 years to meet the Proposed LOS. Operations and maintenance costs grew in alignment with the growth in the asset portfolio. Regular increases due to inflation were not included in the following forecast.

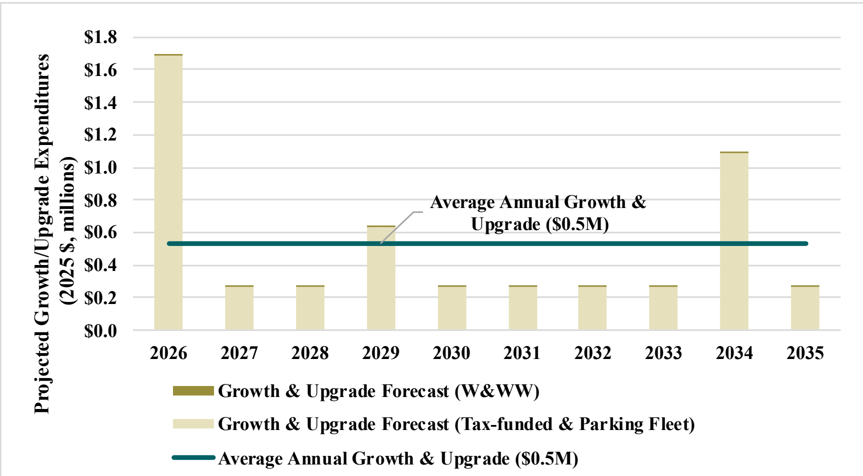
Figure 10-3 Operations and Maintenance Summary



10.5.3 Growth, Upgrade, and Disposal Forecast

Growth reflects the acquisition of assets that did not previously exist within the asset portfolio. This includes both growth based on historical spending and the growth in the fleet as outlined by the Active Transportation Master Plan. Upgrades result from improves asset performance (i.e., environmental, safety, accessibility, etc.). Disposals are when assets are removed from the portfolio. City teams are working to develop a more accurate assessment of future growth requirements for each asset portfolio. Only ~$6K per year has been allocated to water and wastewater fleet growth as there was limited historical spending for these categories.

Figure 10-4 Growth and Upgrade Summary



10.5.4 Renewal & Condition Forecast

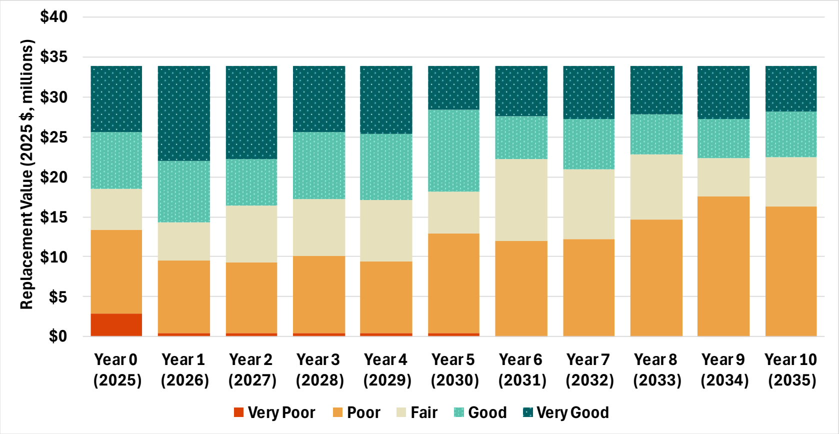
This section presents renewal lifecycle forecasts for:

- Scenario A: Anticipated Budget
- Scenario B: Maintain Current LOS
- Scenario C: Proposed LOS

Scenario A: Anticipated Budget

Figure 10-5 shows the forecast condition distribution of fleet assets based on an average annual anticipated funding of $1.9 million per year (based on historical 5-year average renewal spending). The graph shows that the renewal backlog (assets in Very Poor condition) decreases from 8.6% in 2025 to 0.1% in 2035.

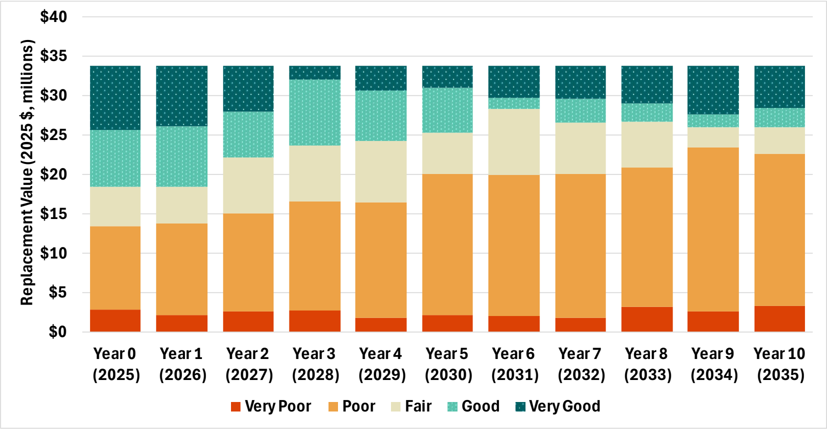
Figure 10-5 Condition Forecast – Fleet
Scenario A: Anticipated Funding



Scenario B: Maintain Current LOS

Figure 10-6 shows the forecast condition distribution of structure assets based on an average annual renewal spend of $1.1 million per year to maintain the renewal backlog (% of assets in Very Poor condition).

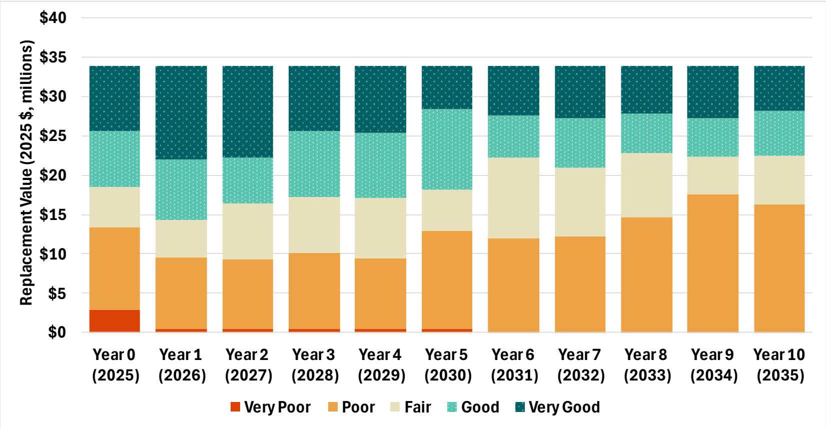
Figure 10-6 Condition Forecast – Fleet
Scenario B: Maintain Current LOS



Scenario C: Proposed LOS

Figure 10-7 shows the forecast condition distribution of structure assets based on an average annual renewal spend of $1.9 million per year (same as Scenario A: Anticipated Budget). The graph shows that the renewal backlog (assets in Very Poor condition) decreases from 8.6% in 2025 to 0.1% in 2035.

Figure 10-7 Condition Forecast – Fleet Scenario C: Proposed LOS



10.5.5 Rationale for Proposed LOS

The Proposed LOS, as defined in Scenario C is recommended because it significantly reduces the renewal backlog for fleet assets and aligns with the anticipated budget.

10.6 Financial Strategy

Table 10-5 shows a comparison of the average annual costs of the three scenarios. The table shows that there is a $0.1 million per year funding gap to achieve the Proposed LOS primarily driven by the additional O&M needs due to growth of the asset portfolio.

Table 10-5 Average Annual Costs – Fleet – Scenario Comparison

Lifecyle Activity Type	Average Annual Cost (2025 $, millions)		
	Scenario A: Anticipated Funding	Scenario B: Maintain Current LOS	Scenario C: Proposed LOS
Non-Infrastructure Solutions	--	--	$0.02
O&M – Existing Assets	$2.8	$2.8	$2.8
Renewal – Existing Assets	$1.9	$1.1	$1.9
Growth & Upgrade Activities	$0.3	$0.3	$0.5
O&M – Growth & Upgrade Assets	--	$0.1	$0.7
Renewal – Growth & Upgrade Assets	--	--	--
Disposal Activities	--	--	--
Total	**$5.0**	**$4.3**	**$5.9**
Funding Gap	**n/a**	**none**	**$0.9**

11 Fire Service

The City owns and operates a specialized fleet of vehicles and equipment along with facilities dedicated to supporting fire and emergency response services. These assets are critical to ensuring timely and effective public safety operations across the community. Preventative maintenance and scheduled replacements are undertaken to ensure that vehicles, equipment and facilities remain safe, dependable, and ready for deployment. The City's fire fleet management strategy prioritizes reliability, service continuity, and long-term cost-efficiency, with future planning aligned to emerging best practices in asset performance and lifecycle optimization.

11.1 State of the Local Infrastructure

11.1.1 Asset Valuation

The City's Fire Services portfolio includes both mobile response assets and fixed facilities essential to delivering effective emergency services. The fleet consists of 12 emergency response vehicles, 22 support vehicles, 10 pieces of specialized equipment, and one historic vehicle, with a total estimated replacement value of $18.87 million (2025 dollars). Replacement values are based on recent procurement data and a like-for-like approach that reflects the cost of comparable fire fleet and facilities. Other fire response equipment (i.e., person protective, rescue equipment, etc.) are not included in the inventory but are accounted for in operational budget.

In addition to fleet assets, the City operates five fire halls (Fire Hall #2 is currently being rebuilt and when it comes back online there will be six) and a fire prevention office with a combined estimated replacement value of $31.86 million. These facilities provide critical infrastructure for housing personnel, apparatus, and equipment, and serve as strategic deployment centers for emergency response. Together, the combined fire asset portfolio supports reliable service delivery and community safety. Table 11-1 and Table 11-2 summarize the replacement values by sub-category, providing a basis for long-term capital planning and reinvestment strategies.

The 1926 Heritage Fire Truck is not a typical operational fleet vehicle but rather a historical asset used for parades and special events to promote fire safety and the fire department more broadly. This asset is maintained to provide this functionality and is not meant to support fire response services.

Table 11-1 Inventory Valuation – Fire

Asset Category	Asset Sub-Category	Count	Unit	Replacement Value (millions, 2025 $)	Replacement Value (% Subtotal)
Fleet	Emergency Response	12	each	$16.05	25%
	Vehicles	22	each	$1.95	3%
	Equipment	10	each	$0.85	1%
	Historic	1	each	$0.02	<1%
Facilities	Fire Halls[6]	6	facility	$38.82	61%
	Storage	4	facility	$0.02	<1%
	Fire Prevention Offices	1	facility	$3.09	5%
	Fire Training Tower	1	facility	$3.00	5%
	Replacement Value			**$63.8**	**100%**

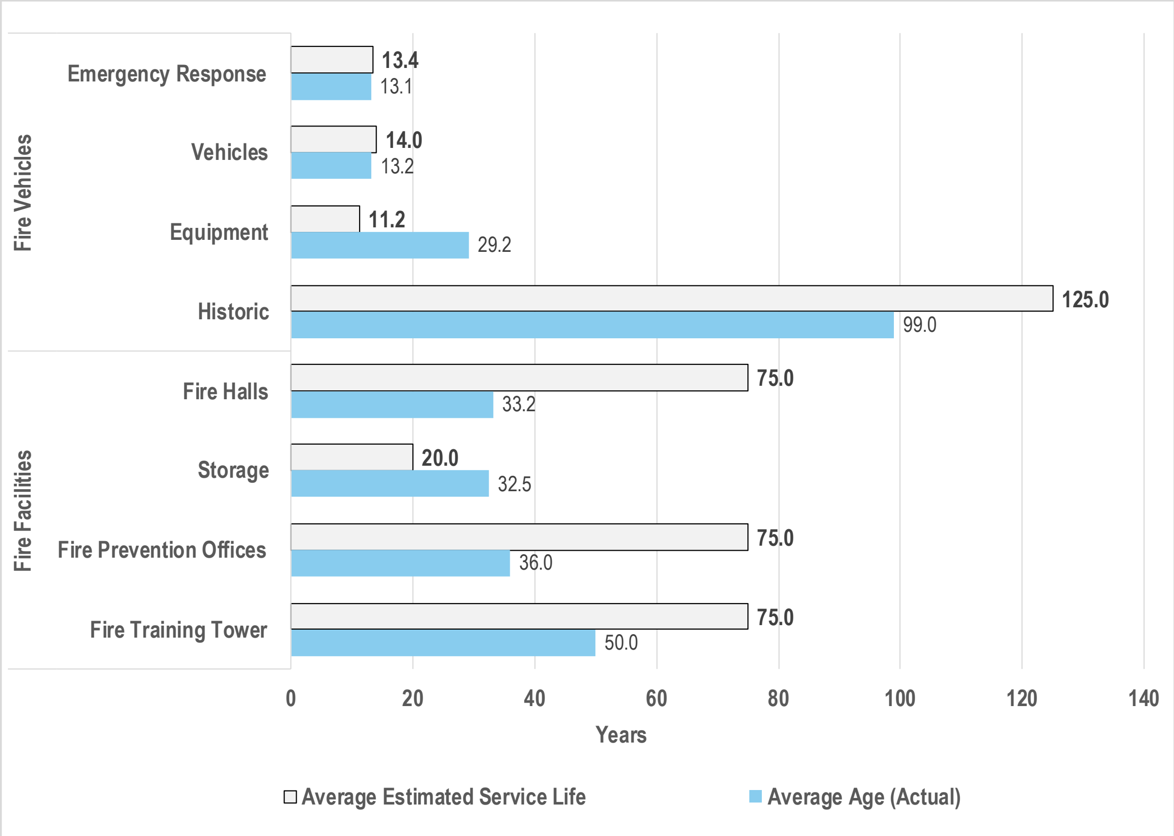
11.1.2 Asset Age

Comparing the average age of fire vehicles, equipment, and facilities to their estimated service lives provides insight into the remaining useful life and renewal needs of the City's Fire Services portfolio. Fire asset replacements may be regulated based on age of an assets and the City's Fire Department follows all age-based regulations for their assets. Critical emergency fleet are run for 15 years, replaced by equivalent vehicles, and then transitioned to a spare for the next 5 years and then ideally decommissioned at 20 years.

The City also operates five fire halls, four storage sheds, a fire prevention office, and has an out-of-service training tower. Fire Hall #2 is currently being reconstructed and the operations are running out of a temporary location until construction is completed. Of note is that the storage sheds are well beyond their expected service life and should be considered for replacement or the estimated service lives should be updated if the sheds are still functional.

[6] Fire Hall #2 is currently under construction.

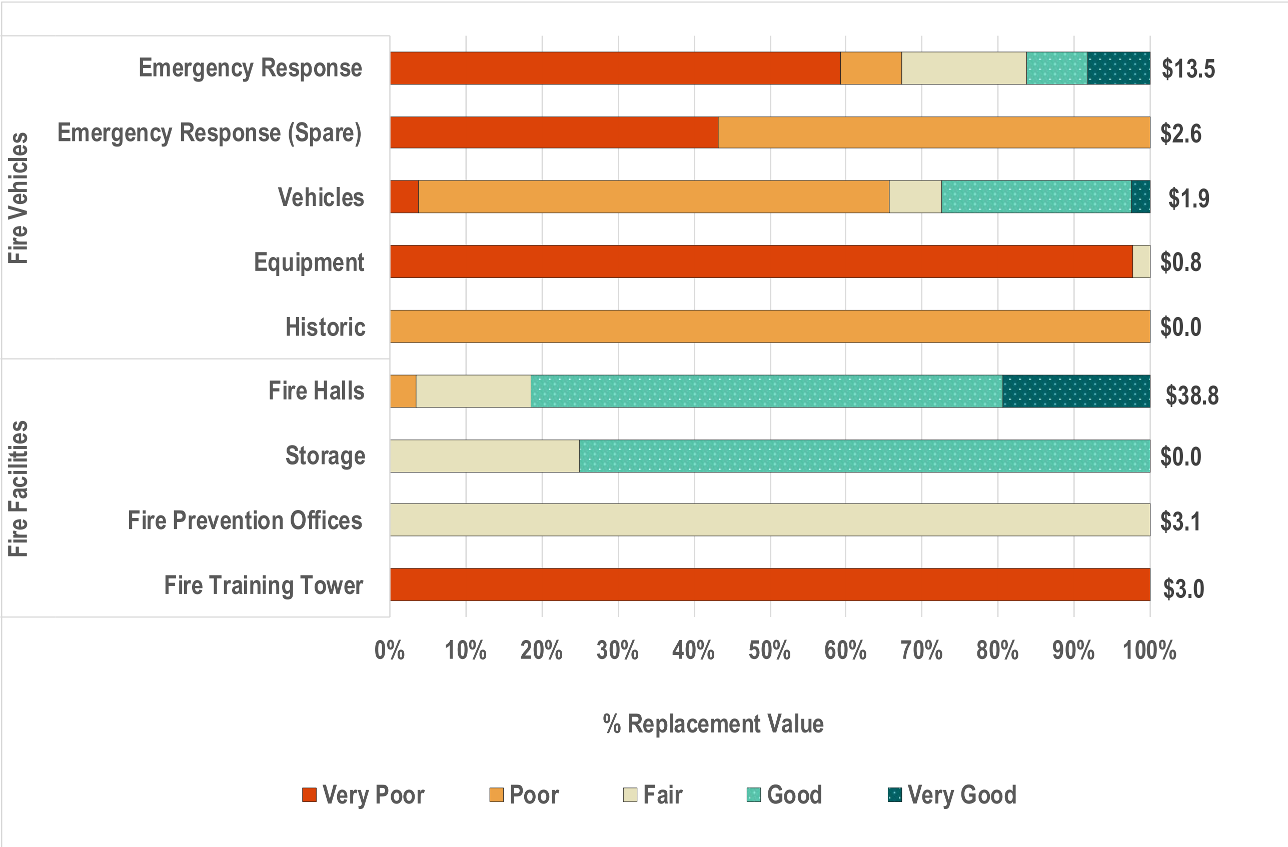
Figure 11-1 Asset Age – Fire



11.1.3 Asset Condition

The condition of fire vehicles assets are determined using the age of each asset relative to its estimated service life. The condition of fire facilities are determined through building condition assessments undertaken by the City which provided a condition score to each component within the facilities. The asset condition distribution is shown in Figure 11-2 for fire assets. Overall, $13.0 million (20%) of fire assets are in very poor condition and $3.6 million (6%) are in poor condition. Assets in very poor condition are considered to be due or overdue for replacement. As shown in the Figure, those assets consist of emergency response vehicles, fire vehicles, fire equipment, and the fire training tower.

Figure 11-2 Asset Condition – Fire[7]



11.2 Levels of Service

The City is committed to maintaining a safe, reliable, and mission-ready fleet of vehicles, equipment, and facilities that are essential for delivering effective fire and emergency response services. Fire assets play a critical role in protecting public safety and include front-line response vehicles, operational support units, specialized equipment, and strategically located fire

[7] The facility condition scores are based on individual facility components may not include accessibility or other requirements that could trigger full facility replacements. The City is working to use the Building Condition Assessment information to develop FCI scores which would provide greater insight into full facility replacements (if required).

halls. Defined Levels of Service (LOS) for fire assets help inform capital investment planning, ensuring that vehicles, equipment, and facilities remain in a state of good repair and are capable of meeting response time standards and evolving service needs. This proactive approach supports community safety, emergency preparedness, and long-term asset sustainability.

11.2.1 Technical Metrics

Table 11-3 outlines the LOS that are driving current and future decision-making and expenditure needs for fire assets. The City's Customer LOS statements and Technical LOS indicators document performance from a service user's and service provider's perspective, respectively. Performance scores from the most recent five years (2020 – 2024) are listed. The table also lists the target or proposed performance for each metric as selected by the City.

Table 11-2 LOS Metrics and Performance – Fire

Service Attribute	Customer LOS Statement (CLOS)	Technical LOS Indicator (TLOS)	Historical Performance					Target / Proposed Performance
			2020	2021	2022	2023	2024	
Capacity and Use	Fire Services have capacity to provide for current and future population needs	Annual # of public education engagements	N/A	N/A	85	110	100	Continue purposeful growth
		% of 9-1-1 Call Answered within 15 Seconds (NFPA 1710 Standard) per year	N/A	N/A	90%	94%	96%	>90%
		% of 9-1-1 Call answered within 20 Seconds (NFPA 1710 Standard) per year	N/A	N/A	95%	97%	98%	>95%
		% of times Emergency incidents answered within 64 seconds (NFPA 1710 Standard) per year	N/A	N/A	90%	92%	91%	>90%
Reliability	Assets are safe and reliable	Percentage of Fire Services assets due or overdue for replacement	N/A	N/A	N/A	36%	20%	N/A
Affordability	Services are affordable and provided at lowest cost for both current and future customers	Annual Capital investment as a % of cost to sustain assets over their lifecycles (replacement value / estimated service life = $2.4M/yr)	7%	57%	252%	120%	261%	100%

The Province of Ontario is currently in the process of updating emergency communication standards through the implementation of Next Generation 9-1-1 (NG911), which will introduce new capabilities such as GIS-based call routing, text messaging, and video communication. While these enhancements are expected to improve emergency response coordination and service delivery, specific performance metrics for NG911 have not yet been finalized. As such, the City will monitor the development of these standards and incorporate relevant metrics into future updates of the AM Plan once provincial guidance and funding mechanisms are confirmed. In the interim, current service level indicators will continue to reflect existing operational standards under NFPA 1710.

11.3 Climate Change

The City completed a Climate Change Risk Assessment in 2022 to evaluate how extreme weather events may impact municipal infrastructure. For Fire Services, the most notable climate-related risks are associated with extreme dry conditions and winter exposure. Extended dry periods may increase the risk of fire incidents, leading to greater demand for fire response services and higher utilization of fleet vehicles and fire protection equipment. In colder seasons, the combination of extreme precipitation and road salt may accelerate rusting and corrosion of fire vehicles, potentially reducing their useful life. While fire facilities and equipment are largely resilient to most climate stressors, the increased operational pressures associated with higher call volumes and vehicle wear during extreme weather events may require proactive planning. Other climate impacts, such as extreme heat, wind, or high-water levels were assessed as having minimal direct effects on fire infrastructure. The City should continue to monitor these risks and incorporate adaptation strategies into fire asset renewal planning, operational readiness, and service delivery frameworks.

