

2024 City of Peterborough Asset Management Plan

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I. Overview

This asset management plan (the Plan) supports and promotes evidence-based decision making and the development of strategies to extend the lifecycle of assets while maintaining services and reducing risks. The Plan benefits the City of Peterborough (the City) by looking to the future and identifying the best places to invest limited dollars to provide the greatest benefit to residents, visitors, and businesses.

The Plan reviews the growth and demand that the City is expected to meet based on the City's approved Official Plan. Peterborough currently acts as a gateway to the cottage communities, a commuter area to and from the GTA and a young adult hub due to post secondary institutions. These features are expected to draw more people to the City in the next 20 years. The expected growth has real implications on how the City will develop and maintain its asset base.

Asset management requires an understanding of what we own, what services we are going to deliver and how we are going to deliver it. To do this the Plan will review the current state of the infrastructure, the levels of service (LoS) delivered, the strategies used to manage assets, an assessment of levels of risk, and the funding sources used to finance these strategies. This Plan is a living document and is intended to be monitored annually with full updates every five years. This Plan includes the following fifteen (15) service areas:

- Roads & Related assets
- Stormwater
- Wastewater
- Transit
- Solid Waste Management
- Community Housing
- Community Recreation
- Airport
- Urban Forest
- Social Services – Day Care
- Arts, Culture & Heritage
- Public Works
- Emergency Services – incl. Police and Fire Services
- Information Technology Services
- Administration

Potable water assets are owned by the City, however management of water assets, including asset management planning activities are currently the responsibility of a separate Municipal Service Corporation, Peterborough Utilities Company.

Incorporating green infrastructure assets, including natural assets, into asset management plans is relatively new for many municipalities. The City of Peterborough incorporates some enhanced green infrastructure assets into the existing Plan (e.g., wet/dry stormwater ponds, street trees, park trees, parks and open spaces), however the co-benefits and services provided through an 'ecosystem' lens is not fully quantified and accounting practices for addressing natural assets are evolving. Staff are currently working on updating the

green/natural asset inventory which will assist in defining processes and methodologies for identification of assets, ownership boundaries, service(s) provided, condition, valuation (replacement cost vs. restoration costs) and risk management.

II. Plan Purpose

The asset management plan provides a means of guiding investment decisions to meet key strategic and operational goals. It communicates how the City's assets will be managed to achieve established service levels and targets. The Plan sets the foundation for making informed decisions and prioritizing investments by using asset data and service level objectives as evidence.

The Plan also:

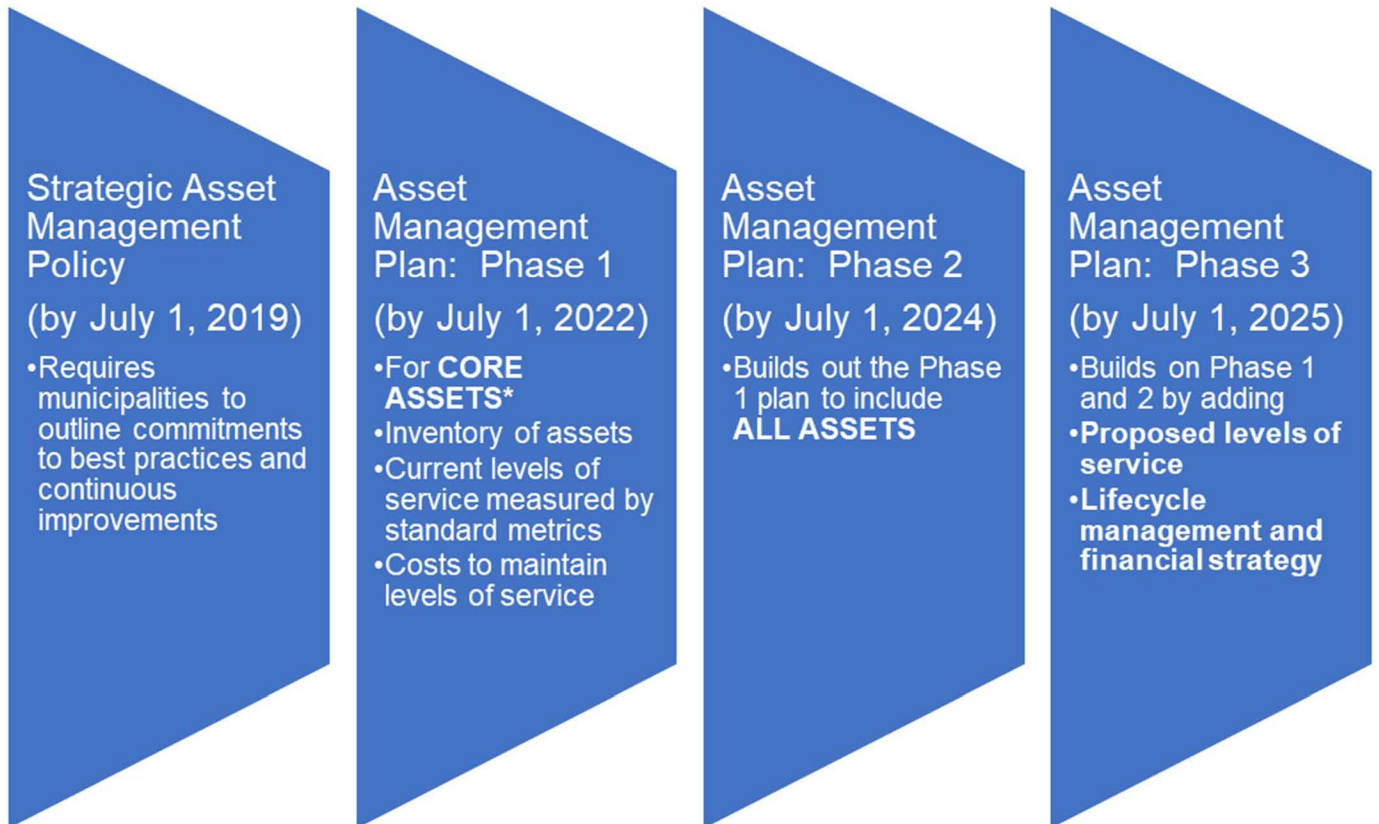
- Reports Council and stakeholder expectations related to asset management
- Provides as a reference for Council, Commissioners, Directors, Managers, and other City staff, the asset lifecycle activities currently in place to deliver services (operation, maintenance, rehabilitation, replacement, disposal, etc.) and the levels of service with current performance.
- Provides the planned approach to maintain assets in accordance with service level provisions, and the financial impacts to provide these services
- Allows the City to meet legislative asset management reporting requirements

The City will continue to apply asset management principals and develop a comprehensive asset management plan. This Plan will seek to prioritize investments over a 25-year period with major updates every five years.

III. Regulatory Asset Management Requirements

On December 27, 2017, under the *Infrastructure for Jobs and Prosperity Act, 2015*, the Province enacted Ontario Regulation 588/17, *Asset Management Planning for Municipal Infrastructure*. The regulation sets forth the following timelines:

Figure E1: Ontario Regulation 588/17 Requirements and Timeline



*Core assets are roads, bridges, stormwater and wastewater assets

The regulation also requires that every municipality's asset management plan be reviewed and approved by the municipal council.

In 2016, the City's Asset Management Policy and Procedure was approved by Council (Report USEC16-021) and complies with the regulation's requirements for the strategic asset management policy, as shown in Figure E1 above.

The intention of the regulation is not only to implement best practice asset management throughout the municipal sector but to also help municipalities better understand what services need to be supported over the long term. It focuses on levels of service and integrating lifecycle management, risk, and financial management to maximize the value on investments and return on ratepayers' dollars.

IV. Elements of the Plan

The 2024 Asset Management Plan provides details about the City's infrastructure (as of year-end 2022), estimated at a total replacement value of \$6.3 billion and contains the following sections:

- Executive Summary
- Introduction
- Levels of Service
- State of Infrastructure
- Asset Management Strategies
- Financial Summary
- Plan Improvement and Monitoring
- Conclusion

Individual Service Area Attachments 1 through to 15 are included as part of this Plan in Section 9.0 – Service Area Attachments. The attachments contain detailed information specific to the asset inventory, replacement costs, age, remaining useful life, condition ratings, current levels of service, asset management lifecycle strategies and risk strategies.

Attachments 1 through to 15 contain specific service area details for the following types of strategies:

- Non-infrastructure solutions
- Operations & Maintenance Activities
- Renewal/Rehabilitation
- Replacement
- Disposals/Abandonment
- Service Improvement Activities
- Growth Activities

City staff will continue to refine asset management strategies and associated costs to meet the new provincial asset management reporting requirements set forth in O. Reg 588/17.

The Plan's format aligns with the provincial "Building Together: Guide for Municipal Asset Management Plans". The Plan is also consistent with:

- Ontario Infrastructure for Jobs and Prosperity Act, 2015
- Development Charges Act, 1997 (Consolidated 2023)
- Requirements for the recording of Tangible Capital Assets (TCA)
- The City's TCA Accounting Policy (Policy 009)

V. Asset Management and Climate Change

The City applies several strategies to acquire, maintain, improve assets in a sustainable and effective manner. This is important as municipalities face increasing challenges with managing aging public assets in the face of increasing uncertainty from risks, including those related to the impacts of climate change.

The City is committed to considering climate change when planning asset lifecycle activities (e.g., design, maintenance, renewal, replacement, etc.). and is an important criterion in the decision-making framework. Climate change is also taken into consideration when developing proposed budgets and forecasts, when assigning useful lives and current replacement costs of assets (for asset management planning purposes), and in the risk management plan.

VI. Levels of Service

a) Overview

The City's core purpose is to provide services to stakeholders. Establishing levels of service (LoS) and tracking over time is essential to measuring the success of service delivery and asset management strategies.

When establishing levels of service, the following are taken into consideration:

- Protecting and upholding public safety
- Protecting the environment
- Regulated/legislated requirements
- Stakeholder expectations
- Vulnerabilities and mitigation approaches to impacts of climate change
- Level of service information provided in approved plans and studies

Levels of service reflect how the City delivers services from the perspective of the service user (Stakeholder LoS) and from the perspective of service delivery (Technical LoS). This section of the Plan includes information on current levels of service (both Stakeholder and Technical), performance measures, and trends in service delivery.

In this iteration of the Plan, performance measures and targets are set to current levels of service and will document performance trends against those measures. At a minimum, legislated/regulatory levels of service will be reported and tracked as part of the levels of service review.

Proposed levels of service (which may or may not differ from current levels of service), will be discussed in future Plans and reported prior to the July 1, 2025 deadline as prescribed in the asset management planning regulation O.Reg. 588/17.

b) **Summary of Current Performance**

The City currently meets all regulatory/legislated requirements relating to provision of services. Performance compared to service areas previously reported in the 2021 Asset Management Plan is mostly neutral but also indicates there were improvements made towards achieving targets in some service areas.

Detailed information about service area levels of service and current performance can be found in Section 9.0 – Service Area Attachments of the Asset Management Plan.

VII. The State of the City's Infrastructure

The State of Infrastructure summarizes the quantity of assets in data inventories, provides a replacement cost valuation of the assets, and summarizes the overall condition of each asset or asset class.

This Plan seeks to answer the following questions of asset management pertaining to City infrastructure:

- What do we own?
- What is it worth?
- How old is it and what is the remaining useful life?
- What is its condition?
- What is the risk rating? (i.e., risk impact should the asset fail)

a) **What do we own?**

A consolidated list of assets included in the Plan can be found in Appendix A – Assets Included in the Plan.

b) **What is it worth?**

The 2024 Plan currently includes fifteen (15) service areas with an estimated asset replacement value of \$6.3 billion. The highest valued service areas are Wastewater (\$1.86 billion), Stormwater (\$1.77 billion), and Roads & Related Assets (\$1.45 billion). Of the total estimated current replacement value of City assets (estimated \$6.3 billion), 80% (estimated \$5.1 billion) are classified as “core” assets (Wastewater, Stormwater and Roads & Related).

Figure E2 and Table E1 below summarizes the total asset replacement value by service area.

Figure E2: Asset Replacement Value by Service Area

**Replacement Value by Service Area:
(\$Millions)
Total: \$6,307M**

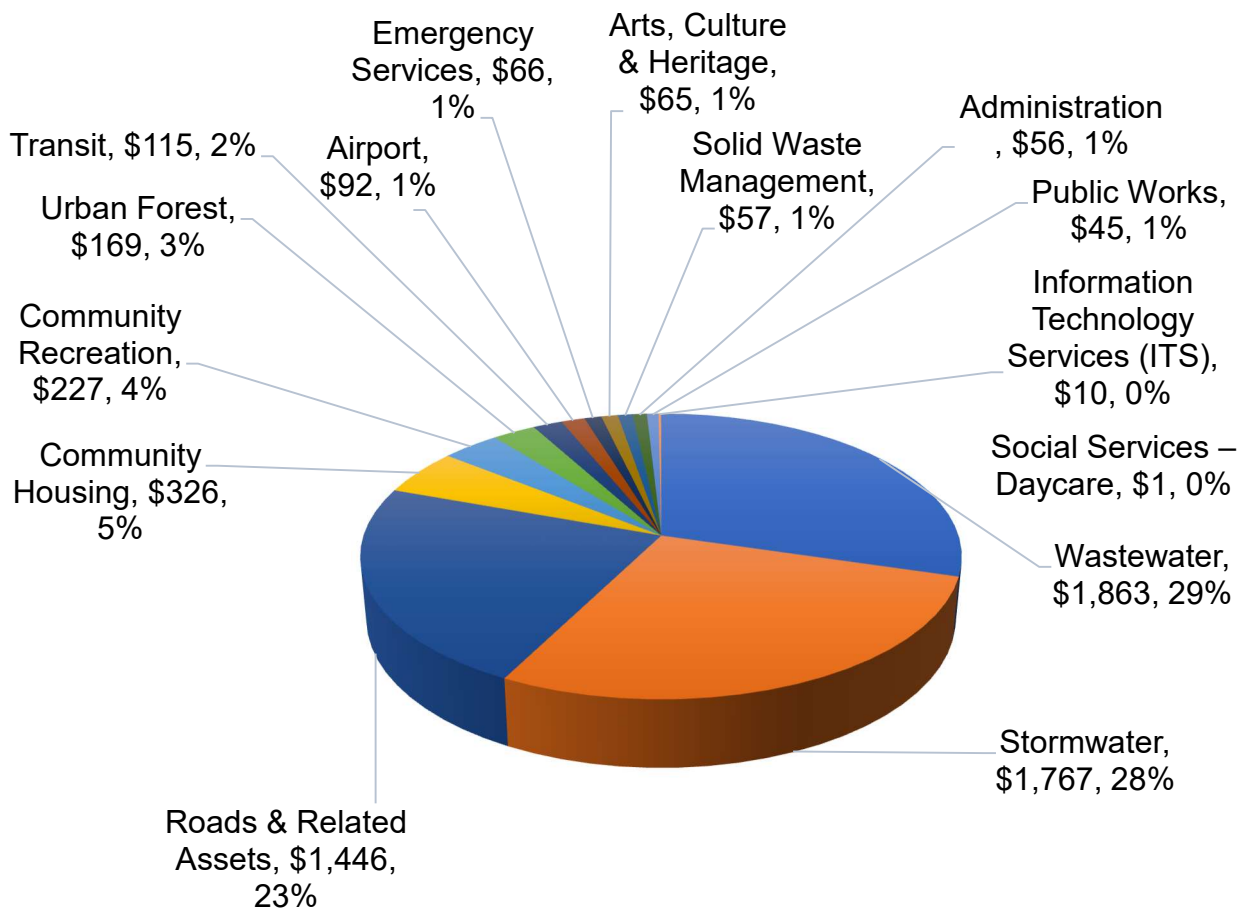


Table E1: Total Asset Replacement Value by Service Area

Service Area	2023 Replacement Value (\$Millions)
Wastewater (core asset class)	\$1,863
Stormwater (core asset class)	\$1,767
Roads & Related Assets (core asset class)	\$1,447
Community Housing	\$326
Community Recreation	\$227
Urban Forest	\$169
Transit	\$115
Airport	\$92
Emergency Services	\$66
Arts, Culture & Heritage	\$65
Solid Waste Management	\$58
Administration	\$56
Public Works	\$45
Information Technology Services (ITS)	\$10
Social Services – Daycare	\$1
Total Asset Replacement Value*	\$6,307

*May not add due to rounding

c) **What is the Age and Remaining Useful Life?**

A requirement of asset management planning is determining the remaining useful life of an asset based on generally accepted life spans for a given asset. It is important to note, that the age profiles are strictly based on the calculated age of the assets unless otherwise noted. The original useful life span of a given asset can be extended through maintenance and betterments. This process can extend the asset's ability to deliver a service beyond its original life span.

Service area age and remaining useful life details can be found within the respective service area attachments in Section 9.0 of this Plan.

d) **What is the Condition?**

The state of the City's assets is a snapshot in time and uses a blend of age-based data and observed data. Based on the total asset replacement value, approximately 79% (\$5.0 billion) of the City's assets are considered to be in fair condition or better.

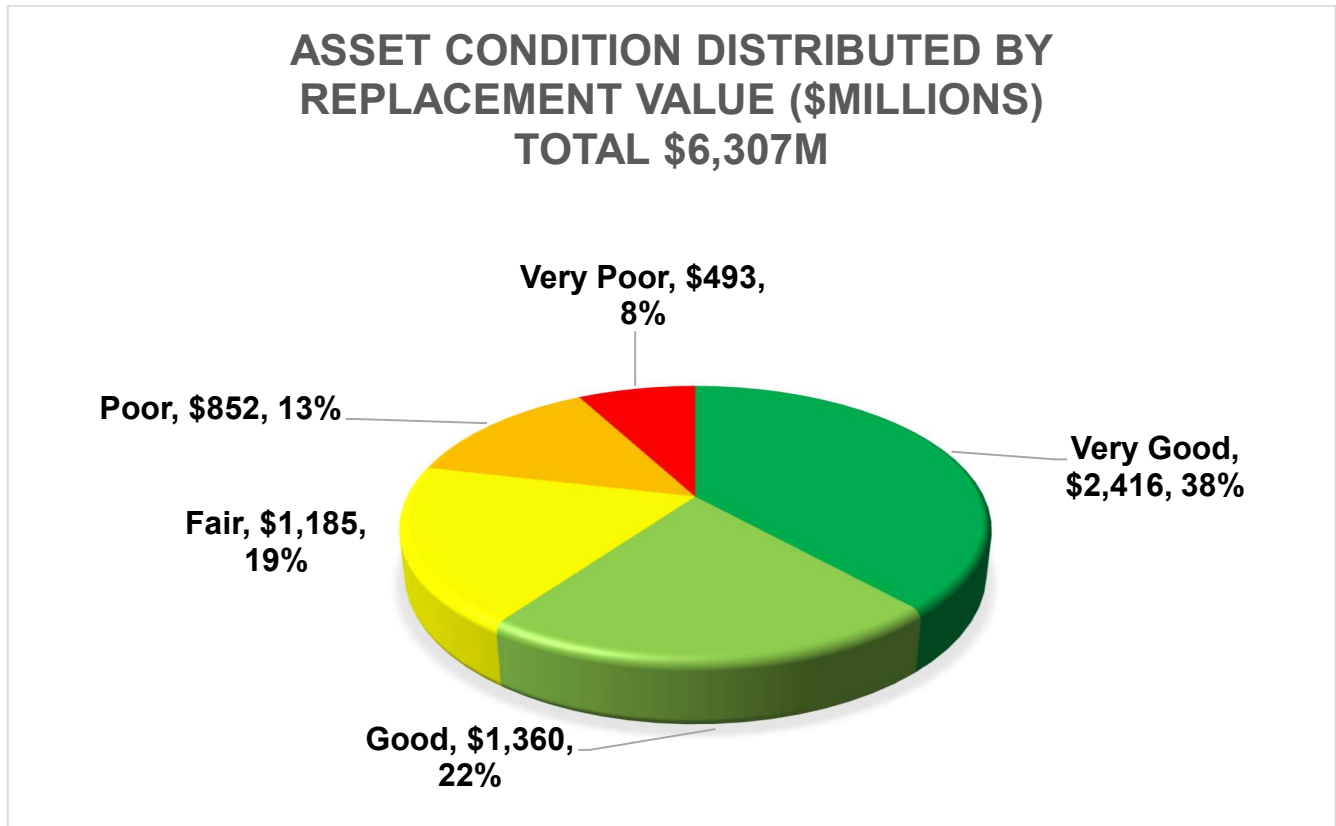
The City significantly invests in ongoing capital programs to maintain existing assets in acceptable condition and to deliver services at sustainable levels. Some of the capital programs planned over the 10-year forecast include a collector and local streets pavement preservation program with a total project cost estimated at \$50.6 million, an underground storm and sanitary pipe CCTV inspection program with an estimated total project cost of \$21.1 million, a fleet and equipment replacement program with a total cost estimated at \$22.9 million

and a sidewalk reconstruction program with an estimated total project cost of \$5.9 million. Without these ongoing investments, it would be expected that levels of service would notably start to decline over the long-term, exposure to risk would increase along with increased asset treatment costs.

Figure E3 below shows the distributed condition ratings and total replacement values of City owned assets included in this 2024 Plan.

Where assets may be rated poor or very poor (approximately \$1.3 billion or 21% of the City's total asset replacement value), the City ensures that these assets will not represent a hazard or pose a health and safety risk. Generally, these are assets that may not be performing as intended. For example, a road segment considered to be in very poor condition would typically require significant resurfacing treatment or asphalt replacement. This does not mean the road is 'unsafe' for use, it means the road is not providing the same level of service and ride quality as a road rated in fair condition would provide.

Figure E3: Overall Distributed Asset Conditions and Replacement Value



As noted above, an estimated 21% of assets with a replacement value of \$1.3 billion are in poor to very poor condition. To maintain established service levels and achieve performance targets, significant investments within the next decade will be needed to avoid further deterioration and/or possible service disruptions.

It is also important to understand that without applying the right treatment at the right time, options typically become more costly. Where lower cost treatments, such as road resurfacing, would significantly improve road surface conditions, not applying this treatment soon enough would result in requiring full asphalt replacement, and at a higher cost. Lifecycle activities, including treatment options are further discussed within individual service area attachments.

e) What is the Risk Rating?

The City has used a risk rating methodology to assign a risk score to each asset included in the asset management plan. The risk ratings are composed of two factors: asset condition and consequence of failure. The asset condition informs the likelihood that an asset will fail, and the consequence of failure informs the impact resulting from the failure. In addition to the asset condition, other asset information, such as size and material, was considered when assigning a risk score where possible. The consequence of failure of an asset is assessed on a 5-point scale that evaluates the impacts on the environment, society, finances, and reputation. It is important to understand that high-risk assets are those with high

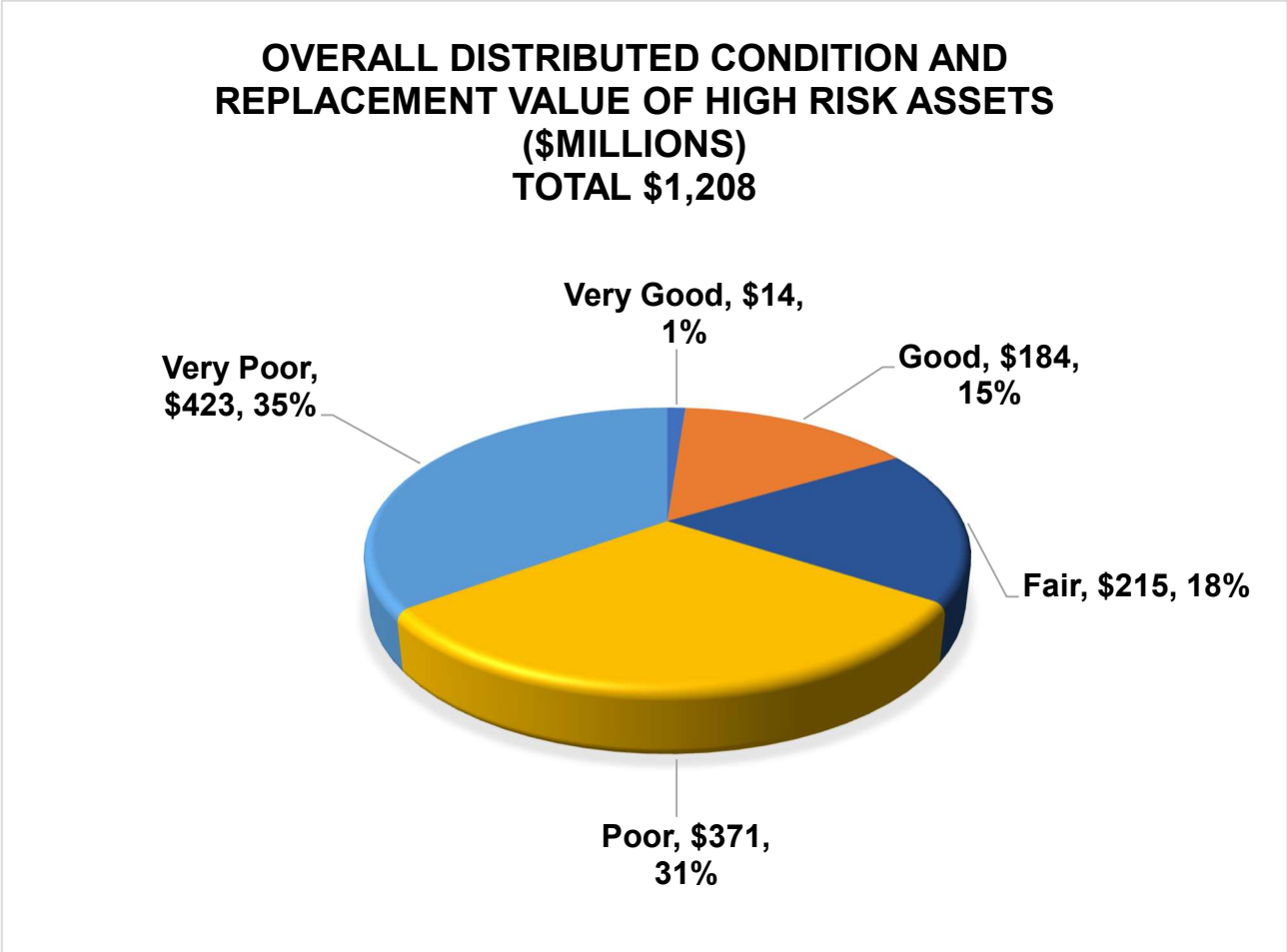
consequence of failure **and** high likelihood of failure (where likelihood is based on asset condition).

The value of high-risk assets in this Plan is an estimated \$1.2 billion (19% of total City asset replacement value).

Of the \$1.2 billion, an estimated asset replacement value of \$795 million are rated poor and very poor, with \$489 million (62% of total asset value in poor and very poor condition) being Roads and Related, Stormwater, and Wastewater assets.

Figure E4 below shows the overall distribution of high-risk assets by condition and replacement value.

Figure E4: Distributed Condition and Replacement Value of High-Risk Assets



High-risk assets that are most critical to service delivery should be prioritized. Where asset conditions continue to deteriorate, the risks to service delivery increases. With adequate investment levels, risk exposure is minimized, and the probability of service interruptions are lowered.

Currently, the Roads & Related Assets, Wastewater, and Stormwater service areas comprise of the largest portion (by replacement value) of high-risk assets in poor or worse condition. The City seeks to prioritize high-risk asset investment needs whenever feasible.

VIII. Future Demand and Emerging Challenges

There are several factors, challenges and trends that influence demand. Also known as demand drivers, these can significantly impact the services delivered by the City of Peterborough. Some examples of demand drivers include (but are not limited to):

- Changing population
- Changing demographics
- Stakeholder service priorities
- Aging assets
- Climate Change
- Legislation/Regulation
- Changing technologies
- Land use planning

Understanding the drivers and challenges that impact levels of service is a key step in forecasting and managing demand. Demand drivers may change the City's requirements for acquisition, operation, maintenance, renewal, or disposal of assets. Demand drivers impact the type of *services* that are delivered, which directly impacts the type of *assets* needed to deliver these services. The City reviews demand drivers through various strategic planning studies, development charges studies, etc. and considers options on how demand drivers will be affordably managed.

Some options (other than the acquisition/construction of new assets) that may be considered to manage demand include (but are not limited to):

- Sharing of services with other local boards, agencies and municipalities
- User fees/pricing
- Service hours of operation
- Restrictions of use (e.g., seasonal use of bridges or roads)
- Incentives for services (e.g., on/off peak times service charges for parking)
- Awareness/education to efficiently and effectively use services the City provides (e.g., plans that inform on stormwater management, energy reduction strategies, GHG reduction strategies)
- Provision of alternative services (e.g., encouragement of using public transit or other methods identified in transportation demand management studies)

It is also important to understand demand drivers and the potential risks they may pose, e.g., climate change. Effects of climate change poses significant risks to both assets and the services they provide and will need to be managed and monitored by the City regularly. High level risks and associated impacts to the City's ability to effectively deliver services are discussed within the individual Service Area Attachments. The City is working towards developing an Integrated Infrastructure Risk Management Plan in which the identification and management strategies of demand drivers and associated risks are better understood and documented.

IX. Financial Summary

Asset funding is often a complex process drawing from several revenue sources. The funding for the City's programs strives to maximize the use of external funding to limit the burden on taxpayers and ratepayers. However, ageing assets and population demographic changes will create a need to replace and expand the current asset base and requires adequate funding.

a) What is the Financial Shortfall?

The financial shortfall represents the unavailable renewal funding for lifecycle activities required to deliver current levels of service. Where a shortfall is identified, management strategies to balance service levels, costs and risks will be considered by staff and Council and incorporated into future plans when possible.