11.4 Risk Management Strategy

As explained in Section 2.5, the City uses a risk-based approach to prioritize renewal needs. The likelihood of failure is primarily estimated based on asset condition. The consequence of failure is estimated based on the scoring criteria shown in Table 11-3 for fire assets.

Table 11-3 Consequence Scoring – Fire

Consequence Category	Criteria	Parameter	Consequence Score				
			1 - Minimal	2 - Minor	3 - Moderate	4 - Major	5 – Extreme
Financial	Capital Expenditure (Replacement of Assets)	Replacement Cost	<$100k	$100k - <$250k	$250k - <$1M	$1M - $2M	>$2M

Consequence Category	Criteria	Parameter	Consequence Score: 1 - Minimal	2 - Minor	3 - Moderate	4 - Major	5 – Extreme
	Revenue loss due to service closure or other direct cost not related to asset repair	N/A - failure will not result in revenue loss	N/A	N/A	N/A	N/A	N/A
Social	Impact to Health and Safety	Asset Category	Support Vehicles, Other Vehicles, Offices, Shed, Other Equipment	N/A	N/A	Emergency Response, Technical Rescue, Medical Response	Emergency Response Vehicles, Firehall, Training Tower, Communication
	Legal liability	Asset Category	Support Vehicles, Other Vehicles, Offices, Shed, Other Equipment	N/A	N/A	Emergency Response, Technical Rescue, Medical Response	Emergency Response Vehicles, Firehall, Training Tower, Communication
	Service Disruption	Asset Category	Support Vehicles, Offices, Shed, Training Tower, Other Equipment	Other Vehicles	Emergency Response, Technical Rescue, Medical Response	N/A	Emergency Response Vehicles, Firehall, Communication
	Customer Impact	Asset Category	Support Vehicles, Other Vehicles, Offices, Shed, Training Tower, Other Equipment	N/A	N/A	N/A	Emergency Response Vehicles, Firehall, Communication, Emergency Response, Technical Rescue, Medical Response
Environmental	Environmental Compliance	Asset Category	All assets	N/A	N/A	N/A	N/A
	Environmental Impact	Asset Category	All assets	N/A	N/A	N/A	N/A

The City's fire response vehicles are maintained on a structured lifecycle replacement plan to ensure operational efficiency, emergency readiness, and compliance with provincial regulations and industry best practices. Each vehicle remains in primary service for 15 years, in alignment with standards for emergency vehicle reliability, before being replaced with a newer model. To mitigate risks associated with unexpected mechanical failures and maintain service continuity, decommissioned vehicles are retained as spare units for an additional 5 years. This approach not only provides a crucial buffer for unplanned breakdowns or increased demand but also aligns with Ontario's fire service recommendations for fleet management and emergency preparedness. By integrating spare vehicles into the risk management strategy, the City enhances resilience, optimizes asset utilization, and maintains public safety standards without disruptions while adhering to regulatory guidelines.

11.5 Lifecycle Management Strategy

11.5.1 Lifecycle Management Activities

The levels of service presented in the previous section are supported by a variety of lifecycle activities in accordance with the activity types presented in Table 11-4. These activities are targeted to extend the asset life, ensure levels of service are being met, and reduce overall lifecycle costs.

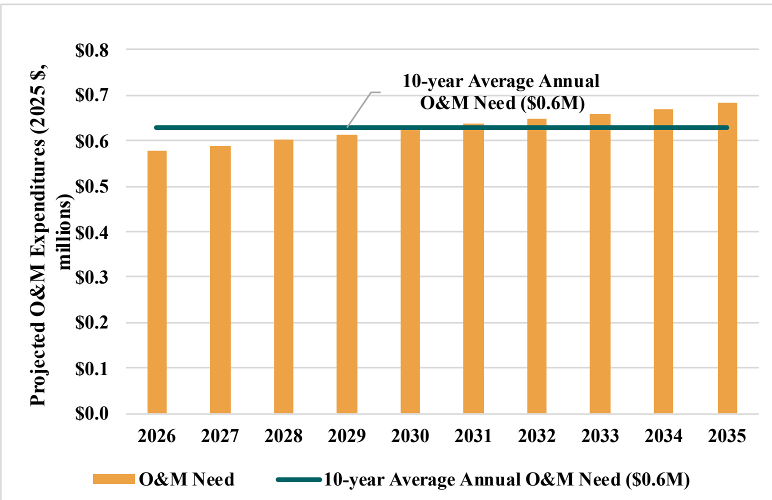
Table 11-4 Lifecycle Activities – Planned and Recommended – Fire

Lifecyle Activity Type	Planned Activities (within Anticipated Funding)	Additional Recommended Activities to Meet Proposed LOS
Non-Infrastructure Solutions	– Current NG911 transition noted, with no metrics yet; continued public education campaigns funded through existing programs.	– Implement NG911 standards (GIS, text, video) as provincial updates are finalized ($75K); improve tracking systems for fleet condition (e.g. ARMS) ($75K). – Develop a fire master plan to ensure suitability of services to meet population needs ($200K in 2027).
Operations and Maintenance Activities	– Ongoing fleet and facility maintenance funded through operating budgets; emergency fleet supported by routine servicing and inspections.	– Enhance vehicle condition tracking with mechanic-entered scores at time of service; revisit PM standards for high-usage emergency vehicles.
Renewal, Rehabilitation and Replacement	– Replacement of emergency vehicles, non-emergency fleet, and facility components guided by age and service life.	– Proceed with scheduled renewal of Fire Hall #1; replace condemned training tower; renew over-age fleet and equipment assets proactively.
Growth Activities	– Fire Hall #3 is being rebuilt and expanded to support future demand.	– Assess future growth and redevelopment needs beyond 2026; plan for additional resources if service volumes increase.
Upgrade Activities	– Fire Hall reconstructions include modernization and capacity upgrades.	– Incorporate upgrades to accommodate evolving technology (e.g., electric vehicles, modern comms) and staffing space requirements.
Disposal Activities	– Office on Academy Street declared surplus and scheduled for transfer to Municipal Development Corporation.	– Improve coordination between asset and disposal records; update DOT inventory to reflect asset retirements.

11.5.2 Operations & Maintenance Forecast

Figure 11-3 shows the forecast for operations and maintenance costs over the next 10 years to meet the Proposed LOS. Operations and maintenance costs grew in alignment with the growth in the asset portfolio. Regular increases due to inflation were not included in the following forecast.

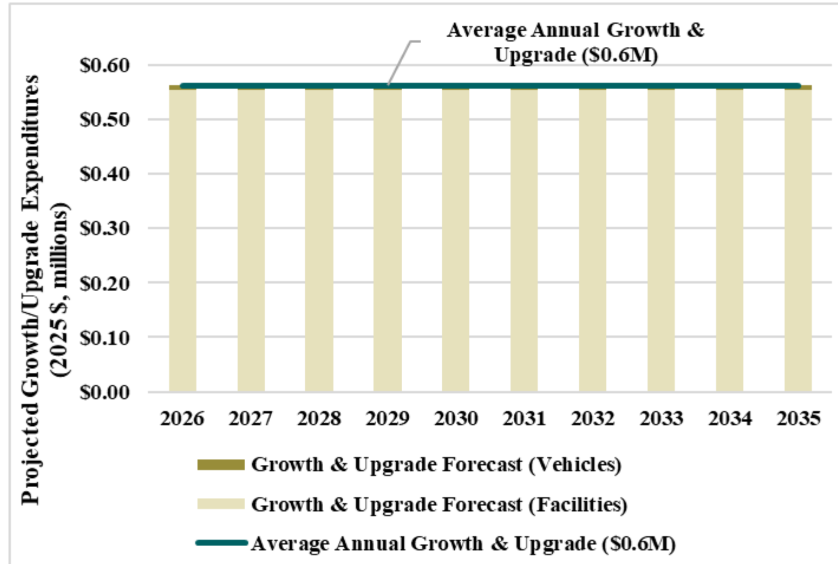
Figure 11-3 Operations and Maintenance Summary



11.5.3 Growth, Upgrade, and Disposal Forecast

Growth reflects the acquisition of assets that did not previously exist within the asset portfolio. Upgrades result from improves asset performance (i.e., environmental, safety, accessibility, etc.). Disposals are when assets are removed from the portfolio. Figure 11-4 shows the forecasted growth and upgrades to meet the Proposed LOS which is stable over the forecasted period as it is based on the past 5 years of historical growth spending. City teams are working to develop a more accurate assessment of future growth requirements for each asset portfolio.

Figure 11-4 Growth and Upgrade Summary



11.5.4 Renewal & Condition Forecast

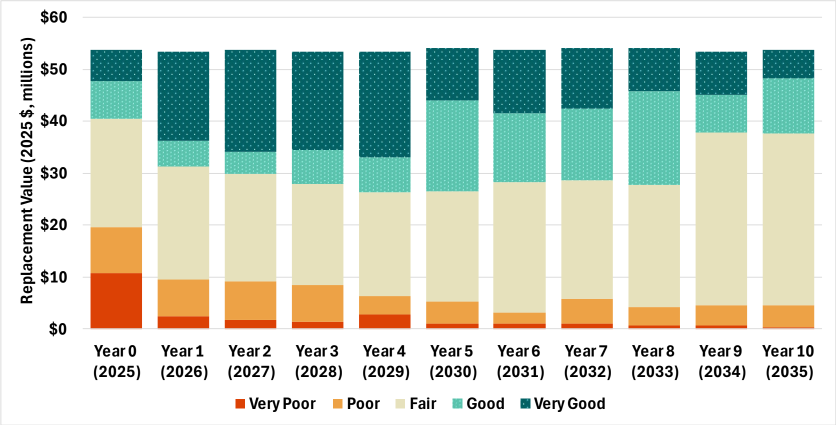
This section presents renewal lifecycle forecasts for:

- Scenario A: Anticipated Budget
- Scenario B: Maintain Current LOS
- Scenario C: Proposed LOS

Scenario A: Anticipated Budget

Figure 11-5 shows the forecast condition distribution of structure assets based on an average annual anticipated funding of $5.0 million per year (based on historical 5-year average renewal spending). The graph shows that the renewal backlog (assets in Very Poor condition) decreases from 19.9% in 2025 to less than 1% in 2035.

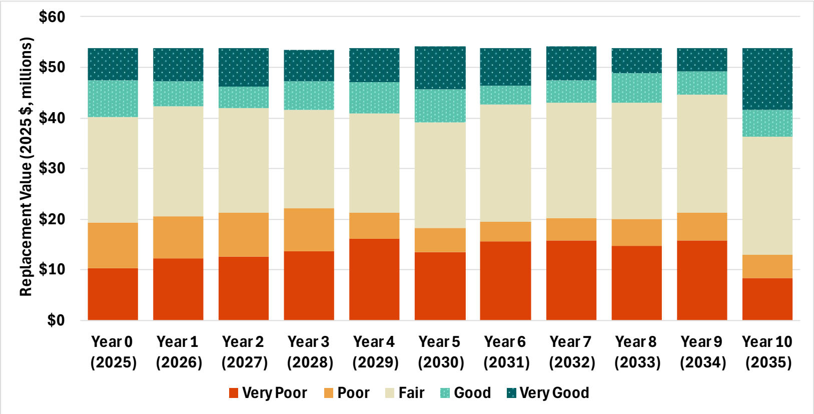
Figure 11-5 Condition Forecast – Fire Scenario A: Anticipated Funding



Scenario B: Maintain Current LOS

Figure 11-6 shows the forecast condition distribution of structure assets based on an average annual renewal spend of $2.6 million per year to maintain the renewal backlog (% of assets in Very Poor condition).

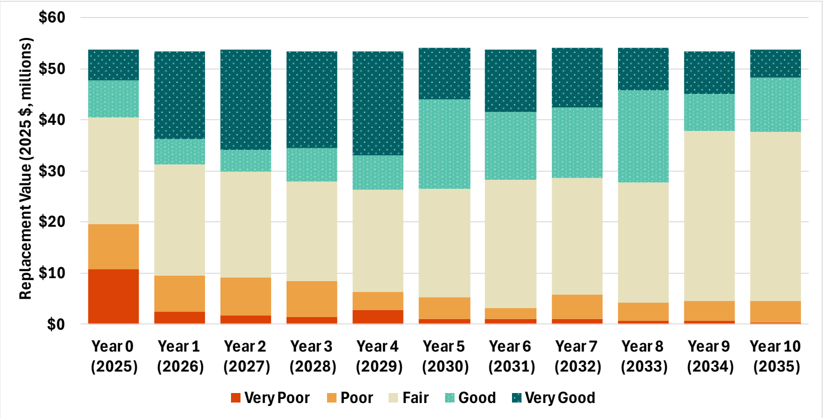
Figure 11-6 Condition Forecast – Fire Scenario B: Maintain Current LOS



Scenario C: Proposed LOS

Figure 11-7 shows the forecast condition distribution of structure assets based on an average annual renewal spend of $5.0 million per year (same as Scenario A: Anticipated Budget). The graph shows that the renewal backlog (assets in Very Poor condition) decreases from 19.9% in 2025 to less than 1% in 2035.

Figure 11-7 Condition Forecast – Fire Scenario C: Proposed LOS



11.5.5 Rationale for Proposed LOS

The Proposed LOS, as defined in Scenario C is recommended because it significantly reduces the renewal backlog for fire assets and aligns with the anticipated budget.

11.6 Financial Strategy

Table 11-5 shows a comparison of the average annual costs of the three scenarios. The table shows that there is a $0.1 million per year funding gap to achieve the Proposed LOS, primarily driven from the expected increase in O&M due to the growth in the asset portfolio.

Table 11-5 Average Annual Costs – Fire – Scenario Comparison

Lifecycle Activity Type	Average Annual Cost (2025 $, millions)		
	Scenario A: Anticipated Funding	Scenario B: Maintain Current LOS	Scenario C: Proposed LOS
Non-Infrastructure Solutions	--	--	$0.04
O&M – Existing Assets	$0.6	$0.6	$0.6
Renewal – Existing Assets	$5.0	$2.6	$5.0
Growth & Upgrade Activities	$0.6	$0.6	$0.6
O&M – Growth & Upgrade Assets	--	$0.1	$0.1
Renewal – Growth & Upgrade Assets	--	--	--
Disposal Activities	--	--	--
Total	**$6.2**	**$3.9**	**$6.3**
Funding Gap	**n/a**	**none**	**$0.1**

12 IT Service

Information Technology (IT) supports the delivery of essential municipal services in the City by enabling communication, data management, and system integration across departments. IT assets—including hardware, software, and networks—are critical to ensuring operational efficiency, security, and service continuity.

The City's IT systems also support collaboration with regional and provincial partners, helping to align services and improve responsiveness. As part of the Asset Management Plan, IT assets are maintained to ensure reliability, reduce risk, and adapt to changing service demands.

12.1 State of the Local Infrastructure

12.1.1 Asset Valuation

Information Technology (IT) assets are critical to the delivery of modern municipal services in the City. These assets support internal operations, enable public-facing services, and provide the digital infrastructure necessary for effective governance, communication, and decision-making.

The City's IT systems include hardware, software, and network infrastructure that facilitate day-to-day administrative functions, data management, and real-time service delivery across all departments. These systems are designed to ensure reliability, security, and scalability in a rapidly evolving digital landscape.

The City's IT environment also plays a key role in supporting collaboration with regional and provincial partners. Integrated digital systems enable seamless data exchange and coordination, enhancing the City's ability to participate in shared service initiatives and respond to community needs efficiently.

As the City continues to digitize its services and expand its use of data-driven technologies, maintaining and adapting its IT systems will be essential to ensuring continued service efficiency and resiliency.

The overall distribution of replacement values by asset type for Information Technology is shown in Figure 12-1. Software accounts for the largest share, representing 89% of the total replacement value for the IT system

Table 12-1 Inventory Valuation – Information Technology

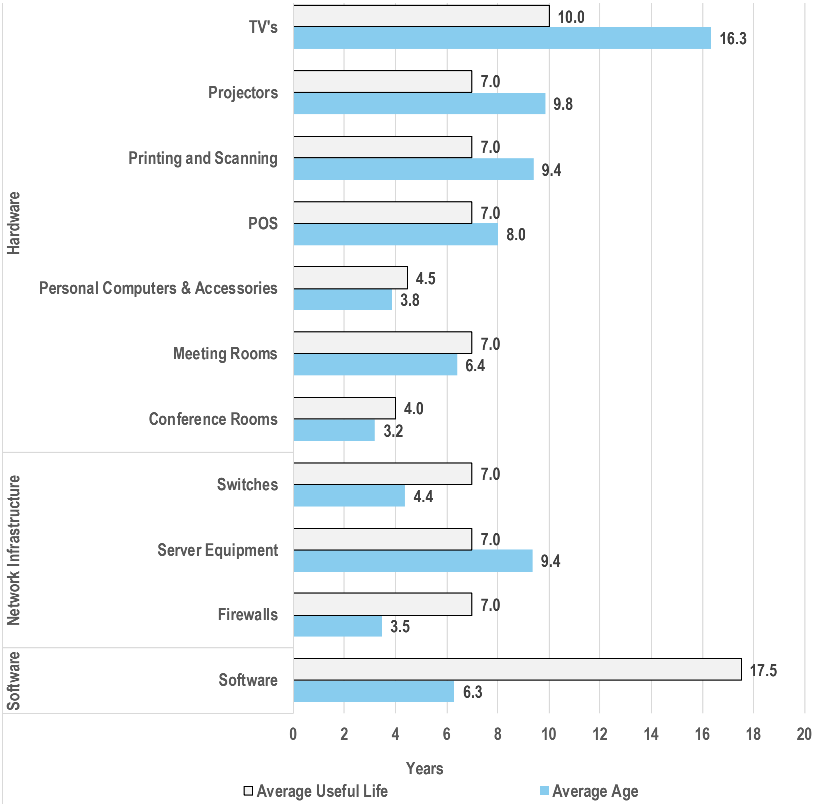
Asset Category	Asset Sub-Category	Count	Unit	Replacement Value (millions, 2025 $)	Replacement Value (% Total)
Hardware	Conference Rooms	5	each	$0.01	<0.1%
	Meeting Rooms	5	each	$0.01	0.1%
	Personal Computers	2056	each	$1.11	5.4%
	POS	4	each	<$0.01	<0.1%
	Printing and Scanning	244	each	$0.08	0.4%
	Projectors	4	each	$0.11	0.6%
	TV’s	2	each	<$0.01	<0.1%
Network Infrastructure	Firewalls	14	each	$0.08	0.4%
	Server Equipment	18	each	$0.17	0.8%
	Switches	98	each	$0.69	3.3%
Software	All Software	30	each	$18.31	89.0%
	Overall Replacement Value			**$20.6**	**100%**

12.1.2 Asset Age

Understanding the average age of IT assets relative to their expected useful life is an important consideration for asset renewal and investment planning. The City’s IT asset portfolio is grouped into three main categories: hardware, network infrastructure, and software. The average age and average useful life of these asset types are illustrated in Figure 12-1.

This comparison helps the City assess whether current replacement cycles are aligned with observed asset performance. Monitoring age and service life supports long-term planning efforts and ensures IT systems continue to meet operational and service delivery expectations.

Figure 12-1 Asset Age – Information Technology



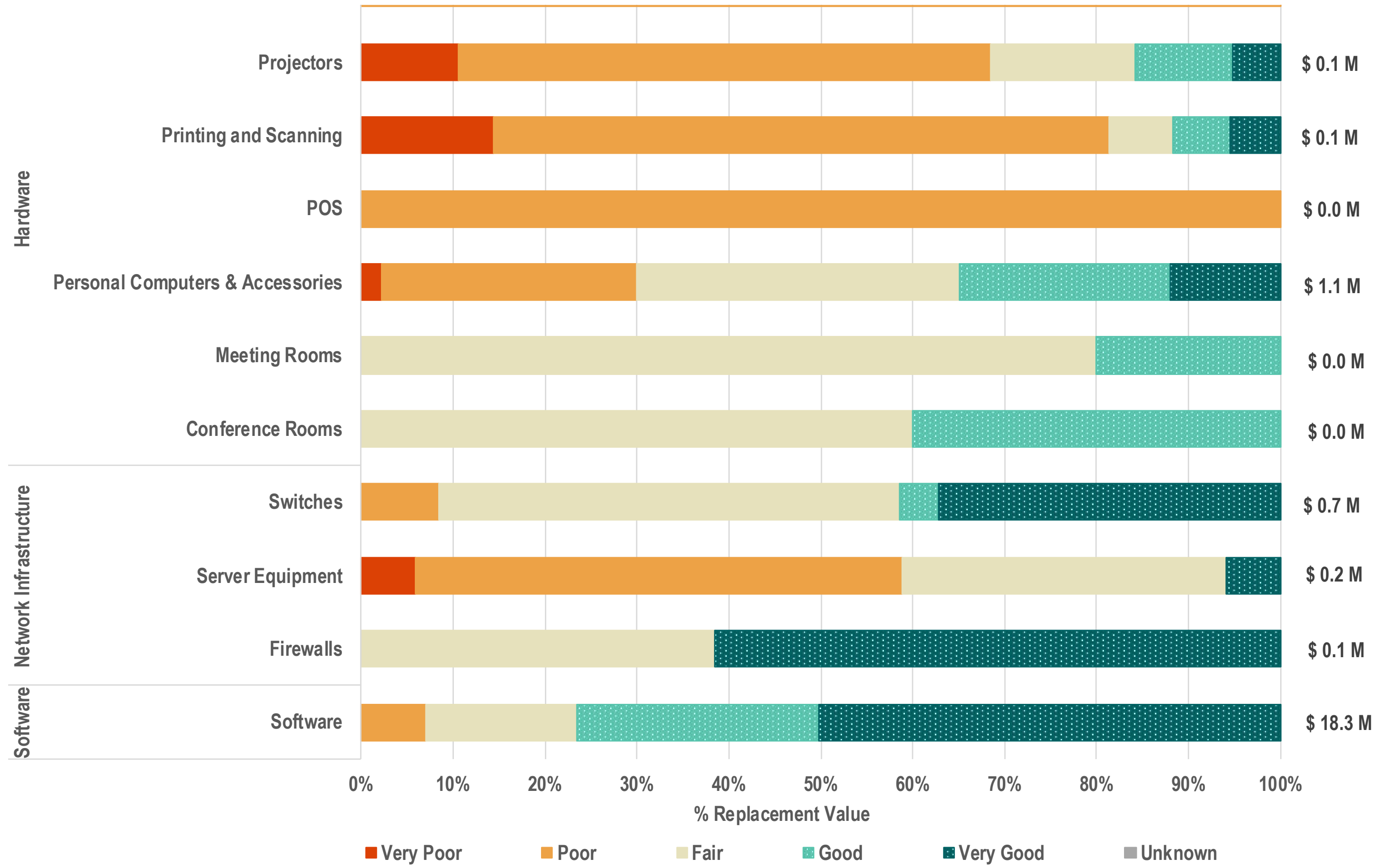
12.1.3 Asset Condition

The asset condition distribution is shown in Figure 12-2 for Information Technology assets. Overall, $0.06 million (0.3%) of IT assets are in very poor condition, and $1.9 million (9%) are in poor condition. Assets in very poor condition are considered to be due or overdue for replacement, but they make up a small percentage of the overall inventory. This reflects a prudent asset management approach by the City where they let a small number of IT assets run to failure as they are easily replaced.

Software assets, which make up the majority of the IT portfolio by replacement value, are mostly in very good or good condition, reflecting relatively recent investments and upgrades. Hardware assets are more broadly distributed across all condition categories, while network infrastructure includes a notable portion in fair to poor condition, indicating some aging equipment nearing the end of its useful life.

Most IT assets have a recorded installation or acquisition date, allowing for an age-based condition grade for most of IT asset inventory, allowing for a complete assessment of current condition. These values are based on age-based assessments and will be refined as more detailed performance data becomes available through future Asset Management planning efforts.

Figure 12-2 Asset Condition – Information Technology



12.2 Levels of Service

The City is committed to maintaining a secure, functional, and reliable information technology (IT) infrastructure system that supports the delivery of municipal services and day-to-day operations. IT assets—including hardware, networks, and enterprise systems—are essential for enabling internal productivity, service accessibility, and effective communication.

The City monitors the condition and performance of IT assets through regular assessments and lifecycle tracking to ensure reliability and minimize service disruptions. Defined Levels of Service (LOS) guide investment planning and asset renewal strategies, ensuring that the City's digital infrastructure continues to meet operational needs and public service expectations.

12.2.1 Technical Metrics LOS

Table 12-2 outlines the Levels of Service (LOS) that are guiding current and future decision-making and investment planning for Information Technology (IT) assets. The City's Customer LOS statements and Technical LOS indicators reflect performance from both the end-user and service provider perspectives. Performance results from the past five years (2020–2024) are included, along with the target or proposed performance for each LOS measure as selected by the City.

Table 12-2 LOS Metrics and Performance – Information Technology

Service Attribute	Customer LOS Statement (CLOS)	Technical LOS Indicator (TLOS)	Historical Performance					Target / Proposed Performance
			2020	2021	2022	2023	2024	
Function	IT services are reliably available when needed, with minimal disruptions to system access or productivity	Annual number of server interruptions longer than a half day	0	0	0	0	0	Minimize
		Average # of monthly help desk tickets	NA	NA	475	494	510	For Monitoring only
Reliability	IT systems are consistently reliable, with up-to-date hardware and network infrastructure that minimizes risk of service disruption	% Hardware and Network assets due or overdue for replacement	NA	NA	NA	NA	<1%	Minimize
		# of vendor unsupported applications	NA	NA	NA	NA	3*	Minimize
Affordability	Services are affordable and provided at lowest cost for both current and future customers	Annual Capital investment as a % of cost to sustain assets over their lifecycles (replacement value / estimated service life = $1.6M/yr)	111%	245%	345%	457%	203%	100%

* WorkManager, Vailtech and Oracle DB

12.3 Climate Change

Information technology services were assessed to have low vulnerability to most climate-related stressors. Hardware and software components are expected to remain largely unaffected by extreme weather conditions, with minimal anticipated impacts across a range of scenarios.

However, network infrastructure may be more susceptible to disruptions resulting from increased frequency and intensity of thunderstorms, heavy rainfall, and high wind events. These conditions may contribute to infrastructure damage or electrical outages, potentially affecting network availability and service continuity. In addition, extreme heat events could lead to higher electricity demand, increasing the risk of blackouts or brownouts that may impact IT system performance.

The City should continue to monitor climate-related risks and incorporate appropriate mitigation and response strategies into future planning efforts.

12.4 Risk Management Strategy

As outlined in Section 2.5, the City applies a risk-based approach to prioritize renewal needs for information technology assets. The likelihood of failure is primarily determined through condition assessments and performance monitoring conducted on a regular basis. Consequence of failure is evaluated using established scoring criteria and weighting methodologies that reflect the potential impact on service delivery, public operations, and system functionality.

Consequence of failure scores and criteria have not yet been developed for certain IT components, including specific hardware systems, network nodes, and backup infrastructure. These elements will be addressed as part of future asset management planning and continuous improvement initiatives.

Table 12-3 Consequence Scoring – Information Technology

Consequence Category	Criteria	Consequence Score				
		1 - Minimal	2 - Minor	3 - Moderate	4 - Major	5 – Extreme
Financial	Capital Expenditure (Replacement of Assets)	<$100k	$100k - <$250k	$250k - <$1M	$1M - $2M	>$2M
Social	Impact to Health and Safety	All Remaining	Electrical Devices	N/A	N/A	CS1000 Phone System
	Legal liability	All	N/A	N/A	N/A	N/A
	Service Disruption	All	N/A	N/A	N/A	N/A
	Impacted Customers	All Remaining	Server, Switches, Firewalls, Storage	N/A	N/A	N/A
Environmental	Environmental Compliance	All	N/A	N/A	N/A	N/A
	Environmental Impact	All	N/A	N/A	N/A	N/A

12.5 Lifecycle Management Strategy

12.5.1 Lifecycle Management Activities

The levels of service presented in the previous section are supported by a variety of lifecycle activities in accordance with the activity types presented in Table 12-4. These activities are targeted to extend the asset life, ensure levels of service are being met, and reduce overall lifecycle costs.

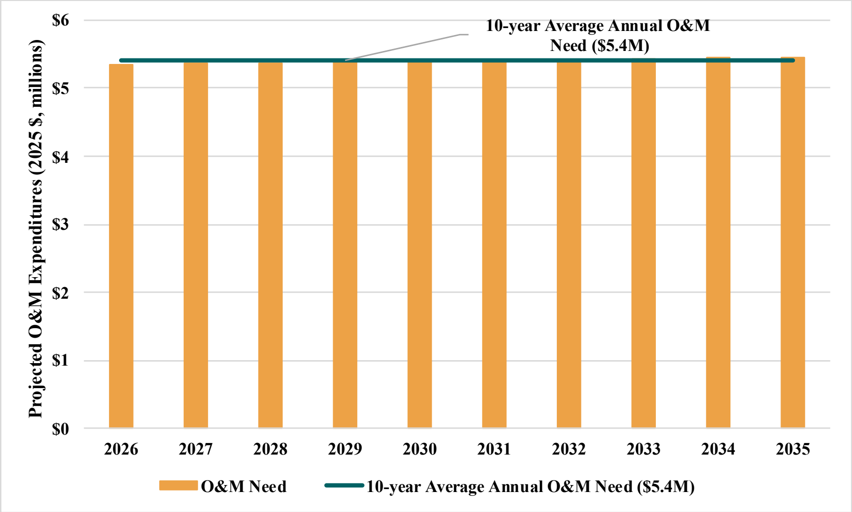
Table 12-4 Lifecycle Activities – Planned and Recommended – Information Technology

Lifecyle Activity Type	Planned Activities (within Anticipated Funding)	Additional Recommended Activities to Meet Proposed LOS
Non-Infrastructure Solutions	– Technical studies and assessments – Monitoring of asset recalls – Contingency and redundancy planning	– Business continuity planning – Cybersecurity risk assessments
Operations and Maintenance Activities	– Planned maintenance (e.g., firmware and software updates) – Service-requested maintenance – Monitoring alerts for updates or defects – Purchase of small equipment and materials – Software licensing	– Proactive capacity management – Expanded monitoring and alert systems
Renewal, Rehabilitation and Replacement	– Replacement of aging or non-functional assets	– Lifecycle-based renewal planning
Growth Activities	– Acquisition and deployment of new assets to support service expansion or modernization	– Integration with smart technologies and scalable solutions
Disposal Activities	– Salvage and disposal of obsolete or decommissioned assets	– Formalized IT asset disposal policy – Secure data erasure procedures

12.5.2 Operations & Maintenance Forecast

Figure 12-3 shows the forecast for operations and maintenance costs over the next 10 years to meet the Proposed LOS. Operations and maintenance costs increased in alignment with increases in the asset portfolio as outlined in the following section. Regular increases due to inflation were not included in the following forecast.

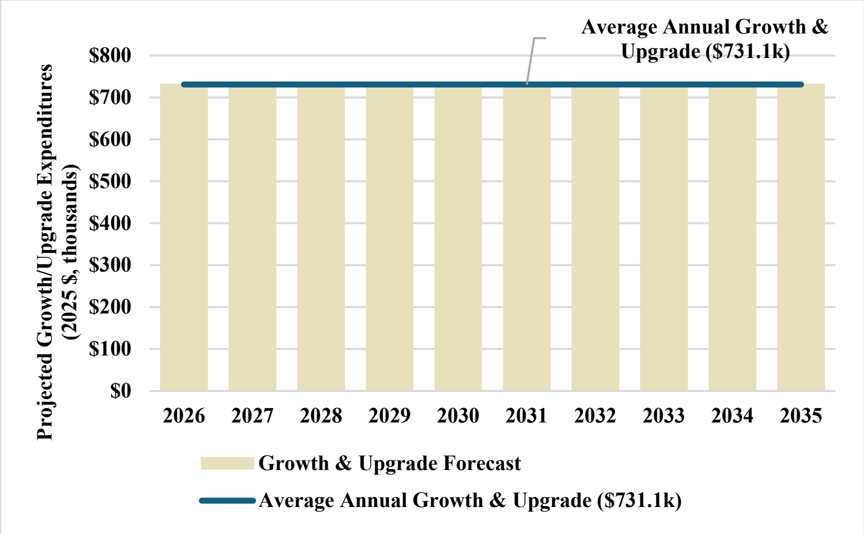
Figure 12-3 Operations & Maintenance Summary



12.5.3 Growth, Upgrade, & Disposal Forecast

Growth reflects the acquisition of assets that did not previously exist within the asset portfolio. Upgrades result from improves asset performance (i.e., environmental, safety, accessibility, etc.). Disposals are when assets are removed from the portfolio. Figure 12-4 shows the forecasted growth and upgrades to meet the Proposed LOS. City teams are working to develop a more accurate assessment of future growth requirements for each asset portfolio.

Figure 12-4 Growth and Upgrade Summary



12.5.4 Renewal & Condition Forecast

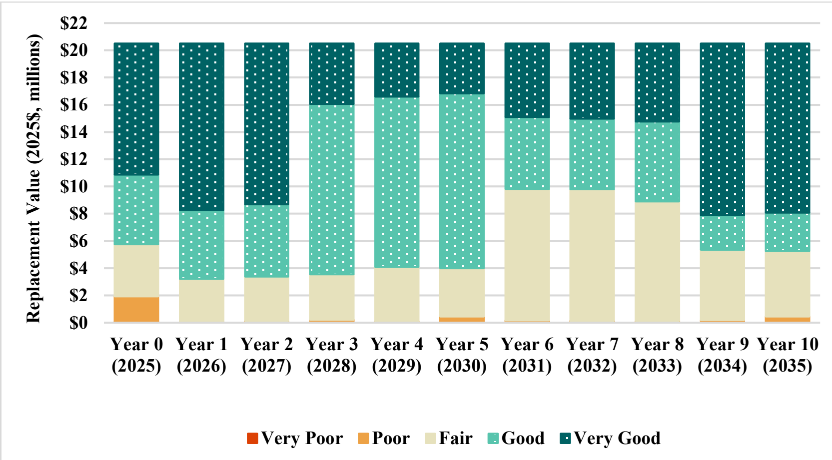
This section presents renewal lifecycle forecasts for:

- Scenario A: Anticipated Budget
- Scenario B: Maintain Current LOS
- Scenario C: Proposed LOS

Scenario A: Anticipated Budget

Figure 12-5 shows the forecast condition distribution of IT assets based on average annual anticipated funding of $2.2 million per year (based on historical 5-year average renewal spending). The renewal backlog (assets in Very Poor condition) is less than 1% in 2025 and eliminated entirely in all subsequent years, indicating that current funding is sufficient to meet renewal needs.

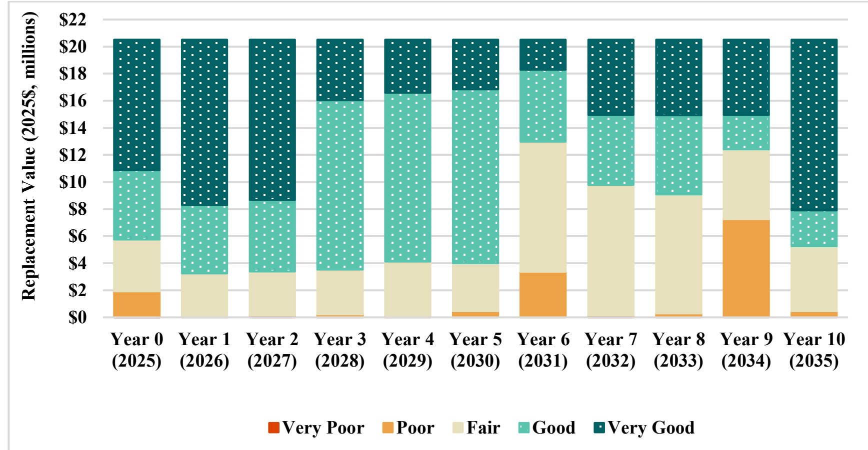
Figure 12-5 Condition Forecast – Information Technology Scenario A: Anticipated Funding



Scenario B: Maintain Current LOS

Figure 12-6 shows the forecast condition distribution of IT assets based on an average annual renewal spend of $1.6 million per year to maintain the renewal backlog (% of assets in Very Poor condition).

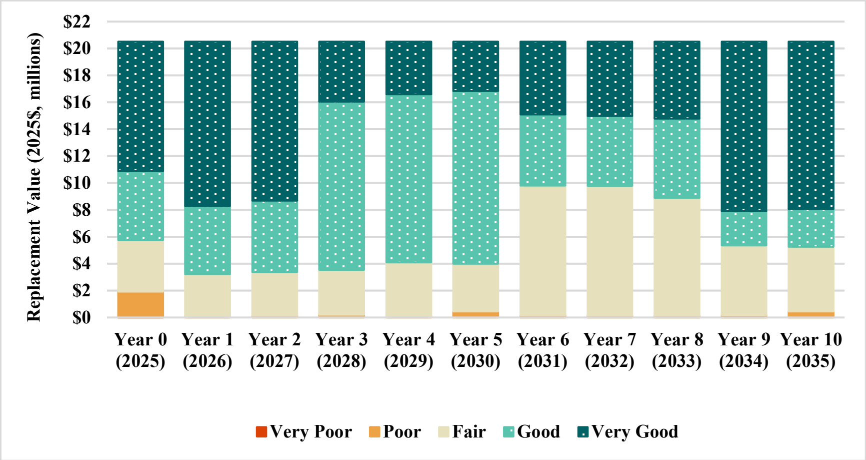
Figure 12-6 Condition Forecast – Information Technology Scenario B: Maintain Current LOS



Scenario C: Proposed LOS

Figure 12-7 presents the projected condition distribution of IT assets based on an average annual renewal investment of $1.6 million. The renewal backlog (assets in Very Poor condition) is less than 1% in 2025 and is eliminated entirely by 2035.

Figure 12-7 Condition Forecast – Information Technology Scenario C: Proposed LOS



12.5.5 Rationale for Proposed LOS

The Proposed LOS, as defined in Scenario A is recommended. Forecasts show that current investment levels are adequate to improve IT asset condition, address renewal needs and ensure continued service performance over the long-term.

12.6 Financial Strategy

Table 12-5 presents a comparison of the average annual costs of the three scenarios, demonstrating that there is no funding gap associated with achieving the Proposed LOS.

Table 12-5 Average Annual Costs – Information Technology – Scenario Comparison

Lifecycle Activity Type	Average Annual Cost (2025 $, millions)		
	Scenario A: Anticipated Funding	Scenario B: Maintain Current LOS	Scenario C: Proposed LOS
Non-Infrastructure Solutions	$0.4	$0.4	$0.4
O&M – Existing Assets	$5.3	$5.3	$5.3
Renewal – Existing Assets	$2.3	$1.6	$1.6
Growth & Upgrade Activities	$0.7	$0.7	$0.7
O&M – Growth & Upgrade Assets	--	$0.1	$0.1
Renewal – Growth & Upgrade Assets	--	--	--
Disposal Activities	--	--	--
Total	**$8.7**	**$8.1**	**$8.1**
Funding Gap	**n/a**	**none**	**none**

13 Natural Assets

Natural assets play a vital role in supporting the delivery of essential municipal services in the City by providing ecological functions such as stormwater management, air and water filtration, and recreational opportunities. These assets—including forests, wetlands, streams, and urban green spaces—are critical to sustaining community well-being, enhancing climate resilience, and reducing the need for built infrastructure. Proper management of natural assets ensures long-term environmental, social, and economic benefits for residents. This Asset Management Plan aligns with the City's strategic goals by promoting sustainable growth, protecting natural resources, and enhancing quality of life through responsible stewardship of environmental assets.

13.1 State of the Local Infrastructure

Natural assets, including urban trees and coastal areas that are both protected and unprotected, support the delivery of essential municipal services by providing critical ecological functions such as erosion control, stormwater management, carbon storage, and habitat for biodiversity. These assets contribute to the City's resilience, support public health, and provide long-term environmental value. Effective management of natural assets ensures these benefits are sustained over time. This AM Plan supports the City's strategic goals by promoting environmental sustainability, mitigating climate risks, and preserving the natural features that enhance the community's quality of life.

13.1.1 Asset Valuation

Valuations were determined for natural assets including city trees, shoreline protection for protected and unprotected areas. Other types of City owned and operated natural assets, are listed however replacement values have not been derived.

Natural assets have several unique characteristics compared to engineered assets. First, it is understood that natural assets such as trees have an intrinsic value. However, to apply asset management principles assigning a financial value to these assets is required. Treating natural assets in this manner is an emerging field and currently there are no established consistent standards for assigning replacement values. The values selected in this plan were based on current best practices.

The second unique characteristic of natural assets, when compared to most engineered assets, is that natural assets often contribute to multiple municipal services. For example, watercourses and forests help with storm water management, flood mitigation, help fight climate change and provide recreational spaces. Conversely, many engineered assets have a single, primary purpose (e.g. watermains, storm sewers etc.).

Lastly, if effectively managed, natural assets do not depreciate in the same manner as other constructed assets. This in turn makes it difficult to assign replacement values or condition based on age. For example, a tree needs to be evaluated differently than constructed assets.

The replacement values for City trees were determined based on the number of equivalent trees a tree is worth. For example, as the diameter of the tree increases several smaller trees will need to be planted to compensate for the loss of a single large canopy tree. The tree removal costs are also included in the replacement value. The City's current tree inventory covers street trees and some trees in City parks. It does not include trees in forested areas and wooded portions of parks.

Table 13-1 Equivalent Tree Replacement

Diameter of Tree (cm)	Number of Replacement Trees
10 – 19	1
20 – 29	2
30 – 39	3
40 – 49	4
50 and greater	5

A condition and performance assessment report has been completed for the City's shoreline protection assets. As part of the report, a forecast of the costs was provided and used for this AMP. The replacement cost for shoreline is based on the cost of shoreline protection, and not the shoreline itself.

Table 13-2 Inventory Valuation – Natural Assets

Asset Category	Asset Sub-Category	Count	Unit	Replacement Value (millions, 2025 $)	Replacement Value (% Total)
Forestry	City Trees	45,490	each	$115.2	55.5%
Coastal	Protected Shorelines[8]	3,632	metres	$81.8	39.5%
	Unprotected Shorelines[8]	1,040	metres	$10.4	5.0%
	Overall Replacement Value			**$207.4**	**100%**

[8] Shoreline replacement cost is based on cost for shoreline protection, not the shoreline itself.

Unlike traditional engineered assets, which can easily be divided along jurisdictional lines, natural assets can often extend beyond municipal boundaries and may require collaboration with private property owners, adjacent municipalities, and other orders of government. For example, a watercourse may span many property owners, both public and private, along its length. Unfortunately, if the management of the creek is disjointed the whole system may be impacted for significant distances up and downstream. Similarly, trees on private property contribute to the overall tree canopy, and parts of the Lake Ontario shoreline are also privately owned.

It is understood the City can only directly maintain and manage natural assets on City-owned lands. However, it is also understood that natural assets on all lands within the municipality provide services to the broader community. Ultimately, the effective management of our natural assets may require a shared responsibility and the City to look beyond the boundaries of City-owned lands.

As additional studies are carried out on other natural assets, the City should endeavor to build a digital inventory on these assets and link them to the various services they provide. Since using asset management principles to manage natural assets is an emerging field there is no standard definition for "municipal natural assets." Until the field matures it will be challenging to benchmark against municipal comparators.

Although watercourses have not been included in this plan, The City of St. Catharines is committed to maintaining sustainable natural watercourses to prevent the erosion of City owned property and reduce impacts to private property. The City has undertaken several Flooding and Erosion control studies over the years and allocates funding to support natural watercourse and two flood control structures along with lock walls of the former Welland Canals that continue to provide bank stabilization.

The following table outlines the additional natural assets that the City does not have readily available replacement costs for but are being managed in some way by the City.