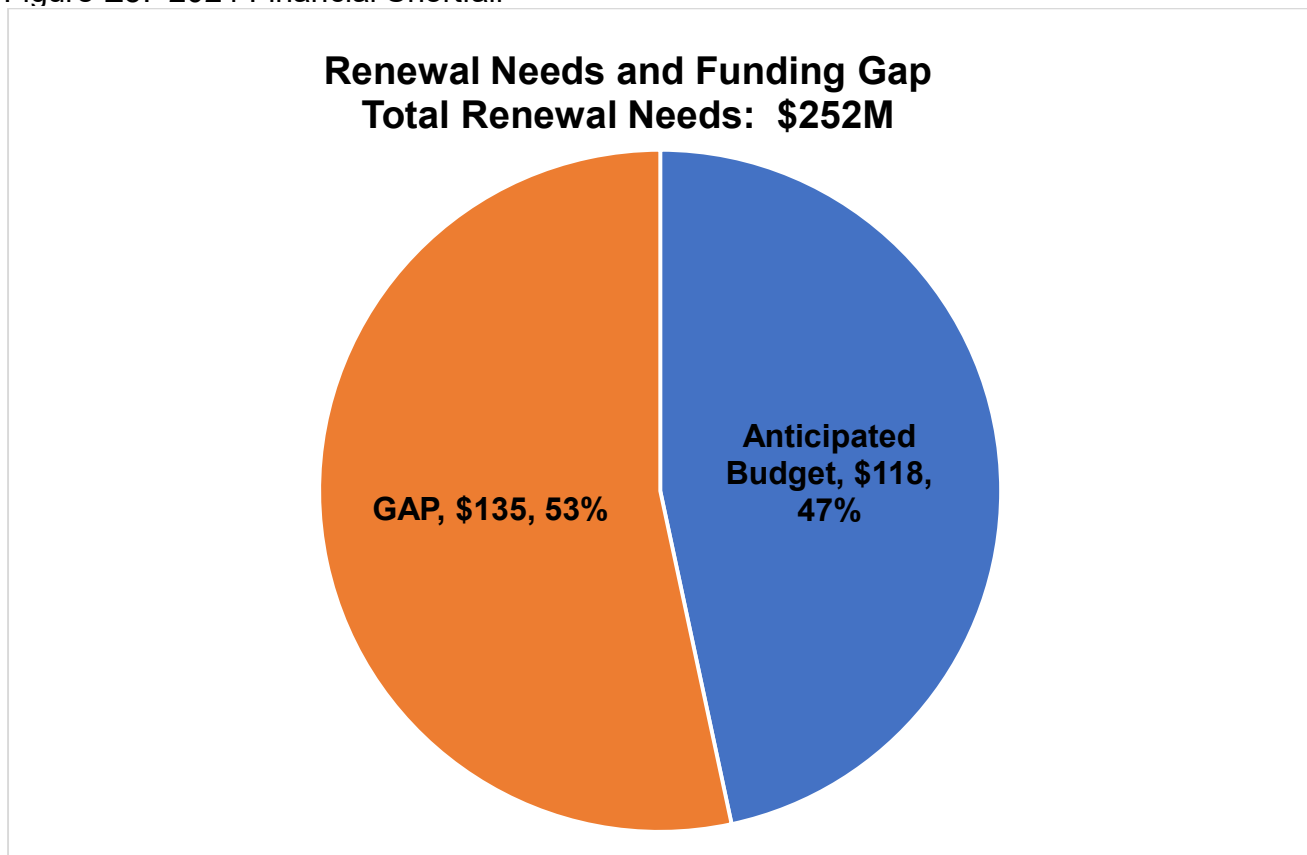
In this Plan, *investment needs* are the estimated lifecycle activity costs for all service areas reported in this Plan. These are based on a 10-year planning period and considers lifecycle costs, investments required to meet growth demands and to achieve 100% established levels of service.

The *anticipated budget* – is represented by the historical 3-year lifecycle costs funded in the City's capital budget. With the assumption that there will not be any significant impacts to revenue sources, this will be used as a baseline to calculate the financial shortfall.

The emphasis of the asset management plan is to communicate the consequences and risks that the shortfall may have on the services provided so that decision making is informed

For the service areas reported in this Plan, the annual lifecycle needs (averaged over 10-years) for existing assets and needs related to growth demands is an estimated \$252.4 million. The anticipated annual budget (estimate for forecasted expenditure) is \$117.8 million, leaving an average annual shortfall of \$134.6 million (as shown in Figure E5 below). With the City expected to experience increased demands such as growth, increased extreme weather events and growing asset inventories etc., without intervention, levels of service are likely to decrease over the long-term planning period.

Figure E5: 2024 Financial Shortfall



The City is currently implementing a variety of strategies to effectively address the increasing capital investment needs and the financial shortfall. Some of the key strategies include:

1. A Debt Management Policy and Capital Financing Plan to assist in financing capital works as presented in report CPFS12-011 Debt Management and Capital Financing Plan, (April 4, 2012) and amended through Report CLSFS23-033 (August 14, 2023)
2. Implementation of the City's approved Asset Management Policy and Procedure and Asset Management Plan which together provide guidance for capital budget planning through asset management principles
3. Review current levels of service for all service areas. Council approved metrics that measure the expected performance of delivering levels of service will influence prioritization of investments during the budget deliberation process.
4. Expand on the use of the existing multi-criteria analysis technique for prioritizing capital projects for all service areas. The analysis technique is intended to consider a range of qualitative and quantitative criteria and reflect the social, cultural, economic, and environmental characteristics of a project's purpose. This process provides transparency to critical/high priority investments and will support planning capital investments with the greatest cost benefit while balancing an acceptable level of risk.
5. Analyze and weigh benefits of maximizing existing revenue sources vs. the provision of current service levels. The City's ability to afford the current service levels will need to be examined in more detail to ensure sustainability or, if necessary, a reduction in

service levels is the more achievable option to avoid increases to user fees or increased property taxes.

X. Managing the Risks

Some of the overarching service area risks associated with the City's ability to deliver established service levels include:

- Insufficient funding levels
- Insufficient staffing and resources to implement lifecycle strategies
- Asset deterioration assessments/models are underestimated/miscalculated
- External/environmental factors such as climate change effects (more severe weather instances, increased demands due to growth)
- Acquisition of new assets

Impacts associated with above risks include:

- Further/accelerated asset deterioration
- Increased backlog of work
- Service interruptions due to poor asset conditions
- Increased treatment costs
- Changes to the level/degree of required asset treatment, requiring increased resources/costs (i.e., maintenance now needing replacement)
- Planned budget/needs forecast not reflective of actual asset needs
- Additional assets/expansion of services required
- Reputation/image negatively affected

Staff are working on developing a more detailed risk register in which risk identification, risk impacts, risk treatment plan and costs, and residual risk ratings will be documented in the asset management plan.

XI. Next Steps

1. The City is collaboratively working towards refining its asset management practices as well as aligning them with the ISO 55000 series of standards. Additionally, the City will work towards ensuring reporting requirements set forth in regulation O. Reg 588/17 *Asset Management Planning for Municipal Infrastructure* are satisfied by the stipulated timelines.
2. Staff will consult with the community to refine and evaluate Levels of Service and associated costs.
3. Complete standardized condition assessments of assets currently without inspected condition and regularly update existing assessments.
4. Develop comprehensive LoS Policy and Procedure.
5. Develop Asset Risk Management Policy and Procedures, which will improve probability assumptions used to determine risk ratings and implement consequence rating system procedures that are data driven

6. Enhance considerations of Climate Change and Sustainability risks
7. Improve the Optimized Decision-Making process including a policy and procedure.
8. Use the Plan to drive capital investment priorities.
9. Monitor progress of strategies and recommendations from AMP.

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1.0 Introduction

The services the City of Peterborough delivers depends on effectively managed assets. The effective management of these assets has a significant impact on the ability for the City to deliver services.

Incorporating an 'asset management lens' into the decision-making process involves the understanding of levels of service, cost of service, and risk, as depicted in Figure 1-0.

Managing the assets requires activities such as planning, purchasing, construction, maintenance, rehabilitation, and disposal. In order to continue to deliver the services stakeholders and businesses depend on day-to-day. The City must make the right investments at the right time in the right assets.

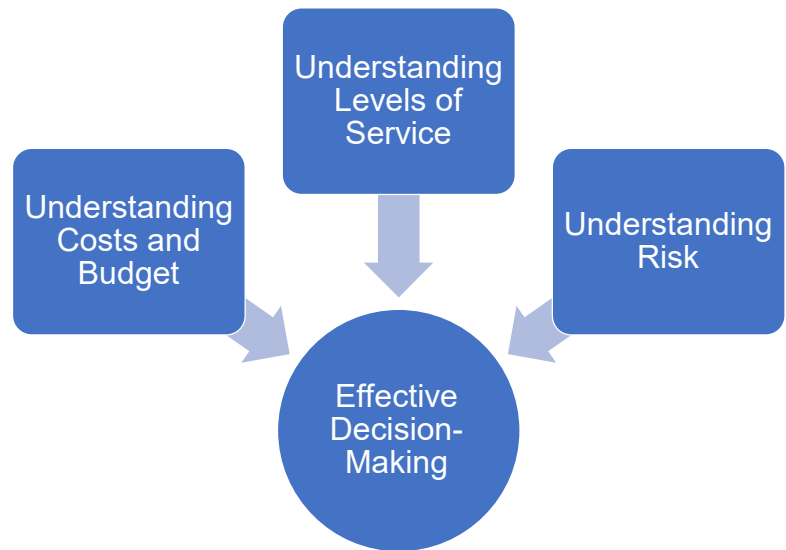


Figure 1-0: Asset Management Lens and Decision-Making

1.1 City of Peterborough Goals

The Official Plan states that 'Peterborough is a prosperous community, distinctive in its natural beauty, cultural heritage and strong sense of community. As a leader in environmental sustainability, growth in Peterborough uses infrastructure and land efficiently, promotes healthy lifestyles and incorporates green initiatives. The City will continue to develop as a complete, resilient and connected community that provides a high quality of life, supports a strong and diverse economy and promotes a unique, vibrant sense of place. Peterborough is equitable and accessible for all residents and visitors and celebrates its engaged, inclusive and diverse community'.¹ The City's Official Plan further details the City's goals for growth and outlines the steps needed to meet them.

The Strategic Plan² states that the Peterborough 2050 vision as 'build a future-ready City with a forward-looking, contemporary community, thriving in creativity and a modern economy. The Peterborough of tomorrow will be bold, innovative, progressive, caring, vibrant, inclusive, prosperous, and sustainable, a place that respects its past, heritage, culture, and readily embraces its future with excitement and renewed vigor. Leading today for tomorrow will ensure our City's fair share of respect and economic growth, locally as well as globally.' The Strategic Plan further details the four (4) strategic priority pillars:

- Growth & Economic Development

¹ City of Peterborough, City of Peterborough Official Plan, (Adopted April 2023),

² City of Peterborough Strategic Plan 2023-2050, (Approved April 2023)

- Infrastructure
- Community & Wellbeing
- Governance & Fiscal Sustainability

These pillars lay the foundation for the development of business and work plans for City departments as well as act as guiding beacons to achieve the Peterborough 2050 vision.

This asset management plan is intended to support these visions, goals and objectives of both the Official Plan and Strategic Plan.

1.2 Relationship with Other Corporate Planning Documents

The Plan considers the goals of several planning documents including the Official Plan and the City of Peterborough Strategic Plan, as well as other various master plans. Information gathered from these documents are included in the assessments and prioritization of asset investments and when defining level of service measures and targets.

Additionally, the Plan contains information that integrates with the budgeting process. The City presents the current year committed funding for both the operating and capital budget. A projected four-year, nine-year, and 24-year forecast is proposed for capital and 'other' capital projects only. The Plan is intended to influence budgets through various asset management strategies and processes such as, but not limited to, evaluating against defined levels of service measures and targets, risk assessment, alignment with climate change adaptation/mitigation strategies, etc.

1.3 The Plan Scope

For a list of service areas and assets included in the 2024 asset management plan, see Section 8.0 – Appendices, Appendix A – Assets Included in the Plan

Refer to Section 9.0 of this Plan for the complete service area analysis that discuss the following:

- Asset inventory
- Replacement cost
- Asset condition and remaining useful life
- Risk analysis
- Levels of service
- Asset management strategies and associated risks

The asset management plan excludes assets owned by other organizations that are funded by the City; however, all organizations are encouraged to align with the Plan's strategies where feasible.

The Plan is based on data as of December 31, 2023 and uses a lifecycle model to forecast renewal needs and other investment needs over a 10 and 25-year planning period. The long-term planning period used is intended to align with master plans and Development Charge Study forecasts and to inform the sustainability of the City's assets and services.

1.4 Council Presentation and Approval

To maintain visibility, transparency and accountability, the Plan including the state of infrastructure report will be updated and reported to council for approval annually, following the final phase implementation of O.Reg. 588/17 in 2025, and fully re-evaluated every five years. If during this timeframe, significant changes occur that will impact the asset management plan, an interim review may be undertaken. A proposed timeline for the Plan and related documents is shown in the table below.

Table 1-0: Asset Management Related Documents and Updates

Document	Frequency of Update
Asset Management Policy and Procedure	Reviewed every five years as required
Asset Management Plan	Annual review with full re-evaluation every 5 years
State of Infrastructure Report	Annual update with full re-evaluation every 5 years
Capital and Operating Budget	Annually

1.5 Developing the Plan

The Council approved Asset Management Policy and Procedure outlines how a constant and reliable asset management plan and effective budget will be delivered. The asset management workflow (Figure 1-1), which includes the asset management plan, is delivered with employee involvement as shown in (Figure 1-2) below.

Figure 1-1: Asset Management Workflow

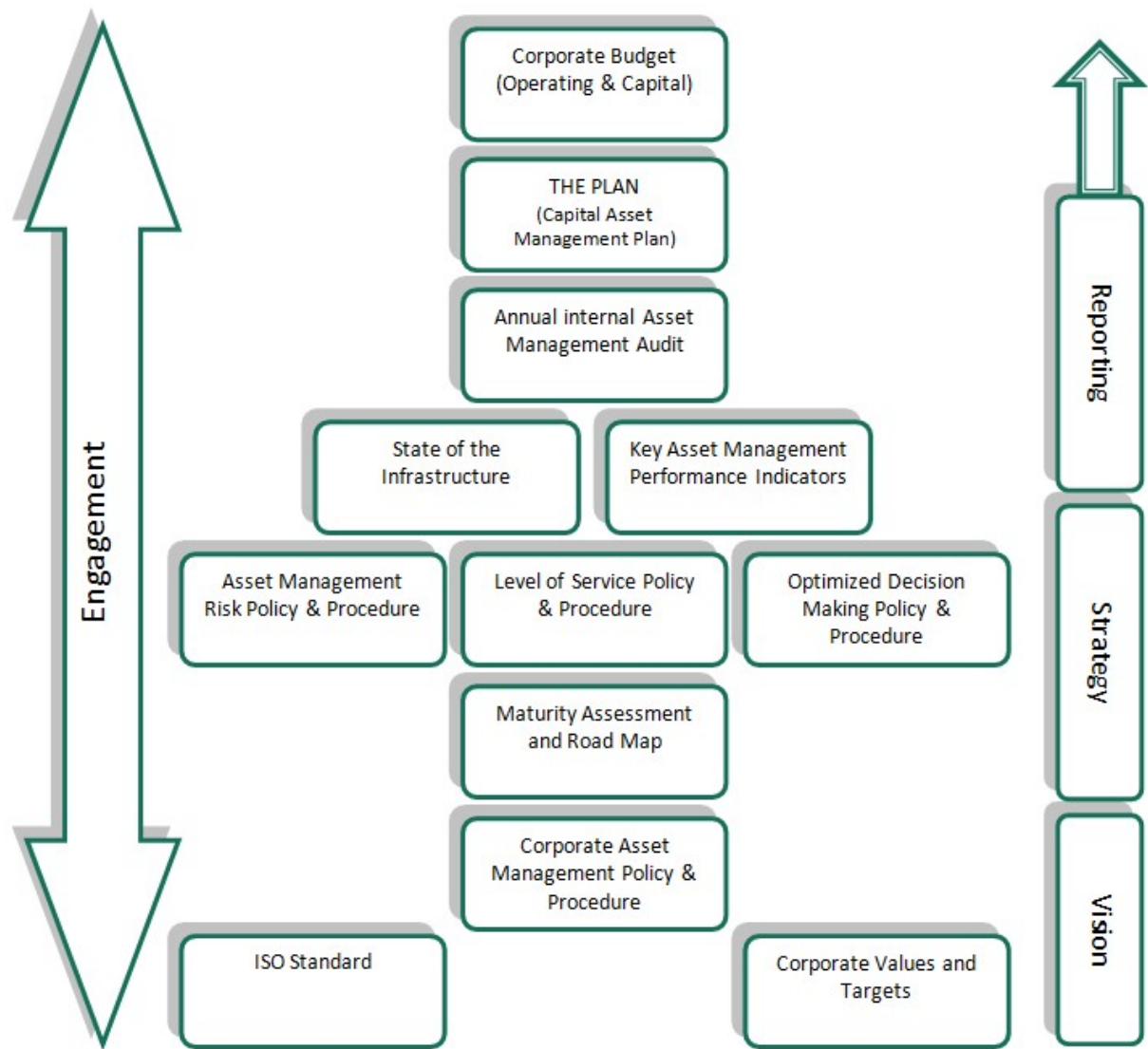
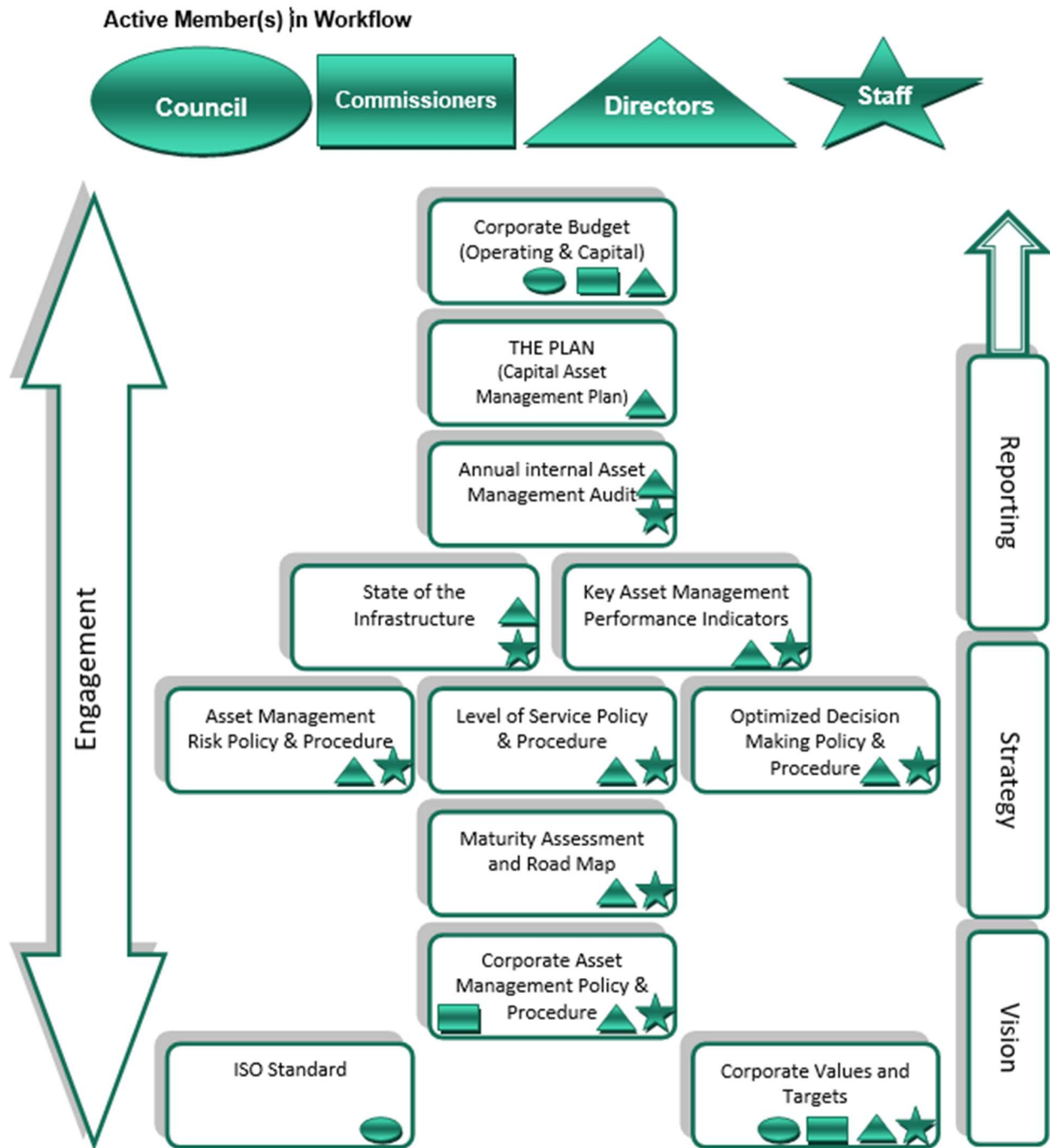


Figure 1-2: Employee Involvement in Workflow Stages



This Plan is developed by utilizing best available information until full implementation of the workflow shown above is applied. The City is working towards fully implementing the asset management workflow to effectively deliver the asset management plan as well as deliver services in a sustainable and transparent manner. Steps to achieve this are detailed in Section 7.0 – Plan Improvement & Monitoring.

1.6 Assumptions and Limitations of the Plan

Key assumptions or limitations made in developing this Plan are documented below. Most assumptions were noted as comments or footnotes throughout the document to show areas where improvements are most required for future iterations of the Plan.

With further developments in the City's asset management program such as policies, procedures, full integration of all asset and data collection templates many of these assumptions will be minimized or eliminated in the future.

Table 1-1: Assumptions and Limitations of the Plan

Assumption	Level of Confidence	Data Used	Comment
Assets 'useful life/remaining useful life' used as proxy for condition when actual condition rating unavailable	Low	Useful life/remaining useful life of assets are based on Public Sector Accounting Board (PSAB) 3150 Asset Register or based on recommendations of subject matter expert.	Misrepresents actual condition and does not account for maintenance activities that extend useful life of the asset
Remaining service life reflects actual conditions	Intermediate	Expected useful life from PSAB 3150 asset register is used to calculate remaining useful life. Current age is based on install date, not 'observed age' for most assets. Updated BCA's use observed age for facility assets.	Unless otherwise stated in the Plan, or when recommended by City staff, the age of the assets used are calculated and not based on 'observed age', unless an updated BCA is completed for a facility.
Consequence of Failure scores are accurate	Intermediate	Manually applied consequence score for many assets.	Provides a very conservative consequence estimate
Fleet condition is in better condition than useful life data	High	Useful Life from TCA register	Fleet maintenance program greater than recommended preventative maintenance program by Original Equipment Manufacturer (OEM)
Information technology equipment/asset condition ratings are accurate	Low	Condition ratings have been assigned using age/service life as proxy in funding model. This is due to not having a	Information Technology Service (ITS) Area reports condition of assets based on age which resulted in significant

Assumption	Level of Confidence	Data Used	Comment
		formalized condition assessment methodology implemented. IT assets are in better condition than calculated age-condition rating.	value of assets in poor/very poor. ITS staff provided high level recommendations on actual condition of assets for consideration which provide more accurate condition (good).
Guardrail condition data from 2009 remains accurate. Visual assessments only to update replacements	Low	Visual images used to update 2009 assessment.	Accurate for capturing replacements since 2009 only.
Trails inspections and roads inspections are similar in nature	High	Condition assessment program is managed through the <i>Paver</i> pavement management software system.	Pavement management software system is robust and captures defects that apply for trails.
Treatment equipment was not inspected in Wastewater treatment building inspections	Intermediate	Historical MP2 database and Megamation Databases.	If treatment equipment is part of the database, it is in large rolled up groups that cannot be broken down for reporting in this report. MP2 database has all assets separated.
Wastewater treatment asset inventory updated to year end 2023	Intermediate	SOI data from previously approved AM Plan (2021) has been updated to reflect actual inventory and condition.	Treatment data is in the process of being fully re-evaluated in detail and will be included in future iterations of the Plan.
Assets with unknown installation dates built at same time as nearby assets	Intermediate	City age polygon from GIS	Generally accurate for engineered assets but not very accurate for 'green' assets
Asset register is complete and at useful level of granularity	Low	Data used to develop asset register is based on best available information	Pooled assets are not at the level of granularity best for lifecycle analysis and

Assumption	Level of Confidence	Data Used	Comment
		and may use pooled assets to ensure the scope of assets in each service area are captured	forecasting costs. Pooled assets may inflate annual renewal needs as the whole replacement cost is reported in one given year.
Risk analysis on a 5-point scale for likelihood and consequence provides enough granularity for assessment	Intermediate	Matrix provided in Section 2.0 State of Infrastructure	May overestimate risk due to a basic consequence matrix being used to assign risk scores. Risk bands in the matrix provide broad measures to compare against.
Customer values understood from previous engagement activities	Intermediate	Workshops with service area management team	Not all service areas have had recent public engagement to understand desired service levels.
Renewal needs are based on current (performance) condition of assets.	Intermediate	Most recent condition assessment data and/or age and useful life as a proxy for condition	Condition data may not be up-to date or accurate, particularly for assets that used age as a proxy for condition. Underestimates needs for most service areas.
Camera and other equipment for CCTV inspection fleet not included in fleet cost	Low	PSAB 3150 Asset Register	Investigation into equipment for CCTV required. Currently not accounted for in the Plan
Annual financial shortfall includes the complete cost of implementing all asset management strategies	Low	Renewal activities and associated costs have had in-depth review however other lifecycle activities and associated costs use existing approved capital budget as baseline.	New budgeting/accounting hierarchy structure is required to do accurate 1:1 comparison of lifecycle activities and related costs. Hierarchy structures are being investigated to track these costs.

Assumption	Level of Confidence	Data Used	Comment
Investment needs are aligned with budget forecast	Low	Data to calculate investment needs is for existing assets and only assumes RUL and/or condition rating	The investment needs are based on the inventory used to calculate SOI, and not necessarily what is submitted by department managers for budget reviews.
Anticipated level of funding in 10-year forecast is accurate	Low	Three-year historical average of previously approved capital budget used as anticipated level of funding for financial strategy section	Currently, capital budgets are only approved for the current year and does not have committed funds to proposed projects beyond current year.

1.7 Continuing Evaluation and Improvement

Asset management practices are constantly evolving and improving. An effective Plan will note the areas that can be improved and the steps that will be taken to make improvements.

These areas may be where data used was not strong objective data or required assumptions. Improvements will also include the identification of any data gaps and a plan to fill those gaps.

Beyond raw data improvements, LoS measures will be limited to the primary service provided by the asset. A plan to identify more comprehensive service measures is in development. While developing these service measures the current service level will be our current target.

There is the need to improve the alignment of financial planning and asset management planning. A corporate asset management communication plan is proposed to be developed in which asset management plans, policies and procedures that define how we will align such activities can effectively be communicated to internal and external stakeholders.

2.0 State of Infrastructure

2.1 Overview

The development of the state of infrastructure (SOI) includes not only an assessment of physical condition, but also the capacity where available. The SOI considers the risk of asset failure by considering the likelihood an asset will fail and the consequence of that failure.

The SOI seeks to review services rather than assets. This means that the report often assesses assets that are owned and managed by different departments to provide a single service. This Plan contains the analysis of the following service areas:

1. Roads & Related Assets
2. Stormwater
3. Wastewater
4. Transit
5. Solid Waste Management
6. Community Housing
7. Community Recreation
8. Airport
9. Urban Forest
10. Social Services - Daycare
11. Arts, Culture & Heritage³
12. Information Technology Services (ITS)
13. Emergency Services (Police and Fire Services)
14. Public Works
15. Administration

2.2 Condition Ratings and Weighted Methodology

A standardized 5-point rating scale has been utilized to assign scores to assets. The following table shows the rating scale range and letter grading system used for assigning condition scores, including using an age-based rating methodology.

Table 2-0: 5 Point Scale for Rating Asset Condition

Condition Rating (Likelihood)	Score	Percent Life Consumed	Grade
Very Good	5	10%	A
Good	4	50%	B
Fair	3	80%	C

³ Heritage is currently within the City's Planning Department but included as part of the ACH Service Area Attachment for grouping of assets with similar services.

Condition Rating (Likelihood)	Score	Percent Life Consumed	Grade
Poor	2	100%	D
Very Poor	1	>100%	F

Facility Condition Index

The Facility Condition Index (FCI) is a standard facility management benchmark that is used to assess the current and/or projected needs of a facility. It is defined as the ratio of the required renewal costs to current replacement value of the facility. The calculated ratio is compared to an FCI scale as follows:

0%-5% = Good
5%-10% = Fair
10%-20% = Poor
Greater than 20% = Very Poor

The City calculates FCI's based on the three-year projected needs rather than using only the current year needs. This ensures that the overall facility rating is not based on a single high dollar capital project needed in the current year and takes into consideration mid-term needs for a better reflection of the state the facility is in. For this AMP, FCI's are used as a performance measure for Levels of Service for each relevant service area with facility assets. Unless otherwise stated in the Plan, facilities with complete and up-to-date condition assessments will use observed age of the inspected building element at the time of assessment as a proxy for condition ratings.



Weighted Average Methodology


A weighted average methodology using replacement costs of assets has been used to compare varying asset types more easily (e.g. a linear asset to a non-linear asset). By applying this methodology, the overall service area condition rating is influenced more by assets with the greater cost, as these represent a greater liability to the City should they not be performing as intended or are nearing failure.

2.3 Trend Scoring System

Trends have been assessed where SOI have been previously documented. The following table shows the system used for assessing trends.

Table 2-1: Trend Scoring System

Trend	Symbol	Meaning
Improving		Condition grade improvement from previous grades.
Neutral		Condition grade remained the same from previous grades.

Declining		Condition grade degraded from previous grades.
N/A	N/A	Condition grade has not been assessed more than once.

The trend development compares the condition grade from previous assessments to the current assessment. This process is a raw comparison. It does not consider changes to data collection process or improvements of data quality. It does consider new assets, updated inspections and expansion of a service.