Table 13-3 Additional Natural Asset Inventory With Unknown Replacement Values

Asset Category	Asset Sub Category	Quantity within City Boundary	Unit	Quantity on City Owned Property	Replacement Value
Forestry	Significant Woodlands	2032.7	ha	TBD	N/A[9]
	Other Woodlands	146.8	ha	TBD	
Beaches			ha	4.68	
Watercourses		119.8	km	26.2	
Wetlands	Provincially Significant Wetlands	23.8	ha	TBD	
	Non-Provincially Significant Wetlands	95.8	ha	TBD	
	Other Wetlands	3.1	ha	TBD	
Waterbodies	Martindale pond	132.7	ha	132.7	
	Lake Ontario	N/A			

13.1.2 Asset Age

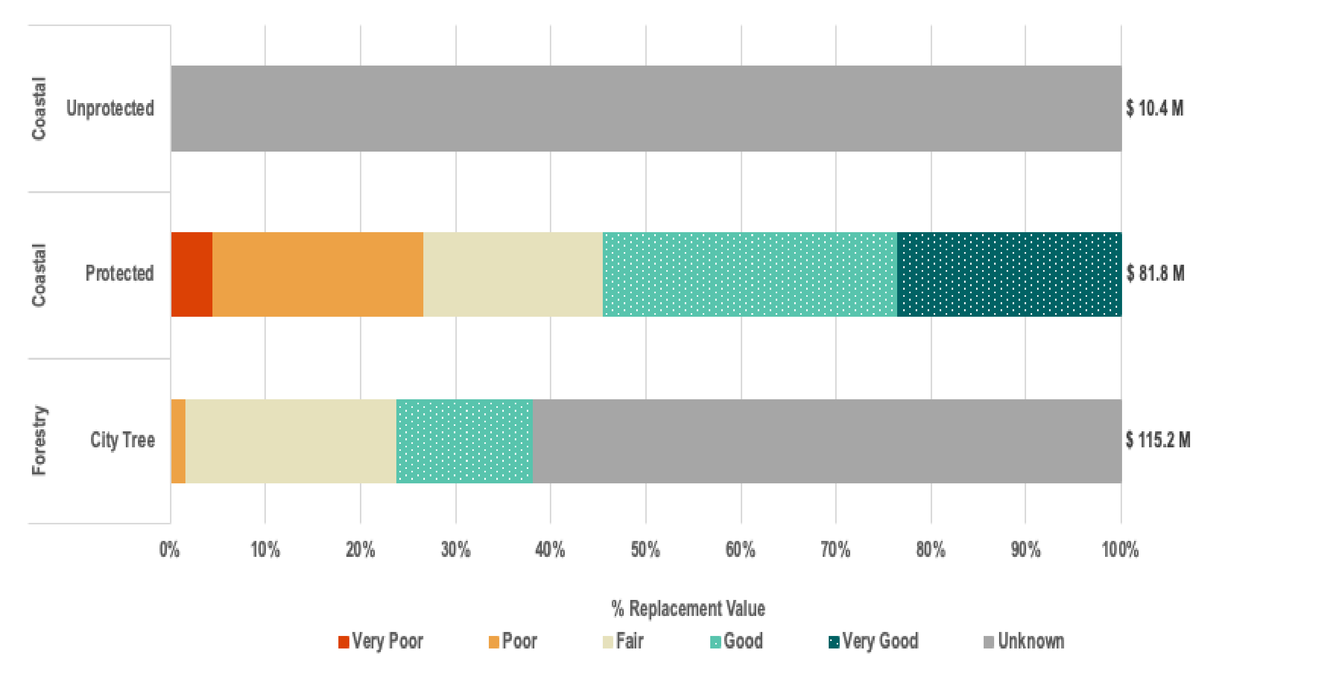
Understanding the age of natural assets in relation to their estimated service life is important for assessing the remaining useful life of the asset portfolio. Natural assets such as urban trees and coastal areas currently have limited documented age information, making it difficult to conduct a comprehensive analysis of average age versus estimated service life. City staff know that these assets are aging, particularly within the urban forest, which underscores the need for proactive management strategies to rejuvenate the canopy and sustain its long-term benefits. Enhancing data collection and inventory processes is a priority for the City to support effective lifecycle planning, targeted maintenance, and informed decision-making. Improved tracking of asset age and condition will strengthen the City’s ability to manage natural assets sustainably and ensure their continued contribution to environmental and community well-being.

[9] Replacement values will be based on typical restoration costs, which are not readily available.

13.1.3 Asset Condition

The asset condition distribution is shown in Figure 13-1 for natural assets. Overall, $20.0 million, or 9.6% of natural assets, are in poor condition and $3.7 million, or 1.8%, are in very poor condition. Assets in very poor condition are considered to be due or overdue for replacement or restoration. Additionally, there are $81.6 million, or 39.3%, of natural assets with an unknown condition. The City is working to improve data collection and assessment practices in order to establish reliable condition ratings and support effective long-term asset management planning.

Figure 13-1 Asset Condition – Natural Assets



13.2 Levels of Service

The City is committed to protecting and enhancing the natural environment to provide a healthy, environmentally sustainable, and aesthetically pleasing City that enhances the quality of life and well-being of the community and is resilient to the impacts of climate change.

The City has developed levels of service for its natural assets based on Capacity, Reliability, and Affordability which provide a basis from which the City can determine whether the service area is performing as expected.

13.2.1 Technical Metrics LOS

Table 13-4 outlines the LOS that are driving current and future decision-making and expenditure needs for Natural Assets. The City's Customer LOS statements and Technical LOS indicators document performance from a service user's and service provider's perspective, respectively. Performance scores from the most recent five years (2020 – 2024) are listed. The table also lists the target or proposed performance for each LOS measure as selected by the City.

Table 13-4 LOS Metrics and Performance – Natural Assets

Service Attribute	Customer LOS Statement (CLOS)	Technical LOS Indicator (TLOS)	Historical Performance					Target / Proposed Performance
			2020	2021	2022	2023	2024	
Capacity	Provide enough natural assets to meet City needs	% of the City covered by tree canopy	Not calculated	Not calculated	Not calculated	Not calculated	22.4%	25%
		# of trees planted by the City per year	Not calculated	Not calculated	Not calculated	Not calculated	1,000	Maintain
		# of trees planted through partnership programs on City land	Not calculated	Not calculated	Not calculated	Not calculated	1,400	Maximize
		# of trees given away for planting on private property in the City	Not calculated	Not calculated	Not calculated	Not calculated	1,000	Maintain
Reliability	Provide safe and reliable natural assets	% of City tree assets due or overdue for replacement						Future[(a)]
		% of shoreline assets identified as requiring work	40.0%	33.5%	33.5%	28.4%	19.5%	Decrease

Service Attribute	Customer LOS Statement (CLOS)	Technical LOS Indicator (TLOS)	Historical Performance					Target / Proposed Performance
			2020	2021	2022	2023	2024	
		(based on assessment reports)						
		Survival rate for newly planted trees (first two years)	Not calculated	Not calculated	Not calculated	Not calculated	96%	Increase
		Number of trees removed (to be replaced by new planting)	Not calculated	Not calculated	Not calculated	262	313	Decrease
Affordability	Services are affordable and provided at lowest cost for both current and future customers	Annual Capital investment as a % of cost to sustain assets over their lifecycles (replacement value / estimated service life = $3.5M/yr)	98%	166%	45%	89%	38%	100%

[a] Condition data on existing trees is out of date and requires more frequent updates in order to properly measure this LOS. Budget has been allocated in the Proposed LOS lifecycle strategy to improve condition assessments.

13.3 Climate Change

Natural assets in the City have been assessed for their vulnerability to a range of climate-related stressors. While many of these assets are expected to experience minimal direct impacts under typical climate scenarios, specific asset types may be more vulnerable to certain conditions and will require closer monitoring and targeted management.

Coastal areas, including both protected and unprotected shorelines, are among the more climate-sensitive natural assets. Increased extreme precipitation may lead to soil instability, slope failure, and erosion, potentially resulting in damage that requires engineered shoreline protection. High lake levels may further contribute to shoreline degradation, increasing the need for remediation and more frequent shoreline condition reviews. In addition, elevated lake or water temperatures could lead to the loss of stabilizing vegetation, further exacerbating erosion and maintenance needs.

Woodlots and open spaces may be affected by prolonged dry conditions and extreme heat. These stressors can contribute to declining tree health, increased tree loss, and a higher risk of damage from wildfire. Other climate events, such as extreme cold, precipitation, and freeze-thaw cycles, are expected to have limited impact on these assets.

Water bodies and watercourses are primarily vulnerable to extreme precipitation events. Increased runoff from heavy rainfall can carry pollutants and degrade water quality. Under other climate conditions, these asset types are anticipated to remain relatively stable.

Wetlands appear to be the least impacted, with minimal vulnerability identified across all assessed climate scenarios.

The City should continue to assess climate-related risks to natural assets and incorporate adaptation measures into long-term asset management planning. Improving data on asset condition and monitoring changes over time will support a more resilient and informed approach to natural asset stewardship.

13.4 Risk Management Strategy

As explained in Section 2.5, the City uses a risk-based approach to prioritize renewal needs. Likelihood of failure is estimated based on condition (refer to Table 2-3). The consequence of failure is estimated based on the largest score from the following table.

Table 13-5 Consequence Scoring – Natural Assets

Consequence Category	Criteria	Parameter	Consequence Score				
			1 - Minimal	2 - Minor	3 - Moderate	4 - Major	5 – Extreme
Financial	Capital Expenditure (Replacement of Assets)	Replacement Cost	<$100k	$100k - <$250k	$250k - <$1M	$1M - $2M	>$2M
Social	Impact to Health and Safety	Asset category	Horticulture, Coastal, Natural Waterbodies	N/A	N/A	N/A	N/A
	Legal liability	Asset category	Horticulture, Unprotected Shoreline	N/A	N/A	Natural Waterbodies, Protected Shoreline	N/A
	Service Disruption	Asset category	N/A	N/A	N/A	Horticulture - Hanging Basket	All Remaining Natural Assets
	Customer Impact	Asset category	Coastal	Watercourses	Pond	Horticulture Remaining	Horticulture - Community Park, All Remaining Natural Assets
Environmental	Environmental Compliance	Asset category	All Remaining Natural Assets	N/A	Coastal, Forested Area	N/A	N/A
	Environmental Impact	Asset category	Horticulture Non-Pollinator Gardens	N/A	N/A	N/A	All Remaining Natural Assets

13.5 Lifecycle Management Strategy

13.5.1 Lifecycle Management Activities

The levels of service presented in the previous section are supported by a variety of lifecycle activities in accordance with the activity types presented in Table 13-6. These activities are targeted to extend the asset life, ensure levels of service are being met, and reduce overall lifecycle costs.

Table 13-6 Lifecycle Activities – Planned and Recommended – Natural Assets

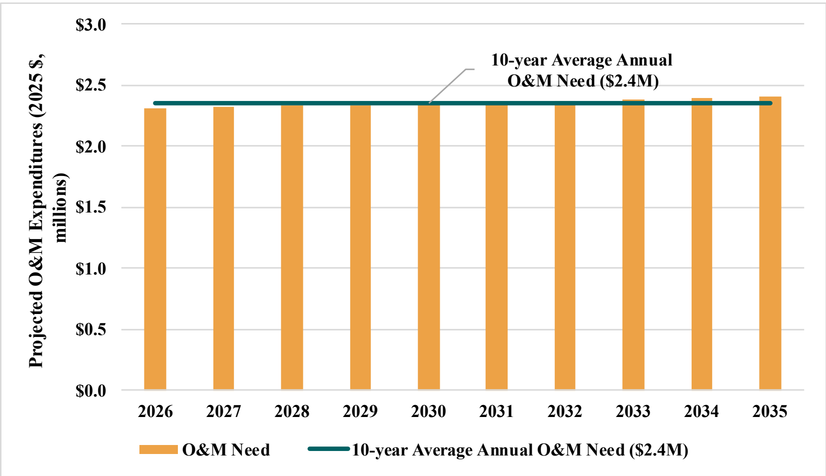
Lifecyle Activity Type	Planned Activities (within Anticipated Funding)	Additional Recommended Activities to Meet Proposed LOS
Non-Infrastructure Solutions	– Shoreline plan every 4-5 years, dependent on high water levels. ($100K)	– Develop a regular interval for and urban forestry management plan. ($150K) – Develop a regular interval for watercourse studies. ($50K every 3 years) – Update the City's Climate Adaptation Plan to determine how natural asset can become more resilient. ($100K) – Formalize condition assessment program and develop data collection tools to support internal staff condition assessments. ($150K) – Implement internal condition assessment program for trees (trees assessed once every 10 years is approximately at estimated internal cost of $10/tree)
Operations and Maintenance Activities	– Planned Maintenance (PM) – Service Requested Maintenance – Reactive Maintenance – Equipment inspections (monthly and annually) – Purchase of small equipment and materials – Watercourse inspection (annually) – General tree maintenance (inspections, pruning, road clearance, etc.)	– O&M needs will increase as assets are added to accommodate growth. – O&M needs may also change as a result of asset upgrades.
Renewal, Rehabilitation and Replacement	– Replacement of assets when they reach end of service life or are no longer fit for purpose. (Tree removal, tree stumping, and replanting new trees).	– Replacement activities could be increased once improve condition information is gathered on existing assets.

Lifecyle Activity Type	Planned Activities (within Anticipated Funding)	Additional Recommended Activities to Meet Proposed LOS
Growth Activities	– Assumption that assets will grow based on historical average.	– Assumption that forestry assets will grow by historical average of $250K/year. – Assumption that $2.3M in waterfront improvements to be constructed from 2025-2034 as specified in the Waterfront Access Master Plan. – Assumption of $8.4M in erosion improvements to be constructed as outlined in the Watercourse Review Report. – Assumption that $3.5M in flood remediation work improvements to be constructed as outlined in the Watercourse Review Report.
Upgrade Activities	– There are currently no plans to upgrade any assets.	– Upgrade needs will be identified in the future strategic or master plans.
Disposal Activities	– Remove any trees due to very poor condition or risk.	– Disposal needs may be identified in future strategic or master plans.

13.5.2 Operations & Maintenance Forecast

Figure 13-2 shows the forecast for operations and maintenance costs over the next 10 years to meet the Proposed LOS. Operations and maintenance costs increased in alignment with the growth in the asset portfolio as described in the next section. Regular increases due to inflation were not included in the following forecast.

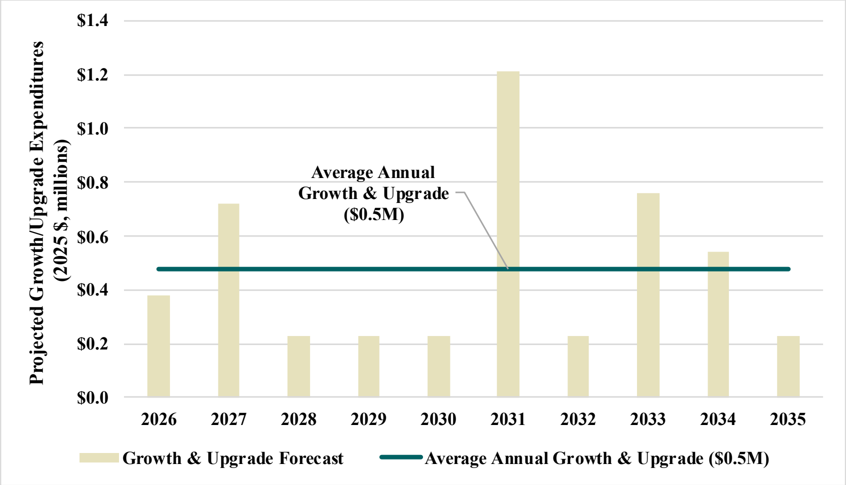
Figure 13-2 Operations and Maintenance Summary



13.5.3 Growth, Upgrade, and Disposal Forecast

Growth reflects the acquisition of assets that did not previously exist within the asset portfolio (including Forestry and Waterfront additions). Upgrades result from improves asset performance (i.e., environmental, safety, accessibility, etc.). Disposals are when assets are removed from the portfolio. Figure 13-3 shows the forecasted growth and upgrades to meet the Proposed LOS. City teams are working to develop a more accurate assessment of future growth requirements through the development of multiple strategic and master plans.

Figure 13-3 Growth, Upgrade, & Disposal Summary



13.5.4 Renewal & Condition Forecast

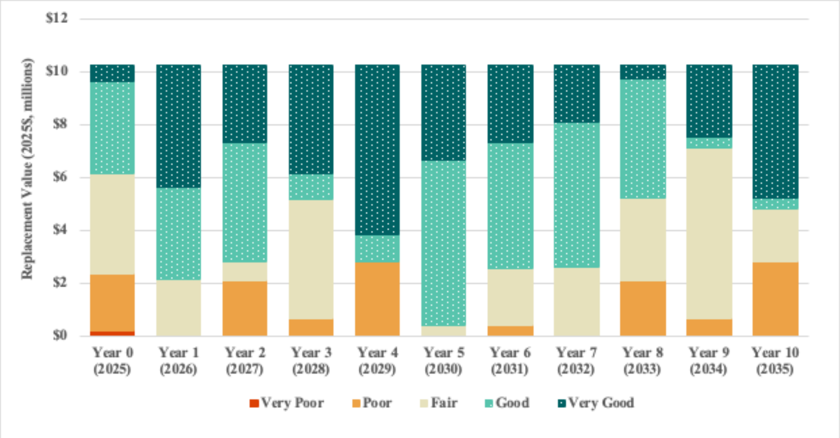
This section presents renewal lifecycle forecasts for:

- Scenario A: Anticipated Budget
- Scenario B: Maintain Current LOS
- Scenario C: Proposed LOS

Scenario A: Anticipated Budget

Figure 13-4 shows the forecast condition distribution of natural assets based on an average annual anticipated funding of $2.2 million per year (based on historical 5-year average renewal spending). The renewal backlog (asset in Very Poor condition) is projected to remain below 2% in 2025 and is eliminated entirely in all subsequent years.

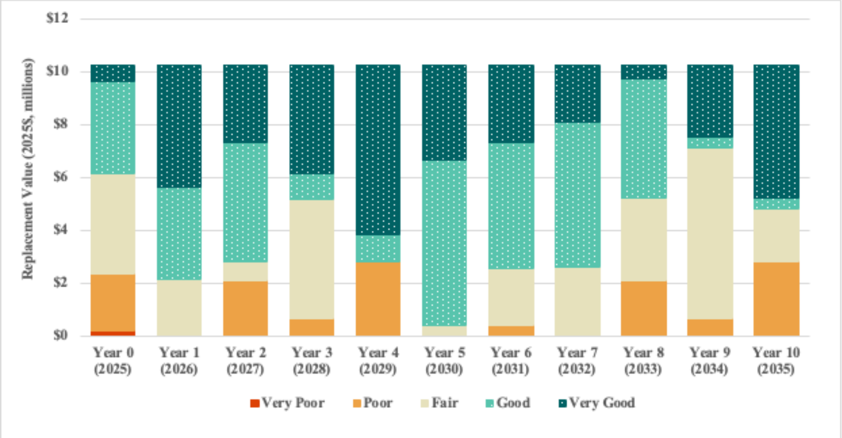
Figure 13-4 Condition Forecast – Natural Assets Scenario A: Anticipated Funding



Scenario B: Maintain Current LOS

Figure 13-5 shows the forecast condition distribution of natural assets based on an average annual anticipated funding of $2.2 million per year. The renewal backlog (asset in Very Poor condition) is projected to remain below 2% in 2025 and is eliminated entirely in all subsequent years.

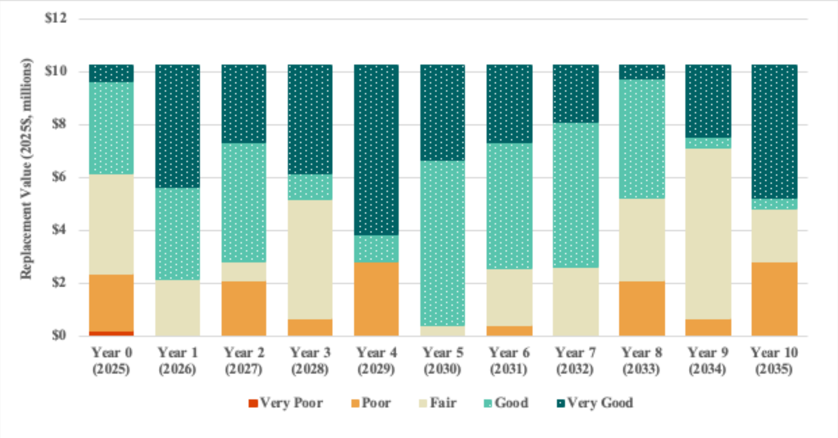
Figure 13-5 Condition Forecast – Natural Assets Scenario B: Maintain Current LOS



Scenario C: Proposed LOS

Figure 13-6 shows the forecast condition distribution of natural assets based on an average annual anticipated funding of $2.2 million per year. The renewal backlog (asset in Very Poor condition) is projected to remain below 2% in 2025 and is eliminated entirely in all subsequent years.

Figure 13-6 Condition Forecast – Natural Assets Scenario C: Proposed LOS



13.5.5 Rationale for Proposed LOS

The Proposed LOS, as defined in Scenario C is recommended to incorporate recommended erosion control and shoreline protection projects. It was assumed that the assets would remaining in the same condition over the forecasted period for this AM Plan due to limited condition data, but future forecasts should be more accurate as condition assessments are completed on the natural assets. This scenario also includes funds to support O&M needs for growth assets to ensure that O&M LOS can be sustained over the 10-year period.

13.6 Financial Strategy

Table 13-7 shows a comparison of the average annual costs of the three scenarios. The table shows that there is a $1.4 million per year average gap between the anticipated funding and the proposed LOS. This is primarily due to the additional erosion, waterfront, and flood control work that was proposed in past reports that has not been completed to date. Once the condition assessment work is completed, more accurate renewal needs will be known.

Table 13-7 Average Annual Costs – Natural Assets – Scenario Comparison

Lifecycle Activity Type	Average Annual Cost (2025 $, millions)		
	Scenario A: Anticipated Funding	Scenario B: Maintain Current LOS	Scenario C: Proposed LOS
Non-Infrastructure Solutions	$0.03	$0.03	$0.1
O&M – Existing Assets	$2.3	$2.3	$2.3
Renewal – Existing Assets	$2.9	$2.9	$2.9
Growth & Upgrade Activities	$0.6	$0.6	$1.7
O&M – Growth & Upgrade Assets	--	$0.05	$0.2
Renewal – Growth & Upgrade Assets	--	--	--
Disposal Activities	--	--	--
Total	**$5.8**	**$5.9**	**$7.2**
Funding Gap	**n/a**	**$0.1**	**$1.4**

14 Parking Service

Parking services support the delivery of essential municipal operations in the City by providing accessible, safe, and efficient parking options for residents, visitors, and businesses. Parking assets include on street meters, pay and display meters, surface lots, and garages. These assets are critical to, supporting local commerce, and ensuring a positive user experience. The City's parking infrastructure also contributes to broader transportation and urban planning objectives at the regional and provincial levels. As part of the AM Plan, parking assets are maintained to ensure reliability, reduce service disruptions, and respond to the changing needs of the community.

14.1 State of the Local Infrastructure

14.1.1 Asset Valuation

Parking assets are critical to the delivery of modern municipal services in the City. These assets support internal operations, enable public-facing services, and provide the infrastructure necessary to manage parking efficiently and effectively across the community.

The City's parking system includes surface lots, on street spaces, and structured parking facilities. These assets play a vital role in supporting mobility, accommodating demand, and ensuring convenient access to key destinations throughout the city. Well-maintained parking infrastructure contributes to economic activity, enhances the user experience, and supports the daily needs of residents, businesses, and visitors.

Parking services are developed in alignment with broader transportation, accessibility, and land use objectives. Planning and management practices are designed to complement the City's long-term urban development goals and contribute to an integrated, accessible transportation system.

As the City continues to grow and adapt to evolving travel patterns, the renewal and effective management of parking assets will remain essential to ensuring service reliability, safety, and sustainability over the long-term.

The overall distribution of replacement values by asset type for parking is shown in Table 14-1. Parking garages represent the largest share, accounting for 70.5% of the total replacement value for the parking system.

Table 14-1 Inventory Valuation – Parking Services

Asset Category	Asset Sub-Category	Count	Unit	Replacement Value (millions, 2025 $)	Replacement Value (% Total)
Paid Parking	Parking Garages	2	facilities	$72.81	70.5%
	Parking Lots	16	lots	$5.15	5.0%
	Parking Meters	66[10]	each	$0.25	0.2%
Unpaid Parking	Parking Lots	76	lots	$23.81	23.0%
Fire Services	Parking Lots	10	lots	$1.30	1.3%
	Overall Replacement Value			**$103.3**	**100%**

14.1.2 Asset Age

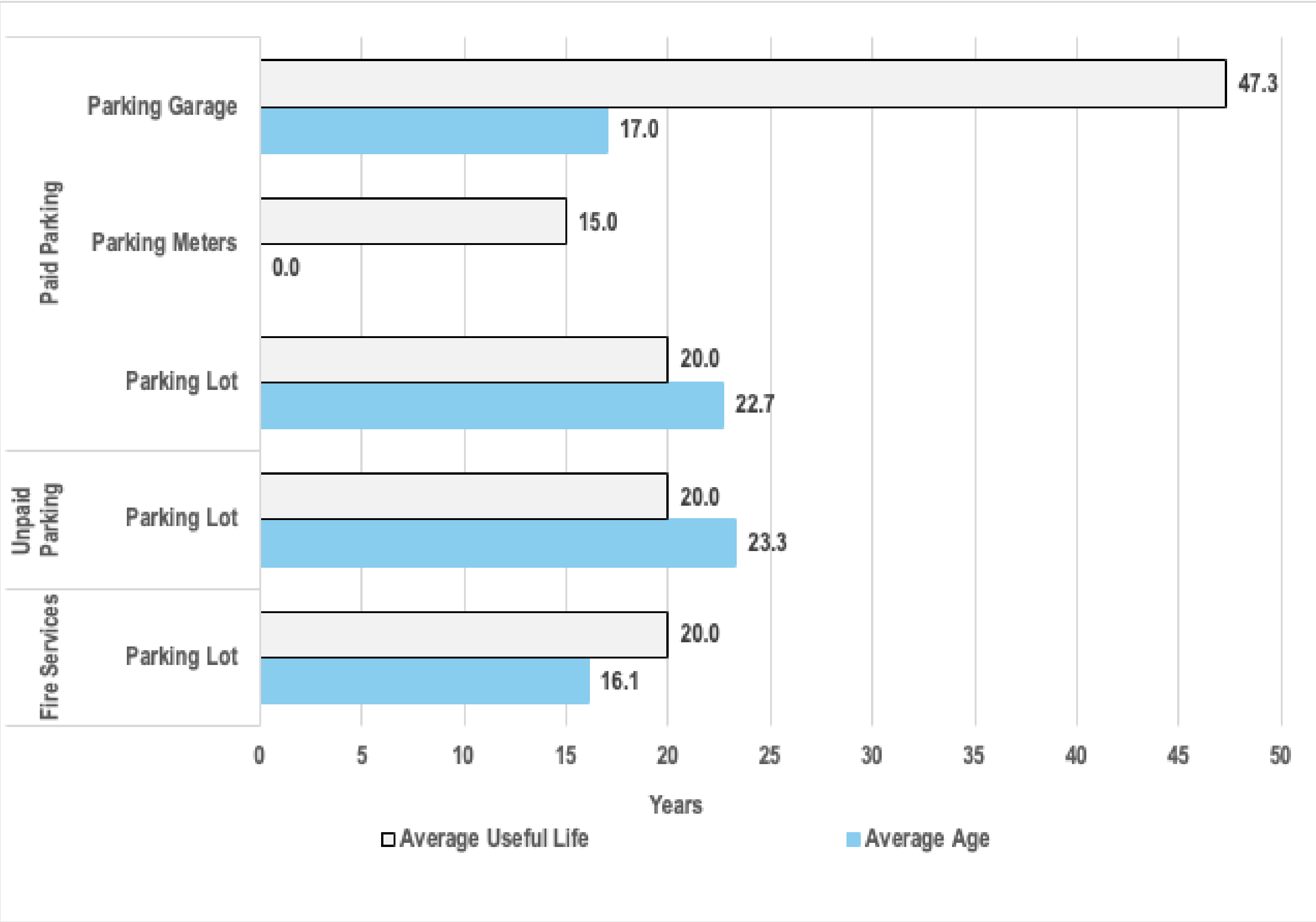
Understanding the relationship between the average age of parking assets and their expected useful life is essential for informing renewal decisions and guiding long-term investment planning. The City's parking asset portfolio includes unpaid parking lots serving various municipal functions, along with paid parking infrastructure such as surface lots, meters, and parking garages.

As shown in Figure 14-1, several parking asset types have average ages that meet or exceed their estimated useful life. This is particularly evident among unpaid parking lots and those associated with paid parking operations. These trends suggest that portions of the parking inventory may be approaching or have surpassed the stage where proactive maintenance or replacement is necessary. The parking garage also reflects signs of aging relative to its expected lifespan. While parking assets supporting fire services are currently within their useful life range, they will require close monitoring in the coming years. Age data for parking meters is not currently available, indicating an area for improvement in asset management practices.

[10] The City is working to establish a process to ensure the inventory is updated when new assets are added.

Tracking asset age in relation to useful life helps ensure that renewal strategies remain aligned with actual asset conditions. This approach supports continued reliability, safety, and operational efficiency in the delivery of parking services across the City.

Figure 14-1 Asset Age – Parking Services



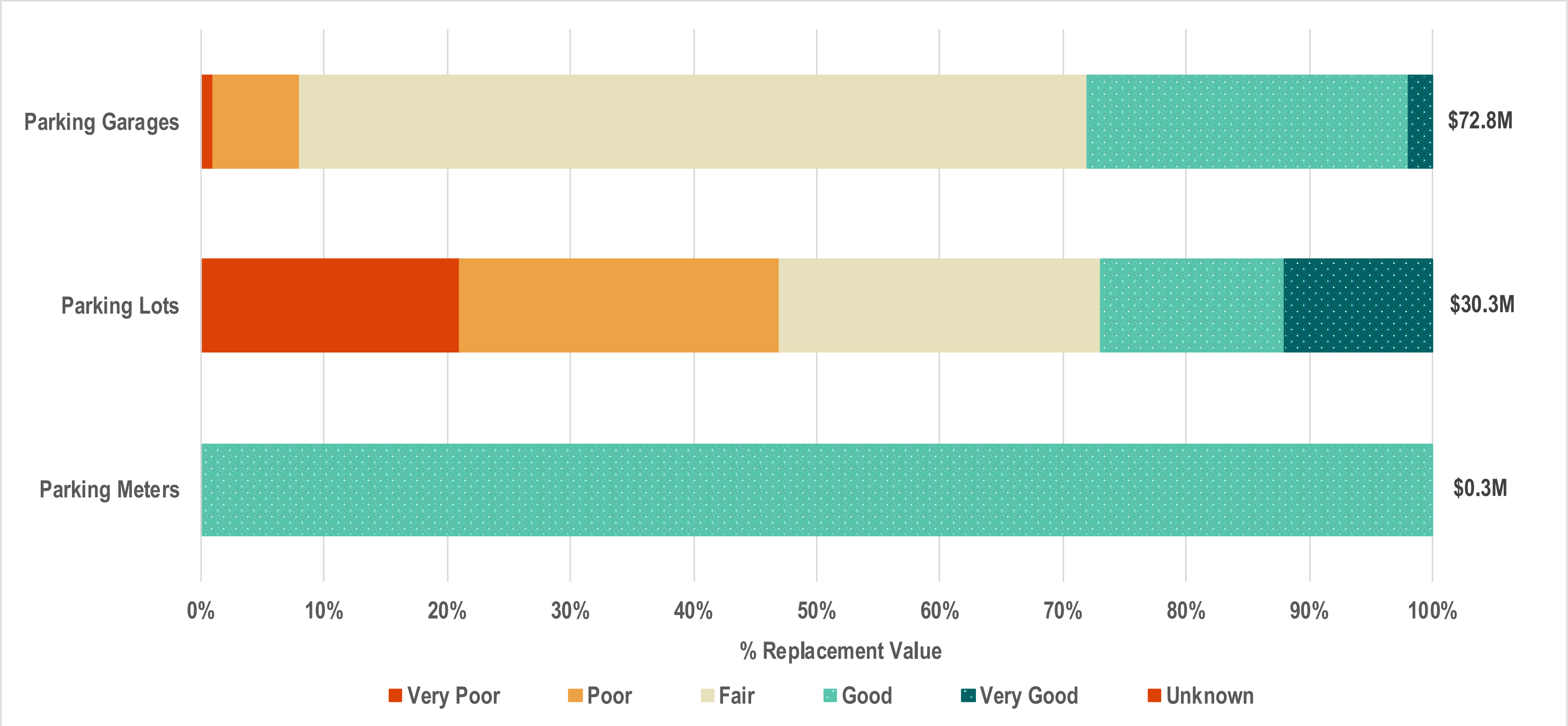
14.1.3 Asset Condition

The asset condition distribution for parking assets is shown in Figure 14-2. Overall, $12.96 million (12.5%) of parking assets are in poor condition, while $7.08 million (6.9%) are in very poor condition. Assets in very poor condition are considered to be due or overdue for replacement. Assets in poor or very poor condition are concentrated mostly within parking lots, highlighting a need for targeted reinvestment and renewal planning.

Condition data is available for the majority of the parking asset inventory, supporting a comprehensive assessment of current asset condition. These condition ratings are based on observed assessments conducted by staff and will continue to be refined as part of ongoing asset management planning efforts.

The most recent Building Condition Assessments, completed in 2022, encompassed a detailed evaluation of the parking garages. These structures have been systematically broken down into their individual components using an unformat approach, facilitating a more precise assessment of each element. The condition ratings for the parking garages are determined at the component level rather than for the overarching parent asset, ensuring a more accurate representation of maintenance and lifecycle requirements.

Figure 14-2 Asset Condition – Parking Services



14.2 Levels of Service

The City is committed to maintaining a safe, functional, and reliable parking infrastructure that supports mobility, accessibility, and the effective delivery of municipal services. Parking assets—including unpaid parking lots and paid infrastructure such as meters and surface lots—play a vital role in supporting local businesses, public facilities, and community events.

The City monitors the condition and performance of parking assets through regular staff assessments and ongoing lifecycle management to ensure continued service reliability and operational efficiency. Defined Levels of Service (LOS) guide long-term planning, maintenance activities, and investment decisions, ensuring that the parking system continues to meet the needs of residents, visitors, and businesses across the City.

14.2.1 Technical Metrics LOS

Table 14-2 outlines the Levels of Service (LOS) that are guiding current and future decision-making and investment planning for Parking Service assets. The City's Customer LOS statements and Technical LOS indicators reflect performance from both the end-user and service provider perspectives. Performance results from the past five years (2020–2024) are included, along with the target or proposed performance for each LOS measure as selected by the City.

Table 14-2 LOS Metrics and Performance – Parking Services

Service Attribute	Customer LOS Statement (CLOS)	Technical LOS Indicator (TLOS)	Historical Performance					Target / Proposed Performance
			2020	2021	2022	2023	2024	
Reliability	Parking services are consistently reliable, with well-maintained infrastructure that minimizes downtime, ensures availability of parking spaces, and supports uninterrupted access for users	% of parking assets due or overdue for replacement (by component)	Not available	Not available	Not available	7.7%	7.0%*	Decrease
Affordability	Services are affordable and provided at lowest cost for both current and future customers	Annual Capital investment as a % of cost to sustain assets over their lifecycles (replacement value / estimated service life = $3.1M/yr)	208%	231%	236%	277%	0%	100%

* Includes BCA needs identified in 2023 and earlier

14.3 Climate Change

Parking services in the City have varying degrees of vulnerability to climate-related stressors. While many assets are expected to remain functional under a range of climate scenarios, certain infrastructure—particularly surface lots and parking garages—is more susceptible to the impacts of extreme weather events.

Extreme precipitation and freeze-thaw events present the most significant risks. Surface parking lots, especially those with granular surfaces, may experience washouts, increased pothole formation, and accelerated surface deterioration. These conditions contribute to higher maintenance costs and shorter asset lifespans. Ice and snow accumulation can reduce parking capacity and revenue unless timely removal occurs, which increases operational costs.

Parking garages are particularly affected on their top floors, where snow and ice accumulation can lead to temporary service reductions and revenue loss. Additionally, infrastructure elements such as gates and payment machines may be vulnerable to damage from extreme wind or ice buildup.

Extreme cold, dry conditions, and extreme heat are expected to have minimal direct impacts on structural components of parking assets. However, extreme heat events may indirectly affect the reliability of electrically powered systems such as gates and payment machines, particularly during periods of elevated electricity demand.

High lake levels and elevated water temperatures are generally not anticipated to significantly impact parking services, based on current asset locations.

The City should continue to monitor climate-related risks to parking infrastructure and incorporate mitigation and adaptation strategies into future asset management planning.

14.1 Risk Management Strategy

As outlined in Section 2.5, the City applies a risk-based approach to prioritize renewal needs for parking assets. The likelihood of failure is primarily assessed through observed condition evaluations and regular monitoring of asset performance. The consequence of failure is determined using established scoring criteria and weighting methodologies that reflect the potential impact on service availability, user accessibility, public safety, and operational continuity.

This approach supports informed decision-making and helps ensure that limited resources are directed toward the most critical assets, minimizing the risk of service disruption and optimizing long-term performance.

Table 14-3 Consequence Scoring – Parking Services

Consequence Category	Criteria	Consequence Score				
		1 - Minimal	2 - Minor	3 - Moderate	4 - Major	5 – Extreme
Financial	Capital Expenditure (Replacement of Assets)	<$100k	$100k - <$250k	$250k - <$1M	$1M - $2M	>$2M
	Loss of Revenue	Parking Lots	N/A	N/A	N/A	Parking Garages
Social	Impact to Health and Safety	N/A	N/A	Parking Lots	N/A	Parking Garages
	Legal liability	Parking Lots	Parking Garages	N/A	N/A	N/A
	Service Disruption	N/A	N/A	N/A	N/A	Parking Garages, Parking Lots
	Impacted Customers	Parking Lots	Parking Garages and Market Square Parking	N/A	N/A	N/A
Environmental	Environmental Compliance	All	N/A	N/A	N/A	N/A
	Environmental Impact	All	N/A	N/A	N/A	N/A

14.2 Lifecycle Management Strategy

14.2.1 Lifecycle Management Activities

The levels of service presented in the previous section are supported by a variety of lifecycle activities in accordance with the activity types presented in Table 14-4. These activities are targeted to extend the asset life, ensure levels of service are being met, and reduce overall lifecycle costs.

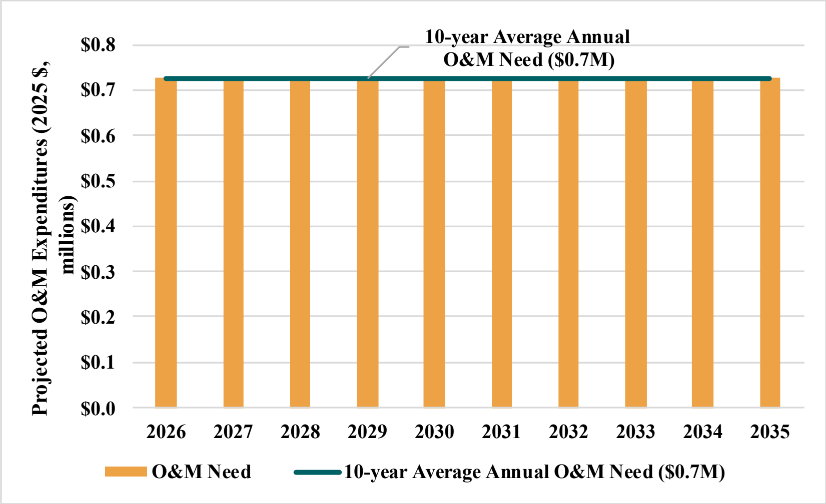
Table 14-4 Lifecycle Activities – Planned and Recommended – Parking Services

Lifecyle Activity Type	Planned Activities (within Anticipated Funding)	Additional Recommended Activities to Meet Proposed LOS
Non-Infrastructure Solutions	– Implement the Climate Adaptation Plan, Accessibility Plan, and Energy Conservation and Demand Management Plan as needed or legislated – Conduct parking studies and other technical assessments as required – Perform annual inspection programs – Monitor post-tensioned strand systems every two years (OSPG requirement)	– Establish a more structured schedule for space planning and contingency planning – Increase frequency of parking studies in response to growth and demand
Operations and Maintenance Activities	– Perform routine planned maintenance based on need – Address service-requested and reactive maintenance as issues arise – Conduct line painting and lighting maintenance as required – Purchase small equipment and materials as needed	– Expand proactive maintenance programming based on asset condition and performance – Implement routine inspections of powered infrastructure (e.g., lighting, payment systems) to enhance reliability
Renewal, Rehabilitation and Replacement	– Rehabilitate parking facilities based on asset condition, risk, and maintenance feedback – Resurface parking lots as required – Replace infrastructure at end of service life, including upgrading lot lighting to LED technology	– Increase frequency of mid-life interventions to extend service life – Use condition data to refine prioritization of resurfacing and rehabilitation activities
Growth Activities	– Construct new parking assets as identified through planning initiatives and technical studies	– Perform future-focused demand analysis to identify and address gaps in service coverage, especially in high-growth or intensifying areas
Upgrade Activities	– Upgrade parking lot lighting systems to LED as part of replacements	– Incorporate modern technologies (e.g., digital payment systems, occupancy sensors) to improve customer service and operational efficiency
Disposal Activities	– Coordinate disposal of assets with replacements when assets reach end of life or become unfit for purpose	– Develop formal disposal criteria to identify underused or obsolete assets and support timely decommissioning decisions

14.2.2 Operations & Maintenance Forecast

Figure 14-3 shows the forecast for operations and maintenance costs over the next 10 years to meet the Proposed LOS. Operations and maintenance costs increased in alignment with the growth in the asset portfolio as described in the next section. Regular increases due to inflation were not included in the following forecast.

Figure 14-3 Operations and Maintenance Summary



14.2.3 Growth, Upgrade, and Disposal Forecast

Growth reflects the acquisition of assets that did not previously exist within the asset portfolio. Upgrades result from improves asset performance (i.e., environmental, safety, accessibility, etc.). Disposals are when assets are removed from the portfolio. However, there is no growth, upgrade or disposal of parking assets included in the capital plan.

14.2.4 Renewal & Condition Forecast

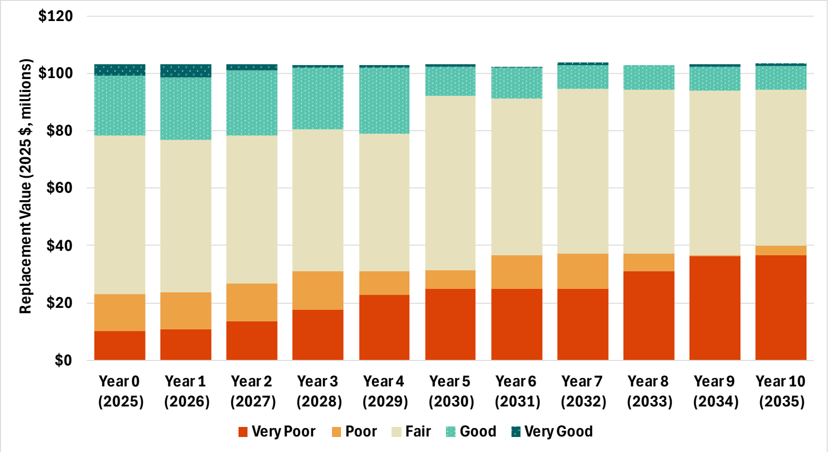
This section presents renewal lifecycle forecasts for:

- Scenario A: Anticipated Budget
- Scenario B: Maintain Current LOS
- Scenario C: Proposed LOS

Scenario A: Anticipated Budget

Figure 14-4 shows the forecast condition distribution of parking assets based on an average annual anticipated funding of $0.4 million per year (based on historical 5-year average renewal spending). The graph shows that the renewal backlog (assets in Very Poor condition) increases from 7.0% in 2025 to 35.3% in 2035.