2.4 Risk Analysis

Every asset has a risk of failure. To measure risk the likelihood of asset failure must be considered against the consequence of failure. The table shown below (also in Appendix B) provides a guideline by which the asset consequence of failure score was assigned:

Table 2-2: Consequence of Failure Scoring System

Consequence	Description	Score
Minimal	No noticeable damage to environment and/or society, no injuries, not a nuisance, no time delays, little to no known fines, no media attention	5
	Minor amount of damage to environment or society, less than a few or very minor injuries, easy work around, limited delays, small fines, no media attention	4
Moderate	Some damage to environment or society, a few injuries or minor injuries, work around available, some delay, subject to fines or investigation, possible media attention	3
	Damage to environment or society, several injuries (varying degrees), work arounds are not easy to implement, large delays, large fines and investigation, local media attention	2
Catastrophic	Major damage to environment/society, life threatening injuries or death, work arounds are not possible or time consuming and costly, major delays, legal action, large fines, major investigations, national media attention	1

Using the product of the likelihood of asset failure score and the consequence of failure score, the asset is placed within a risk category using the ranges shown in the chart below:

Category	Range
High Risk	< 5
Medium Risk	5 – 20
Low Risk	> 20

By evaluating risk, the City of Peterborough can develop a deeper understanding of the state of the infrastructure along with impacts of failures. The City continues to refine risk management strategies and implement a more consistent risk-based approach. The City owns an estimated \$1.0 billion worth of high-risk assets.

2.5 Asset Valuations

As a part of Public Sector Accounting Board (PSAB) 3150, all departments were required to develop an asset register. This register required basic asset information such as the historical purchase or construction costs. Since historical record keeping varied on the level of details, many assumptions were required.

The current replacement costs (where current construction costs are not available) are evaluated by escalating the historical cost based on inflation. The actual replacement costs of assets in this Plan include soft costs and assumes that the replacement considers current technologies and enhancements available today.

2.6 Age and Useful Life

PSAB 3150 accounting requires the City to report the age of the assets and the expected useful life of assets. The expected useful life for the PSAB 3150 relates to the period of time that the City will apply depreciation to the assets. This also helps the City to build reserves for asset replacement over the life of an asset.

In practice, assets often are well beyond their accounting useful life. Improvements in maintenance and operational practices have also contributed to extending the useful life of the City's assets

For older assets where acquisition (e.g. donation, constructed, purchased) data is not available, the age of the asset was assumed to be at the time of the historical growth patterns of the City. Sub-asset classes were assumed to be purchased at the time of initial construction of the asset class.

The useful life of assets is assumed using engineering best practices and the current institutional knowledge of the time. These values are not regularly updated and are applied to all assets of a similar type.

Assuming condition using useful life often shows asset conditions in worse condition than the formal condition assessments. Over time the City will improve condition inspection programs to include additional service areas.

2.7 Overview of the Corporate SOI

The current SOI for the services covered in this plan is summarized in Table 2-3 and shown by service area in Table 2-4. Detailed state of infrastructure information for each service area can be found in Section 9.0- Service Area Attachments.

Table 2-3: SOI Overview


City of Peterborough State of Infrastructure Summary		
Valuation	Average Condition (by Replacement \$)	Trend
\$6.3 Billion	Good (B)	

Table 2-4: Service Area Condition and Replacement Value⁴

Service Area	Overall Condition	Replacement Value (\$M)
Wastewater	Good (B)	\$1,863
Stormwater	Good (B)	\$1,767
Roads & Related Assets	Fair (C)	\$1,447
Community Housing	Poor (D)	\$326
Community Recreation	Fair (C)	\$227
Urban Forest	Fair (C)	\$169
Transit	Fair (C)	\$115
Airport	Good (B)	\$92
Emergency Services	Fair (C)	\$66
Arts, Culture & Heritage	Good (B)	\$65
Solid Waste Management	Fair (C)	\$58
Administration	Fair (C)	\$56
Public Works	Good (B)	\$45
Information Technology Services (ITS)	Good (B)	\$10
Social Services – Daycare	Very Good (A)	\$1.0
Total Replacement Value*		\$6,307

*May not add due to rounding

2.8 Condition Assessments

Over the years, the City's condition inspection program has been growing to capture more of the core assets such as facilities, pipes, manholes, etc. and continues to capture regulated or legislated assets such as wastewater treatment assets and sidewalks. These inspection programs have formal standards based on engineering best practices and regularly scheduled updates. Where visual condition assessments have not been completed, the age of the asset has been used to assume the physical condition of the asset.

⁴ Total replacement values may not add up due to rounding

2.9 Limitations of the SOI

The City is currently working towards improving fixed asset reporting through the upgrade of the Enterprise Resource Management software. The City is also pursuing the development of a formal data governance policy and procedure to create clear lines of communication around data ownership, collection and maintenance practices.

The asset management group has reviewed the current state of asset management and is working through a plan to improve all asset management practices at the City. These programs and projects will all contribute to the improvement of the development of the asset management plan and state of infrastructure data.

3.0 Levels of Service (LoS)

3.1 Overview

The City's levels of service review depicts City services delivered from the perspective of the service user (Stakeholder LoS) and from the perspective of service delivery (Technical LoS). The measures included in this Plan are fluid and may be revised in future iterations of the Plan where applicable. In 2019, the City acquired a community engagement platform where internal and external stakeholders are able to provide input on municipal topics, such as performance on level of service delivery. Determining sustainable levels of service is the key to successful asset management as it allows the City to meet the needs of stakeholders in a low-risk and cost-efficient manner.

For the purpose of this report, each service area will have a service objective statement that describes the service offered by the City, a stakeholder value/service attribute and at least one technical and one stakeholder level of service for each of the major service areas. Technical measures relate to the City's delivery of a service while stakeholder level of service measures show the service from the perspective of citizens and businesses.

3.2 Current Levels of Service and Performance

In this iteration of the Plan, the levels of service and targets will be set to current performance. The Plan will also include required legislated/regulatory levels of service and measures in addition to previously established levels of service. For core assets, current reported qualitative descriptions and technical metrics are in accordance with those set forth in O. Reg 588/17 *Asset Management Planning for Municipal Infrastructure*. In the future, targets will be set and measured using a formal procedure. Levels of service analysis for each service areas can be found in detail in Section 9.0 of this Plan.

3.3 Trends in Service Delivery

Levels of service objectives are typically supported by one or more key performance indicators or measures that help quantify the services being delivered. The table below summarizes the overall trend in how the City is performing against defined targets and provides a brief description of what performance measure is not being met when a level of service has not met its objective. Full details are found in the service area attachments.

Table 3-0: Current Service Area Levels of Service Trends

Service Area	Asset Class	Target Achieved	Comments
Roads & Related Assets	Roads-ROW	✗	<ul style="list-style-type: none">Currently, 21% of local roads are in poor or better condition (target of minimum 50%)Currently 84% of streetlight inventory has had low energy retrofit (target of 100%)
	Municipal Structures	✓	<ul style="list-style-type: none">Stakeholder and Technical LoS performance measures are currently being met
	Active Transportation Network – Sidewalks	✓	<ul style="list-style-type: none">Stakeholder and Technical LoS performance measures are currently being met
	Active Transportation Network – Trails	✗	<ul style="list-style-type: none">Currently only 84% of the population is 400m from a trail (target of 90%)
Stormwater	Management	✗	<ul style="list-style-type: none">Currently 17% of properties resilient to 100-yr storm, where buildings are not impacted by flooding (target of 21%)Currently 94% of conveyance assets are in poor or better condition (target of 100%) and 81% of SWM assets are in poor or better condition (target of 100%)
	Conveyance		
Wastewater	Treatment	✗	<ul style="list-style-type: none">Currently 86% of treatment assets are in fair or better condition (target of 100%)Effluent occurrences were outside target parameters
	Conveyance	✗	<ul style="list-style-type: none">Currently 97% of conveyance assets are in poor or better condition (target of 100%)Quantities of serviced parcels is increasing however not all (target of 100%) parcels are serviced.Current ratio of 163 connection days: 26,082 serviced parcels (target of zero connection days: current parcels serviced).

Service Area	Asset Class	Target Achieved	Comments
Transit	Fleet	✗	<ul style="list-style-type: none"> Fleet: 14% of vehicles past their useful life (target of max. 10%) Facilities: 2 out of 3 facilities with an overall condition rating of 'Fair' (target of 3 facilities)
	Facilities		
Solid Waste	Fleet	✗	<ul style="list-style-type: none"> Fleet: Currently 50% of vehicles are past their useful life (target of 10%) Facilities: Currently 1 facility with a Facility Condition Index of 10% (poor) or better (target of 2)
	Facilities		
Community Housing	Facilities	✗	<ul style="list-style-type: none"> Currently 1,848 households seeking placement (target of less than 1000) Facilities: 84% of all community housing facilities with Facility Condition Index of 10% (poor) or better (target 100%)
Recreation	Arenas and Rec. Facilities	✗	<ul style="list-style-type: none"> Facility: Current provision of 1 ice surface to 16,730 population (target of 1 ice surface to 11,000 population) Facility: Current provision of 1 indoor pool to 83,651 population (target of 1 indoor pool to 25,000 population) Fleet: 52% of fleet current replacement value in poor or better condition (target of 100%)

Service Area	Asset Class	Target Achieved	Comments
	Parks	✗	<ul style="list-style-type: none"> • Average ratio of neighbourhood parks to current population is 0.76ha/1,000 (target of 1ha/1,000 population). • Average ratio of outdoor pool facilities to current population is 1:83,631 (target of 1:25:000 population) • Average ratio of splash pads/wading pools is 1:9,295 (target of 1:7,500 population) • 43 neighbourhood parks not meeting minimum design standards (target of all parks meeting min. design standards) • 70% of parks amenity assets in poor or better condition (target of 100%)
Airport	Facilities	✗	<ul style="list-style-type: none"> • Annual energy use intensity is 1.23 GJ/m2 (target of 0.86 GJ/m2 or less)
Urban Forest	Trees	✗	<ul style="list-style-type: none"> • 2207 service requests processed and reviewed (target of minimum 2,700) • 94% of tree inventory is in poor or better condition (target of 100%)
Social Services - Daycare	Facility	✓	<ul style="list-style-type: none"> • Stakeholder and Technical LoS performance measures are currently being met
Arts, Culture & Heritage Facilities	Libraries	✗	<ul style="list-style-type: none"> • Currently 0.3 gross square feet/capita (target of 0.8 – 1.25 gross square feet/capita)
	Museum & Heritage	✗	<ul style="list-style-type: none"> • Annual energy use intensity of 0.83 GJ/m2 (target of 0.41 GJ/m2 or less)
	Art Gallery	✗	<ul style="list-style-type: none"> • Ratio of galleries to current population is 1 facility : 83,651 population (target of 1 facility : 45,000 population) • Annual energy use intensity is 1.34 GJ/m2 (target of 0.41 GJ/m2 or less).

Service Area	Asset Class	Target Achieved	Comments
Information Technology Services (TS)	Equipment	✓	<ul style="list-style-type: none"> Stakeholder and Technical LoS performance measures are currently being met.
Emergency Services	Fire Services	✗	<ul style="list-style-type: none"> Facilities: Fire suppression incidents are within NFPA response travel time – Target of 90% Fire Station 1: 86% Fire Station 2: 71% Fire Station 3: 95% Facilities: 3 facilities in overall condition of fair or better (target of 4 facilities) Facilities: Annual energy use intensity is 1.10 GJ/m2 (target of 0.66 GJ/m2 or less) Fleet: 25% of fleet (apparatus and first response) vehicles past their useful life (target of less than 5%)
	Police Services		<ul style="list-style-type: none"> Facilities: Facility parking needs are not being met for staff and service vehicles Facilities: Annual energy use intensity is 1.05GJ/m2 (target of 0.66 GJ/m2 or less)
Public Works	Fleet, Facilities	✗	<ul style="list-style-type: none"> Fleet: <ul style="list-style-type: none"> 36% of vehicles past their useful life (target of max 10%) 20% of machinery and equipment past their useful life (target of max. 10%) Facilities: Annual energy use intensity is 2.39GJ/m2 (target of 0.86 GJ/m2 or less)
Administration	Facilities	✗	<ul style="list-style-type: none"> Parking needs of staff at City Hall and Provincial Court House are not being met Annual energy use intensity of 210 Wolfe St is 1.23 GJ/m2 (target of 0.87 GJ/m2)

4.0 Asset Management Strategy

4.1 Overview

The City of Peterborough has adopted several strategies to maintain and deliver LoS; however, some of these strategies have been developed in an ad-hoc fashion based on expert knowledge of the area and what works in the context of the City. These have not been formally documented. The strategies involve a wide range of corporate involvement across several departments to coordinate staff and funding.

An Optimized Decision-Making strategy has been initiated but will be developed as a part of the City's Asset Management Road Map previously approved by council. This strategy will formalize how investments are made to maintain services and optimize spending while reducing risks across the corporation.

4.2 Asset Lifecycle Strategies

Asset lifecycle strategies seek to optimize the life cycle of assets to improve service and minimize risk at an appropriate level of investment. The strategy includes several processes that are dependent on life cycle stage, condition, ability to meet service targets and available operational and capital budgets. Strategies seek to combine projects where feasible to share resources and reduce the instances of negatively impacting other assets or services and lower overall cost of ownership.

The strategy for each service area will consider:

- Non-infrastructure Solutions
- Maintenance Activities
- Rehabilitation/Renewal Activities
- Replacement Programs
- Disposal/Abandoning Policies
- Service Expansion Programs
- Future Strategies in development/investigation

This section will also discuss the potential risks should the strategy fail to meet or improve condition or service targets. Service area asset management strategy details and associated risks can be found in Section 9.0 of this Plan.

4.3 Procurement Methodologies

The City's Procurement By-law outlines the different types of procurement processes, including co-operative purchasing, that may be used for the acquisition and disposal of goods and services such as request for proposals, request for tenders, request for formal quotations, pre-qualifications, etc. The purpose of the By-law is to ensure the following:

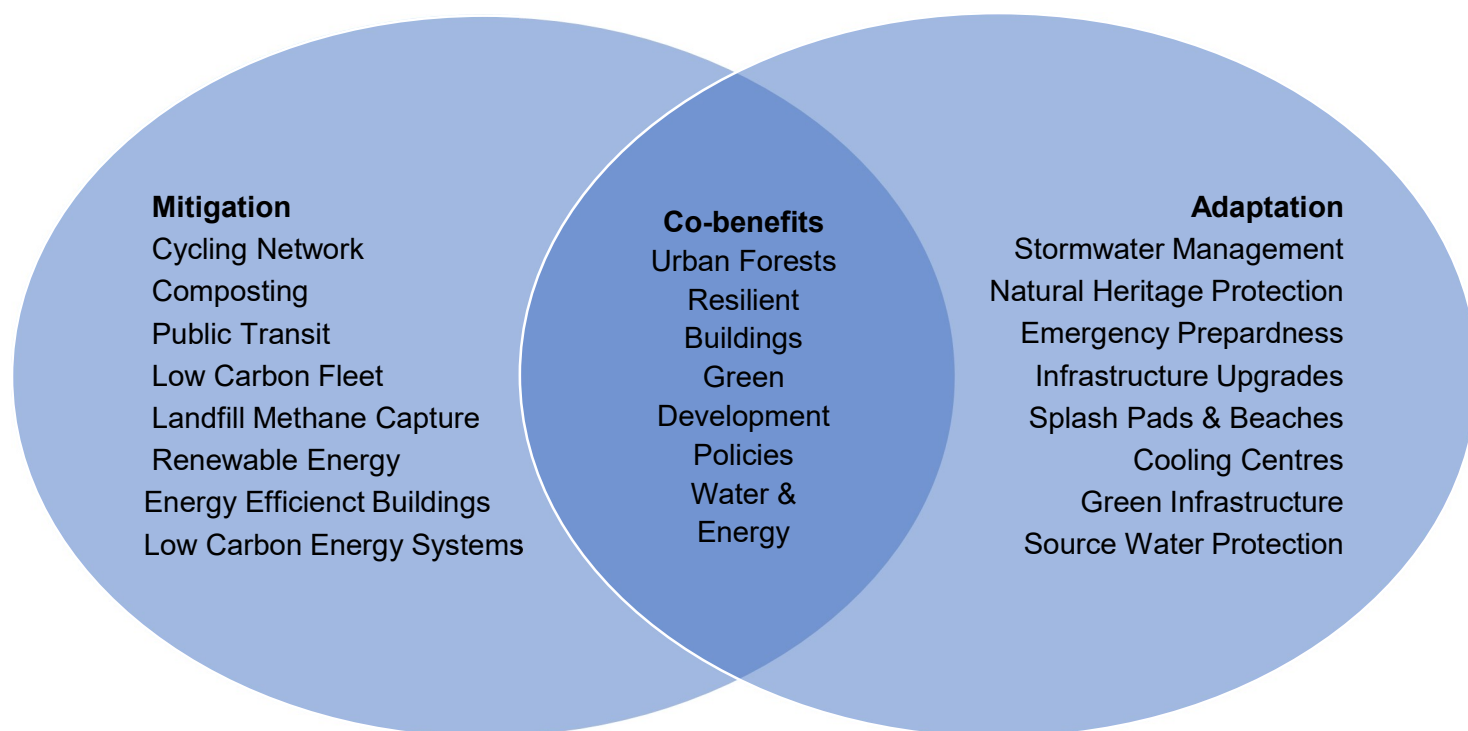
- To ensure openness, accountability and transparency while protecting the financial best interests of the City of Peterborough.
- To maximize savings for taxpayers.
- To ensure service and product delivery, quality, efficiency and effectiveness.
- To encourage competitive bidding for the acquisition and disposal of goods and services where practicable.
- To ensure fairness among bidders.
- To encourage the procurement of goods and services with due regard to the preservation of the natural environment; to this end, a Supplier may be selected to supply goods made by methods that are environmentally friendly and sustainable and where practicable, incorporating recycled materials; and
- To provide City staff, which have purchasing responsibilities, clear direction on the policy to be followed.

4.4 Asset Management Strategies and Climate Change

Commitment to Climate Change

Climate change impacts all community and corporate sectors, with each containing varying levels of unique vulnerabilities and exposure to climate risks. Developing asset management strategies for high at-risk assets is necessary to reduce the risk of incurring potential catastrophic losses to built and natural infrastructure. Introducing mitigation and adaptation policies within corporate assets can significantly reduce greenhouse gas (GHG) emissions and improve asset resiliency against climate risks. Integrating mitigation and adaptation strategies simultaneously reduces the impact of future risks from climate change and contributes to the efficient management of asset lifecycles. This can be achieved by developing holistic plans targeting assets and asset management approaches that are both adaptive and mitigative, which accelerates achieving both interrelated climate change goals, as seen in Figure 4-1.

Figure 4-0: Mitigation and Adaptation Strategies



The City officially embarked on taking action against climate change in December 2016, when City Council approved Report CSD16-031, thereby adopting a Climate Change Action Plan (CCAP) for the community and corporate sectors. The CCAP established an initial GHG emissions reduction target of 30% below the 2011 baseline by 2031. Following the Federation of Canadian Municipalities' Partners for Climate Protection framework, the CCAP sets a course to reduce local contributions to climate change and prepare municipalities for present and expected changes due to our shifting climate. The corporate CCAP identifies nine strategies with 45 specific actions addressing how buildings, water and sewage infrastructure, solid waste, streetlighting, and the fleet will achieve the 30% target.

In September 2019, the City of Peterborough declared a climate emergency and upgraded the emission target to 45% GHG reduction by 2030 and net-zero by 2050. To support the modified GHG emission goal, the declaration affirmed the adoption of using a climate change lens to verify all corporate actions and policies to enable reaching the revised target. Furthermore, additional climate actions are slated to be developed to facilitate the accelerated timelines and emission goals.

4.4.1 Climate Change & Asset Management Integrated Policies

The City of Peterborough has striven to entrench climate change considerations into corporate operations and asset planning. Adaptation approaches are being incorporated concurrently within multiple bodies of work to address climate risk within community and corporate assets and strategizing plans to lower additional risks, as evident in the following documents:

- Official Plan 2021-2051,
- Community Climate Change Resiliency Strategy; and
- Watershed Planning Study.

Moreover, to lessen the inherent vulnerabilities of community and corporate assets from climate disruptions caused by unmitigated global GHG emissions are supported through corporate mitigation policies and plans. These bodies of works advance GHG emissions reductions from assets and contribute to lowering corporate assets being sources of emissions. The following are key documents that target GHG reductions from community and corporate assets:

- Official Plan 2021-2051,
- Corporate Energy Management Plan 2019-2023; and
- Climate Change Action Plan.

Official Plan 2021-2051

The new Official Plan (OP) provides direction and guidelines for the community to 2051 and has been embedded with many adaptation and mitigation policies throughout the plan. Multiple sections in the OP include direct and indirect adaptation and mitigation objectives to support mainstreaming climate action. Furthermore, climate change is addressed explicitly in section 5.7 of the OP with the vision to,

“In the face of a changing climate, the City recognizes the need to adopt climate change mitigation and adaption measures to enhance the resiliency of its built and natural environments. The intent of this Plan is to support energy efficiency, improved air quality, reduced greenhouse gas emissions and climate change adaption through sustainable land use patterns and the integration of green infrastructure.” – 5.7.a, OP (2021)

The OP encourages a multisectoral approach to improving community and corporate resiliency and mitigation outcomes through the following strategies:

- Active travel and transit focused neighborhoods,
- Promoting zero and low carbon built forms,
- Expanding the utilization of renewable and alternative energy systems,
- Sustainable land-use planning and implementing low-impact developments,
- Increasing the role of green infrastructure for mitigation and adaptation,
- Protect and enhance natural heritage features, especially assets that have hydrological or ecological functions,
- Incorporating adaptation plans for all capital planning projects; and

- Monitoring GHG emissions and strategizing reduction.

Community Climate Change Resiliency Strategy

In 2020, the Community Climate Change Resiliency Strategy (CCCRS) was finalized that identified local vulnerabilities and risks associated with the changing local climate. The CCCRS is intended to be a guiding document to be further refined and integrated within corporate operations and capital programs. The strategy seeks to reduce climate vulnerabilities by addressing the following adaptation themes:

- Reducing flood risk and protecting water quality and quantity from changing climate and extreme weather,
- Reducing damage and/or disruptions to infrastructure due to extreme weather and improving the safety of travel on roads and sidewalks,
- Protecting and enhancing natural heritage, tree canopy, natural vegetation, and wildlife from extreme weather and climate-related risks; and
- Integrating climate change into municipal decision-making processes that inform the way Peterborough is planned, developed, used, restored and maintained.

The CCCRS dovetails with asset management planning by recognizing that asset lifecycle activities can be directly impacted by extreme weather conditions fuelled by the changing climate. Asset management planning can utilize the adaptation themes of the CCCRS to inform how planning, acquisitions, maintenance schedules, asset renewals, and monitoring schedules can be implemented to support new and existing asset lifecycles.

Watershed Planning Study

The Watershed Planning Study is intended to characterize the urban watershed to inform how the impacts of extreme weather will affect the built and natural infrastructure in Peterborough. Modelling the watershed will reveal how varying climate extremes will impact assets and levels of services. The study has five overarching goals to protect, support, and enhance the watershed within the city boundaries are as follows:

- Minimize flood risks to infrastructure,
- Support natural channel morphology and protect against erosion and sedimentation,
- Prevent eutrophication and algae growth,
- Protect drinking water supply; and
- Protect, restore, and enhance the integrity of the watershed ecosystem through an integrated approach of natural areas, habitats, and connected links.

The Watershed Planning Study will guide land-use and water management practices, natural infrastructure restoration targets, and best practices for water quality and quantity to inform asset management planning for at-risk assets in the city.

Corporate Energy Management Plan 2019-2023

In 2014, the City adopted the Corporate Energy Management Plan (CEMP) mandated by the Province of Ontario through Ontario Regulation 507/18. The CEMP objectives were to encourage energy efficiency and staff awareness combined with establishing a target of 5% energy intensity (ekWh/ft²) reduction below the 2013 baseline by 2018 for all non-wastewater treatment facilities. The original plan was superseded with a revised CEMP containing new energy reduction goals and targeted a 10% energy intensity reduction below 2018 levels. The objectives of the updated CEMP are as follows:

- Introduce climate lens reporting to review all new corporate project's impact on GHG emissions,
- Develop energy training for staff to support energy usage reduction goals,
- Undertake a multi-division facility GHG reduction pathway study to understand the budgetary and technological requirements needed to achieve significant emission savings before 2050. This study is intended to explore some of the following topics:
 - Strategies to lower natural gas consumption for heating and domestic hot water heaters to reduce GHG emissions,
 - Solar photovoltaic and solar thermal opportunity mapping to support the introduction of zero-carbon energy sources,
 - Examine corporate phantom electricity loads and plan for decreasing usage; and
 - Investigate alternatives to traditional lighting to reduce electricity demand during daytime operating hours at facilities.

The CEMP is a leading document to support facility management planning to improve building energy efficiency and reduce associated energy GHG emissions. The CEMP also seeks to protect the City against the rising fuel cost attributed to the federal carbon tax that will increase throughout this decade. Asset management strategies can further boost the CEMP goals by targeting equipment renewals for high efficiency and by adopting low or no carbon energy systems during lifecycle activity updates instead of replacing like-for-like equipment.

Climate Change Action Plan

In 2016, the corporate Climate Change Action Plan (CCAP) was adopted that targeted a 30% reduction in GHG emissions by 2031. The CCAP developed a multiple sector strategy to realize its mitigation goal with the following actions:

- Institutionalize energy efficiency and low-carbon thinking into the corporation,
- Enhance operational efficiency of existing buildings,
- Build municipal facilities to ensure high environmental performance,
- Improve the environmental performance of existing municipal facilities,
- Utilize renewable energy sources,

- Transition the municipal fleet to be more efficient and less carbon-emitting,
- Enhance operation efficiency of the water services system,
- Improve the energy efficiency of the streetlighting system; and
- Reduce the amount of organic waste generated through municipal operations.

Incorporating asset management strategies within the CCAP actions can improve many outcomes, such as implementing lifecycle equipment renewals that target energy efficiency and low or no carbon energy systems.

The CCAP has subsequently produced results that have lowered the energy consumption and GHG emissions from corporate assets. These achievements are as follows:

- Conversion of all streetlights to LEDs has reduced energy consumption by 52% and GHG emissions by 49 tCO₂e,
- In 2016, a solar photovoltaic array was installed onto the rooftop of Kinsmen Arena that generates 530,000 kWh of electricity per year and supplies 45% of the building's power annually,
- Added synchronized traffic lights and conversion to smart signal lights to improve traffic flow to reduce vehicle emissions,
- Increased tree planting to expand the urban canopy to support adaptation and mitigation efforts,
- Replaced ice resurfacers with electrically powered equipment,
- Added biogas digester at the landfill to capture anaerobic organic methane leaking from the landfill to lower GHG emissions and generate renewable energy,
- Upgraded nine facilities interior lighting systems with LEDs,
- Implemented lighting motion sensors to reduce electricity usage,
- Replaced community centre pool pumps with variable frequency drive to lower energy use; and
- Expanded waste diversion efforts at the landfill to collect reclaimable items and divert hazardous material away from the landfill.

The CCAP has also initiated the following corporate projects that are in the development phase that will reduce energy and GHG emissions:

- Planned conversion of decorative streetlights to LEDs,
- Development of Source Separated Organics/curbside green bin collection,
- Construction of a net-zero emission fire station,
- Planned installation of electric vehicle charging stations at facilities; and
- Planned purchase of light-duty electric vehicles.

4.4.2 Climate Risk Analysis

The Federation of Canadian Municipalities (FCM) four-step climate asset management framework is utilized to support integrating strategic decision-making to understand

corporate risks and impacts to levels of service from climate change. The framework enables a municipality to identify how climate change will impact its ability to provide municipal services and whether plans are in place to ameliorate losses to services or assets. The framework assesses a municipality's corporate climate readiness on the spectrum of identification, assessment, prioritization, and management. The FCM developed separate frameworks for risk management (Table 4-1) and level of service (Table 4-2) to distinguish between corporate service groups' climate readiness. The City will continue to utilize the frameworks below to assess its current state and seek to improve in areas identified.

Climate Risk Management Assessment

The framework for climate risk management contributes to understanding the state of vulnerability of City services and assets from climate change hazards and identifying planned or implemented strategies to improve resiliency (Table 4-0). Determining the level of risk to services and assets will support decision-makers to prioritize additional investments to reduce climate at-risk corporate service areas.

Table 4-0. FCM Climate Change Asset Management Risk Management Assessment Framework

Identification	Assessment	Prioritization	Management
Confirming the existing services the municipality provides, gathering regional and local climate change data, and identifying potential climate change hazards.	Determining the areas where the community is the most vulnerable due to climate change, looking specifically at how this could compromise a municipality's ability to provide services.	Exploring potential strategies to mitigate or adapt to climate change risks.	Incorporating climate change strategies in infrastructure plans, programs and budgets, and monitoring progress over time.
Question			
Identification	Have all assets been identified to deliver the service?		
	Have the latest local climate projections been utilized to determine future impact?		
	Have the implication of climate risks to asset been understood?		
	Has the identification of most likely asset climate hazards been recognized?		
Assessment	Has an asset risk assessment (consequence vs likelihood) been completed?		
	Are controls in place to reduce risks from climate hazards?		

Question	
	Has the impact of climate change on standards that inform future infrastructure design been understood?
Prioritization	Has a management plan limiting impacts of climate risks to assets been developed?
	Has a proactive strategy to overcome climate risk impacts been created?
	Has a preferred strategy for addressing the highest asset risks been selected?
Management	Has an asset management climate strategy been completed and activated?
	Has an evaluation of asset strategies in relation to its climate risk been completed?

Levels of Service Assessment

Evaluating the level of service impacts from climate change follows a similar stepwise pathway as climate risk management. This assessment seeks to understand if service groups' capacity and municipal asset conditions can withstand climate stressors, in addition to describing if strategies and implementation plans are in place to lower potential disruptions to service (Table 4-1).

Table 4-1. FCM Climate Change Asset Management Level of Service Assessment Framework

Identification	Assessment	Prioritization	Management
Documenting existing services provided to your community and identify the built or natural assets that enable service delivery.	Identifying the level at which your municipality currently provide services and commitments that are expected to meet; exploring current and future gaps in your ability to provide services; and assessing how the municipality's ability to provide services may be compromised because of climate change.	Exploring strategies to address current and potential future gaps in levels of service as a result of climate change.	Incorporating climate change strategies in infrastructure plans, programs and budgets, and monitoring progress.
Question			
Identification	Are existing levels of services provided to the community understood?		
	Have built and natural assets required to deliver the service been identified?		
Assessment	Has the impact of climate change affecting service been determined?		
	Have the implications to maintaining the current performance service level in relation to climate hazards been undertaken?		
	Have the most climate vulnerable areas of service been identified?		
Prioritization	Have strategies to address current and future gaps in the level of services from climate impacts been created?		
	Has a preferred strategy for tackling the largest gap in service been completed?		
Management	Have climate risk management strategies been completed and activated?		
	Has an evaluation of strategies in relation to its climate risk been completed?		