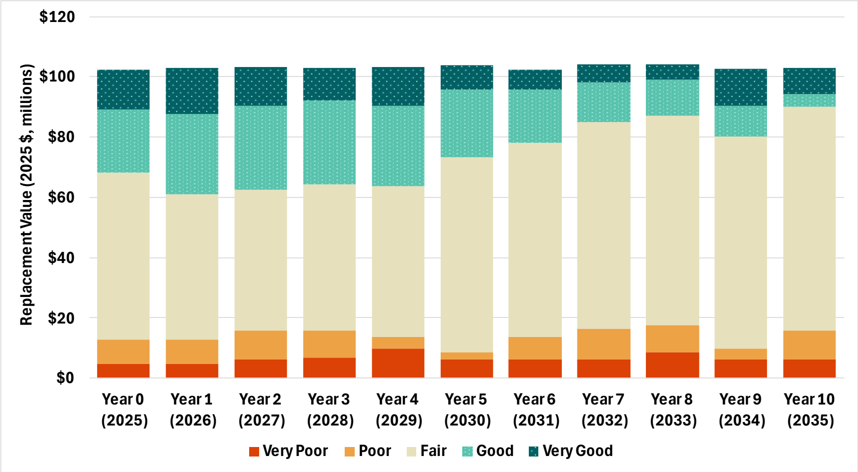
Figure 14-4 Condition Forecast – Parking Services Scenario A: Anticipated Funding



Scenario B: Maintain Current LOS

Figure 14-5 shows the forecast condition distribution of parking assets based on an average annual renewal spend of $2.2 million per year to maintain the renewal backlog (% of assets in Very Poor condition).

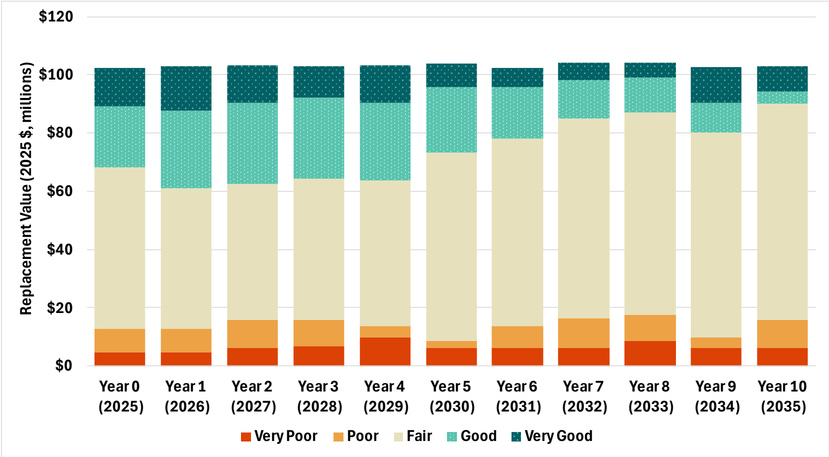
Figure 14-5 Condition Forecast – Parking Servies Scenario B: Maintain Current LOS



Scenario C: Proposed LOS

Figure 14-6 shows the forecast condition distribution of parking assets based on an average annual renewal spend of $2.2 million per year (same as Scenario B: Maintain Current LOS). The graph shows that the renewal backlog (assets in Very Poor condition) is maintained over the course of the analysis period.

Figure 14-6 Condition Forecast – Parking Services Scenario C: Proposed LOS



14.2.5 Rationale for Proposed LOS

The Proposed LOS, as defined in Scenario C is recommended as it maintains parking assets in the current state of repair over the analysis period. Unlike the anticipated funding scenario, which results in a significant deterioration of asset condition, Scenario C provides sufficient investment to address the renewal backlog and preserve asset functionality, safety, and reliability.

14.3 Financial Strategy

Table 14-5 shows a comparison of the average annual costs of the three scenarios. The table shows that there is a $1.8 million per year average gap between the anticipated funding and the proposed LOS. This is due to the additional renewal need in order to maintain the condition of assets over the course of the analysis period.

Table 14-5 Average Annual Costs – Parking Services – Scenario Comparison

Lifecyle Activity Type	Average Annual Cost (2025 $, millions)		
	Scenario A: Anticipated Funding	Scenario B: Maintain Current LOS	Scenario C: Proposed LOS
Non-Infrastructure Solutions[11]	--	--	--
O&M – Existing Assets	$0.7	$0.7	$0.7
Renewal – Existing Assets	$0.4	$2.2	$2.2
Growth & Upgrade Activities	--	--	--
O&M – Growth & Upgrade Assets	--	--	--
Renewal – Growth & Upgrade Assets	--	--	--
Disposal Activities	--	--	--
Total	**$1.1**	**$2.9**	**$2.9**
Funding Gap	**n/a**	**$1.8**	**$1.8**

[11] Current non-infrastructure solutions are captured in the O&M budget.

15 Parks Service

The City is committed to providing safe, reliable, affordable, accessible, inclusive and sustainable parks and recreational spaces that reflect 'The City where everybody can play.' The parks and recreation services will enhance the well-being of residents, visitors, places and spaces. The parks services will support a variety of activities and functions for recreation, business, arts and culture, historical, maintenance and operations purposes.

The City is responsible for the following park assets:

- 109 Parks which include:
    - 182 Park Amenities (Ball Diamonds, Playgrounds, Pools, etc.)
    - 2 Piers
    - 2,108 Site Works / Land Improvements
    - 355 ha of Parkland
    - 76.0 kms of Park Paths including 25 stairs

15.1 State of the Local Infrastructure

Parks are important to enhancing the well-being of residents, visitors, places, and spaces through provisions of safe, reliable, affordable, accessible, inclusive and sustainable environments. The City owns and operates 109 parks.

Table 15-1 provides a further breakdown of these assets into the various asset types (i.e., Ball diamonds, playgrounds, etc.).

15.1.1 Asset Valuation

For the valuation of assets for the parks services, the replacement values considered are intended for the replacement of a similar asset (like-for-like) on a complete and standalone basis. These were calculated based on historical values that the City has incurred as part of previous replacements of similar assets. Park Amenities consist of 44% of the total replacement value of parks assets, followed by Piers (28%), Site Works / Land Improvements (13%), Park Paths (12%), and Parkland (3%).

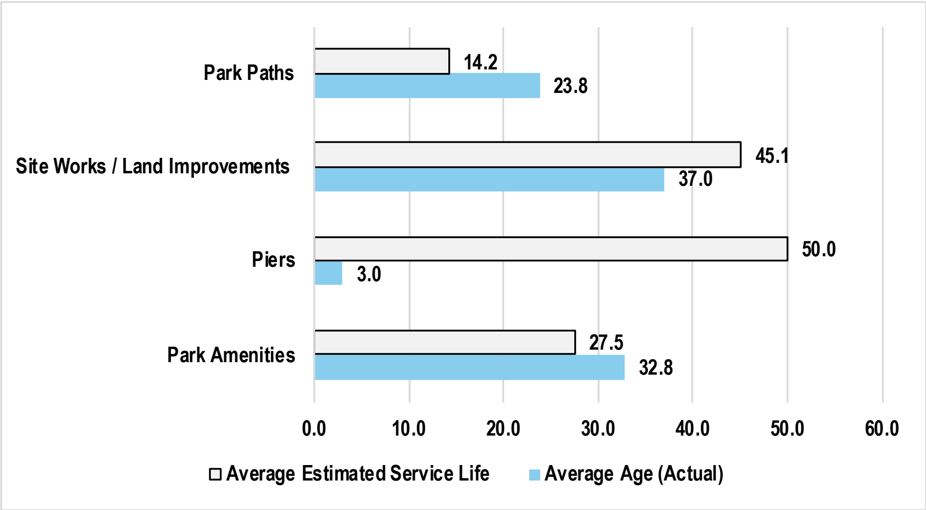
Table 15-1 Inventory Valuation – Parks Service

Asset Category	Asset Sub-Category	Count	Unit	Replacement Value (millions, 2025 $)	Replacement Value (% Total)
Park Amenities	Ball Diamond	22	each	$19.1	9%
	Dog Parks	2	each	$0.2	<1%
	Outdoor Court	36	each	$11.6	5%
	Playground	735	each	$27.7	12%
	Pools (outdoor)	5	each	$16.3	7%
	Skateboard Parks	1	each	$1.1	<1%
	Splash Pads	54	each	$1.6	<1%
	Sports Fields	32	each	$16.5	7%
	Track and Field	1	each	$1.3	<1%
	Park Features	4	each	$1.7	<1%
Piers	Piers	2	each	$62.6	28%
Site Works / Land Improvements	Park Furniture, Site Electrical, Erosion Control, Golf Course, Flag Poles, Fountains, Garden Structures, Grading and Landscaping, Irrigation Systems, Closed Landfills, Beach Ammenities, Signs, Fire Services Tower, Lighting	2,108	each	$23.7	11%
	Fencing	107	km	$5.0	2%
Parkland	Forest	0.46	ha	$0.8	<1%
	Manicured Areas	3.10	ha	$6.2	3%
Park Paths	Stairs	25	sets	$0.5	<1%
	Service Roads	9.7	Km	$17.3	8%
	Sidewalks	30.6	km	$4.0	2%
	Trails	35.7	km	$4.8	2%
	Overall Replacement Value			**$222.0**	**100%**

15.1.2 Asset Age

Comparing the average age of the assets with the average estimated service life (ESL) provides a representation of the average overall portfolio remaining life. Figure 15-1 below summarizes the average ages of each asset type in park assets. On average, park amenities and park paths are beyond their average estimated service life. Any assets (e.g., all Parkland assets) that did not have an installation date were not included in the graphic below. Park path ages were not well known at the time of developing this AM plan and as a result there is a low confidence in the accuracy of park path age. The City will be working to improve this confidence in the future.

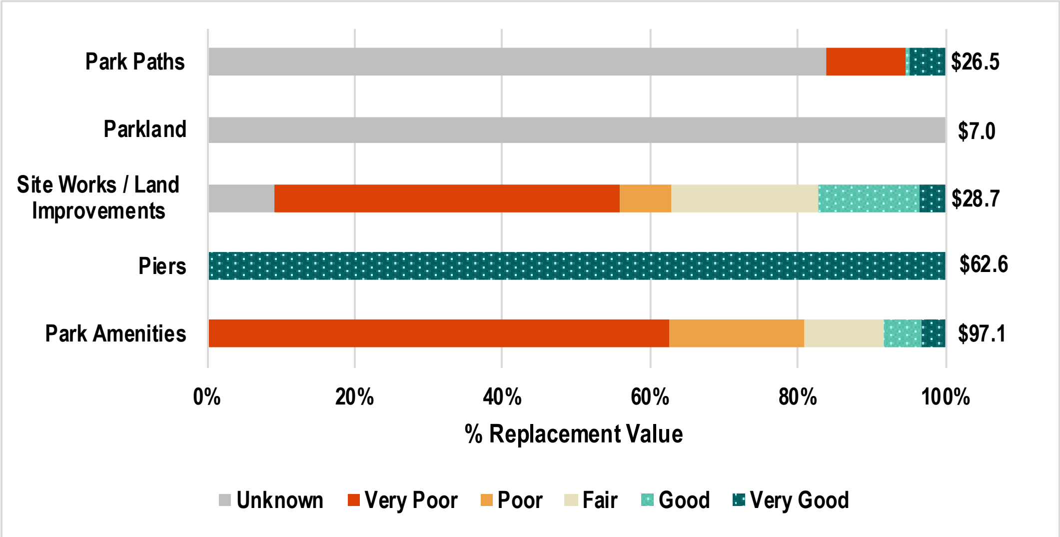
Figure 15-1 Asset Age – Park Service



15.1.3 Asset Condition

The asset condition distribution is shown in Figure 15-2 for parks service assets. Overall, $77.1 million (35%) of parks assets are in very poor condition and $19.8 million (9%) are in poor condition. Assets in very poor condition are considered to be due or overdue for replacement. As shown in the Figure, those assets consist of park amenities, park paths, and site works / land improvements. Additionally, there are $31.8 million (14%) of parks assets with an unknown condition. The City is working to obtain condition ratings for these assets.

Figure 15-2 Asset Condition – Parks Service



Condition was assigned to park assets primarily on the basis of the asset age versus expected service life where the data was available, as per Table 15-2.

Table 15-2 Age-based Condition Score – Parks

Age-based Condition Score	Remaining Service Life (%)
1	76 to 100
2	51 to 75
3	26 to 50
4	0 to 25
5	Past Service Life

15.2 Levels of Service

The City is committed to providing safe, reliable, affordable, accessible, inclusive and sustainable parks and recreational spaces that reflect 'The City where everybody can play.'

The City has developed levels or service for its park assets based on Reliability and Affordability which provide a basis from which the City can determine whether the service area is performing as expected. LOS related to Capacity and Function will be determined through the updated Parks Policy Plan in 2026.

The City's LOS document the asset performance from a service provider's perspective and service user's perspective. These metrics outline the LOS that are currently driving decision-making/spending on assets and can be linked to financing consequences/demand. The following provides a summary of these LOS associated with the parks in the City.

15.2.1 Technical Metrics LOS

Table 15-3 outlines the LOS that are driving current and future decision-making and expenditure needs for Parks Service assets. The City's Customer LOS statements and Technical LOS indicators document performance from a service user's and service provider's perspective, respectively. Performance scores from the most recent five years (2020 – 2024) are listed. The table also lists the target or proposed performance for each LOS measure as selected by the City.

The City intends to provide more granular technical LOS as the condition data is improved over time.

Table 15-3 LOS Metrics and Performance – Parks Service

Service Attribute	Customer LOS Statement (CLOS)	Technical LOS Indicator (TLOS)	Historical Performance					Target / Proposed Performance
			2020	2021	2022	2023	2024	
Reliability	Provide safe and reliable parks, open spaces and trails	% of Park assets in very poor condition	Not reported	Not reported	Not reported	27%	35%	Improve
Affordability	Services are affordable and provided at lowest cost for both current and future customers	Annual Capital investment as a % of cost to sustain assets over their lifecycles (replacement value / estimated service life = $6.4M/yr)	7%	35%	44%	72%	34%	100%

15.3 Climate Change

The City completed an internal Climate Change Risk Assessment which reviewed the likelihood extreme climate events and their impacts on parks infrastructure. Extreme climate events included:

- Extreme precipitation
- Extreme dry conditions
- Extreme precipitation and extreme cold
- Extreme cold
- Extreme heat
- Freeze-thaw events
- High lake levels
- High lake temperatures
- High winds

Impacts to the parks asset portfolio include:

- Increased erosion and decreased slop stability from increased precipitation and high water levels.
- Increased temperatures leading to increased demand on parks with water features (natural or constructed) resulting in increased water demand / costs.
- Close portions of parks along the lake due to high water levels.
- Sports field closures to prevent damage due to high rainfall.
- Lake water is warmer resulting in more algae, increasing the costs for removal and possibly resulting in more beach closure days.
- Extreme dry conditions can lead to increased irrigation needs for sports fields and ball diamonds and increased evaporation in outdoor pools.

The City should develop risk treatment and response plans to address these climate change risks.

15.4 Risk Management Strategy

As explained in Section 2.5, the City uses a risk-based approach to prioritize renewal needs. Likelihood of failure is estimated based on condition (refer to Table 2-3). The consequence of failure is estimated based on the largest score from Table 15-4.

Table 15-4 Consequence Scoring – Parks

Consequence Category	Criteria	Parameter	Consequence Score: 1 - Minimal	2 - Minor	3 - Moderate	4 - Major	5 – Extreme
Financial	Capital Expenditure (Replacement of Assets)	Replacement Cost	<$100k	$100k - <$250k	$250k - <$1M	$1M - $2M	>$2M
	Revenue loss due to service closure or other direct cost not related to asset repair	Lost revenue due to closure.	No significant impact to operating budget (less than $50,000)	Moderate impact to operating budget ($50,000 to $100,000)	Significant impact to operating budget (less than $100,000 - 250,000).	Significant impact to operating budget (more than $250,000, less than $500,000)	Significant increase to operating budget ($500,000 or more)
Social	Impact to Health and Safety	Asset category	Open Spaces, Site Works	N/A	Park Amenities, Sidewalks and Pathways, Pools (outdoor)	Playgrounds	N/A
	Legal liability	Asset category	All	Passive Gas Venting Trench & Leachate Collection	N/A	N/A	N/A
	Service Disruption	Asset category	Open Spaces, Remaining Site Works	N/A	Other Park Amenities	Playgrounds	Lighting, Memorial Benches, Site Electrical,
	Customer Impact	Asset category	N/A	N/A	Assets in Neighbourhood Parks	N/A	Assets in Citywide Park, and Sports Fields
Environmental	Environmental Compliance	Asset category	All Remaining	N/A	Passive Gas Venting Trench & Leachate Collection	Pools (outdoor), Leachate Collection	N/A
	Environmental Impact	Asset category	All Remaining	Pools (outdoor)	Leachate Collection	N/A	N/A

15.5 Lifecycle Management Strategy

15.5.1 Lifecycle Management Activities

The levels of service presented in the previous section are supported by a variety of lifecycle activities in accordance with the activity types presented in Table 15-5. These activities are targeted to extend the asset life, ensure levels of service are being met, and reduce overall lifecycle costs.

Table 15-5 Lifecycle Activities – Planned and Recommended – Parks Service

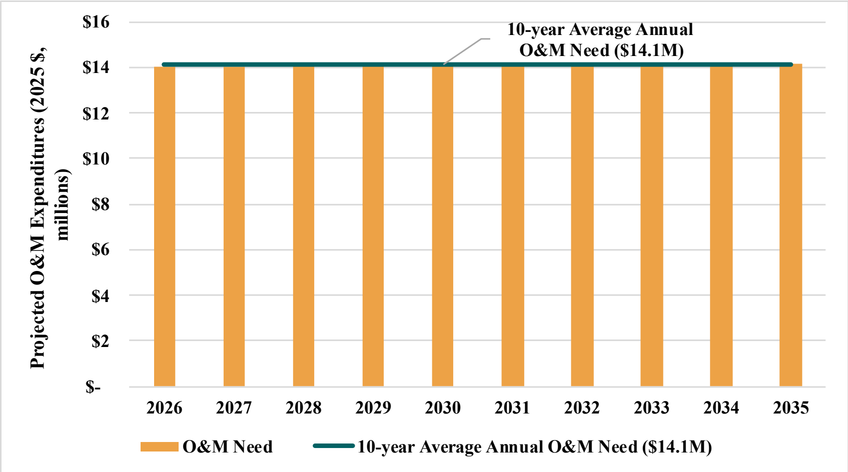
Lifecyle Activity Type	Planned Activities (within Anticipated Funding)	Additional Recommended Activities to Meet Proposed LOS
Non-Infrastructure Solutions	– Regular parks master plan to include portfolio growth to accommodate population increases.	– Develop Climate Adaptation Plan to determine how Parks can become more resilient ($100K) – Formalize condition assessment program and develop data collection tools to support internal staff condition assessments. ($150K) – Consider the development of a horticultural master plan and a beach strategy.
Operations and Maintenance Activities	– Planned Maintenance (PM), including landfill environmental monitoring. – Service Requested Maintenance – Reactive Maintenance – Purchase of small equipment and materials	– O&M needs will increase as assets are added to accommodate growth. – O&M needs may also change as a result of asset upgrades.
Renewal, Rehabilitation and Replacement	– Replacement and rehabilitation of assets when they reach end of service life or are no longer fit for purpose. Renewal of outdoor sport assets are completed in the off season to mitigate the impact of disruption to service.	– Replacement and rehabilitation activities could be increased to reduce the renewal backlog (assets in Very Poor condition) more quickly.
Growth Activities	– Assumption that $7.2M in parks assets to be constructed from 2025-2034. – Assumption that $1.4M in waterfront improvements to be constructed from 2025-2034	– Incorporate future projects identified from updated Parks Policy Plan in 2026.
Upgrade Activities	– There are currently no plans to upgrade any assets.	– Upgrade needs will be identified in the upcoming Parks Policy Plan. This may include upgrades to existing lighting and safety enhancements.

Lifecyle Activity Type	Planned Activities (within Anticipated Funding)	Additional Recommended Activities to Meet Proposed LOS
Disposal Activities	– There are currently no plans to dispose of any assets without replacement.	– Disposal needs may be identified in the upcoming Parks Policy Plan.

15.5.2 Operations & Maintenance Forecast

Figure 15-3 shows the forecast for operations and maintenance costs over the next 10 years to meet the Proposed LOS. Operations and maintenance costs increased in alignment with the growth in the asset portfolio as described in the next section. Regular increases due to inflation were not included in the following forecast.

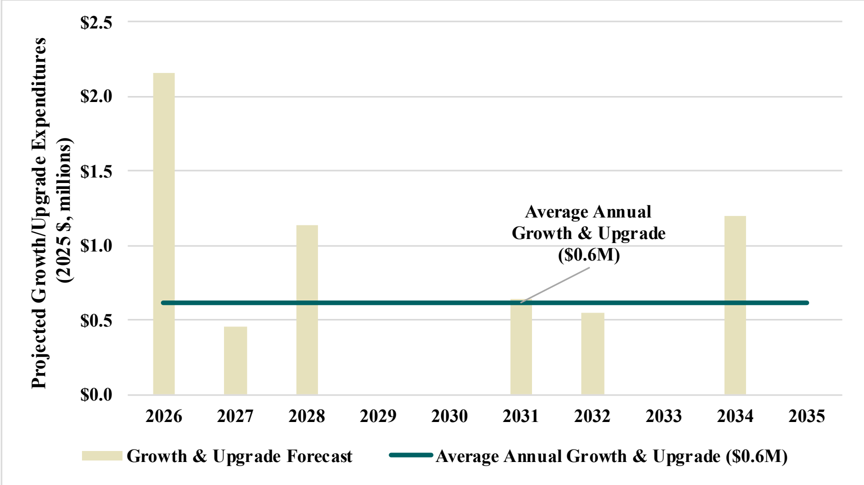
Figure 15-3 Operations and Maintenance Summary



15.5.3 Growth, Upgrade, and Disposal Forecast

Growth reflects the acquisition of assets that did not previously exist within the asset portfolio (including Parks and Waterfront additions). Upgrades result from improves asset performance (i.e., environmental, safety, accessibility, etc.). Disposals are when assets are removed from the portfolio. Figure 15-4 shows the forecasted growth and upgrades to meet the Proposed LOS. City teams are working to develop a more accurate assessment of future growth requirements through the development of a Parks Policy Plan.