4.4.3 Strategic Facilities Planning

The Corporate Facilities and Energy Manager uses a Long-Term Strategic Facilities Planning Tool to assess the condition and the life expectancy of the Municipality's current facilities. Supported by energy audits and asset management, the tool provides for a comprehensive and detailed overview of all electrical, mechanical and facility components by life expectancy. This tool helps to populate the annual budget and work plan for energy management and facilities planning. Furthermore, the City is seeking funding to develop a greenhouse gas emissions reductions study for municipal facilities to include the impacts of climate change in future facility planning.

4.5 Investment Priorities

Capital forecasting and the prioritization thereof play a key role to the City's annual budget process particularly with the financial shortfall challenge. Projects proposed in the capital budget are subject to an internal prioritization process using a two-tiered review. Individuals involved in the initial review process include Department Commissioners and Financial Services staff. The second review is completed by the CAO, Commissioner of Corporate and Legislative Services, Manager of Financial Services, Budget Analyst and individual Department Commissioners. After this second review process, the budget is finalized and presented to Council for approval.

It is important to note that the review process is extremely fluid, however investment priorities follow the direction set in the approved annual budget guideline and are also focused towards projects that:

- Are legislated requirements for services and infrastructure,
- Maintain service levels that are expected by Council, the community, and the asset management plan,
- Are identified as part of the service area's lifecycle management strategies, and;
- Preserve the long-term financial health of the City.

The City has recently implemented a project prioritization tool that is intended to support the capital budget review process. The tool will allow the City to score each project proposed in the capital budget against each other using various criteria that considers legislation, risk management, strategic planning, community benefits, climate change and finance.

5.0 Financial Summary

5.1 Overview

This section of the Plan reviews operating investment needs, growth investment needs, historical revenues, historical capital and operating expenditures, and the lifecycle costs required to provide a level of service over a 10-year period. Unless otherwise noted, amounts shown are budgeted amounts, not actuals.

Financial projections will be improved as the discussion of proposed levels of service and asset performance matures. Various assumptions were made to determine the lifecycle costs sourced from the City's capital budget and 10-yr forecast due to departmental hierarchy and project costs not fully aligning to the type of asset and lifecycle activities reported in this Plan.

5.2 Operating Investment Needs

The following section outlines the current and forecasted operational lifecycle costs to maintain levels of service for the service areas reported in this plan.

Operating costs include those associated with the day-to day activities required to provide the service such as general maintenance costs, preventative maintenance costs, energy and utility costs, etc.

Table 5-0 summarizes the estimated operating costs by service area required to deliver current levels of service over the 10-yr forecast. Values shown are based on the current year budgeted values and are indexed 3% over the 10-year horizon.

Table 5-0: Operating Lifecycle Costs

Operating Lifecycle Cost Forecast (\$000)											
Service Area	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Roads & Related	\$13,149	\$13,543	\$13,949	\$14,368	\$14,799	\$15,243	\$15,700	\$16,171	\$16,656	\$17,156	\$17,671
Stormwater	\$773	\$796	\$820	\$845	\$870	\$896	\$923	\$951	\$979	\$1,009	\$1,039
Wastewater	\$17,268	\$17,786	\$18,319	\$18,869	\$19,435	\$20,018	\$20,618	\$21,237	\$21,874	\$22,530	\$23,206
Transit	\$19,282	\$19,860	\$20,456	\$21,070	\$21,702	\$22,353	\$23,023	\$23,714	\$24,425	\$25,158	\$25,913
Solid Waste Management	\$15,575	\$16,043	\$16,524	\$17,020	\$17,530	\$18,056	\$18,598	\$19,156	\$19,730	\$20,322	\$20,932
Community Housing	\$3,919	\$4,037	\$4,158	\$4,282	\$4,411	\$4,543	\$4,679	\$4,820	\$4,964	\$5,113	\$5,267
Community Recreation	\$3,385	\$3,487	\$3,591	\$3,699	\$3,810	\$3,924	\$4,042	\$4,163	\$4,288	\$4,417	\$4,549
Airport	\$933	\$961	\$990	\$1,020	\$1,051	\$1,082	\$1,115	\$1,148	\$1,182	\$1,218	\$1,254
Social Services - Daycare	\$2,318	\$2,387	\$2,459	\$2,533	\$2,609	\$2,687	\$2,768	\$2,851	\$2,936	\$3,024	\$3,115
Arts, Culture & Heritage	\$6,339	\$6,529	\$6,725	\$6,927	\$7,135	\$7,349	\$7,569	\$7,796	\$8,030	\$8,271	\$8,519
Emergency Services	\$48,868	\$50,334	\$51,844	\$53,399	\$55,001	\$56,651	\$58,351	\$60,101	\$61,905	\$63,762	\$65,675
Public Works	\$632	\$651	\$670	\$690	\$711	\$732	\$754	\$777	\$800	\$824	\$849
ITS	\$3,793	\$3,906	\$4,024	\$4,144	\$4,269	\$4,397	\$4,529	\$4,665	\$4,804	\$4,949	\$5,097
Administration Facilities	\$2,127	\$2,190	\$2,256	\$2,324	\$2,394	\$2,465	\$2,539	\$2,616	\$2,694	\$2,775	\$2,858
Engineering, Construction & Public Works - Pooled Assets - Roads, Wastewater, Storm)	\$3,407	\$3,509	\$3,615	\$3,723	\$3,835	\$3,950	\$4,068	\$4,190	\$4,316	\$4,445	\$4,579
Fleet (all service areas)	\$350	\$361	\$371	\$382	\$394	\$406	\$418	\$430	\$443	\$457	\$470
Underground Services (Pooled Assets - Wastewater, Stormwater)	\$467	\$481	\$495	\$510	\$525	\$541	\$557	\$574	\$591	\$609	\$627
Parks and Forestry (Pooled Assets - Park Amenities, Urban Forest)	\$4,317	\$4,446	\$4,580	\$4,717	\$4,859	\$5,004	\$5,155	\$5,309	\$5,468	\$5,633	\$5,802
Total	\$146,901	\$151,308	\$155,847	\$160,522	\$165,338	\$170,298	\$175,407	\$180,669	\$186,089	\$191,672	\$197,422

5.3 Growth Investment Needs

Based on the City's adopted Official Plan (November 2021) and the Growth Plan for the Greater Golden Horseshoe, the City of Peterborough's projected residential population will grow from a population of 83,000 in 2016 to 125,000 by 2051. It is anticipated that the employment sector will grow from 45,000 jobs in 2016 to 63,000 jobs by 2051.

Adding to service demands, the City of Peterborough also provides services to the surrounding townships within the County of Peterborough, where many County residents commute to the City of Peterborough for work. The City's population also fluctuates with post secondary enrolment in Trent University and Fleming College for eight months of the year, as well as servicing the cottage community during the summer months. These factors combined all play a significant role to the service requirements for the City.

To accommodate residential growth, the City has annexed large plots of land, mainly at the north, east and south boundary limits. These annexations have placed further strain on the City's servicing needs where annexed residents are expecting full City service.

In order to recover costs for development-related capital works, the City of Peterborough levies two types of development charges (DC): Planning Area development charges and City-wide uniform development charges. The City needs to continue to levy DCs to help fund capital projects throughout Peterborough so that development continues to be serviced in a fiscally sustainable manner.

Many of the assets in this Plan are captured in the Development Charges (Citywide and Area Specific) study and By-law^{5 6} for growth. The By-law is generally based on the findings from Secondary Planning Area Studies, the Transportation Master Plan, and previous Development Charge (DC) By-laws. Consideration shall be given to the City's growth targets provided by the province and applied to the DC study versus achieved growth rates. This alone could have drastic impacts on the overall 'needs' of the Plan. If the City does not meet the proposed growth, the overall need can likely be reduced.

Table 5-1 illustrates that by 2033 the City will need to fund an additional estimated \$30.6 million (benefit to existing only) per year to properly fund the full lifecycle costs of assets supporting the increased demand caused by growth. The growth-related capital expenditures shown in Table 5-1 are based on the 2024 to 2033 growth horizon and development needs identified in the DC bylaws. Costs beyond the planning horizon identified in the DC Study have been estimated using an average of the first three years of the forecast.

⁵ City of Peterborough & Hemson Consulting Limited, Citywide Development Charges Background Study, (November 2019 as amended May 26, 2022)

⁶ City of Peterborough & Hemson Consulting Limited, Planning Area-Specific Development Charges Background Study, (June 2017 as amended May 26, 2022)

Table 5-2 below summarizes the estimated increase in net operating costs that the City will experience due to increases related to growth demands. Table 5-1 shows that by 2033, the net operating costs are estimated to increase by \$50.7 million.

Table 5-1: Growth-Related Lifecycle Costs

Lifecycle Costs for Growth Related Demands (2024-2033) (\$000)				
	Annual Lifecycle Cost for Growth 2024-2033		Total (10-yr)	Annual 10-Yr Average (BTE only)
Service Area	New Assets	Benefit to Existing		
Library Services	\$5,652	\$4,230	\$9,882	\$423
Fire Services	\$375	\$9,892	\$10,267	\$989
Police Services	\$2,547	\$63,111	\$65,658	\$6,311
Recreation*	\$3,191	\$31,001	\$34,192	\$3,100
Parks	\$13,576	\$16,545	\$30,121	\$1,655
Public Works	\$4,166	\$13,417	\$17,583	\$1,342
Parking	\$8,065	\$25,646	\$33,711	\$2,565
Transit	\$8,065	\$25,646	\$12,467	\$813
Affordable Housing	\$4,340	\$8,127	\$6,040	\$544
Waste Management	\$604	\$5,436	\$2,002	\$192
Roads & Related Assets, City-Wide Engineered Assets**	\$79	\$1,924	\$453,150	\$11,237
Wastewater Treatment	\$340,781	\$112,369	\$4,774	\$0
Wastewater Pumping Stations	\$4,774	\$	\$1,778	\$178
Stormwater/Wastewater Conveyance	\$	\$1,778	\$4,015	\$402
Stormwater Facilities	\$	\$4,015	\$8,371	\$837
Total	\$388,147	\$305,862	\$694,401	\$30,586

*Recreation includes arena facilities, Morrow Park, Peterborough Marina Building and Peterborough Sport and Wellness Centre.

**Includes growth related demands for Airport Service Area and Parking

Table 5-2: Operating Cost Impacts Associated with Growth-Related Demands

Cumulative Net Operating Impacts	2024 (\$000)	2025 (\$000)	2026 (\$000)	2027 (\$000)	2028 (\$000)	2029 (\$000)	2030 (\$000)	2031 (\$000)	2032 (\$000)	2033 (\$000)
Library	\$8	\$8	\$8	\$8	\$8	\$8	\$8	\$8	\$8	\$8
Fire	\$5,780	\$5,780	\$5,780	\$5,780	\$5,780	\$5,780	\$5,780	\$5,780	\$5,780	\$5,780
Police	\$	\$	\$	\$	\$33,750	\$33,750	\$33,750	\$33,750	\$33,750	\$33,750
Recreation	\$798	\$798	\$798	\$1,298	\$1,298	\$798	\$798	\$798	\$798	\$798
Parks	\$533	\$633	\$2,678	\$2,703	\$2,728	\$1,281	\$1,281	\$1,281	\$1,281	\$1,281
Public Works	\$258	\$208	\$208	\$208	\$208	\$208	\$208	\$208	\$208	\$208
Parking	\$1,229	\$1,229	\$1,229	\$1,229	\$1,229	\$1,229	\$1,229	\$1,229	\$1,229	\$1,229
Transit	\$6,481	\$6,540	\$7,061	\$7,120	\$7,180	\$6,694	\$6,694	\$6,694	\$6,694	\$6,694
Engineered Services										
Roads & Other City-Wide Engineering	\$788	\$907	\$1,032	\$1,159	\$1,287	\$909	\$909	\$909	\$909	\$909
Net Operating Impacts	\$15,874	\$16,103	\$18,794	\$19,505	\$53,468	\$50,657	\$50,657	\$50,657	\$50,657	\$50,657

5.4 Review of Historical Revenues and Historical Capital & Operating Expenditures

Figure 5-0 and Table 5-3 provides the average values for the historical three-year operating revenues by type (2021-2023). Values shown are gross revenues as per the approved annual Budget Highlights books.

Table 5-4 shows historical expenditures (2018-2020) for capital and 'other' capital and Table 5-5 shows historical operating expenditures. Operating expenditures include the costs for maintenance and operation activities for service areas covered in this Plan. The year-over-year increase is primarily due to inflation and additional asset inventory.

Figure 5-0: Three Year Average - Historical Operating Revenue by Type

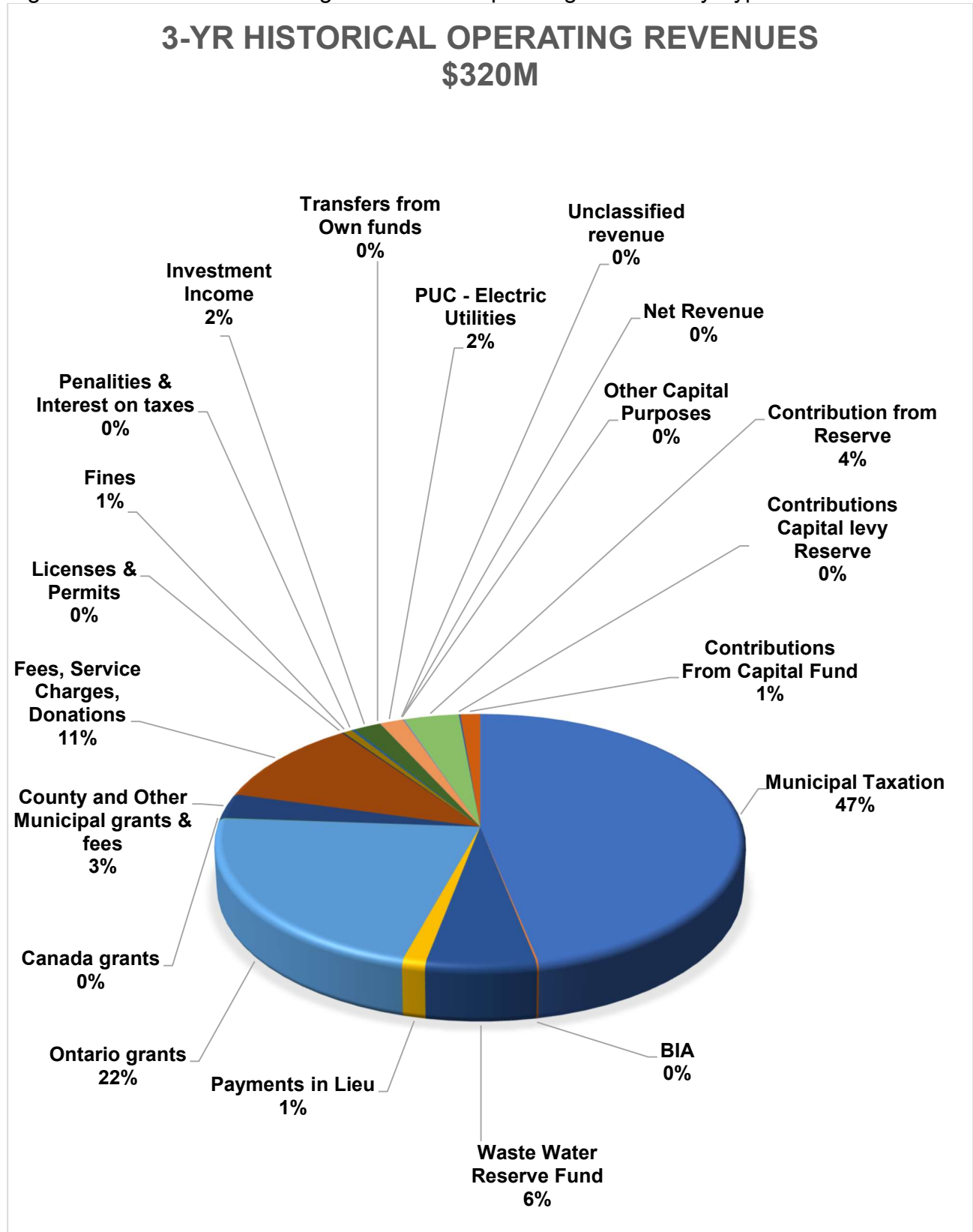


Table 5-3: Three Year Historical Operating Revenues by Type

Revenues by Type	2021 Approved (\$millions)	2022 Approved (\$millions)	2023 Approved (\$millions)	3-Yr Historical Average (\$millions)
Municipal Taxation	\$143.5	\$149.0	\$156.1	\$149.5
BIA	\$0.3	\$0.4	\$0.4	\$0.4
Wastewater Reserve Fund	\$19.1	\$19.5	\$20.4	\$19.7
Payments in Lieu	\$4.0	\$4.2	\$4.2	\$4.1
Ontario grants	\$66.3	\$62.4	\$79.9	\$69.5
Canada grants	\$0.1	\$0.2	\$0.2	\$0.2
County and Other Municipal grants & fees	\$9.7	\$10.3	\$10.5	\$10.2
Fees, Service Charges, Donations	\$33.1	\$34.6	\$37.0	\$34.9
Licenses & Permits	\$0.4	\$0.4	\$0.4	\$0.4
Fines	\$2.2	\$1.9	\$1.9	\$2.0
Penalties & Interest on taxes	\$0.7	\$0.7	\$0.8	\$0.7
Investment Income	\$4.9	\$5.9	\$7.2	\$6.0
Transfers from Own funds	\$0.1	\$0.1	\$0.0	\$0.1
PUC - Electric Utilities	\$5.2	\$5.2	\$5.2	\$5.2
Unclassified revenue	\$0.2	\$0.2	\$0.2	\$0.2
Net Revenue	\$0.0	\$0.1	\$0.1	\$0.1
Other Capital Purposes	\$0.1	\$0.1	\$0.4	\$0.2
Contribution from Reserve	\$10.4	\$12.2	\$12.8	\$11.8
Contributions Capital levy Reserve	\$0.0	\$0.0	\$1.0	\$0.3
Contributions From Capital Fund	\$4.6	\$4.1	\$4.2	\$4.3
TOTAL with Grants	\$289.6	\$294.6	\$324.2	\$319.7

The following Table 5-4 and Table 5-5 provide a breakdown of historical annual expenditures for capital and ‘other’ capital projects and historical operating expenditures for service areas that are reported in this iteration of the Plan. Values shown in Table 5-4 and Table 5-5 are approved budgeted capital and operating expenditures. The City’s Capital Budget is categorized and reported by Department and Division.

Table 5-4: Historical Capital Expenditures for Existing Assets by Lifecycle Activity

Combined Tangible and Other Capital Program Summary	2021 (\$millions)	2022 (\$millions)	2023 (\$millions)	3 Year Average (\$millions)
Non-Infrastructure Solutions	\$13.1	\$10.9	\$15.1	\$13.0
Operation and Maintenance Type Activities	\$4.4	\$4.8	\$2.4	\$3.9
Renewal Activities	\$48.3	\$54.4	\$60.0	\$54.2
Disposal/Abandonment Policies	\$0.1	\$0.0	\$0.2	\$0.1
Service Improvement Activities	\$14.7	\$19.5	\$38.3	\$24.2
Total	\$80.6	\$89.6	\$116.1	\$95.5

Table 5-5: Historical Operating Expenditures

Expenditures	2021 Approved (\$millions)	2022 Approved (\$millions)	2023 Approved (\$millions)
Personnel	\$110.7	\$115.6	\$121.8
Contractual	\$93.3	\$93.4	\$112.1
Materials, Supplies	\$11.2	\$11.1	\$11.6
Repairs, Maintenance	\$3.1	\$3.6	\$3.8
Debt Charges	\$19.5	\$20.5	\$22.6
Fees	\$9.9	\$10.6	\$10.6
Tax Write-offs	\$1.7	\$1.6	\$1.5
Other Transfers	\$20.0	\$19.7	\$21.2
Inter-departmental Charges	\$21.7	\$22.4	\$26.0
New Equipment	\$0.2	\$0.2	\$0.2
Rentals	\$1.4	\$1.5	\$1.3
Travelling, Training	\$1.6	\$1.6	\$1.7
Contributions to Reserves	\$20.4	\$21.8	\$24.0
Transfer to FRMP from Capital Levy	\$1.3	\$0.8	\$1.0
Transfer to FRMP WWRF	\$2.5	\$2.5	\$2.5
Transfer to Capital Fund	\$8.8	\$9.3	\$9.2
Recoveries	-\$22.6	-\$24.7	-\$28.5
County Share	\$0.2	\$0.0	\$0.1
Total	\$304.8	\$311.3	\$342.8

5.5 Financial Strategy Methodology

The financial strategy was developed by completing an analysis on the City's current capital budget forecast (2023-2033), and combining that with the City's lifecycle, risk and LoS strategies to develop a 10-year investment forecast. The following sections detail the methodology used to complete this analysis for the financial strategy.

The City's lifecycle models have been developed to account for asset condition-based lifecycle strategies (rehabilitation and replacement), which is the driver for most capital works that the City undertakes. Additional activities to meet Levels of Service (LOS) related non-condition-based aspects of asset performance, including growth, performance and/or climate change impacts can also be modelled. The City may seek to include non-condition-based models into its overall lifecycle modelling strategy in the future.

5.5.1 Budget Analysis

The purpose of the budget analysis was to identify the different lifecycle costs for each of the Service and Subservice areas. The projects in the City's approved capital budget were used and categorized by lifecycle activity and asset hierarchy (where information was available). Table 5-6 below shows the definitions of Lifecycle Activities used for the analysis in this Plan.

Table 5-6: Lifecycle Activities

Lifecycle Activity	Definition
Non-Infrastructure Solutions	Actions or policies that can lower costs or extend useful lives. Activities include strategic plans, modelling, demand analysis, etc.
Operations and Maintenance Activities	Costs to deliver the service. Including regularly scheduled inspection and maintenance or more significant repair and activities associated with unexpected events. For this AMP, the Capital Budget was used as the source for operations and maintenance type activity costs.
Renewal Activities (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.
Disposals/Abandonment Policies	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.
Service Improvement Activities	Planned activities to improve the asset's capacity, quality, and system reliability.

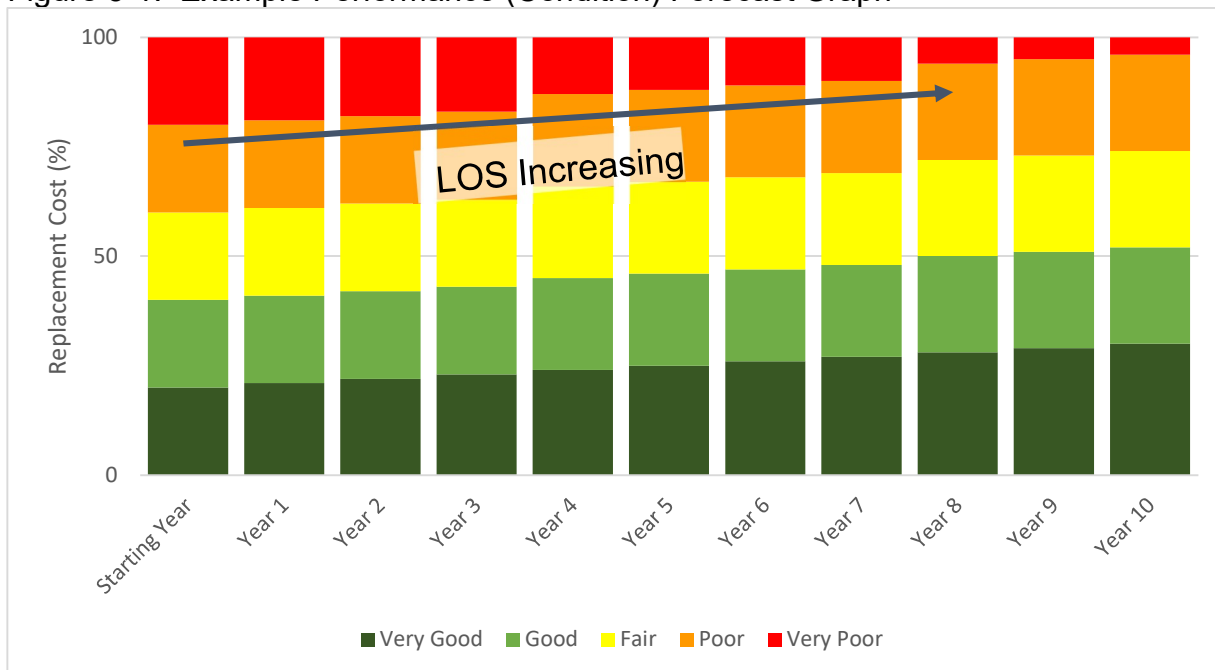
Lifecycle Activity	Definition
	New assets not related to growth would be considered a service improvement.
Growth Activities	Planned activities required to extend services to previously unserved areas or expand services to meet growth demands.

Projects in the capital budget forecast that had multiple lifecycle activities were separated to isolate the costs for each year. For example, if a \$1 million project was split 70% growth and 30% renewal then the first row would be categorized as growth and the remaining cost of the project changed to \$700K. An additional row would be added and categorized to renewal with the cost at \$300K. The same process was done for projects with multiple Service, Subservice, or Asset Categories.

5.5.2 Asset Needs Forecasting

Asset needs forecasting combines the lifecycle models, levels of service (LoS) measures, and risk management strategy in a decision support (DSS) model. The model has the ability to forecast either asset performance (condition) or spending needs over a given time horizon. This relationship between performance and spending needs is important to understanding the costs associated to achieving various service level requirements. The model allows the City to assess the resulting forecasted performance and related spending over time to support decision making. The following figure illustrates an example of a performance forecast graph.

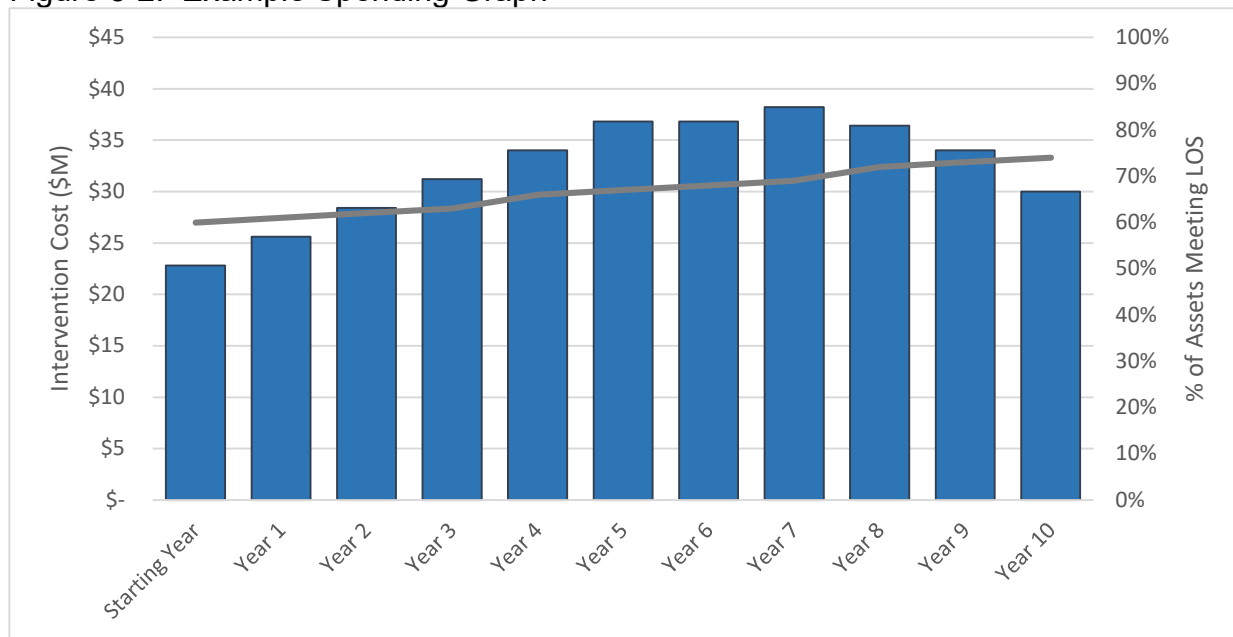
Figure 5-1: Example Performance (Condition) Forecast Graph



The graph can be interpreted as follows. Each of the bars in the figure represent the condition distribution of a group of assets in a given year. The condition is distributed over five (5) condition states: Very Good, Good, Fair, Poor and Very Poor. The City's LoS measures are tied to asset condition through a condition-based measure. As the proportion of assets in Very Poor condition decreases, the City's LoS improves. If this proportion of assets is maintained, then so is the City's LoS.

Each performance forecast figure is paired with a spending graph. The following figure provides an example spending graph.

Figure 5-2: Example Spending Graph



The spending graph illustrates the amount of spending required over time to achieve the given performance state. Each bar on the graph is the amount of spending required in a given year to match that same year's performance (condition) distribution. Also on the graph, represented by the right axis, is a line that indicates the percentage of assets meeting LoS under this given scenario.

The City reviewed scenarios for the cost to maintain current levels of service, and the cost to achieve 100% current established levels of service (Backlog Analysis).

The following subsection describes each scenario:

5.5.3 Forecast Scenarios

Scenario 1: Cost to Maintain Current Levels of Service

This scenario derives the cost that would be required to maintain current levels of service over a 10-year forecast period. This is performed by calculating the condition based LoS for each asset group, which is represented as the percentage of assets meeting objectives (i.e. not in very poor condition/past its service life). This percentage is maintained over the

forecast period, and the associated spending needs are calculated by the model. Understanding the cost to maintain current LoS is a requirement of the July 1, 2024 milestone of O.Reg. 588/17.

For this iteration of the Plan, Service Area Attachments will report the renewal costs to maintain current levels of service.