Figure 15-4 Growth, Upgrade, & Disposal Summary



15.5.4 Renewal & Condition Forecast

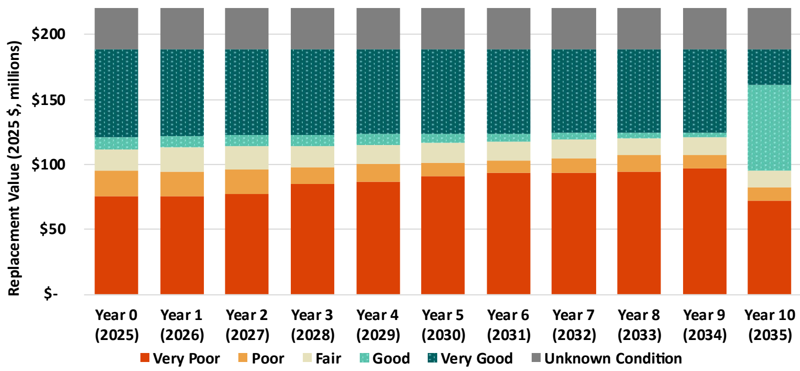
This section presents renewal lifecycle forecasts for:

- Scenario A: Anticipated Budget
- Scenario B: Maintain Current LOS
- Scenario C: Proposed LOS

Scenario A: Anticipated Budget

Figure 15-5 shows the forecast condition distribution of park assets based on an average annual anticipated funding of $3.0 million per year (based on historical 5-year average renewal spending). The graph shows that the renewal backlog (assets in Very Poor condition) decreases from 37% in 2025 to 33% in 2035.

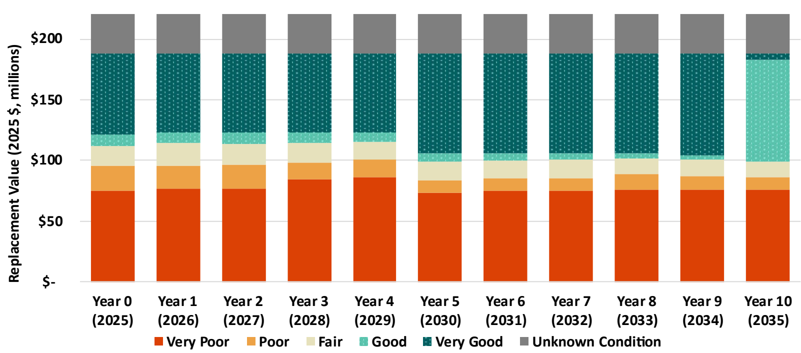
Figure 15-5 Condition Forecast – Parks
Scenario A: Anticipated Funding



Scenario B: Maintain Current LOS

Figure 15-6 shows the forecast condition distribution of park assets based on an average annual renewal spend of $2.6 million per year to maintain the renewal backlog (% of assets in Very Poor condition).

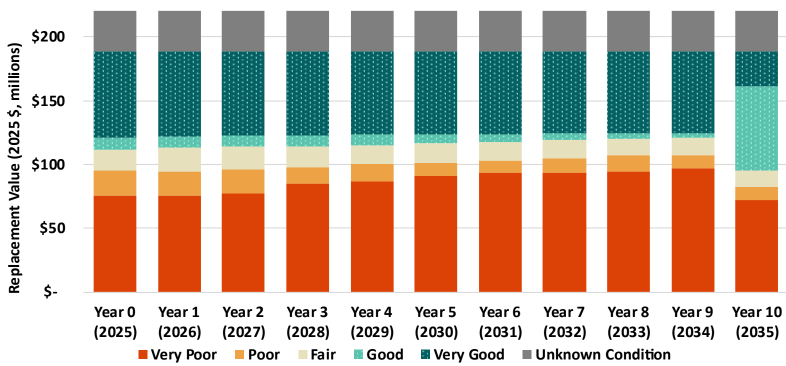
Figure 15-6 Condition Forecast – Parks
Scenario B: Maintain Current LOS



Scenario C: Proposed LOS

Figure 15-7 shows the forecast condition distribution of park assets based on an average annual renewal spend of $3.0 million per year which is the anticipated funding. The graph shows that the renewal backlog (assets in Very Poor condition) decreases from 37% in 2025 to 33% in 2035.

Figure 15-7 Condition Forecast – Parks
Scenario C: Proposed LOS



15.5.5 Rationale for Proposed LOS

The Proposed LOS, as defined in Scenario C is recommended because it follows the anticipated budget. Council members agreed to follow the anticipated budget until improvements in condition data can be received. Council members agreed to review renewal funding once condition was better known. The City is working to gather better condition data to provide a clearer forecast will work to increase the renewal funding to make incremental improvements in its capital reinvestment rate LOS. This scenario also includes funds to support O&M needs for growth assets to ensure that O&M LOS can be sustained over the 10-year period.

15.6 Financial Strategy

Table 15-6 shows a comparison of the average annual costs of the three scenarios. The table shows that there is a $0.3 million per year funding gap to achieve the Proposed LOS. This is driven from the additional O&M spending from growth assets and additional long-term plans and condition assessments.

Table 15-6 Average Annual Costs – Parks – Scenario Comparison

Lifecyle Activity Type	Average Annual Cost (2025 $, millions)		
	Scenario A: Anticipated Funding	Scenario B: Maintain Current LOS	Scenario C: Proposed LOS
Non-Infrastructure Solutions	$0.1	$0.1	$0.2
O&M – Existing Assets	$14.5	$14.5	$14.5
Renewal – Existing Assets	$3.0	$2.6	$3.0
Growth & Upgrade Activities	$0.9	$0.9	$0.9
O&M – Growth & Upgrade Assets	--	$0.2	$0.2
Renewal – Growth & Upgrade Assets	--	--	--
Disposal Activities	--	--	--
Total	**$18.5**	**$18.3**	**$18.8**
Funding Gap	**n/a**	**none**	**$0.3**

16 AM Plan Monitoring and Review

16.1 Monitoring

In accordance with O.Reg. 588/17, the City will report annually to Council on the progress implementing this AM Plan. The progress report will include the following:

- Updated State of Inventory report, including inventory values and condition scores
- Updated Level of Service performance scores relative to proposed performance
- Progress implementing planned lifecycle activities
- Progress implementing planned AM improvements

16.2 Review

In accordance with O.Reg. 588/17, the City will update this AM Plan in 5 years or earlier.

17 AM Improvement

Asset Management at the City relies on having practices and principles to ensure the City makes the best possible decisions regarding their varied assets portfolios.

As part of the development of this AM Plan, opportunities for improvement of asset management practices and principles and the asset management plan were identified. When establishing an improvement plan, it is useful to consider international standards and well-known asset management guidance for advancing Asset Management capabilities including:

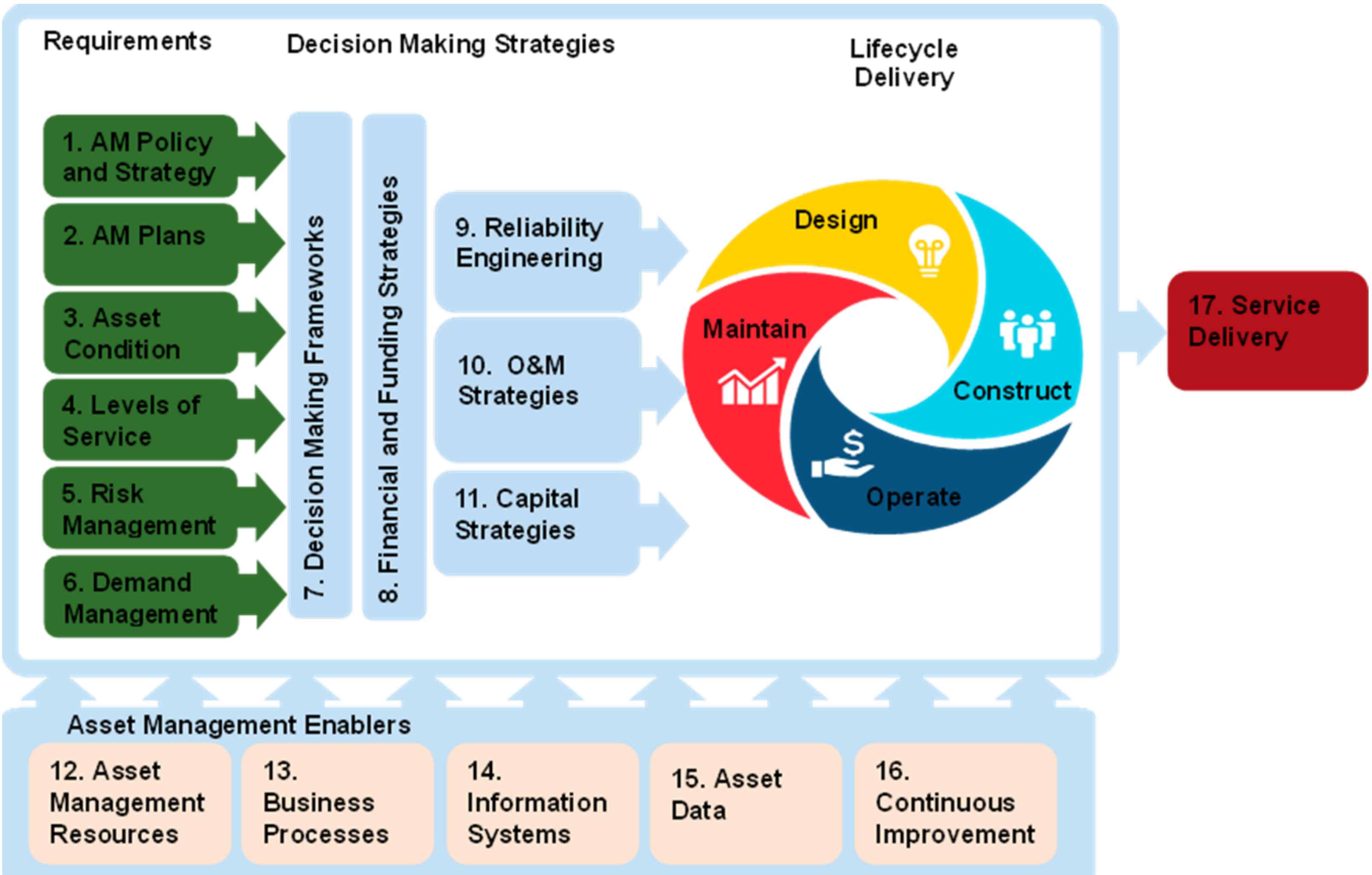
- ISO 55000
- International Infrastructure Management Manual (IIMM), 6th edition, by the Institute of Public Works Engineering Australasia (IPWEA)
- Asset Management – An Anatomy, Version 4, by the Institute of Asset Management (IAM)
- The Asset Management Landscape, 3rd edition, by the Global Forum on Maintenance and Asset Management (GFMAM)

These standards were developed over several years with international collaboration and are widely regarded as best practices for the field of Asset Management. Key recommendations have been categorized according to Figure 17-1, which organizes efforts related to Asset Management into:

- AM Requirements:
  Key documentation that defines the governance, objective and direction of the AM practices
- Decision Making Strategies:
  Tools that support decision making with a full asset lifecycle perspective
- AM Enablers:
  Processes and resources available to ensure Asset Management remains a well-established component of successful service delivery.

Understanding that the City is committed to improving the Asset Management practices over the long-term, the following provides a summary of recommended improvements. These are provided to guide strategic decisions for the City to continually improve levels of service, asset reporting (valuation and condition), risk, and therefore improve future iterations of the AM Plan.

Figure 17-1 Asset Management Capability Framework



Source: Adapted from IPWEA, 2015 and ISO 550001

17.1 AM Requirements

As indicated in Section 1, the City has proactively been working on developing the necessary documentation to guide their AM practices. The following sub-sections provide an overview of continuous improvement opportunities for each framework element.

17.1.1 AM Policy and Strategy

As explained in Section 1.0, the City reviewed and updated its AM Policy in 2024. In accordance O.Reg. 588/17, the AM Policy must be reviewed and updated at least every five years.

The City does not currently have a Strategic AM Plan (SAMP) in place. The SAMP is not required by O.Reg. 588/17, but is identified in industry best practices as a key element in the line-of-sight from organizational goals and objectives to AM Plans and activities. It is recommended that a SAMP be developed following the next update of the City's Strategic Plan to guide the next update of the AM Plan.

Recommendations:

i. Review and update AM Policy every 5 years
ii. Develop and update Strategic AM Plan following each update of the City's Strategic Plan

17.1.2 Asset Management Plan

The current document fulfills the requirements for Asset Management Plans as set out by O.Reg. 588/17. In accordance with O.Reg. 588/17, the City must report to Council annually by July 1, on the progress implementing the AM Plan. In addition, the regulation requires that the AM Plan must be updated at least every five years.

It is recommended that through a continuous improvement process, work continues to improve background data and the processes that will streamline the development of future AM Plan progress reports and AM Plan updates.

Recommendations:

i. Develop templates for each department to complete yearly to support AM Plan Progress Reports.
ii. Prepare annual AM Plan Progress Reports
iii. Update AM Plan every 5 years

17.1.3 Asset Condition

To establish consistency across and within asset types, it is recommended asset condition assessment protocols and templates be formalized. The protocols, developed for each asset category would outline the restrictions, assumptions, and requirements of the work, including:

- Defining the level at which assets will be identified (granularity) for condition assessments
- Defining the deterioration failure modes to be assessed (e.g. physical condition, capacity, function)
- Assigning grading standards for each failure mode to be assessed
- Defining the frequency of assessments
- Defining a prioritized sequence of assessments, for example, starting with a visual assessment of all assets in the category, followed by a more detailed

assessment of critical assets in Poor or Very Poor condition.

Condition data condition templates would be digitized for seamless collection, review and upload to the City's master asset database (GIS).

Existing condition assessment practices at the City are listed in Table 17-1. The table includes only condition assessments that assign a condition score to assets. The table does not include maintenance inspections that record defects without assigning a condition score.

In addition, the City has planned condition assessments on the following asset types, for which assessments have not previously been conducted:

- Playgrounds, play courts and other park assets
- Stormwater ponds (bathymetric surveys)
- Constructed wetlands
- Urban trees
- Streetlight and other lighting poles (park lighting, sports field lighting and parking lot lighting)

Recommendations:

i. Proceed with planned condition assessments in accordance with existing practices (Table 17-1) as well as assets not previously assessed

ii. Formalize asset condition assessment protocols for all asset types across the City, including assets for which condition will not be assessed

iii. Develop digital asset condition data collection templates

Table 17-1 Existing Condition Assessment Practices

Asset Type	Assessment Frequency	Assessment Last Completed
Pavement	3-5 years	2022
Sidewalks	Annually	2024
Trails	Not Defined	N/A
Traffic signs (retro-reflectivity)	Annual	2024
Traffic signals	Annually by the Region on behalf of the City	2024
Guiderails	Not defined*	2023
Bridges & culverts spanning more than 3m	2 years, per O.Reg. 104/97	2024
Bridges & culverts spanning less than 3m	Based on condition	2024
Lock walls (unburied only)	Not defined*	2024
Retaining walls	2 years	2024
Buildings and facilities	Not defined*	2023
Shoreline protection	5 years or sooner after high water events	2019
Watercourse flooding and erosion control	Not defined*	2015
Sanitary mains and stormwater mains a) CCTV b) Zoom camera inspections	 a) On-going, (estimated 70km/year) b) As needed	 a) n/a b) 2021

Asset Type	Assessment Frequency	Assessment Last Completed
Sanitary mains and stormwater maintenance holes • Zoom camera inspections	As needed	2021

* City to define and formalize frequency

17.1.4 Levels of Service

Proposed LOS were established as part of this AM Plan. It is recommended that performance be reported for these indicators as part of the annual AM Plan Progress Report to Council.

Currently, LOS performance data is gathered through email requests and manual manipulation of data. It is recommended that streamlined processes be formalized for gathering and updating performance data, and that a centralized source for LOS performance scores be established. Ideally, the centralized source will be a Business Intelligence (BI) dashboard that pulls performance data from multiple enterprise systems.

LOS metrics and targets should be reviewed and revised as part of the SAMP development and update process to ensure that metrics are continually aligned with the City's strategic priorities and AM objectives.

A specific refinement within the LOS metrics relates to the "% assets due or overdue for replacement". This metric has been used in the current AM Plan, because of the availability of this data; however, in the future this metric should differentiate between critical and non-critical assets. In general, the City should aim for 0 for "% critical assets due or overdue for replacement"; however, the target may be less stringent for non-critical assets.

Adjustment of LOS metrics and targets should consider customer expectations and input. Significant customer input is already obtained through the following existing channels:

- Customer calls and complaints
- Resident deputations at budget meetings and other Council meetings
- On-going feedback from Council and Council members
- On-going feedback from ratepayers' groups, business associations and other collaborative partner groups
- Input from media and social media
- Input from project-specific Public Information Centres, such as for master servicing plans

As part of the current AM Plan project, a public survey was conducted on the community's opinion and concerns about the City's infrastructure. The survey findings showed that for most infrastructure types, 74% - 86% of respondents felt that the City's infrastructure is in Average or Good condition; however, the results also showed that many members of the community:

- Do not understand which services and assets are managed by the City versus other jurisdictions
- Do not understand or accept that improved LOS may require increased investment

This survey may be considered a first step in a longer-term strategy to inform the community about the City's assets and services, and to engage the community in future LOS target-setting activities. For example, the IIMM recommends that public engagement on LOS be done in the following phases:

- Phase 1: Engage public on what aspects of service are most important to them
- Phase 2: Engage the public on LOS-cost scenarios, focusing on the most important aspects of service identified in Phase 1. Based on public's input, identify the preferred LOS-cost scenario
- Phase 3: Confirm the preferred LOS-cost scenarios

From this survey, it was clear that the community had a strong interest in roads, sidewalks, trails and park assets. As such, these would be good candidates for future Phase 2 and 3 engagement activities to present LOS-cost scenarios and identify community preferences.

It is recommended that an AM LOS Community Engagement Strategy be developed to formalize the objectives of future LOS engagement, including how customer satisfaction input will be considered for LOS target-setting for different services and asset types. The AM LOS Community Engagement Strategy should be aligned with the AM objectives identified in the SAMP. Another objective may be to increase community awareness of the City's assets and LOS, and the relationship between cost and LOS.

Rather than establishing separate outreach efforts, AM LOS engagement can be embedded within existing communication channels and points of contact with the public. This could include integration into regular municipal updates, public forums, budgeting discussions, and service-related consultations. By leveraging established engagement mechanisms, the City can ensure that AM LOS considerations are effectively communicated to the community while maintaining efficiency and minimizing additional resource demands.

Based on this integrated approach to community engagement, an AM LOS Community Engagement Plan can then be developed to define specific activities, timing, and outputs in support of the next AM Plan update.

Recommendations:

i. Report LOS performance in annual AM Plan Progress Reports
ii. Formalize processes for gathering and updating LOS performance data
iii. Establish a centralized tool for viewing LOS performance scores, as well as processes for keeping performance scores current
iv. Update LOS metrics as part of SAMP updates, including refinement of the "% assets due or overdue for replacement" to differentiate between critical and non-critical assets
v. Develop an AM LOS Community Engagement Strategy to formalize how community input will be incorporated into the AM Plan, ensuring LOS communication is integrated into existing public engagement efforts rather than requiring separate outreach initiatives

vi. Develop an AM LOS Community Engagement Plan to define engagement activities and timing in support of the next AM Plan update, leveraging established municipal communication channels and community touchpoints to optimize outreach effectiveness

17.1.5 Risk Management

For this AM Plan, the City used a risk management framework that is aligned with ISO 31000. Consequence categories and category weights have been defined, and likelihood and consequence scoring criteria were assigned to different asset types. These weights and scoring criteria are being refined by City staff. The intention is to have subject matter experts ensure the assigned weights are reasonable and align with real-world expectations to enhance the robustness of the risk management framework. Once the consequence weights have been finalized, they will be implemented in the City's ARMS application for AM planning.

It is recommended that the City review its risk framework, including consequence categories and weights, as well as scoring criteria for consequence and likelihood. The risk framework should then be formally adopted for AM decision-making and prioritization. Weights and scoring criteria should then be updated in the ARMS application for AM planning.

In this AM Plan, the risk framework has only been used to prioritize asset renewal needs. It is recommended that the City extend the risk framework to consider other types of failures, such as capacity or function failures, as well as risks related to specific external threats, such as extreme weather events or cyber attacks. These types of risks should be tracked in a risk register with risk treatments flowing into the decision-making process.

Recommendations:

i. Review and formalize risk management framework for AM
ii. Extend the risk framework to consider capacity, function and other types of failures, as well as external threats
iii. Establish the process for incorporating the risk register into AM decision-making and prioritization

17.1.6 Climate Change

Climate Change is a growing concern for communities around the world and the City is not immune from its potential impacts. The City should build upon the work done previously to develop the Corporate Climate Adaptation Plan and the more detailed adaptation plan prepared for the City's water and wastewater infrastructure by extending the analysis to all other assets within its portfolio.

The resulting strategies and implementation costs identified within the adaptation plan should be integrated into the City's budget framework.

Recommendations:

i. Build on the Climate Change Adaptation Plan to address the specific vulnerabilities of all asset groups and the associated service areas across the City.

17.1.7 Demand Management & Growth

It is recommended that the City proceed with planned updates of the Water Master Servicing Plan, Wastewater Master Servicing Plan and Stormwater Master Servicing Plan. These plans should be updated every 5 to 10 years, depending on the extent of changes in the operating context and community needs.

The City updated its Transportation Master Plan (TMP) in 2021 and developed an Active Transportation Master Plan (ATMP) in 2024. The City should review and update these at a frequency of every 5 to 10 years. In future updates, ATMP will be integrated into overall TMP.

The Recreation Facility and Programming Master Plan (RFPMP) was updated in 2015 and covered indoor and outdoor (parks) recreation facilities. The RFPMP was followed by the Aquatics Facilities Strategy in 2021 and an Arena Strategy in 2019. In accordance with the recommendations of those studies, the City will be undertaking a Multi-Purpose Facility Feasibility Study. City is currently updating the RFPMP and it is anticipated for Q4 2025 to provide a City-wide updated perspective of recreation needs and facilities.