Scenario 2: Achieve 100% LoS Targets - Backlog Analysis

A second **scenario** that was completed as part of the asset needs forecasting is the backlog analysis. This scenario derives the cost that would be required for the City to meet 100% of its condition-based LOS measure. It represents the cost to complete all necessary lifecycle activities on each asset at the appropriate time. It is referred to as a backlog analysis, due to the fact that it often identifies a significant financial need in the first year of the analysis (otherwise known as the backlog). This need represents the amount of outstanding asset capital works that is currently required.

Note that this scenario is not necessarily intended to represent a practical plan that can be enacted, but rather, it illustrates the theoretical upper limit of asset performance that can be achieved, given an unlimited amount of funding. It may or may not be practical, given available funding and LOS targets that the City may propose to achieve.

5.6 Results

5.6.1 Anticipated Funding Analysis

The summary of the Capital Budget Analysis by lifecycle activity is provided in Table 5-6 below. Costs shown are the historical three-year annual average from the City's capital budget forecast.

Total costs shown in Table 5-7 below will be assumed as the baseline level of funding available for financial analysis purposes. Operating and maintenance costs shown are based on activities/projects from the capital budget forecast only.

Table 5-7: Summary of Lifecycle Activity Costs – Anticipated Budget

Lifecycle Activity	Scenario 1: Anticipated Budget
Non-Infrastructure Solutions	\$13,048,774
Operations and Maintenance Activities ⁷	\$3,881,667
Renewal Activities	\$53,798,263
Disposals/Abandonment Policies	\$113,333
Growth Activities	\$7,723,656
Service Improvement Activities	\$24,170,590
Total	\$102,736,284

5.6.2 Costs to Maintain Current Levels of Service

The compiled investment needs under this scenario are presented in Table 5-7 below. The analysis focused on identifying the renewal and rehabilitation investments, with renewal activity investments for this scenario reporting condition based LoS needs over the 10-yr forecast.

The City may also be experiencing operational and maintenance investment gaps and is working towards quantifying the true cost to maintain LoS from the operational side. The City is working towards refining processes to capture the full lifecycle investment needs for inclusion in future iterations of the Plan.

Table 5-8 shows the lifecycle costs to maintain current LoS. Growth activity costs are based on the most recent Development Charge Study (and amendments).

Table 5-8: Summary of Lifecycle Activity Costs to Maintain Current LoS

Lifecycle Activity	Scenario 2: Maintain LOS (10-yr annual average)
Non-Infrastructure Solutions	\$19,571,731
Operations and Maintenance Activities	\$5,990,200
Renewal Activities	\$56,376,000
Disposals/Abandonment Policies	\$100,000
Growth Activities	\$30,546,386

⁷ Costs classified as operations and maintenance type activities from the Capital Budget only (for all scenarios)

Lifecycle Activity	Scenario 2: Maintain LOS (10-yr annual average)
Service Improvement Activities	\$50,098,386
Total	\$162,722,538

The following Figures 5-3 and 5-4 illustrate the forecasted performance (condition) and spending required to maintain levels of service for renewals for all service areas reported in this plan.

Figure 5-3: 10-Yr Performance Forecast – Maintain Current LoS, All Service Areas

Performance Forecast

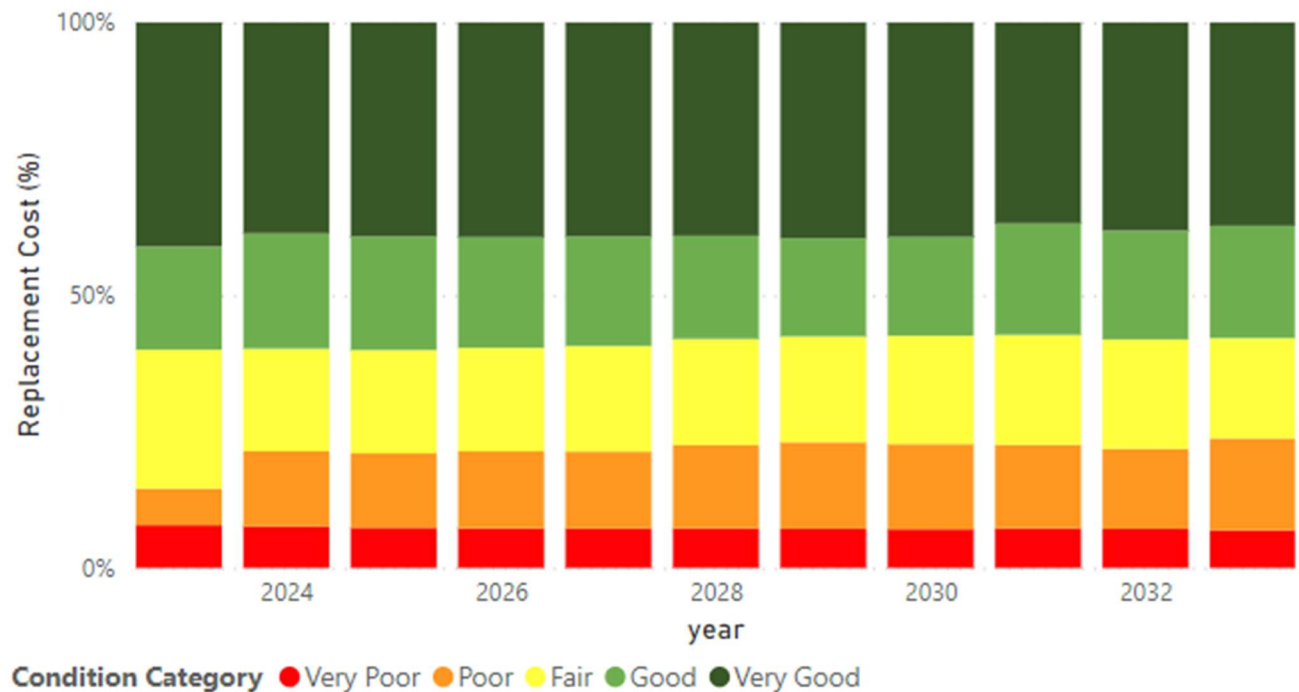


Figure 5-4: 10-Yr Spending Forecast – Maintain Current LoS, All Service Areas



As shown above in Table 5-8, the average equivalent annual spending for renewals to maintain the current conditions shown in Figure 5-3 is estimated at \$56.38 million per year over the next 10 years. The spending graph indicates that 88% of assets will be achieving current levels of service.

Refinements to lifecycle activity investments will be required as condition assessments are updated, and data accuracy improves. This Plan is a fluid document and will require continual updating to make the best-informed decisions possible.

5.6.3 Backlog Analysis

The compiled investment needs under this scenario are presented in Table 5-9 below.

The backlog analysis considers all necessary lifecycle activities and costs on each asset at the appropriate time. While this may present a significant up-front investment which the City realistically will not be able to fund in a single year, it represents the cost that would be needed to achieve 100% of the established level of service targets as discussed in Section 3.0 – Levels of Service.

Table 5-9: Summary of Lifecycle Activity Costs – Backlog Analysis

Lifecycle Activity	Scenario 3: Backlog Analysis (10-yr annual average)
Non-Infrastructure Solutions	\$19,571,731
Operations and Maintenance Activities	\$5,990,200
Renewal Activities	\$113,780,000
Disposals/Abandonment Policies	\$100,000
Growth Activities	\$30,586,386
Service Improvement Activities	\$50,098,386
Total	\$220,126,538

The following Figures 5-5 and 5-6 illustrate the forecasted performance (condition) and spending required to achieve 100% LoS for renewals for all service areas reported in this plan.

Figure 5-5: 10-Yr Performance Forecast – Achieve 100% LoS, All Service Areas

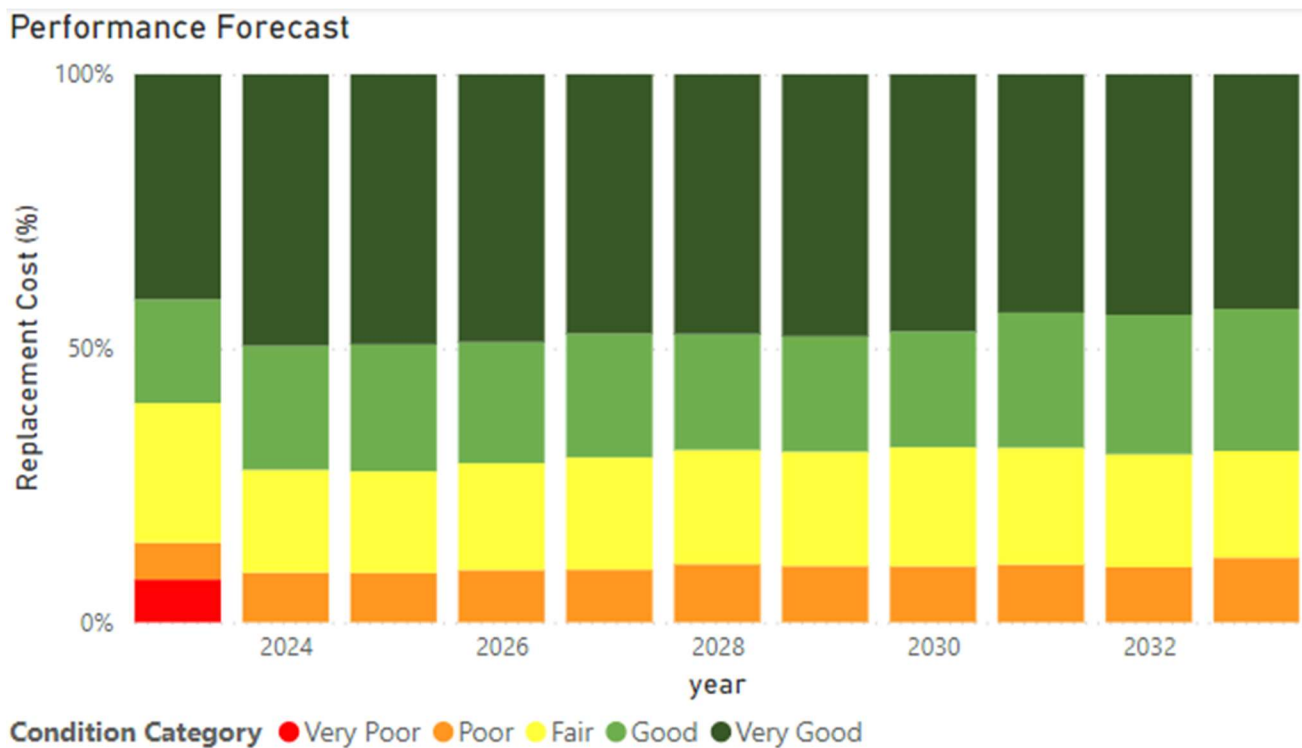


Figure 5-6: 10-Yr Spending Forecast – Achieve 100% LoS, All Service Areas

Spending Forecast



As shown above in Table 5-9, the average equivalent annual spending for renewals to maintain the current conditions shown in Figure 5-3 is estimated at \$113.78 million per year over the next 10 years. The spending graph indicates that 100% of assets will be achieving current levels of service with the related level of spending.

5.7 Summary of the Financial Shortfall

Public infrastructure is often looked at as the backbone of our economy and quality of life. Unfortunately, years of under investment throughout the country has resulted in years of deferred repairs. Canada is beginning to confront its "infrastructure deficit" but it is not without challenges. Peterborough and most other municipalities struggle with the same infrastructure challenges.

The financial shortfall represents the amount of funding that is unavailable to achieve 100% current levels of service for existing assets and growth-related demands. The financial shortfall analysis is determined over a 10-year planning period by comparing the 'investment needs' to the 'anticipated budget'.

Many assumptions are made when determining the financial shortfall. Currently, the cost of fully implementing the lifecycle strategies identified in this Plan and the cost for delivering current levels of service are not fully understood and do not align with the City of Peterborough's budget planning processes. As a result, not all lifecycle strategy costs are accurately presented in the needs analysis. This also creates a somewhat misleading financial shortfall that will be improved as the City's asset management planning matures. Until levels of service are fully understood, it can be assumed that the needs identified in this Plan ensure that assets are (at a minimum) maintained in acceptable condition, funding is available to meet growth demands and regulatory requirements are met. Also incorporated into the analysis are other assumptions such as provincial targets for growth in Peterborough, user rates remaining constant and Community Housing support continuing with reduced provincial involvement.

For the purpose of the financial shortfall analysis, investment needs and anticipated budget are defined as follows:

Investment Needs – This is the average annual lifecycle investment needs for all service areas reported in this Plan. These are based on a 10-year planning period and considers all lifecycle costs for existing assets, investments required to meet growth demands and to achieve 100% established levels of service. The 2024 investment needs used for this part of the analysis is based on the backlog analysis and is an estimated **\$220.1 million**.

Anticipated Budget – This is the averaged three year historical expenditures for lifecycle activities from the City's approved Capital Budget and forecasted out over the 10-year planning period. With the assumption that there will not be any significant impacts to revenue sources, the average of the City's current funding levels allocated for lifecycle costs will be used as the anticipated budget and used to calculate the annual shortfall/surplus. The 2024 anticipated budget is an estimated **\$102.7 million**.

Service area investment dollars and projected budget dollars shown in Table 5-10 below have been indexed by 3% per year to reflect inflationary costs.

Table 5-10: Investment Needs and Anticipated Funding – Existing and Growth Related

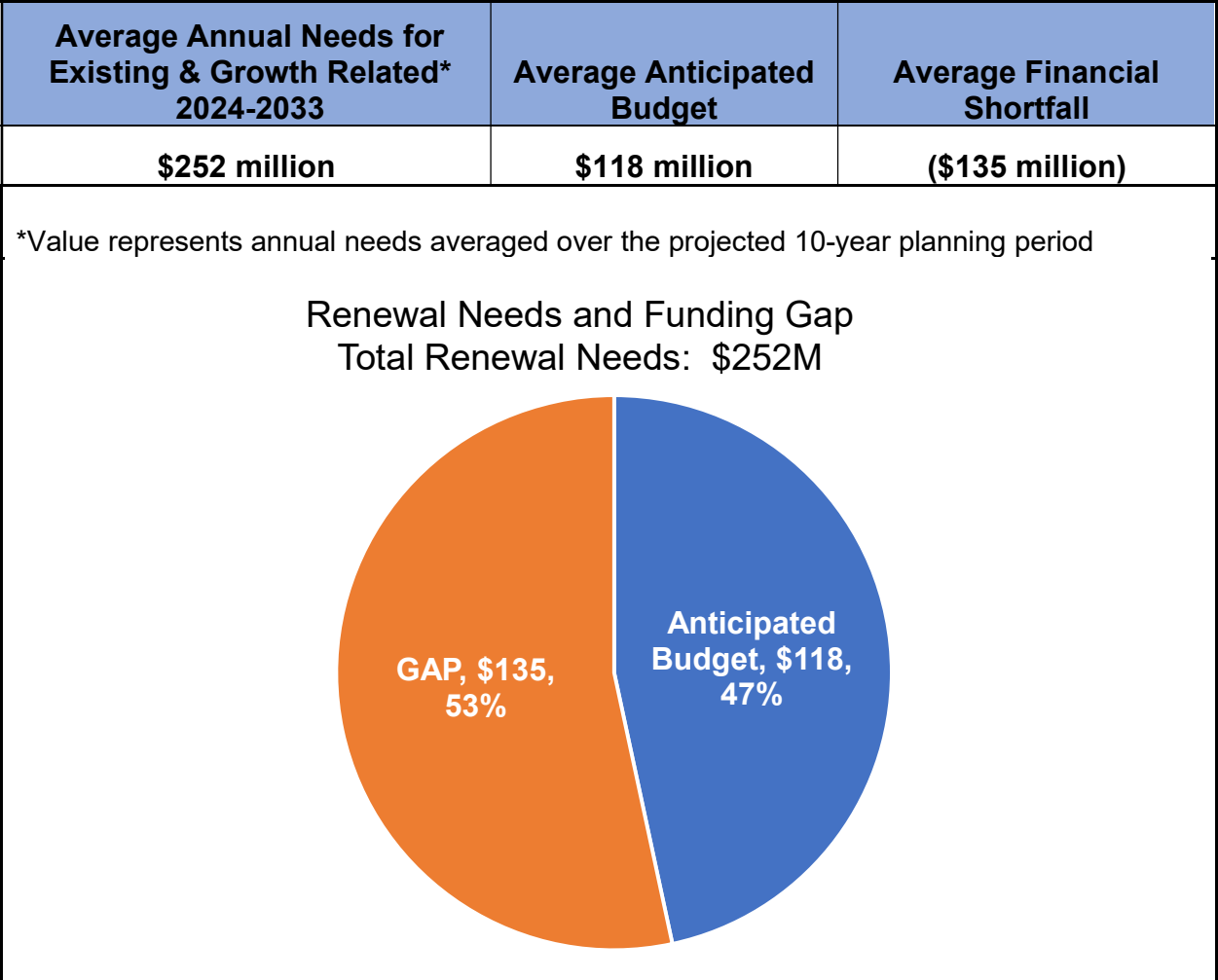
	Lifecycle Investment Needs (\$millions)									
Lifecycle Activity	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Non-Infrastructure Solutions	\$19.6	\$20.2	\$20.8	\$21.4	\$22.0	\$22.7	\$23.4	\$24.1	\$24.8	\$25.5
Operations and Maintenance Activities	\$6.0	\$6.2	\$6.4	\$6.5	\$6.7	\$6.9	\$7.2	\$7.4	\$7.6	\$7.8
Renewal Activities	\$113.8	\$117.2	\$120.7	\$124.3	\$128.1	\$131.9	\$135.9	\$139.9	\$144.1	\$148.5
Disposals/Abandonment Policies	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1
Growth Activities	\$30.6	\$31.5	\$32.4	\$33.4	\$34.4	\$35.5	\$36.5	\$37.6	\$38.7	\$39.9
Service Improvement Activities	\$50.1	\$51.6	\$53.1	\$54.7	\$56.4	\$58.1	\$59.8	\$61.6	\$63.5	\$65.4
Total	\$220.1	\$226.7	\$233.5	\$240.5	\$247.8	\$255.2	\$262.8	\$270.7	\$278.8	\$287.2
Anticipated Budget	\$102.7	\$105.8	\$109.0	\$112.3	\$115.6	\$119.1	\$122.7	\$126.4	\$130.1	\$134.0
Shortfall/Surplus	-\$117.4	-\$120.9	-\$124.5	-\$128.3	-\$132.1	-\$136.1	-\$140.2	-\$144.4	-\$148.7	-\$153.2
Average Total Lifecycle Needs	\$252.4									
Average Anticipated Budget	\$117.8									
Average Shortfall	-\$134.6									

5.7.1 Current Financial Shortfall

As shown in Figure 5-7 below, the projected average budget over the 10-yr forecast is estimated at \$118 million per year giving an average financial shortfall of \$135 million. This indicates that 47% of the forecasted lifecycle costs needed to provide the services reported in this Plan at the lowest lifecycle cost are accommodated in the proposed budget.

Figure 5-7 provides a high-level summary the current financial shortfall for existing and growth-related infrastructure.

Figure 5-7: Current Financial Shortfall Analysis



Assets that are not able to maintain current LoS are likely to experience a reduction in service levels over the 10-year period. They may potentially experience more frequent asset failures or disruption to services, as well as increased levels of maintenance to keep assets in service.

Several possibilities exist to begin minimizing the gap between needs versus anticipated budget. To overcome this financial challenge, the City must review asset needs comprehensively in view of the services they deliver. As unplanned revenues become available, the City will seek to apply them towards mitigating the shortfall whenever possible. The assets included in this Plan have a large impact on delivering the services that Stakeholders expect, and at reasonable costs (taxes, fees etc.). As further information becomes available and is refined, these financial projections will be improved.

5.7.2 Options for the Financial Shortfall

Finding the right balance between service delivery and funding can be a complicated process with pros and cons. For example, strategically prioritizing the City's land development growth areas allows for responsible delivery of services in a fiscally responsible manner but may have an impact on economic growth.

A plan to increase the City financing available for capital works was recommended to council in 2012 and amended in 2021⁸, in which a Debt Management Policy and other changes to assist in capital works was outlined. The report is a result of a full analysis Finance staff undertook to review the City's financial situation, existing debt policy, the options available and consequences of those options.

Of significant importance to capital planning, the following was adopted by Council;

- That the Debt Management Policy will increase the maximum amount of debt the City of Peterborough can issue.
- That the annual draft operating budget include a 5% increase in the capital levy provision as a means of providing more capital levy to support the capital investment needs.
- A phase-in of the new maximum debt limit, the total annual amount of new tax-supported debt charges and any increase in the base capital levy provision be limited so that the impact on the all-inclusive tax increase does not exceed 1% per year.

In reference to the information in this Plan and as previously reported to council in the Debt Management and Capital Financing Plan, the City will consider a blend of the Debt Management Policy and the approaches outlined below in order to manage the shortfall and achieve service delivery goals:

- Alignment of the City's budget process with the asset management plan.
- Review and prioritize assets in poor to very poor condition.
- Give priority to asset renewal expenditure vs. new build.
- Maximize available Federal and Provincial Funding.

⁸ City of Peterborough, Report CPFS12-011 Debt Management and Capital Financing Plan, (April 4, 2012) and amended through Report CLSFS21-024 (July 2, 2021)

- Growth area strategies and funding.
- Lifecycle costing prior to new development or renewals to understand future expenditure needs and commitments.
- Expanded partnerships or external funding.
- Revisit disposal strategies.
- Dedicated funding programs.
- Community review of and input on service levels; and
- Procurement methodologies as per the Procurement By-law.

In addition to the approaches listed above, the City recently developed a Capital Project Prioritization Questionnaire in which the discussion on prioritization is initiated by aligning the criteria in which projects are scored against with asset management program initiatives, objectives, and overarching City goals and targets. Factors such as legislative requirements, achieving levels of service, risk, cost benefits and climate change, etc. play a significant role in developing investment plans across the organization. The capital project prioritization process helps position investments with the greatest benefit (considering impact and benefit from a financial aspect and the consequences of not completing it), while balancing an acceptable level of risk.

6.0 Plan Improvement & Monitoring

6.1 Improvement Plan

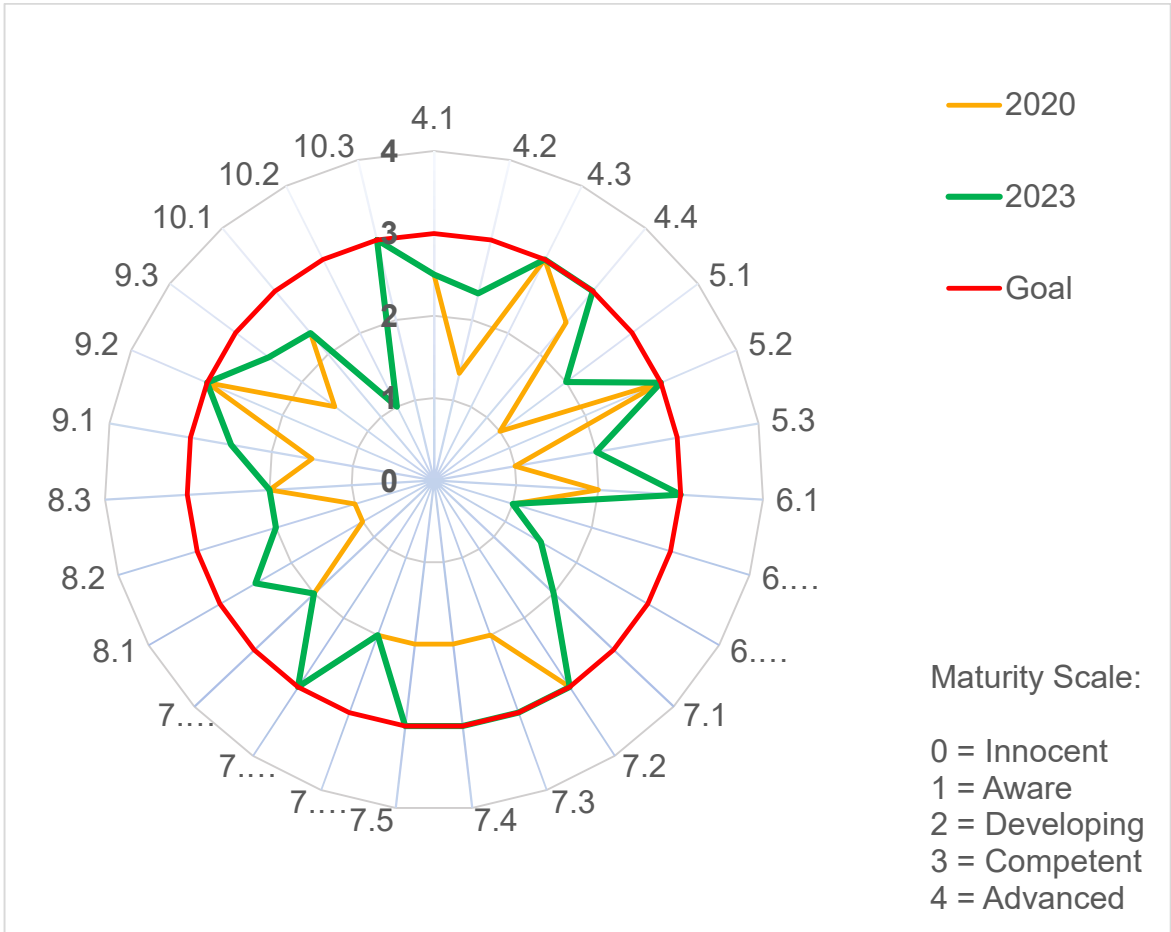
Asset management is a continuously improving practice that is rapidly being applied across all Municipalities. As the City's asset management practices evolve and matures this Plan will also mature. The City completed a State of Asset Management (SOAM) assessment and an Asset Management Road Map to improve the City's asset management practices for decision making.

6.2 Asset Management Maturity

The SOAM identifies that the City has implemented a continual improvement process for the City's asset management practices based on ISO 55000 for Asset Management. The most recent internal audit completed in 2023 has determined that the City is currently considered to be asset management "Developing" and moving towards "Competent" with an average score of 2.4, with the goal of achieving a minimum average score of 3.0 or 'Competent' (bold circle).

Figure 6.0 below shows where the City scores relative to the AM Maturity 'wheel' and the criteria in which the City was scored against. Asset management maturity audits are anticipated to be completed on a regular cycle where each section shown in the figure below is evaluated and scored for compliance.

Figure 6-0: City of Peterborough State of Asset Management Maturity



Clause No.	Subsection
4.1	Understanding the organization and its context
4.2	Understanding the needs and expectations of stakeholders
4.3	Determining the scope of the asset management system
4.4	Asset Management system
5.1	Leadership and commitment

Clause No.	Subsection
5.2	Policy
5.3	Organizational roles, responsibilities, and authorities
6.1	Actions to address risks and opportunities for the asset management system
6.2.1	Asset management objectives
6.2.2	Planning to achieve asset management objectives
7.1	Resources
7.2	Competence
7.3	Awareness
7.4	Communication
7.5	Information requirements
7.6.1	Documented information general
7.6.2	Creating and updating documented information
7.6.3	Control of documented information
8.1	Operational planning and control
8.2	Management of change
8.3	Outsourcing
9.1	Monitoring, measurement, analysis, and evaluation
9.2	Internal audit
9.3	Management review
10.1	Nonconformity and corrective action
10.2	Preventive action
10.3	Continual improvement

7.0 Conclusion

The City strives to effectively deliver services to the expectations of the public while meeting legal obligations. To meet the service expectations the City has developed several strategies in which some are successful to reduce the costs to the City while improving the overall asset condition. Other strategies are either recently approved or have not been documented well enough to fully understand their impact to the overall condition or service delivery.

Beyond the current asset base, the City needs to plan for new assets to meet growth needs. Growth needs are based on planning areas in the Official Plan and are influenced by the Province's Places to Grow Act and the Greater Golden Horseshoe Growth Plan.

Options are available for the City to manage the financial shortfall. The City can continue to deliver services at the current levels and maintain the commitment to fund required investments whenever possible. As additional revenue sources become available, these can be put towards reducing the shortfall (a.k.a. paying for the gap). However, the capital program needs continue to exceed the available funding on an ongoing basis, leaving the City with no other option but to defer asset renewals to future years. This often results in higher costs over the long-term planning period. The second option is reducing service levels to align with the available budget (with the understanding that there are legislated/regulated/essential services that can't be reduced or eliminated). This may be received with hesitation since Stakeholders are often unwilling to give up services being enjoyed and do not fully understand the true cost of delivering them (and the willingness to pay). Finally, the City can seek to implement more efficient strategies to deliver services such as the sharing of services with other local boards, agencies and municipalities, offering incentives for services, or the provision of alternate services.

The options outlined above is not an exhaustive list and have yet to be discussed as part of proposed levels of service. This will play an integral part in meeting O.Reg 588/17 *Asset Management Planning for Municipal Infrastructure* reporting requirements prior to the 2025 deadline.

The asset management plan will play a significant role in understanding current and proposed services being delivered, the costs to deliver them and associated risks. The Plan also seeks to help prioritize capital projects and serve as an overarching guiding document for decision making processes.

This Plan has had to make several assumptions to come to the conclusions drawn. In making these assumptions, actions are being reviewed to help improve future iterations and reduce the number of assumptions.

Council approved Plans, Policies and Procedures are available on the City's corporate website. Asset specific details relating to the asset management plan can be found in

the Service Area Attachments which are also available on the City's website at www.peterborough.ca.

8.0 Appendices

Separately attached

9.0 Service Area Attachments

The service area attachments in this section contain details relating to the topics below and are further analyzed:

- Inventory Details
- Replacement Costs
- Asset Condition and Remaining Useful Life
- Risk Assessment
- Levels of Service
- Asset Management Strategies

Assets Included in the Plan - 2024

Service	Subservice	Asset Category
Administration & Operations/General Government	Administration	Facilities
	PTS	Hardware
		Software
	Public Works	Equipment
		Facilities
		Fleet
Arts, Culture & Heritage	Heritage Services	Facilities
	Library Services	Collections
		Equipment
		Facilities
	Museums and Arts	Collections
		Facilities
Community Recreation	Aquatics and Equipment	Public Beaches
		Splash Pads and Wading Pools
	Arenas & Recreation Facilities	Equipment
		Facilities
		Fleet
	Parks	Facilities
		Land
		Parks Amenities
		Parks Siteworks
	Urban Forest	Equipment
		Fleet
		Trees
Emergency Services	Fire Services	Equipment
		Facilities
		Fleet
	Police Services	Equipment
		Facilities
		Fleet
Environmental Services & Water Resource Systems	Solid Waste Management	Facilities
		Fleet
		Land
	Storm Water	Conveyance
		Stormwater Management
	Wastewater Collection	Conveyance
		Fleet

Appendix A


Service	Subservice	Asset Category
	Wastewater Treatment	Facilities
		Fleet
Social Services	Daycare	Facilities
	Housing	Facilities
Transportation	Airport	Airport Support Assets
		Facilities
		Land
	Roads & Related Assets	Active Transportation Network
		Equipment
		Facilities
		Fleet
		Municipal Structures
		Right of Way
		Traffic Management
	Transit	Facilities
		Fleet
		Miscellaneous

Appendix B – Standardized Chart for Consequence Scores

<u>Consequence</u>	Description	Score
Minimal	No noticeable damage to environment society, no injuries, not a nuisance, no time delays, little to know fines, no media	5
	Minor amount of damage to environment or society, less than a few or very minor injuries, easy work around, limited delays, small fines, no media	4
Moderate	Some damage to environment or society, a few injuries or minor injuries, work around available, some delay, subject to fines or investigation, possibly media attention	3
	Damage to environment or society, a number of injuries (varying degrees), work around are not easy to implement, large delays, large fines and investigation, local media attention	2
Catastrophic	Major damage to environment/society, life threatening injuries or death, work around are not possible or time consuming and costly, major delays, legal action, large fines, major investigations, national media attention	1

Attachment #1: Roads & Related Assets Service Area



Infrastructure Value	\$1,447M	
Annual Renewal Needs	\$26M	
Overall Condition	3.0	Fair
High Risk Asset Value	\$470M	32%
Trend		

1.0 Summary of Roads & Related Assets

Asset classes that fall under the roads & related assets service area include road right of ways, municipal structures, active transportation network (sidewalks, trails), facilities, equipment, and traffic management (traffic lights, streetlights, poles, etc.). Annual renewal needs shown are based on lifecycle management strategies and represent the estimated amount of capital (renewal) the City needs to reinvest in its existing asset inventory on an annual basis over the next 10 years to sustain the current levels of service (based on 25-yr investment forecast). Condition rating trends show a slight decline from the previous reported Plan due to changes in asset valuation and data improvements.

Table 1 details the City's inventory for the roads & related asset service area.

1.1 Inventory Details

Table 1: Roads and Related Assets Service Area Inventory

Asset Class & Sub-class	Asset	2023 Quantity	Unit of Measure
Right of Way - Roads			
Arterial	Rural & Urban	100	km
Collector	Rural & Urban	76	km
Local	Rural & Urban	225	km
Lane	Rural	0.2	km
Unclassified	-	1	km

Asset Class & Sub-class	Asset	2023 Quantity	Unit of Measure
Municipal Structures			
Road Bridges	-	26	Each
Pedestrian Bridges	-	21	Each
Culvert Bridges	-	16	Each
Culvert	-	3	Each
Active Transportation			
Sidewalks	Sidewalks & Sidewalk Walkways	404	km
Trails	Trails, Bicycle and Footpaths, Trail Roadside	35	km
Equipment			
Parking Equipment	Meters	Pooled	
	Parking Equipment		
Fleet			
Light Duty Vehicles	-	5	Each
Traffic Management			
Guardrails	-	5.4	km
Street Signs	Signs	18,196	Each
	Supports	8,836	Each
Traffic Signals	Intersections	142	Each
Controllers/Detectors	Controllers/Detectors	953	Each
Street Lights	Lamps	7,574	Each
	Poles	2,030	Each
Facilities			
Parking Garage – King St. Parkade		1	Each
Parking Lots		7	Each

1.2 Replacement Costs

The estimated year end 2023 replacement costs for the roads & related assets service area totalled \$1.4 billion. Replacement costs were determined using different valuation methods, such as unit cost multipliers based on recent construction projects or replacements, condition assessments or historical costs inflated to 2023 where recent assessments or costing information was not available.

Figure 1: Roads & Related Assets Service Area –Replacement Cost by Asset Class

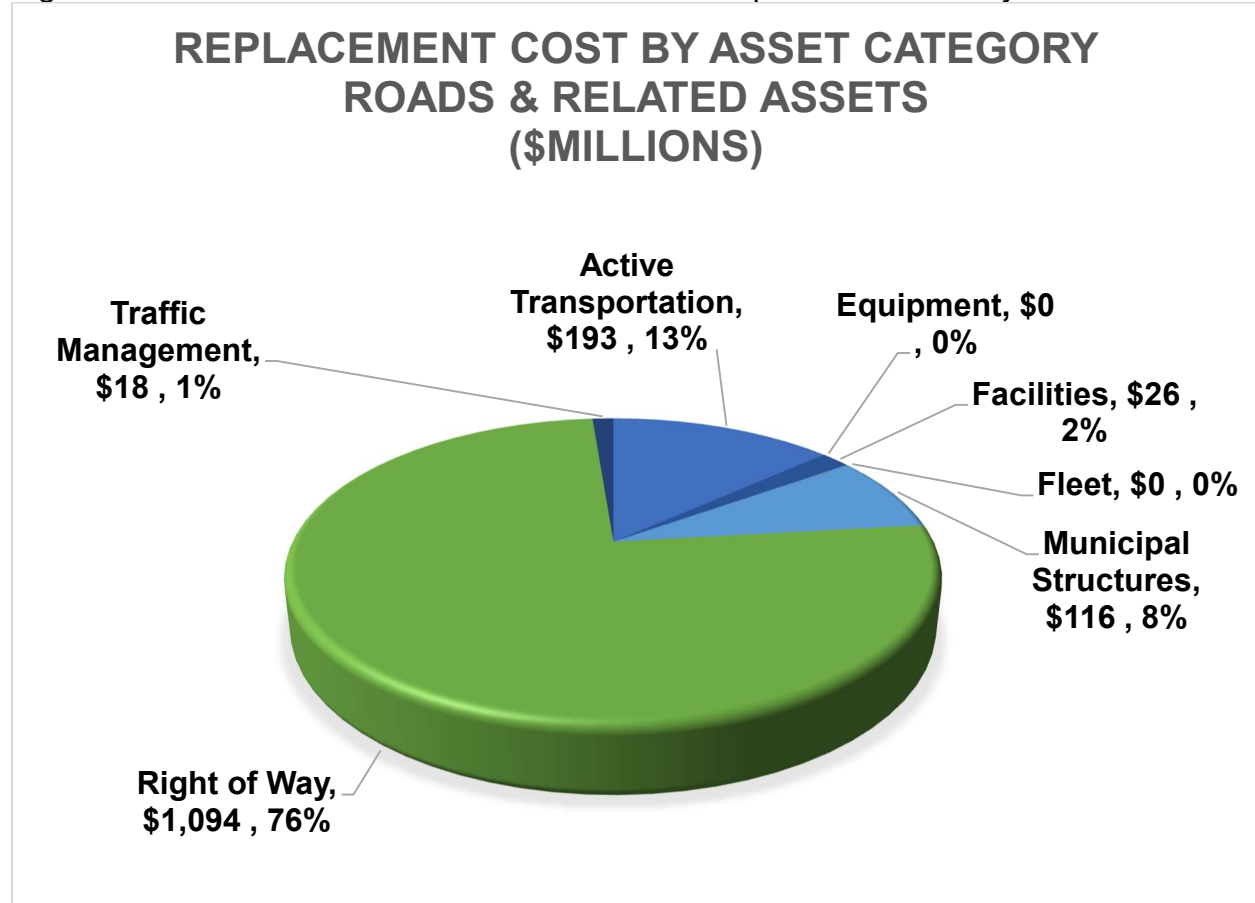


Table 2: Roads & Related Assets - Replacement Costs by Asset Class

Asset Category & Class	Asset Type	2023 Replacement Cost
Roads - Right of Way		\$1,094,189,539
Arterial	Rural & Urban	\$274,249,440
Collector	Rural & Urban	\$207,191,853
Local	Rural & Urban	\$609,972,577
Lane	Rural	\$531,340
Unclassified	-	\$2,244,337
Municipal Structures		\$115,801,869
Road Bridges	-	\$66,574,782
Pedestrian Bridges	-	\$14,313,859
Culvert Bridges	-	\$30,365,096
Culvert	-	\$4,548,132
Active Transportation		\$193,192,356
Sidewalks	Sidewalks	\$172,057,406

Asset Category & Class	Asset Type	2023 Replacement Cost
	Sidewalk Walkways	
	Trail Neighbourhood	
	Bicycle and Footpaths	
	Trails	\$21,134,942
Trails	Trail Roadside	
Equipment		\$41,761,151
Parking Equipment	Metres and Parking Equipment	\$37,423
Fleet		\$132,684
Light Duty Vehicles		\$132,684
Facilities		\$25,665,607
Parking Garage – King St. Parkade	-	\$23,505,351
Parking Lots	-	\$2,160,256
Traffic Management		\$17,860,467
Guardrails	-	\$123,014
	Signs	
Street Signs	Supports	\$1,838,995
Traffic Signals	-	\$8,503,248
	Lamps	\$5,821,599
Street Lights	Poles	\$1,572,578
Roads & Related Assets Total		\$1,446,878,910

1.3 Asset Condition and Remaining Useful Life

The City's roads & related service area is currently rated in overall fair condition. Condition assessments have been completed for road right of way, municipal structures, sidewalks, signs, facilities and most traffic management assets except for guardrails and traffic assets. Where condition inspections have not been completed, age-based ratings were used. Based on replacement cost, 26% or \$373 million are rated very good, 17% or \$252 million rated good, 29% or \$422 million rated fair and 28% or \$399 million rated poor and very poor. Figure 2 and Table 3 provide condition details of the roads & related assets service area.

Figure 2: Roads & Related Assets - Distributed Condition and Replacement Cost

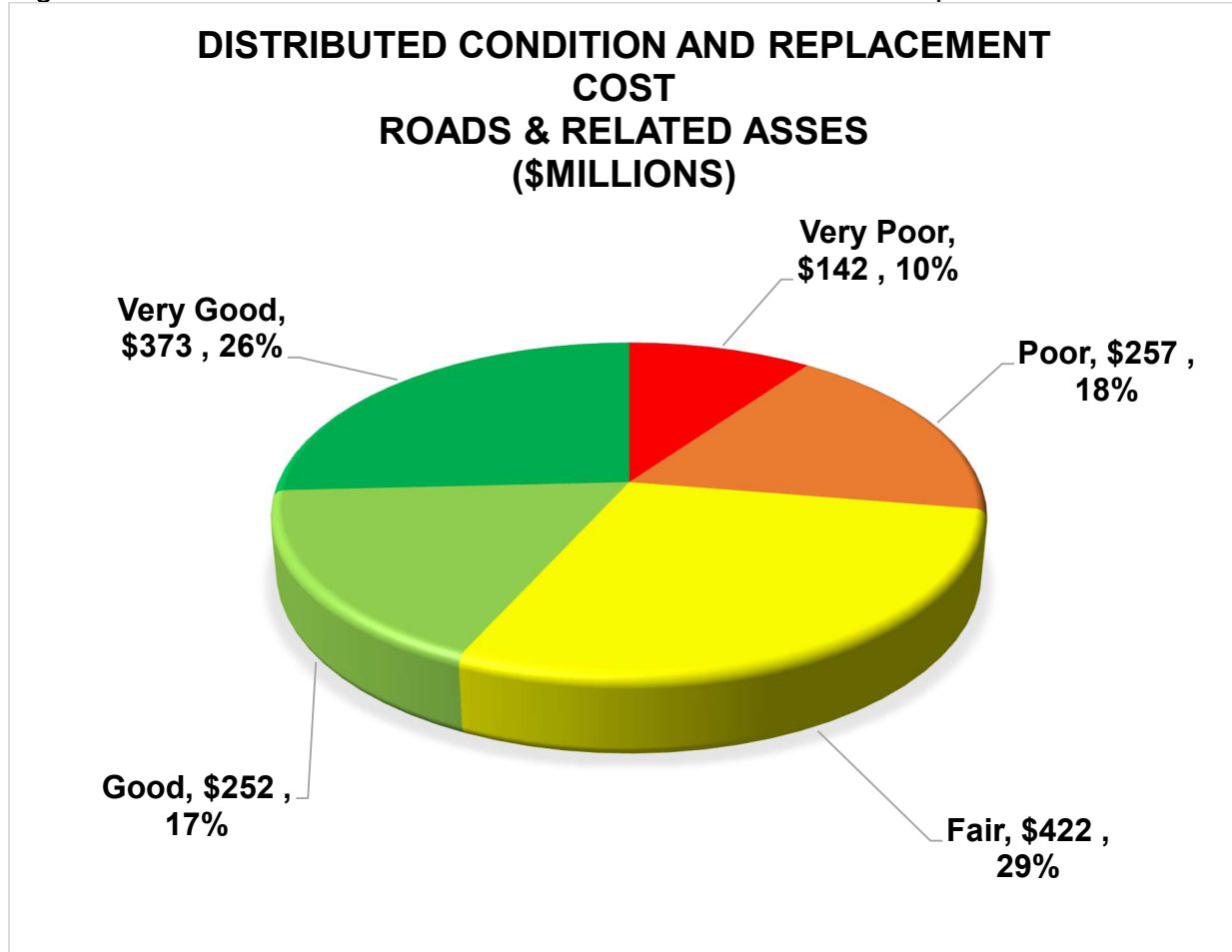


Table 3: Roads & Related Assets - Asset Condition Ratings

Asset Category & Class	Asset Type	2023 Condition Rating
Roads - Right of Way		
Arterial	Rural & Urban	Fair
Collector	Rural & Urban	Fair
Local	Rural & Urban	Fair
Lane	Rural	Very Good
Unclassified	-	Poor
Municipal Structures		
Road Bridges	-	Good
Pedestrian Bridges	-	Fair
Culvert Bridges	-	Fair
Culvert	-	Fair
Active Transportation		

Asset Category & Class	Asset Type	2023 Condition Rating
Sidewalks	Sidewalks	Very Good
	Sidewalk Walkways	
	Trail Neighbourhood	
Trails	Bicycle and Footpaths	Very Good
	Trails	
	Trail Roadside	
Equipment		
Parking Equipment	Metres and Parking Equipment	Poor
Fleet		
Light Duty Vehicles		Poor
Facilities		
Parking Garage – King St. Parkade	-	Good
Parking Lots	-	Poor
Traffic Management		
Guardrails	-	Good
Street Signs	Signs	Very Good
	Supports	
Intersections	-	Fair ¹
Street Lights	Lamps	Very Good
	Poles	Fair
Roads & Related Overall Condition		Fair

Roads

The City conducts road right-of-way pavement condition assessments based on frequency cycles recommended in the 2014 Road Needs Study². The frequency for each asset class is as follows:

- Arterial roads - every two years
- Collector roads – every three years
- Local roads – every four years

The City's Public Works department also operates a weekly pavement inspection program which focuses on routine maintenance repairs (i.e. pothole filling, small patching, etc.).

¹ Revised to 'fair' from 'very poor'. Alternate rating is based on professional judgement/expertise by subject matter experts.

² City of Peterborough & DM Wills Associates Limited, Road Needs Study Report, (2014)

The City is currently using Paver to perform road analysis. Paver calculates a PCI for each individual road section based on the data collected. Values range from zero (Failed) to 100 (Perfect) and relies on three data types; distress type, distress severity and distress quantity. Using this data, a PCI is assigned using the scale shown in Table 4 Standard PCI Rating Scale. The City of Peterborough currently aims for a target condition rating of Fair or minimum PCI of 55.

Table 4: Standard PCI Rating Scale

Standard PCI Rating Scale (Paver)		
PCI Scale		Pavement Management Strategy
Good	85-100	Preventative Maintenance – crack route & seal, micro-surfacing, inspection program
Satisfactory	70-85	
Fair	56-70	Micro-surfacing and/or road resurfacing
Poor	41-55	Road Resurfacing
Very Poor	26-40	Road surface repairs only – ‘Do nothing strategy’
Serious	11-25	
Failed	0-10	Full Reconstruction

Municipal Structures

Municipal structures (bridges and culverts) that are 3 metres or greater are inspected every two years and must follow specific inspection procedures as provided in the Ontario Structure Inspection Manual³. Each structure is assigned a Bridge Condition Index (BCI) which is used to determine an overall condition rating. The City currently aims to maintain municipal structures in fair or better range (minimum BCI of 60). The overall 2022 BCI rating for all structures is 71.56⁴ or good. Figure 3 in Section 2 Levels of Service shows the BCI rating scale along with recommended capital works timelines.

Active Transportation

The active transportation network’s overall condition is rated very good. Except for sidewalks, condition ratings for trails are age based and do not reflect actual conditions. Future plans will be to include trails and hardscaping in an on-going inspection program which will provide for more accurate and up-to-date condition ratings. Currently, sidewalks are inspected annually⁵ in the spring with remediation work commencing in the fall of the same year.

³ Ontario, Ministry of Transportation, Ontario Structure Inspection Manual (OSIM) 2008, (St. Catharines, ON: Ministry of Transportation, 2008)

⁴ Non weighted average.

⁵ Ontario, Municipal Act 2001, O. Reg 239/02, Minimum Maintenance Standards for Municipal Highways, (Consolidated 2018)

Fleet, Equipment, Traffic Management & Facilities

The overall condition rating for fleet is poor, fair for parking equipment, fair for traffic management and good for facility assets.

Traffic controllers and detectors are currently inspected and tested twice a year as per the Minimum Maintenance Standards for Municipal Highways, O. Reg 239/02.

Replacement activities for traffic signal controllers are currently underway with a total estimated project cost of \$2.7 million and is anticipated to be completed in the spring of 2024. The traffic signal controller upgrades are required to implement Smart Signal systems across the city. Traffic signal asset condition ratings are primarily based on high level recommendations provided by expert City staff until refinements to the asset hierarchy can be completed which better reflects actual condition and ages.

Guardrail condition ratings are currently age based. Future plans include adding guardrails in an annual inspection program which will provide more accurate and up-to date condition ratings.

Street signs overall condition rating is very good. Condition ratings are based on a combination of visual condition assessments which include annual retro reflectivity testing for regulatory and warning signs and age-based ratings. Regulatory and warning signs are required to meet minimum retro reflectivity standards set forth in the Manual of Uniform Traffic Control Devices for Canada [MUTCD(C)] and are replaced as required.

Parking equipment assets overall condition rating is poor. Assets include parking equipment and parking meters.

Facilities overall condition rating is good. Facilities include parking lots and parking garages. The King St. Parking Garage (rated good) reflect actual conditions as per the most recent building condition assessment completed in 2020/2021.

Based on previously completed condition assessments, streetlights are in overall very good condition. Streetlight condition assessments are planned to be completed every five years, pending budget approvals.

Remaining Useful Life

The following summarizes the roads & related assets service area remaining useful life. The useful life of an asset is the estimated period over which the City expects to use the asset. Estimates are based on the calculated age or observed age (where condition assessments have been completed) and do not take into consideration any betterments that extend the useful life of the asset(s). Ideally, as condition assessments are completed the 'observed' age will be used in calculating remaining useful life. The ages of the assets are variable and with efforts to extend the life by application of lifecycle treatments, there isn't necessarily a linear relationship between age and condition.

Table 5 shows the roads & related assets remaining useful life details.

Table 5: Roads & Related Assets Remaining Useful Life⁶

Asset Category & Class	Average Expected Useful Life (Yrs)	Average Remaining Useful Life (Yrs)	Percent Useful Life Remaining
Roads - Right of Way	21	0	0%
Municipal Structures	69	7	10%
Active Transportation	30	0	0%
Equipment	5	0	0%
Fleet	6	0	0%
Facilities	64	36	56%
Traffic Management	26	0	0%
Roads & Related Assets Total	27	0	0%

1.4 Asset Risk Assessment

Currently, the consequences of failure for road & related assets have been determined manually by City staff based on a standardized chart for consequence (found in Appendix B). The risk evaluation considers environmental, economical, social, life safety, legislation and corporate reputation as factors when scoring consequence. Service area specific factors include the road classification, the land use and the zoning surrounding the asset, where possible.

Using the product of the scores for likelihood of failure (likelihood is higher as asset condition worsens) and the consequence of failure, the asset is assigned a risk rating using the ranges shown in the chart below:

Category	Range
High Risk	< 5
Medium Risk	5 – 20
Low Risk	> 20

⁶ ESL, RUL, and percent of useful life remaining are based on calculated weighted average of asset classes

The estimated replacement value of Roads & Related Assets high risk assets is \$338 million.

The City continues to prioritize the operational, maintenance and renewal needs of both the critical assets and high-risk assets to minimize health and safety risks and impacts to service delivery.

2.0 Levels of Service

This section will present levels of service as they are currently being provided by the City. Service area objective statements were developed by taking into consideration the goals, strategies and objectives defined in other overarching Council approved City plans, studies and policies such as the 2022 Transportation Plan and the Official Plan.

Stakeholder and technical levels of service, performance measures and current targets for the roads & related assets service area are outlined in Table 6 below. Further development of the City's levels of service is underway in which the proposed levels of service and the affordability of the service will be analyzed and presented. Future versions of the Asset Management Plan will also include other proposed levels of service reporting requirements set forth in the Asset Management Planning for Municipal Infrastructure Regulation (O.Reg. 588/17).

Table 6: Levels of Service – Roads & Related Assets

Asset Class: Roads - ROW								
Service Objective Statement: The City strives to provide a safe mode of transportation maintained to an acceptable quality that allows for drainage and movement of goods								
Stakeholder Value/Service Attribute	Stakeholder LoS and		Stakeholder Performance		Technical Measure		Technical Performance	
	Measures		Year of Measure				Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
Scope/ Availability	The road network is safe, efficient, and accessible for all residents, businesses and visitors.	Level of connectivity of road network throughout the city	Peterborough's road network consists of Arterial, Collector, Local and Lane roads, connecting people, goods and places. See Figure 4: City of Peterborough Road System	Peterborough's road network consists of Arterial, Collector, Local and Lane roads, connecting people, goods and places. See Figure 4: City of Peterborough Road System	Number of lane-kilometres of each arterial roads, collector roads and local roads as a proportion of square kilometres of land area of the municipality	Maintain or increase for accessibility	City Area: 67.35 km2	City Area: 67.35 km2
							Arterial: 1.12 km/ 67.35 sq.km	Arterial: 265 km/ 67.35 sq.km
							Collector: 0.80 km2/67.35 sq.km	Collector: 152 km/67.35 sq.km
							Local: 2.08 km2/67.35 sq.km	Local: 450 km/67.35 sq.km
							Lane road: 0.002 km2/67.35 sq.km	Lane road: 0.39 km/67.35 sq.km
Reliability/ Quality	Providing reliable mode of transportation at an	Road pavement is maintained in a state of good repair	See Figure 3: Road Class Pavement Conditions	See Figure 3: Road Class Pavement Conditions	Average PCI for Paved Roads	Greater than 55	Average PCI for Paved Roads = 63	Average PCI for Paved Roads = 63
					Percentage of arterial roads in	100%	n/a	100%

Asset Class: Roads - ROW								
Service Objective Statement: The City strives to provide a safe mode of transportation maintained to an acceptable quality that allows for drainage and movement of goods								
Stakeholder Value/Service Attribute	Stakeholder LoS and		Stakeholder Performance		Technical Measure		Technical Performance	
	Measures		Year of Measure				Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
	acceptable quality that meets the needs of the community.				poor or better condition			
					Percentage of collector roads in poor or better condition	Min. 75%	n/a	91% of total surface area
					Percentage of local roads in poor or better condition	Min. 50%	n/a	21% of total surface area
					Average Surface Condition for unpaved roads (e.g. Good, fair, poor)	Fair	Fair	Fair

Asset Class: Roads - ROW								
Service Objective Statement: The City strives to provide a safe mode of transportation maintained to an acceptable quality that allows for drainage and movement of goods								
Stakeholder Value/Service Attribute	Stakeholder LoS and		Stakeholder Performance		Technical Measure		Technical Performance	
	Measures		Year of Measure				Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
Climate Leadership	Providing streetlights that are energy efficient	Streetlights are meet our environmental objectives	Streetlights are replaced with energy efficient or LED fixtures where possible	Streetlights are replaced with energy efficient or LED fixtures where possible	Percentage of streetlights that are LED or low energy fixtures	100%	n/a	84% of streetlight inventory is LED

Asset Class: Municipal Structures								
Service Objective Statement: The City strives to provide safe structures efficiently and connecting roads, sidewalks and trails								
Stakeholder Value/Service Attribute	Stakeholder LoS and		Stakeholder Performance		Technical Measure		Technical Performance	
	Measures		Year of Measure				Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
Scope/Availability	The road and crossings network is adequate for all modes of transportation .	Types of traffic that are supported by municipal bridges	Bridges and crossings within the City support the movement of motor vehicles, heavy transport vehicles, emergency vehicles, pedestrians and cyclists	Bridges and crossings within the City support the movement of motor vehicles, heavy transport vehicles, emergency vehicles,	% of bridges with loading/dimensi onal restrictions	Maintain or decrease restrictions	4.5% of bridges with loading/dimen sional restrictions (3 out of 66 structures)	No City owned bridges have loading/dimen sional restrictions however 2 bridges within City limits have loading restrictions but

Asset Class: Municipal Structures								
Service Objective Statement: The City strives to provide safe structures efficiently and connecting roads, sidewalks and trails								
Stakeholder Value/Service Attribute	Stakeholder LoS and		Stakeholder Performance		Technical Measure		Technical Performance	
	Measures		Year of Measure				Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
				pedestrians and cyclists				owned by Parks Canada.
Reliability/Quality	Providing reliable and high-quality bridges that meet the needs of the community and stakeholders	Bridges and culverts are maintained in a state of good repair.	See Figure 5: Bridges and Culverts Condition Rating Descriptors	See Figure 5: Bridges and Culverts Condition Rating Descriptors	Average Bridge Condition Index	BCI = >60 (Fair or better)	Average BCI: 69.98 (Fair)	Average BCI: 71.93 (Good)
					Percentage of bridges in fair or better condition	Maintain current LoS as minimum	n/a	87%
					For Structural Culverts: Average Bridge Condition Index	BCI = >60 (Fair or better)	Average BCI of structural culverts: 68.33 (Fair)	Average BCI of structural culverts: 68.86 (Fair)
					Percentage of structural culverts in fair or better condition	Maintain current LoS as minimum	n/a	88%

Asset Class: Active Transportation Network - Sidewalks								
Service Objective Statement: The City strives to provide a safe and connected health promoting network of alternate transportation								
Stakeholder Value/Service Attribute	Stakeholder LoS and		Stakeholder Performance		Technical Measure		Technical Performance	
	Measures		Year of Measure				Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
Scope/Availability	A connected network that is safe, efficient and accessible with sidewalks installed on both sides of the road, as per Provision of Sidewalk Policy	Description, which may include maps, of the sidewalk network in the municipality and its level of connectivity.	n/a	The City is working to advance sidewalk installation, as per the Sidewalk Strategic Plan. See Figure 6: City of Peterborough Pedestrian Network.	Km and % of missing sidewalk installed	Maintain or increase for accessibility	4.8 Km and 0.013% of missing sidewalk installed	1km, 0.003% of missing sidewalk installed
Reliability/Quality	Providing reliable sidewalks that meet the needs of the community	Sidewalks are maintained in a state of good repair	Sidewalks are proactively maintained and reliable for intended use	Sidewalks are proactively maintained and reliable for intended use	Percentage of sidewalks in poor or better condition (using condition parameters to meet minimum maintenance standards)	Maintain current LoS as minimum	n/a	99%
Safety	New subdivisions are built with sidewalks on	Kilometers of sidewalks built compared to new	No new streets built in 2019	Subdivisions are planned to have sidewalks on both sides	All trip hazards greater than 2 cm are marked	100% of trip hazards greater	100% of trip hazards greater than 2 cm were	100% of trip hazards greater than 2 cm were marked. 146

Asset Class: Active Transportation Network - Sidewalks								
Service Objective Statement: The City strives to provide a safe and connected health promoting network of alternate transportation								
Stakeholder Value/Service Attribute	Stakeholder LoS and		Stakeholder Performance		Technical Measure		Technical Performance	
	Measures		Year of Measure				Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
	both sides of the road.	subdivision streets		except on back lanes. New subdivisions that are not assumed by the City may not have all sidewalks installed yet.		than 2 cm are marked	marked. 759 defects marked in 2019, 468 repairs completed in 2019	defects marked and 2 repairs completed in 2022.
					Sidewalks inspected annually as per Minimum Maintenance Standards from Ministry of Transportation	Annually	Completed June 2019	Completed June 2023

Asset Class: Active Transportation Network - Trails								
Service Objective Statement: The City strives to provide a network of trails for recreation and transportation connecting people to places.								
Stakeholder Value/Service Attribute	Stakeholder LoS and		Stakeholder Performance		Technical Measure		Technical Performance	
	Measures		Year of Measure				Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
Scope/Availability	The pedestrian network is well connected and accessible for users	90% of population is within 400m of a trail	80% of pop. is within 400m of a trail	84 % of pop. is within 400m of a trail. - note that this is all trails This also included non-city owned trails such as portions of the Trans Canada trail owned by ORCA)	Trails are maintained in the winter	Greater than 75% of trails are maintained	78.3% of trails maintained in the winter	78.6% of trails maintained in the winter
					Availability of bike only lanes	Increase to 83km by year 2031	34 km of bike specific lanes	35 km of bike specific lanes
Reliability/Quality	Providing reliable trails that meet the needs of the community	Trails are maintained in a state of good repair	Trails are proactively maintained and reliable for intended use	Trails are proactively maintained and reliable for intended use	Percentage of trails in poor or better condition	Maintain current LoS as minimum	n/a	96%