The City developed an Urban Forest Management Plan (UFMP) in 2011 which provided an estimate that there were 300,000 publicly and privately owned trees in the City providing 15-17% tree canopy. The UFMP established a tree canopy target of 30% and in 2017 Council adopted a Tree Management Framework to help achieve that target. In 2024, staff estimated that the tree canopy had reached 22.4% and Council adjusted the canopy target to 25%, due to the City's existing land constraints. It is recommended that the UFMP be updated every 10 years, informed by an aerial inventory or field data collection. Improved data will enhance the UFMP's ability to address pest and disease threats, and to increase resilience through species diversity.

In 2024, the City developed a Waterfront Access Master Plan (WAMP) recommending access improvements to beaches, boat launches, lookouts and stairs along 8.75km of shoreline within the City's urban boundary. It is recommended that the WAMP be updated every 10 years in consideration of changing lake levels, weather patterns and community use patterns.

Table 17-2 summarizes the City's existing master plans and update frequencies. It is recommended the City formalize the scope and frequencies for master plan updates for the assets and services listed in Table 17-2, as well as for assets and services that are not currently covered by a master plan, but for which demand and growth forecasts are needed. Additional master plans that the City is considering, include:

- Horticulture Management Plan
- Beach Strategy

Recommendations:

i. Formalize scope and frequency for master plan updates related to services listed in Table 17-2, as well as for assets and services that are not currently covered by a master plan.

ii. Proceed with planned master plan updates in accordance with existing practices (Table 17-2).

iii. As part of each master plan's public engagement activities, consider how public input on LOS can also be obtained. (For more information, refer to Section 17.1.4.)

Table 17-2 Recommended Master Planning Practices

Service / Asset Scope	Update Frequency	Master Plan Last Completed
Water Master Servicing Plan	10 years for plan 5 years for model	2026 (projected)
Wastewater Master Servicing Plan	10 years for plan 5 years for model	2027 (projected)
Stormwater Master Servicing Plan	10 years for plan 5 years for model	2028 (projected)
Transportation Master Plan (TMP)	5-10 years	2021
Active Transportation Master Plan	5-10 years (integrate into TMP)	2024
Recreation Facility and Programming Master Plan	10 years	2015, 2025 (projected)
Urban Forest Management Plan	Not defined*	2011
Waterfront Access Master Plan	Not defined*	2024

* City to define and formalize frequency

17.2 Decision-Making Strategies

The City has been working to formalize and streamline its AM decision-making strategies and has recently implemented an AM Decision Support System (DSS) to support capital planning and AM planning.

17.2.1 Decision-Making Framework

For this AM Plan, the City has applied a risk-based decision-making framework to optimize capital renewal planning. As explained in Section 17.1.5, there is a need to review and calibrate the consequence categories, weights and scoring criteria. It is also recommended that the City extend the risk framework to consider other types of failures, such as capacity or function failures, as well as risks related to specific external threats, such as extreme weather events or cyber attacks. These types of risks should be tracked in a risk register with risk treatments flowing into the overall decision-making process.

See Section 17.1.5 for AM improvement recommendations.

17.2.2 Financial and Funding Strategies

It is recommended that the City continue to integrate and create alignment between the current financial plans and the AM plan. This includes developing long-term forecasts for all asset classes in alignment with the lifecycle strategies outlined in the AM plan.

Capital and operating budget accounts should reference:

- Assets or asset categories that are supported by the account
- Asset lifecycle stage (planning, acquisition, upgrade, renewal, operation, maintenance, disposal) that is supported by the account

The amounts budgeted should correspond with the costs estimated in the AM Plan. It is recommended that the City formalize the types of costs to be included in AM planning and forecasting for each asset type and lifecycle stage. For example, replacement costs should include:

- Installation labour, equipment and services
- Purchase of new asset
- Disposal of existing asset
- Contingency costs (%)
- Engineering, design, permits, utility relocation (%)

These costs should be reflected in needs estimates from condition assessments and master plans.

It is also recommended that the City formalize how growth in the asset portfolio is estimated for each asset type, and how that growth is to be reflected in the operations, maintenance and renewal needs forecasts.

Recommendations:

i. Ensure that capital and operating budget accounts align with the AM Plan by referencing asset or asset categories, as well as asset lifecycle stages.

ii. Formalize the types of costs to be included in AM planning and forecasting for each asset type and lifecycle stage (e.g. installation, purchase, disposal, contingency, soft costs). These costs should be reflected in needs estimates from condition assessments and master plans.

iii. Formalize how growth in the asset portfolio is estimated for each asset type, and how that growth is to be reflected in the operations, maintenance and renewal needs forecasts.

iv. To improve strategic planning and minimize disruptions to the public, businesses, and homeowners, the City should adopt a corridor-based approach to asset management. Instead of evaluating water, wastewater, stormwater, and transportation needs separately, this approach will coordinate infrastructure projects across multiple services within shared corridors.

v. Align project timelines and assess the impacts of advancing or delaying work to optimize efficiency, reduce the frequency of road closures and service interruptions, and ensure decisions consider costs, service levels, and public convenience.

17.2.3 Reliability Engineering

Reliability engineering is the systematic application of engineering principles and techniques, throughout the product lifecycle, to ensure that a system or asset has the ability to perform a required function, under given conditions, for a given time interval. It uses techniques to predict potential failures, understand the causes behind them, and develop strategies to prevent or mitigate such failures.

The City is implementing a Computerised Maintenance Management System (CMMS), which will be used to track asset failures, repairs and maintenance activities.. This data will enable to the City conduct reliability engineering analysis and implement a proactive maintenance program. For example, the City is tracking how watermains fail (i.e., ring crack, longitudinal crack, etc.) and are working to compile the data to inform decision making in the future.

It is recommended that after the CMMS has been implemented and stabilized, the City explore reliability engineering improvement opportunities by conducting a reliability engineering maturity assessment, establishing goals for its reliability engineering program, then developing a strategy and roadmap for implementing reliability engineering at the City. The roadmap may recommend development of a service reliability framework, service reliability plans, resiliency plans and contingency plans.

Recommendation:

i. After the CMMS has been implemented and stabilized, develop a Reliability Engineering Strategy and Roadmap, including a maturity assessment and goals for the program

17.2.4 Operations and Maintenance

Operations and maintenance (O&M) activities and costs will be tracked in the CMMS, which is currently being implemented at the City. In the CMMS, work orders will reference specific assets to enable actual O&M lifecycle costs to be determined by asset and asset category and thus enable forecasting of future O&M costs.

In preparation for availability of this data, it is recommended that the City establish a framework for O&M planning, for example, formalizing the need for each service area to establish O&M plans, standard operating procedures, lock-out tag-out procedures, and performance metrics. The O&M framework may identify a need for service reliability plans, resiliency plans and contingency plans, as referenced in Section 17.2.3.

Recommendations:

i. Complete implementation and stabilization of CMMS and work order management processes
ii. Establish a framework for O&M planning
iii. Establish a plan for developing and updating the plans and procedures defined in the O&M planning framework
iv. Developing and updating the plans and procedures

17.2.5 Capital Works Strategy

The City recently transitioned to multi-year budgeting process, which includes 10-year capital plans. Ten-year capital needs forecasts are also required by O.Reg. 588/17 to be included in AM Plans.

In addition, the City recently implemented an AM DSS to support develop of capital plans. The software is being configured to optimize capital plans using a risk-based approach. As explained in Section 17.1.5, there is a need to review and calibrate the consequence categories, weights and scoring criteria.

There is also a need for the City to extend the risk-based decision-making framework to consider other types of failures, such as capacity or function failures, as well as risks related to specific external threats, such as extreme weather events or cyber attacks.

Currently, the DSS is primarily focused on existing assets, particularly renewals and replacements. However, to ensure a more comprehensive asset management approach, the City needs to develop a strategy for incorporating infrastructure expansion and other lifecycle activities—including non-infrastructure solutions, disposals, growth-related needs, and service improvements—into its decision-making framework

Recommendations:

i. Continue developing 10-year capital plans according to its current multi-year budgeting process while also advancing strategies to integrate infrastructure expansion, disposals, non-infrastructure solutions, and service improvements into the AM DSS. See also Section 17.1.5 for recommended improvements to the City's risk-based decision-making process.

17.3 Asset Management Enablers

These initiatives form the foundation for the City's AM practices.

17.3.1 AM Resources

The City has established an Asset Management Working Group (AMWG) which includes representatives from across the organization. The AMWG is a forum for organization-wide coordination and collaboration on AM frameworks, standards and processes. The AMWG also provides recommendations to the Senior Leadership Team (SLT) on AM policy and strategies.

The City's asset management (AM) activities are jointly supported by the Financial Management Services (FMS) team and the Asset Management and GIS (AM and GIS) section of the Engineering, Facilities, and Environmental Services Department (EFES). Together, these teams ensure a coordinated approach to AM by integrating financial planning, budgeting, and risk-based asset management strategies. The AM and GIS section focuses on AM frameworks, standards, and data stewardship, while the FMS team plays a critical role in capital planning, funding allocation, and long-term financial sustainability to align investment decisions with asset lifecycle needs. Additionally, the EFES team serves as the administrator of the AM DSS software, overseeing its configuration, optimization, and application in decision-making processes. Specific roles include:

- Asset Management team
  This team stewards AM frameworks, standards and processes, administers the AM DSS and leads AM initiatives, such as development of AM Plans. This team also facilitates the activities of the AMWG.
- GIS team
  This team manages the GIS database and applications. The GIS database is the City's designated master repository for asset data. This team digitizes asset data from new construction and assumption assets.
- Finance Team
  This team plays a critical role in capital planning, budgeting, and long-term financial planning. It ensures financial sustainability by integrating AM priorities into multi-year financial strategies, supporting investment decisions, and aligning funding allocations with asset lifecycle needs.

An AM Planning Governance Model was established in 2024 establishing roles and responsibilities for updating asset data and developing capital plans. As part of the ARMS project, training is being provided to staff to ensure that they are able to update asset data and develop capital plans in accordance with their assigned roles. On-going resource capability and capacity needs will be monitored following as the ARMS AM planning and CMMS systems are rolled out.

As the organization matures in its AM practices, the City's AM needs may change as follows:

- The City may need additional capacity and capability to support more advanced analytics and forecasting. The data and tools for such analytics have not previously been available, so such resources were not needed. These resources would be needed to realize the benefits of the investments in ARMS.
- City maintenance staff may need capacity to capture data. The ARMS requires more robust data capture than in the past, and City management and staff should recognize that this may affect maintenance capacity.

Recommendations:

i. Monitor the need for additional capacity and capability to conduct AM analytics and forecasting.
ii. Monitor the need for additional capacity to accommodate the increased data capture requirements in maintenance areas.

17.3.2 Business Processes

An AM Planning Governance Model was established in 2024 establishing roles and responsibilities for updating asset data and developing capital plans. The Governance Model included business processes for capital planning; however, business processes were not mapped and detailed for asset data updates. It is recommended that business processes be detailed for asset data updates.

As part of the CMMS implementation, business processes have been documented for

- Service request management
- Work order management
- Stores management
- Work order time reporting and payroll
- Billable work orders
- Fuelling

Recommendations:

i. Assign responsibility for review and update of maintenance business processes.
ii. Review and update the AM Planning Governance model in accordance with the designated frequency (every 2 years).
iii. Establish business processes for asset data updates (e.g., tracking work completed for natural assets and storm drains).

17.3.3 Information Systems

As part of the ARMS project, the City has implemented an AM DSS to support capital planning and is in the process of implementing a CMMS. Both systems pull asset data from the City's enterprise GIS, which acts as the organization's master asset register.

The CMMS is integrated with the City's financial system for accounting, purchasing and payment processes.

Capital projects approved in the AM DSS will be transferred to the CMMS as work orders to track completion status. It is recommended that in the future the City consider tracking and managing complex capital projects in a Project Management Information System (PMIS) instead of the CMMS.

The City tracks Tangible Capital Assets (TCA) for financial reporting in a dedicated application, which is not integrated with the financial system, the AM DSS or the GIS. Moreover, the asset register in the TCA application is not consistent with the master asset register in the GIS and requires reconciliation. In addition, processes are needed to ensure that the data sets are kept consistent.

Recommendations:

i. Continue implementing and refining ARMS for capital planning and work order management. See next section for data improvements.
ii. Consider implementing a PMIS to track and manage execution capital projects. PM processes should be formalized for implementation.
iii. Review TCA data, processes and software application to identify potential improvements to TCA reporting practices.

17.3.4 Asset Data

Table 17-3 shows the current state of the City's asset inventory, condition and replacement value data, and recommends data improvements.

Inventory update responsibilities are defined in the AM Planning Governance Model; however, as explained in Section 17.3.2, it is recommended that the City establish business processes for asset data updates.

The table also shows that there is a need for the City to formalize condition assessment protocols and frequencies. This is aligned with the recommendation in Section 17.1.3.

Moreover, although replacement values were estimated for this AM Plan, there is a need for the City to formalize update frequencies for these values and unit costs.

As explained in Section 17.3.3, there is also a need to reconcile the TCA register with the master asset register, and to establish processes to keep the two asset registers consistent.

Recommendations:

i. Establish business processes for asset data updates (see also Section 17.3.2).
ii. Formalize condition assessment protocols and frequencies (see also Section 17.1.3).
iii. Formalize update frequencies for replacement values and unit costs.
iv. Fill data gaps as identified in Table 17-3.
v. Ensure all data collected is in a digital format to allow for improved management (i.e., where possible convert existing pdf reports into digital format).
vi. Reconcile the TCA register with the master asset register, and to establish processes to keep the two asset registers consistent (see also Section 17.3.3).
vii. To ensure the accuracy, reliability, and consistency of asset registry data, it is recommended that the City implement a Quality Assurance/Quality Control (QA/QC) process. This process will help maintain data integrity, minimize errors, and support informed decision-making for asset management.

Table 17-3 Current State of Asset Data

Service	Asset	Inventory Data	Age Data	Condition Data	Replacement Value	Improvement Recommendations
Water	Mains	Complete	Complete, but reflects original installation	Based on age and break history	Unit costs updated annually	Update demand requirements to clarify capacity improvements.
	Hydrants	Complete, including connection type (Stortz or standard)	Complete	**None** (replaced with mains)	Included with mains for capital planning	
	Valves	Complete	**Mostly complete**	**None** (replaced with mains)		
	Meters	Incomplete. Data extraction from existing inputting application needs refinement	Complete	Based on age	Unit costs updated for AM Plan updates	
	Bulk Water Station	Complete, by building and process system	Available at facility level, but limited dates for component renewals	Completed with Building Condition Assessment	Unit costs updated for AM Plan updates	City to track renewal history at component level
	Booster Station	Complete, by building and process system		Complete (2011)	Unit costs updated for AM Plan updates	Condition assessment needed, along with establishment of update frequency
Wastewater	Mains	Mostly complete materials and separation status incomplete	Mostly complete	PACP based on Zoom camera and CCTV	Unit costs updated annually	Update demand requirements to clarify capacity improvements.
	Maintenance Holes	Complete	Complete	MACP based on Zoom camera	Included with mains	

Service	Asset	Inventory Data	Age Data	Condition Data	Replacement Value	Improvement Recommendations
	Pumping Station	Complete, by building and process system	Complete	**None**	Unit costs updated for AM Plan updates	Condition assessment and assessment frequency needed
	Storage Facility	Complete, by facility	Complete	**None**	Unit costs updated for AM Plan updates	Condition assessment and assessment frequency needed
Stormwater	Mains	Mostly complete. Materials incomplete and some ownership status unresolved	Complete	PACP based on Zoom camera and CCTV	Unit costs updated for AM Plan updates	City to track renewal history, if applicable
	Maintenance Holes	Complete	Complete	MACP based on Zoom camera	Included with mains	
	Oil & Grit Separators	Complete	Complete	**None**		Condition assessment and assessment frequency needed
	Ditches	Incomplete. Data is mostly derived from old information.	**None**	**None**		Consider condition assessments on a consistent frequency for critical locations.
	Open Channels	Complete	**None**	**None**		Condition assessment and assessment frequency needed
	Constructed Wetlands	Complete	Complete	**None**		Condition assessment and assessment frequency needed
	Stormwater Ponds	Complete	**artially Complete**	**None**		Condition assessment and assessment frequency needed

Service	Asset	Inventory Data	Age Data	Condition Data	Replacement Value	Improvement Recommendations
Transportation	Roads	Complete	Complete, **but reflects last work date or renewal date and maybe not install date**	Complete, updated every 3-5 years	Unit costs updated annually	Convert old historical renewal data from dTIMS and Roadmatrix into DOT treatment types. Update ESLs to reflect deterioration curves for each type of road. Add the MMS classes into central repository.
	Sidewalks	Complete	Complete	Complete, updated annually	Unit costs updated annually	
	Trails	Partially Complete	Partially Complete	Partially complete, no update frequency		City to establish condition assessment and frequency
	Traffic Signs	Mostly complete. Data not updated regularly since last inventory done.	Incomplete	Complete, updated annually (retro-reflectivity)	Unit costs updated for AM Plan updates	--
	Traffic Signals	Complete	Complete	Complete, update annually	Unit costs updated for AM Plan updates	These assets are managed by the Region under contract.
	Streetlights - Heads Poles Wiring	Complete Mostly complete Based on Poles	Complete **No data** **No data**	Based on age **No data** **No data**	Unit costs updated for AM Plan updates	Assess condition of poles (and wiring if possible)
Structures	Vehicular Bridges & Culverts*	Complete, by structure	Complete	Complete	Unit costs updated for AM Plan updates	
	Pedestrian Bridges	Complete, by structure	Complete	Complete	Unit costs updated for AM Plan updates	

Service	Asset	Inventory Data	Age Data	Condition Data	Replacement Value	Improvement Recommendations
	Retaining Walls	Complete, by structure	**Partially complete**	**None, OSIM reports will incorporate these in the future.**		Condition assessment and assessment frequency needed
Buildings and Facilities	All	Complete, at component level	Complete	Complete	Complete	Align BCA recommended projects to Asset IDs for each facility to enable FCI score development Update BCAs at least every 5 years.
Fleet	All	Complete, at unit level	Complete	By age	By equipment type	City to establish condition assessment protocols (incorporating milage), and establish unit costs by equipment type (instead of using purchase cost)
Culture	Carousel	Complete	**Year of last renewal sourced from TCA data**	By years since last renewal	Complete	City to track renewal history in master asset register
	Lock Walls	Complete	Complete, **but reflects original installation, not renewal date**	Complete for above ground segments	Complete for above ground segments	City to track renewal history
	Public Art	Complete		Complete	Mostly complete	City to track renewal history
Fire	Facilities	Complete, at component level	Complete	Complete	Complete	Align BCA recommended projects to Asset IDs for each facility to enable FCI score development Update BCAs at least every 5 years.

Service	Asset	Inventory Data	Age Data	Condition Data	Replacement Value	Improvement Recommendations
	Fleet	Complete, at unit level	Complete	By age	By equipment type	Incorporate milage in fleet condition assessment in the future.
IT	Hardware	Complete	Complete	By age	Complete	
	Network	Complete	Complete	By age	Complete	
	Software	Complete (enterprise systems)	Complete	By age	Complete	
Natural Assets	Forestry	Incomplete. Data is actively being updated	**No Data**	**Mostly incomplete**	Complete	Condition assessment and assessment frequency needed
	Coastal Assets - Protected	Complete	Complete	**No data**	Complete	Condition assessment and assessment frequency needed
	Coastal Assets - Unprotected	Complete	n/a	**No data**	Complete	Condition assessment and assessment frequency needed
	Woodlots & Open Spaces	**No data**	n/a	**No data**	**No data**	Collect inventory and condition data. Establish condition assessment protocols.
	Water Bodies	**No data**	n/a	**No data**	**No data**	Collect inventory and condition data. Establish condition assessment protocols.

Service	Asset	Inventory Data	Age Data	Condition Data	Replacement Value	Improvement Recommendations
	Water Courses	In Watercourse Flooding and Erosion Control Report, but **not in asset database**	n/a	Complete (2015), **but requires update**	**No data**	Establish inventory data in master asset register (GIS). Update condition data and establish condition assessment protocols. Incorporate track restoration activities into inventory.
	Natural Wetlands	**No data**	n/a	**No data**	**No data**	Collect inventory and condition data. Establish condition assessment protocols.
Parking	Parking Garages	Complete, at component level	Complete	Complete	Complete	
	Parking Lots	Complete, by lot	**Mostly complete**	**Mostly complete**	Complete	Collect condition data. City to consider linking parking lots with facilities / parks and linking lighting with parking lots Establish assessment protocol for assets
	Pay & Display	Partially Complete	Complete	By age	Complete	Review and update parking meter inventory and establish process for adding assets when they come online
Parks	Amenities	Complete	Complete	By age	Complete	

Service	Asset	Inventory Data	Age Data	Condition Data	Replacement Value	Improvement Recommendations
	Piers	Complete	Complete	By age	Complete	
	Benches	Partially complete	**Partially complete**	**Mostly complete**	Complete	Complete condition data
	Site Works / Land Improvements	Partially complete	Partially Complete	By age	Complete	Assess condition of assets using a method other than age for at least the high valued assets.
	Lighting - Heads Poles Wiring	Complete Complete Based on poles	**Mostly Incomplete** **Mostly Incomplete** **No data**	**By age** **No data** **No data**	Complete Complete Complete	Complete age and/or condition Assess condition of poles (and wiring if possible)
	Park Paths and Walkways	Complete	**Mostly Incomplete**	**Mostly Incomplete**	Complete	Complete condition data
	Stairs	Mostly Complete	**Mostly Incomplete**	None	**Mostly Incomplete**	Field data collection needed to complete inventory, service life, condition and replacement value

* Excludes driveway culverts

17.3.5 Continuous Improvements

To ensure the City's AM practices are aligned with best-in-class practices it is important to make a concerted effort to continually improve the City's documentation, data, tools, and resource availability. Recommendations to do this are listed below.

Recommendations:

i. Establish and regularly update an AM Improvement Strategy and Roadmap.

ii. Establish processes for measuring and managing the use and effectiveness of the AM DSS and CMMS, including compliance with defined business processes, validity of data, and user perception of the new tools and processes. Metrics should be reported to the AMWG and SLT for review and action.

iii. Establish processes for City staff to report issues with AM processes, tools and data to AMWG and SLT for review and action.