Figure 3: Road Class Pavement Conditions



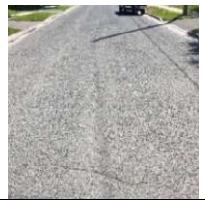

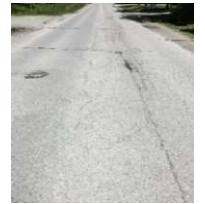


Condition	PCI Score	Description	Sample
Good	86 – 100	Functional, new or like new, little deterioration; preventative maintenance work required (crack route and seal), renewal work is not usually required within short term planning.	
Satisfactory	71 – 85		
Fair	56 – 70	Functional, little deterioration; preventative maintenance ongoing, renewal work usually required (micro-surfacing) reconstruction not usually required within short term planning.	
Poor	41 – 55	Functional, some deterioration; preventative maintenance ongoing, still required, renewal work usually required (road resurfacing) reconstruction not usually required within short term planning.	
Very Poor	26 – 40	Not functioning as intended. Significant to major deterioration, surface repairs on an as needed basis, replacement considered within short term planning.	
Serious	11 – 25		
Failed	1 – 10		

Figure 4: City of Peterborough Road System

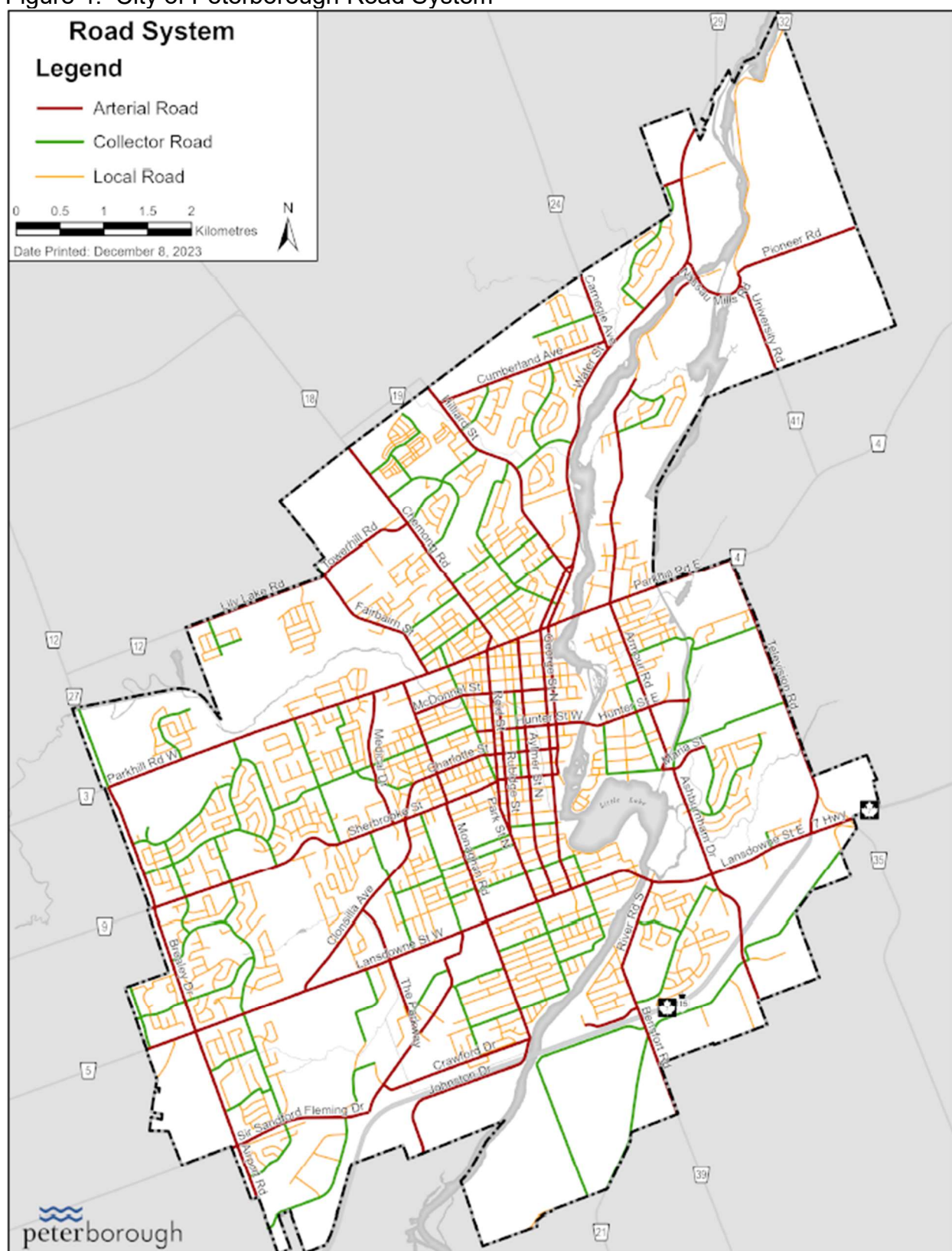


Figure 5: Bridges & Culverts Condition Rating Descriptors




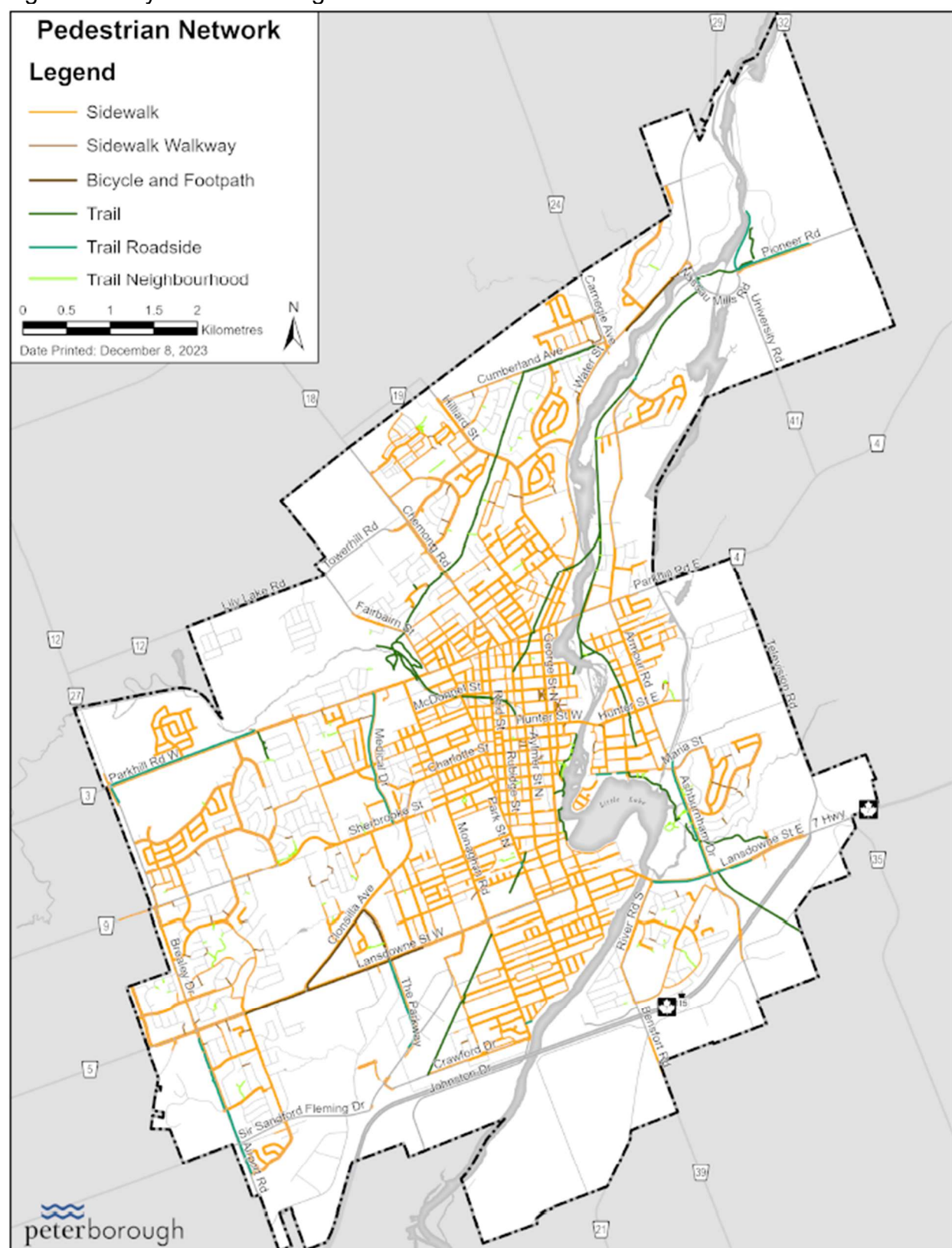
Condition Rating	Condition	Description
Good BCI Score: 70-100		Refers to an element or part of an element which is new or like new, minor defects are visible, remedial action not usually required, performing as intended.
Fair BCI Score: 60-70		Refers to an element or part of an element where medium defects are visible, preventative maintenance work usually required, performing as intended.
Poor BCI Score: <60		Refers to an element or part of an element where severe defects are visible, rehabilitation or replacement is usually required, performance of element is affected and/or not performing as intended.

Figure 6: City of Peterborough Pedestrian Network



3.0 Asset Management Strategies - Roads & Related Assets

Roads & related assets include all major infrastructure for the movement of people and goods excluding public transit. The following table below documents the set of planned actions or 'activities' that the City undertakes to sustain current levels of service, while managing risk at the lowest lifecycle cost. The City plans the necessary lifecycle activities at the required time and does not necessarily need to alter the *type* of activity undertaken. However, with limited funding available, the interval and timing of the necessary lifecycle activities are affected, which can have an overall impact on the performance of the asset(s) over its useful life.

Table 7: Roads & Related Assets – Asset Management Lifecycle Strategies

Strategy Type	Current Practice
Non-infrastructure Solutions Actions or policies that can lower costs or extend asset life (e.g. better integrated infrastructure planning and land use planning, demand management, insurance, process optimization, managed failures, etc.).	Development of <i>Comprehensive Transportation Plan, 2012</i> to understand demand, needs and develop direction
	Ontario Structures Inspection Manual (OSIM) inspections for all bridges with maintenance management reports every 2 years.
	Linking the asset management plan to other studies, master plans and strategies
	Public consultation on levels of service
	Transportation Demand Management program which promotes encouraging alternate use of transportation assets to reduce strain on system
	Tool kits for external organizations to promote alternate transportation
	Promote carpooling, car sharing
	Inspection program for roads, and sidewalks to understand future needs and reduce ad hoc spending
	Trails are multi-purpose for access for City vehicles and bicycles, pedestrians and other recreational users
	Load restrictions on bridges posted
Maintenance Activities Activities include regularly scheduled inspection and maintenance, or more	Signaling program to effectively move all forms of traffic through the city
	Implementation of Road Needs Study to assist in priority decision making
	Implementation of minimum maintenance standards legislated by the Province of Ontario for Roads and Sidewalks
	Winter maintenance program for sidewalks, paved trails and roads

Strategy Type	Current Practice
significant repair and activities associated with unexpected events.	Ontario Structure Inspection Manual (OSIM) recommended maintenance program implementation for bridges with BCI rating of 70 or better
	Less severe trip hazards are grinded
	Crack route and seal for roads with PCI of 70 or better
	Severe trip hazards are asphalt repaired to eliminate safety hazards
Renewals/Rehabilitation: Includes significant repairs designed to extend the life of the asset (e.g. the lining of iron watermain can defer the need for replacement).	Pavement Preservation Program (previously various road resurfacing project):
	Micro-surfacing only for arterial and collector roads with PCI between 56-70
	Resurfacing of roads with PCI between 40-55
	Bridges: Minor rehabilitation at BCI between 70 and 65, major rehabilitation at BCI between 60 and 50. Road Culverts (Corrugated Steel): No rehabilitations, only replacement at end of life. Road Culverts (Concrete, Steel/Conc, Other): Minor Rehabilitation at BCI between 67 and 62, major rehabilitation at BCI between 60 and 50.
Replacement Activities that are expected to occur once an asset has reached the end of its useful life and renewal/rehabilitation is no longer an option.	Full replacement of roads with PCI less than 50
	Streetlight replacement program (current initiative is to convert to LED lights)
	Replacement of surface asphalt/cement mix with less recycled material to extend road surface life
	Bridges: Replace at a BCI of 60, but after a second rehabilitation occurs. Road Culverts (Corrugated Steel): Replace at BCI of 50. Road Culverts (Concrete, Steel/Conc, Other): Replace at BCI of 60, but after a second rehabilitation occurs.
	Coordinate replacements of roads, sidewalks etc. with buried infrastructure needs
	Replacement of traffic controllers and detectors at end of useful life and coordinate implementation of improved/new technologies at time of replacement
	Roads sold for private ownership (very rare)

Strategy Type	Current Practice
Disposals/Abandonment Policies Activities associated with disposing of an asset once it has reached the end of its useful life or is otherwise no longer needed by the municipality.	Decommissioning and repurposing of pedestrian bridges (rare)
Expansion Programs Planned activities required to extend the services to previously un-serviced areas – or expand services to meet growth demands.	Complete design standards to develop streets for all abilities and traffic types
	Cyclist designated lanes
	On road marked cycle routes
	Sidewalks provided
	Subdivision assumptions of roads, trails, sidewalks
	Purchasing of old rail lines for trail development
	Implementation of sidewalk policy and procedure to create sidewalks on priority 1 and 2 streets and new streets
Future Strategies	Road Degradation Program fees according to road cuts for restoration recuperation fund recommended in Failed Roads Report
	Materials investigations to extend the life of paved surfaces
	Investigations into different maintenance equipment to reduce damage to assets during regular maintenance

3.1 Asset Management Strategies and Associated Risks

Strategic Risks

Strategic level risks are events that may impact the ability of the City to deliver asset management strategies and minimize costs.

Potential strategic level risks associated with the City's ability to effectively deliver established Recreation Services are:

- Insufficient funding levels
- Insufficient staffing and resources to responsibly implement lifecycle strategies
- Asset deterioration assessments/models are underestimated/miscalculated
- External/environmental factors such as climate change effects (more severe weather instances, increased demands due to growth)

Risk Trade Offs

If lifecycle activities (operations, maintenance, renewal, and other capital projects) are not undertaken, they may sustain or create risk consequences. These risk consequences may include (but not limited to):

- Public health and safety – assets not adequate/available for emergency response
- Further/accelerated asset deterioration
- Increased backlog of work
- Increased treatment costs
- Level of treatment changes requiring increased resources/costs (maintenance now needing replacement)
- Planned budget/needs forecast not a reflection of actual asset needs
- Additional assets/expansion of services required
- Reputation/image negatively affected

Risks relating to road & related asset infrastructure failure are mitigated through condition assessment programs and maintenance programs (legislated and best practices) which provide the data necessary to plan the actions at the right time to achieve the determined levels of services. Risks related to fleet asset failures are addressed through proactive fleet maintenance and adequate vehicle storage to ensure adequate service readiness.

All City services, including Roads & Related services are reviewed and identified in the City's Business Continuity Plan (BCP) and prioritization process. The BCP identifies the key interruption impacts, recovery time objectives, dependencies, qualified resources available and a resource back-up strategy should services be interrupted. The BCP is

reviewed and updated regularly to ensure that critical services are not interrupted, minimizing risks.

The choice of strategy for maintaining roads & related assets considers the risk of failure of the assets, the risk to service delivery and the risk to other services dependant on this service area. Roads & related assets projects seek to work with external stakeholders to align projects to minimize disruption to the transportation network and reduce costs. Strategies implemented are at the lowest cost in order to reduce the burden on the tax base and user fees where possible and to maintain the current levels of service.

A full detailed, documented risk analysis in which the identification of credible risks, the likelihood of the risk event occurring, the consequences should the event occur, development of a risk rating, evaluation of the risk and the development of a risk treatment plan for non-acceptable risks is planned and will be included in future versions of the asset management plan when completed.

3.2 Lifecycle Models, Interventions, and Cost of Service:

Overview of Lifecycle Models

Service area lifecycle models have been developed⁷ in which asset intervention thresholds and associated costs for lifecycle activities (rehabilitation and replacement) are documented.

Lifecycle models are mathematical, statistical and logic models of planned actions and of asset deterioration over time. This helps the City to forecast required asset lifecycle activities and their impacts on levels of service, risk, and funding needs. In short, lifecycle models are mathematical representation of the City's *Lifecycle Activities*.

Overview of Interventions

Interventions represent the major lifecycle activities carried out for assets over their service life and are typically accounted for as part of the capital planning process. The term 'intervention threshold' or 'intervention trigger' are used interchangeably, and they describe a point in an asset's lifecycle when the intervention typically occurs.

When an asset degrades and an intervention threshold is reached, the asset will require treatment (i.e., repair or rehabilitation). After the treatment is applied, the performance (condition) of that asset will increase to a higher value, at which point it will continue to degrade. This will extend the overall estimated service life (ESL) of the asset.

The costs associated with interventions can be used to establish capital funding needs and determine the most cost-effective solution to maintain level of service targets. Costs for thresholds were derived from the City's historical financial information for actual or similar interventions where available and applicable. Where replacement activities are determined, asset replacement costs were used.

3.3 Lifecycle Options Analysis and Costs of Service

The options analysis of the lifecycle activities that could be undertaken were reviewed with the Roads & Related services subject matter experts. Lifecycle activity options were discussed and determined that the current planned activities are appropriate and the most cost-effective option(s). Details related to the Roads & Related Assets services available funding, investments and shortfalls can be found in Section 5.0 – Financial Summary.

Table 8 and Figure 7 below shows the Roads & Related Assets services area projected 10-year lifecycle costs (asset renewal and replacement activities required for existing assets) and performance to maintain current levels of service. For details on current

⁷ Request for Proposal RFP 22-22 Consulting Services to Support Asset Management Planning Updates

levels of service descriptions, measures and targets and current performance, refer to Table 5 in Section 2 – Levels of Service of this attachment.

Lifecycle costs shown below were calculated based on current asset conditions and forecasted out over the 10-yr period using the recommended deterioration model for that asset/asset class. Where asset condition data was not available, age-based condition ratings were applied.

Table 8: Roads & Related Assets Lifecycle Associated Costs – Delivering Current Levels of Service, existing assets

Lifecycle Activity Costs - Roads & Related Assets	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	Total 10-Yr
Roads-ROW	\$0	\$24,016,824	\$24,016,824	\$24,016,824	\$24,016,824	\$24,016,824	\$24,016,824	\$24,016,824	\$24,016,824	\$24,016,824	\$24,016,824	\$240,168,241
Municipal Structures	\$0	\$1,331,637	\$1,331,637	\$1,331,637	\$1,331,637	\$1,331,637	\$1,331,637	\$1,331,637	\$1,331,637	\$1,331,637	\$1,331,637	\$13,316,375
Active Transportation	\$0	\$282,637	\$282,637	\$282,637	\$282,637	\$282,637	\$282,637	\$282,637	\$282,637	\$282,637	\$282,637	\$2,826,367
Equipment & Facilities	\$0	\$249,365	\$249,365	\$249,365	\$249,365	\$249,365	\$249,365	\$249,365	\$249,365	\$249,365	\$249,365	\$2,493,653
Fleet	\$0	\$8,533	\$8,533	\$8,533	\$8,533	\$8,533	\$8,533	\$8,533	\$8,533	\$8,533	\$8,533	\$85,328
Traffic Management	\$0	\$349,741	\$349,741	\$349,741	\$349,741	\$349,741	\$349,741	\$349,741	\$349,741	\$349,741	\$349,741	\$3,497,412
Annual Total	\$0	\$26,238,738	\$26,238,738	\$26,238,738	\$26,238,738	\$26,238,738	\$26,238,738	\$26,238,738	\$26,238,738	\$26,238,738	\$26,238,738	\$262,387,376
Average Annual Lifecycle Cost	\$26,238,738	\$26,238,738	\$26,238,738	\$26,238,738	\$26,238,738	\$26,238,738	\$26,238,738	\$26,238,738	\$26,238,738	\$26,238,738	\$26,238,738	

Based on the lifecycle assessment of Roads & Related Assets (for renewal and replacement activities only), it is estimated that the City would need to spend an average of \$26 million per year to carry out the required lifecycle activities to maintain current levels of service.

Figure 7: 10-Year Forecasted Performance for Maintaining Levels of Service – Roads & Related Assets

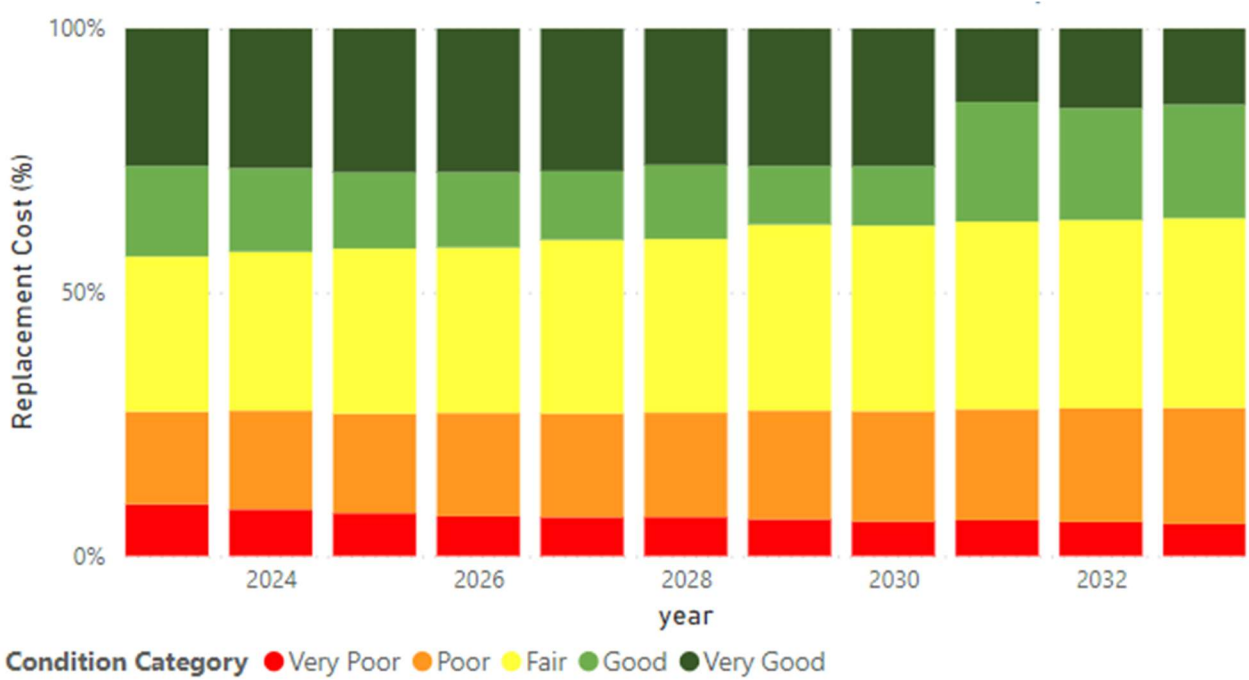


Figure 7 above illustrates the performance (condition) of Roads & Related assets over the 10-year forecast. The estimated average combined annual expenditures to maintain these conditions is approximately \$26 million.

Attachment #2: Stormwater Service Area



Infrastructure Value	\$1.8B	
Annual Renewal Needs	\$5.2M	
Overall Condition	4.0	Good
High Risk Asset Value	\$142M	8%
Trend	➡	

1.0 Summary of Stormwater Assets

Asset classes that fall under the Stormwater service area include stormwater management ponds, conveyance assets and ancillary assets such as catch basins, headwalls, manholes, outfalls, etc. which capture storm water flows from roads. The annual renewal needs are based on lifecycle management strategies and represent the estimated amount of capital the City needs to reinvest in its existing asset inventory on an annual basis over the next 10 years to sustain the current levels of service (based on the 25-yr investment forecast). Condition rating trends remain neutral for with an overall service area rating of good.

1.1 Inventory Details

Table 1 details the City of Peterborough's inventory for the stormwater service area

Table 1: Stormwater Service Area Asset Inventory

Asset Category and Class	Asset	2023 Quantity	Unit of Measure
Stormwater Management			
Ponds	Wet Pond	19	Each
	Dry Pond	13	Each
Conveyance			
Pipes	Lead	48	km
	Main	168	km
	Trunk	119	km
	Unclassified	0.4	km
Ancillaries	Catch basin	4,883	Each
	Catch basin Manhole	4,991	Each

Asset Category and Class	Asset	2023 Quantity	Unit of Measure
	Headwall	2	Each
	Storm Manhole	1,666	Each
	Oil/Grit Separator	23	Each
	Clean Out	6	Each
	Double Catch basin	554	Each
	Ditch Inlet Catch basin	146	Each
	Inlet Headwall	21	Each
	Double Ditch Catch basin	6	Each
	Double Catch basin Manhole	275	Each
	Ditch Catch basin Manhole	22	Each
	Rainwater Manhole	88	Each

1.2 Replacement Costs

The estimated year end 2023 replacement costs for the Stormwater service area totalled \$1.8 billion. Replacement costs were determined using unit cost multipliers based on recent construction projects¹, condition assessments or historical costs inflated to 2023 where recent assessments or costing information was not available.

¹ Stormwater pipes and ancillaries' replacement costs are based on recent construction projects which include hard costs, soft costs and the cost of replacing materials above the pipes at the time of install (i.e. granular fill, asphalt, sod, concrete, etc.).

Figure 1: Stormwater Service Area –Replacement Cost by Asset Sub-Class

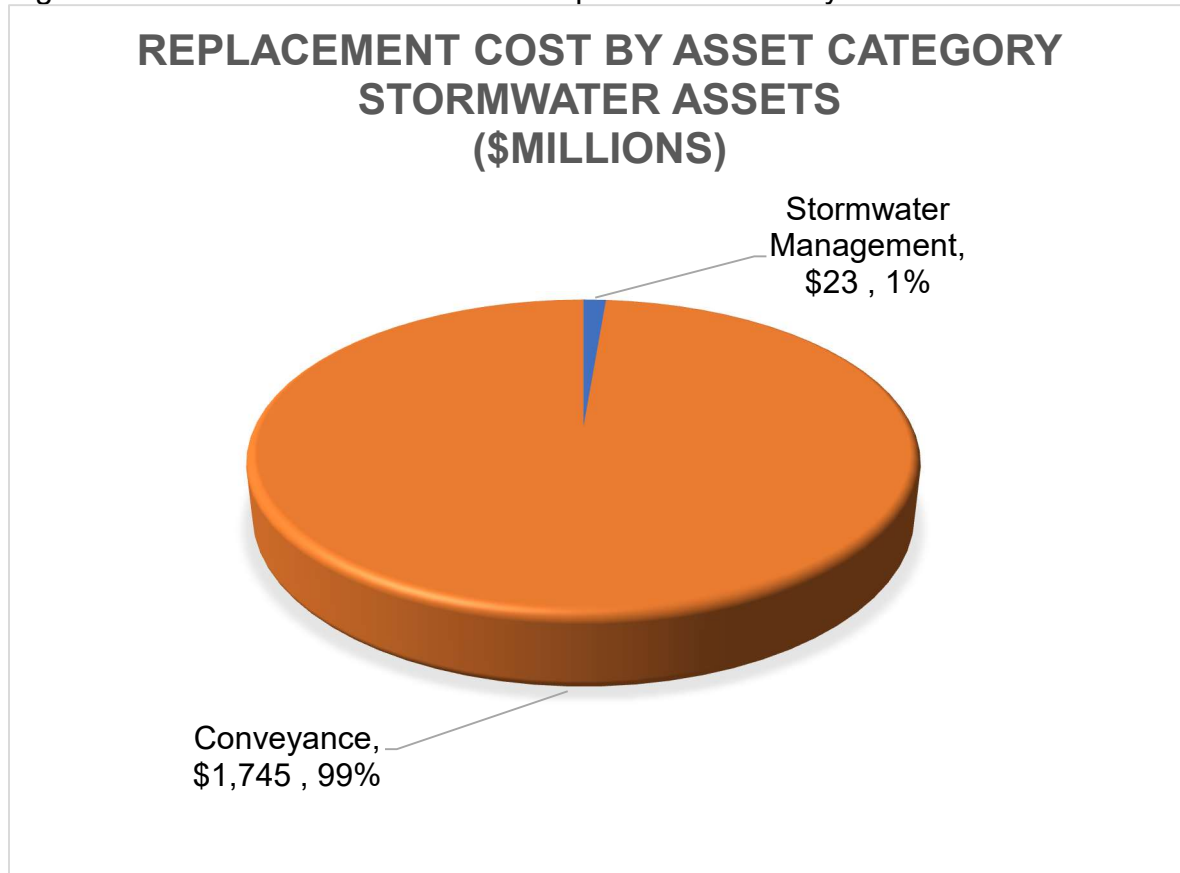


Table 2: Stormwater – Replacement Cost by Asset Class

Asset Class & Sub-Class	Asset	2023 Replacement Cost
Stormwater Management		\$22,525,169
Ponds	Wet Pond	\$15,307,537
	Dry Pond	\$7,217,632
Conveyance		\$1,744,855,801
Pipes	Lead	\$152,906,354
	Main	\$607,789,079
	Trunk	\$586,695,881
	Sub-drain	\$395,503
	Unclassified	\$169,795
Ancillaries	Catchbasin	\$150,087,387
	Catchbasin Manhole	\$157,152,692
	Headwall	\$61,524
	Storm Manhole	\$53,795,946

	Oil/Grit Separator	\$745,634
	Clean Out	\$177,684
	Double Catchbasin	\$17,181,937
	Ditch Inlet Catchbasin	\$4,569,556
	Inlet Headwall	\$719,593
	Double Ditch Catchbasin	\$184,571
	Double Catchbasin Manhole	\$8,711,088
	Ditch Catchbasin manhole	\$781,903
	Rainwater Manhole	\$2,730,275
Stormwater Total		\$1,767,383,493

1.3 Asset Condition and Remaining Useful Life

The City's Stormwater service area is currently rated in overall good condition. Where condition assessments have not been completed, age-based ratings were used. Based on replacement cost, 32% or \$566 million are rated very good, 34% or \$600 million are rated good, 18% or \$319 million are fair and 17% or \$300 million are poor to very poor condition. Figure 2 and Table 3 provide condition details of the stormwater service area.

Figure 2: Stormwater - Distributed Condition and Replacement Cost

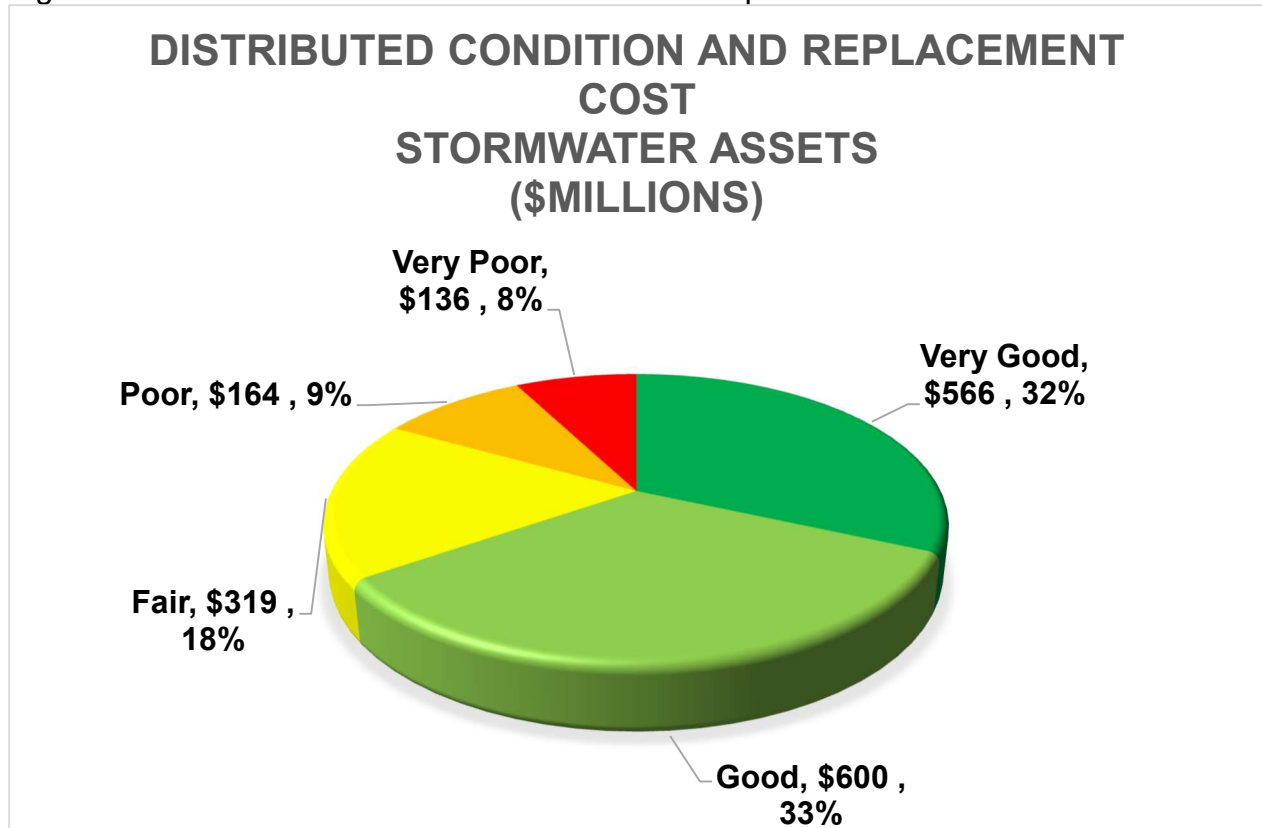


Table 3: Stormwater – Asset Condition Ratings

Asset Class & Sub-Class	Asset	2023 Condition Rating
Stormwater Management		
Ponds	Wet Pond	Good
	Dry Pond	Fair
Conveyance		
Pipes	Lead	Good
	Main	Good
	Trunk	Very Good
	Sub Drain	Very Good
	Unclassified	Very Good
Ancillaries	Catchbasin	Fair
	Catchbasin Manhole	Fair
	Headwall	Fair
	Storm Manhole	Fair
	Oil/Grit Separator	Very Good
	Clean Out	Good
	Double Catchbasin	Good
	Ditch Inlet Catchbasin	Good

	Inlet Headwall	Good
	Double Ditch Catchbasin	Very Good
	Double Catchbasin Manhole	Good
	Ditch Catchbasin manhole	Good
	Rainwater Manhole	Good
Overall Stormwater Condition		Good

Stormwater Management Ponds

City staff perform detailed surveys of storm ponds every three years to provide water quality and quantity performance monitoring of the stormwater management ponds (facilities) within the City of Peterborough. Stormwater management facilities work as temporary storage for runoff to avoid flooding in the city, as well as quality control to trap pollutant laden sediment before the stormwater is released to receiving water bodies. Surveys of these facilities are necessary to monitor asset functionality to maintain required standards. To determine total pond clean-out requirements, the Ministry of the Environment's (MOE) 2003 *Stormwater Management Planning and Design Manual* governs required capacity for desired pond efficiency. Also inspected is the forebay diminished capacity requirements as set-out in the subdivision agreement.

Conveyance Assets

The City currently conducts sanitary sewer condition inspections (CCTV) in conjunction with the storm sewers, on a six-year cycle as part of the Flood Reduction Master Plan project. CCTV inspections of storm and sanitary sewers are in accordance with NASSCO² inspection standards and use a PACP³ defect rating approach. As a result, structural and service deficiencies are evaluated in which performance ratings for pipe segments are established. Based on the findings of the condition inspections, a remedial plan to address the deficiencies is developed and implemented.

Remaining Useful Life

The useful life of an asset is the estimated period over which the City expects to use the asset. Estimates are based on the calculated age or observed age where available, and do not take into consideration any betterments that extend the useful life of the asset(s). Ideally, as condition assessments are completed the 'observed' age would be used in calculating remaining useful life. The age of the stormwater service area is variable and with efforts to extend the life by application of lifecycle treatments, there isn't necessarily a linear relationship between age and condition. Table 4 shows the stormwater remaining useful life details.

² National Association of Sewer Service Companies

³ Pipeline Assessment Certification Program

Table 4: Stormwater Remaining Useful Life

Asset Class & Sub-Class	Expected Useful Life (Yrs)	Ave. Remaining Useful Life (Yrs)	Percent of Useful Life Remaining
Stormwater Management			
Ponds	30	9	31%
Conveyance			
Pipes	75	27	35%
Ancillaries	75	26	56%
Stormwater Remaining Useful Life⁴	74	30	40%

1.4 Asset Risk Assessment

Currently, the consequences of failure for Stormwater assets have been determined manually by City staff based on a standardized chart for consequence (found in Appendix B) which also took into consideration the pipe size, land use and the zoning surrounding the asset, where possible. Where condition assessment data isn't available, likelihood of failure was calculated using age of the asset.

Using the product of the scores for likelihood of failure (likelihood is higher as asset condition worsens) and the consequence of failure, the asset is assigned a risk rating using the ranges shown in the chart below:

Category	Range
High Risk	< 5
Medium Risk	5 – 20
Low Risk	> 20

The estimated replacement value of Stormwater high risk assets is \$142 million.

The City continues to prioritize the operational, maintenance and renewal needs of both the critical assets and high-risk assets to minimize health and safety risks and impacts to service delivery.

⁴ Overall RUL and Percent Useful Life remaining are weighted by replacement cost

2.0 Levels of Service

This section will present levels of service as they are currently being provided by the City. Service area objective statements were developed by taking into consideration the goals, strategies and objectives defined in other overarching Council approved City plans, studies and policies such as the City of Peterborough's Flood Reduction Master Plan (2005).

Stakeholder and technical levels of service, performance measures and current targets for the stormwater service area are outlined in Table 5 below. Further development of the City's levels of service is underway in which the proposed levels of service and the affordability of the service will be analyzed and presented. Future versions of the Asset Management Plan will also include other proposed levels of service reporting requirements set forth in the Asset Management Planning for Municipal Infrastructure Regulation (O.Reg. 588/17).

Table 5: Levels of Service – Stormwater

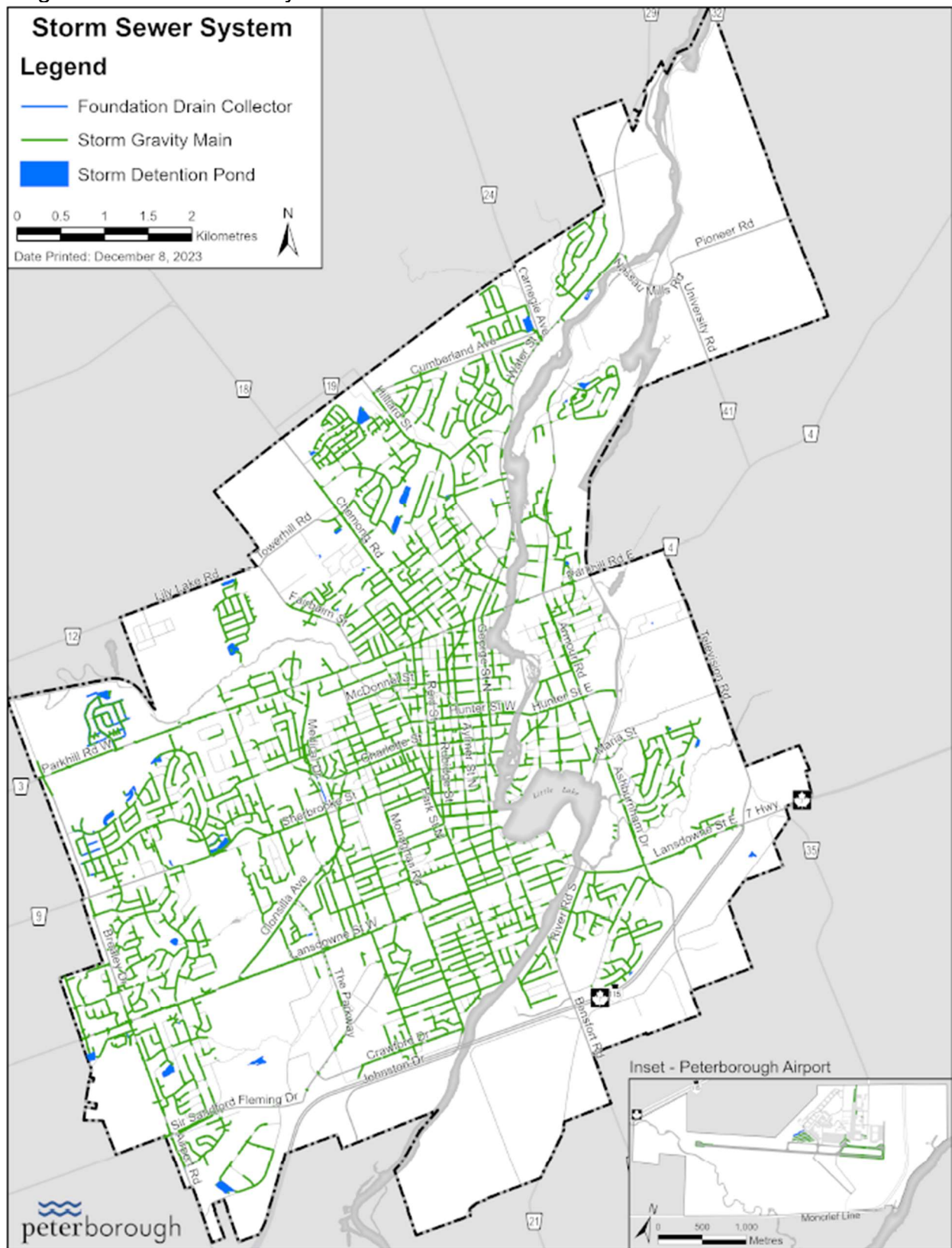
Asset Class: Stormwater								
Service Objective Statement: The City strives to protect property, infrastructure and the environment.								
Stakeholder Value/Service Attribute	Stakeholder LoS and Measures		Stakeholder Performance		Technical Measure		Technical Performance	
			Year of Measure				Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
Scope	Protect property, infrastructure and environment	Area of the City that is protected from flooding, including the extent of the protection provided by the municipal stormwater management system	Peterborough's storm sewer and storm management system consists of foundation drain collectors, storm gravity main pipes and stormwater detention ponds. See Figure 3: Storm Sewer System	Peterborough's storm sewer and storm management system consists of foundation drain collectors, storm gravity main pipes and stormwater detention ponds. See Figure 3: Storm Sewer System	Percentage of properties in municipality that are resilient to a 100-year storm	21% of properties are resilient to 100-year storm	n/a - not reported	a) % of properties resilient to 100-yr storm (buildings not impacted by flooding = 17%) b) % of properties resilient to 100-yr storm (overland flooding only) - 89%

Asset Class: Stormwater								
Service Objective Statement: The City strives to protect property, infrastructure and the environment.								
Stakeholder Value/Service Attribute	Stakeholder LoS and		Stakeholder Performance		Technical Measure		Technical Performance	
	Measures		Year of Measure				Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
					Percentage of municipal stormwater management system resilient to a 5-year storm	21% of municipal stormwater management system to be resilient to 5-yr storm	n/a - not reported	a) % of municipal SWM system (pipes) resilient to 5-year storm - 21% b) % of municipal SWM system (maintenance holes) resilient to 5-year storm = 66%
Reliability/Quality	Providing reliable stormwater assets that meet the needs of the community	Stormwater assets are maintained in a state of good repair	Stormwater assets are proactively maintained and reliable for intended use	Stormwater assets are proactively maintained and reliable for intended use	Percentage of Conveyance assets in poor or better condition	Maintain 100% of conveyance assets in poor or better.	n/a - not reported	94%
					Percentage of Storm Management assets in fair or better condition	100% of SWM assets in fair or better condition	n/a - not reported	81%

Asset Class: Stormwater								
Service Objective Statement: The City strives to protect property, infrastructure and the environment.								
Stakeholder Value/Service Attribute	Stakeholder LoS and		Stakeholder Performance		Technical Measure		Technical Performance	
	Measures		Year of Measure				Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
					Length of pipe inspected and flushed per year	All pipes inspected on a 5-year cycle	n/a - new measure description 2021: 1000km of pipe inspected and flushed per year	Target achieved
					Maintain catch basin cleanout program	20% of existing inventory to be cleaned out annually	30% of existing catch basin inventory cleaned	2022: 1412 cleaned or 26%

To provide updated level of service measures for properties resilient to a 100-yr storm and systems resilient to 5-yr storms, the City developed a comprehensive storm sewer model for the entire sewer network. The model assesses sewer conveyance capacity (minor system) using current conditions and future land-use and climate scenarios, as well as the risks associated with urban surface flooding (major system). The model will provide the City with a detailed assessment of our resilience now, and in the future, to a range of design storms, including a 5-year (or greater) return period event.

Figure 3: Storm Sewer System



3.0 Asset Management Strategies – Stormwater

The stormwater management strategy incorporates all major stormwater management assets. Options for which lifecycle activities that could potentially be undertaken are explored and analyzed in various studies and reports such as the Flood Reduction Master Plan (2005), Stormwater Quality Management Master Plan (2015) and CCTV inspection reports. The following table below documents the set of planned actions or 'activities' that the City undertakes to sustain current levels of service, while managing risk at the lowest lifecycle cost. The City plans the necessary lifecycle activities at the required time and does not necessarily need to alter the *type* of activity undertaken. However, with limited funding available, the interval and timing of the necessary lifecycle activities are affected, which can have an overall impact on the performance of the asset(s) over its useful life.

Table 6: Stormwater - Asset Management Lifecycle Strategies

Strategy Type	Current Practice
Non-infrastructure Solutions Actions or policies that can lower costs or extend asset life (e.g. better integrated infrastructure planning and land use planning, demand management, insurance, process optimization, managed failures, etc.).	Public notices to remind residents to clean catch basin covers during fall before large storms
	Storm water management design standards in place
	Official Plan provides high level guidance to development and the inclusion of storm water management in development
	Linking the asset management plan to other studies, master plans and strategies
	Public consultation on levels of service
	Inspection programs to understand the condition of pipes, manholes and catch basins
	Annual inspection program for SWM facilities.
	Standard operating procedures in place for the survey, inspection and monitoring of all stormwater management facilities to ensure storm water management wet and dry ponds are operating properly and adhere to the City's Consolidated Linear Infrastructure Environmental Compliance Approval
	Assumption process for subdivisions to minimize City risks and ensure development to City design standards

Strategy Type	Current Practice
	New Provincial guidelines and legislation that require Municipalities to ensure stormwater management practices minimize stormwater volume and contaminate loads and maintain or increase the extent of vegetative and pervious cover.
Maintenance Activities Activities include regularly scheduled inspection and maintenance, or more significant repair and activities associated with unexpected events.	Street Sweeping
	Catchbasin clean out program
	Pipe flushing and cleaning during condition inspection programs
	Roots and heavy debris removal
	Spot repairs and other trenchless maintenance based on inspection programs findings
	Vegetation management and removal, debris removal, and minor structural repairs at stormwater ponds
Renewals/Rehabilitation: Includes significant repairs designed to extend the life of the asset (e.g. the lining of iron watermain can defer the need for replacement).	Relining program for pipes based on inspection programs findings and pipe rehabilitation matrix. After relining of pipes, replace at end of service life.
	Pond structures and grading renewals, including major sediment removals to maintain compliance with CLI-ECA. Ponds are dredged based on sediment accumulation, as determined by surveys
Replacement Activities that are expected to occur once an asset has reached the end of its useful life and renewal/rehabilitation is no longer an option.	Replacement of collapsed pipes
	After a single reline, replace pipes in poor condition based on a matrix of inspection findings and risk.
	Structures replaced with pipe when warranted
	After a single reline, stormwater pipes are replaced at end of service life. Replacement of stormwater pipes and ancillaries are combined with other projects or utilities to reduce the cost and impact to other infrastructure
	Storm asset replacement is prioritized when in combination of road rehab/replacement activities
	Availability of grants for funding storm water management programs

Strategy Type	Current Practice
	For every capital project with regards to road reconstruction the storm sewers are looked at in detail for possible replacement and in many cases upgrade in diameter to suit larger storms due to climate change
Disposals/Abandonment Policies Activities associated with disposing of an asset once it has reached the end of its useful life or is otherwise no longer needed by the municipality.	Project coordination in combination with the age and condition to remove old infrastructure
	Plug pipes on a case-by-case basis (rare)
Expansion Programs Planned activities required to extend the services to previously un-serviced areas – or expand services to meet growth demands.	System expanded when city grows through subdivision developments
	Legislative changes in minimum design standards
	Capacity of the system no longer meets needs
	Intensification programs
	Most replacement of pipes are actually an expansion of the system
	new design standards requiring increase design from 2–5-year storms to 5-100 year storms
	Climate change related improvement requirements
	Rural road upgrades to urban roads requires ditch replacements with storm infrastructure
	Addition of storm separators for environmental protection
Future Strategies	Implementation of Water Resource Funding Strategy recommendations
	Continued implementation of the recommendations from the Storm Water Quality Management Master Plan
	Improve existing programs to encourage private stormwater management features including rain gardens
	A source control program to reward customers that reduce and disburse storm water on their property in the form of credits

Strategy Type	Current Practice
	Update engineering standards to include climate change adaptation and promote the use of LID
	Improve the storm pond design standards to minimize the need for upgrades and redesigns before useful life
	Public education program
	Implement the vision, goals, objectives, targets, policies and guidelines from the Watershed Plan and use the watershed as the ecologically meaningful scale for integrated and long-term planning of stormwater infrastructure

3.1 Asset Management Strategies and Associated Risks

Strategic Risks

Strategic level risks are events that may impact the ability of the City to deliver asset management strategies and minimize costs.

Potential strategic level risks associated with the City's ability to effectively deliver established Stormwater services are:

- Insufficient funding levels
- Insufficient staffing and resources to responsibly implement lifecycle strategies
- Asset deterioration assessments/models are underestimated/miscalculated
- External/environmental factors such as climate change effects (more severe weather instances, increased demands due to growth)

Risk Trade Offs

If lifecycle activities (operations, maintenance, renewal, and other capital projects) are not undertaken, they may sustain or create risk consequences. These risk consequences may include (but not limited to):

- Public health and safety – assets not adequate/available for emergency response
- Further/accelerated asset deterioration
- Increased backlog of work
- Increased treatment costs
- Level of treatment changes requiring increased resources/costs (maintenance now needing replacement)
- Planned budget/needs forecast not a reflection of actual asset needs
- Additional assets/expansion of services required
- Reputation/image negatively affected

The City has recently invested a great deal of resources into improving the gaps in knowledge for the storm water system and developing programs to maintain and improve the system. The Storm Water Quality Master Plan⁵ provides options for programs to reduce the City's risks. Additionally, the recent Water Resource Funding Study has developed creative financing options to implement the recommendations of the Storm Water Quality Master Plan. As the City moves towards implementing these programs the current risks surrounding our storm water management will be greatly reduced.

The City is also undertaking a Watershed Plan for our region's various sub-watersheds. The Watershed Plan will create a number of risk-based targets, policies and guidelines

⁵ Stormwater Quality Master Plan, October 2015

for the watershed in relation to surface water quality and quantity, groundwater, natural hazards, natural heritage and infrastructure.

All City services, including Stormwater services are reviewed and identified in the City's Business Continuity Plan (BCP) and prioritization process. The BCP identifies the key interruption impacts, recovery time objectives, dependencies, qualified resources available and a resource back-up strategy should services be interrupted. The BCP is reviewed and updated regularly to ensure that critical services are not interrupted, minimizing risks.

The choice of strategy for maintaining Stormwater assets considers the risk of failure of the assets, the risk to service delivery and the risk to other services dependant on this service area. Strategies implemented are at the lowest cost in order to reduce the burden on the tax base and user fees where possible and to maintain the current levels of service.

A full detailed, documented risk analysis in which the identification of credible risks, the likelihood of the risk event occurring, the consequences should the event occur, development of a risk rating, evaluation of the risk and the development of a risk treatment plan for non-acceptable risks is planned and will be included in future versions of the asset management plan when completed.

Strategies implemented are primarily at the lowest cost in order to reduce the burden on the tax base and user fees in order to maintain the current levels of service at the lowest risk.

3.2 Lifecycle Models, Interventions, and Cost of Service:

Overview of Lifecycle Models

Service area lifecycle models have been developed⁶ in which asset intervention thresholds and associated costs for lifecycle activities (rehabilitation and replacement) are documented.

Lifecycle models are mathematical, statistical and logic models of planned actions and of asset deterioration over time. This helps the City to forecast required asset lifecycle activities and their impacts on levels of service, risk, and funding needs. In short, lifecycle models are mathematical representation of the City's *Lifecycle Activities*.

Overview of Interventions

Interventions represent the major lifecycle activities carried out for assets over their service life and are typically accounted for as part of the capital planning process. The

⁶ Request for Proposal RFP 22-22 Consulting Services to Support Asset Management Planning Updates

term ‘intervention threshold’ or ‘intervention trigger’ are used interchangeably, and they describe a point in an asset’s lifecycle when the intervention typically occurs.

When an asset degrades and an intervention threshold is reached, the asset will require treatment (i.e., repair or rehabilitation). After the treatment is applied, the performance (condition) of that asset will increase to a higher value, at which point it will continue to degrade. This will extend the overall estimated service life (ESL) of the asset.

The costs associated with interventions can be used to establish capital funding needs and determine the most cost-effective solution to maintain level of service targets. Costs for thresholds were derived from the City’s historical financial information for actual or similar interventions where available and applicable. Where replacement activities are determined, asset replacement costs were used.

3.3 Lifecycle Options Analysis and Costs of Service

The options analysis of the lifecycle activities that could be undertaken were reviewed with Stormwater subject matter experts. Lifecycle activity options were discussed and determined that the current planned activities are appropriate and the most cost-effective option(s). Details related to the Stormwater services available funding, investments and shortfalls can be found in Section 5.0 – Financial Summary.

Table 7 and Figure 4 below shows the Stormwater service area projected 10-year lifecycle costs (asset renewal and replacement activities required for existing assets) and performance to maintain current levels of service. For details on current levels of service descriptions, measures and targets and current performance, refer to Table 5 in Section 2 – Levels of Service of this attachment.

Lifecycle costs shown below were calculated based on current asset conditions and forecasted out over the 10-yr period using the recommended deterioration model for that asset/asset class. Where asset condition data was not available, age-based condition ratings were applied.

Table 7: Stormwater Lifecycle Associated Costs – Delivering Current Levels of Service, existing assets

Lifecycle Activity Costs - Stormwater Services Assets	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	Total 10-Yr
Stormwater Conveyance and Management	\$0	\$5,192,124	\$5,192,124	\$5,192,124	\$5,192,124	\$5,192,124	\$5,192,124	\$5,192,124	\$5,192,124	\$5,192,124	\$5,192,124	\$51,921,238
Annual Total	\$0	\$5,192,124	\$5,192,124	\$5,192,124	\$5,192,124	\$5,192,124	\$5,192,124	\$5,192,124	\$5,192,124	\$5,192,124	\$5,192,124	\$51,921,238
Average Annual Lifecycle Cost	\$5,192,124	\$5,192,124	\$5,192,124	\$5,192,124	\$5,192,124	\$5,192,124	\$5,192,124	\$5,192,124	\$5,192,124	\$5,192,124	\$5,192,124	

Based on the lifecycle assessment for Stormwater services assets (for renewal and replacement), it is estimated that the City would need to spend an average of \$5.2 million per year to carry out the required lifecycle activities to maintain current levels of service

Figure 4: 10-Year Forecasted Performance for Maintaining Levels of Service – Stormwater Services

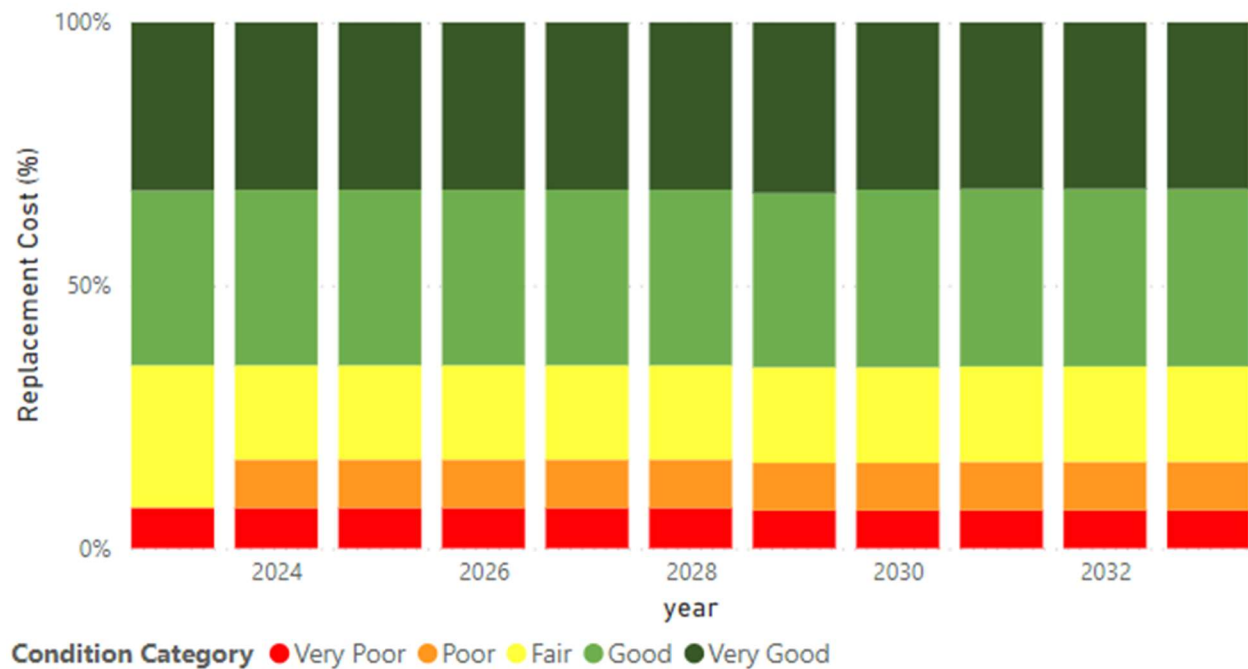



Figure 4 above illustrates the performance (condition) of Stormwater treatment and collection assets over the 10-year forecast. The estimated average combined annual expenditures to maintain these conditions is approximately \$5.2 million.

Attachment #3: Wastewater Service Area



Infrastructure Value	\$1,863M	
Annual Renewal Needs	\$9.7M	
Overall Condition	4.0	Good
High Risk Asset Value	\$105M	6%
Trend		

1.0 Summary of Wastewater

Asset classes that fall under the Wastewater service area include treatment and conveyance assets. Treatment assets include wastewater treatment plants and pumping stations, fleet, equipment (process mechanical, electrical, safety, structural and the Centennial fountain). Conveyance assets include linear infrastructure such as gravity pipes (forcemains, trunk, main, siphon pipes) and ancillaries (manholes, flushing manholes, valve chambers and unclassified). The annual renewal needs are based on lifecycle management strategies and represent the estimated amount of capital the City needs to reinvest in its existing asset inventory on an annual basis over the next 10 years to sustain the current levels of service (based on 25-year investment forecast). Condition rating trends remain neutral with an overall rating of good.

1.1 Inventory Details

The following table details the City of Peterborough's inventory for the wastewater service area.

Table 1: Wastewater Service Area Asset Inventory

Asset Category & Class	Asset	2023 Quantity	Unit of Measure
Treatment			
Facilities	Treatment Plant	1 plant (20 structures)	Structures
	Pumping Stations	10	Buildings
	Bypass Station	1	Buildings

Asset Category & Class	Asset	2023 Quantity	Unit of Measure
	Administration/Laboratory	1	Buildings
Fleet	Light duty trucks/van, heavy duty trucks, trailers, boat/carts	7	each
Equipment	Various pumping station and treatment plant process equipment and Centennial fountain.	1,625	each
Conveyance			
Pressure Pipe	Forcemains	12	km
Gravity Pipe	Mains	284	km
	Trunk	78	km
	Siphon	0.4	km
Ancillaries	Flushing Manholes	5,130	each
	Sanitary Manhole		
	Valve Chamber		
	Unclassified		

1.2 Replacement Costs

The estimated year end 2023 replacement costs for the wastewater service area totalled \$1.9 billion. Replacement costs were determined using different valuation methods, such as unit cost multipliers based on recent construction projects¹, condition assessments or historical costs inflated to 2023 where recent assessments or costing information was not available.

¹ Wastewater gravity pipes and ancillaries' replacement costs are based on recent construction projects which include hard costs, soft costs and the cost of replacing materials above the pipes at the time of install (i.e. granular fill, asphalt, sod, concrete, etc.).

Figure 1: Wastewater Service Area –Replacement Cost by Category²

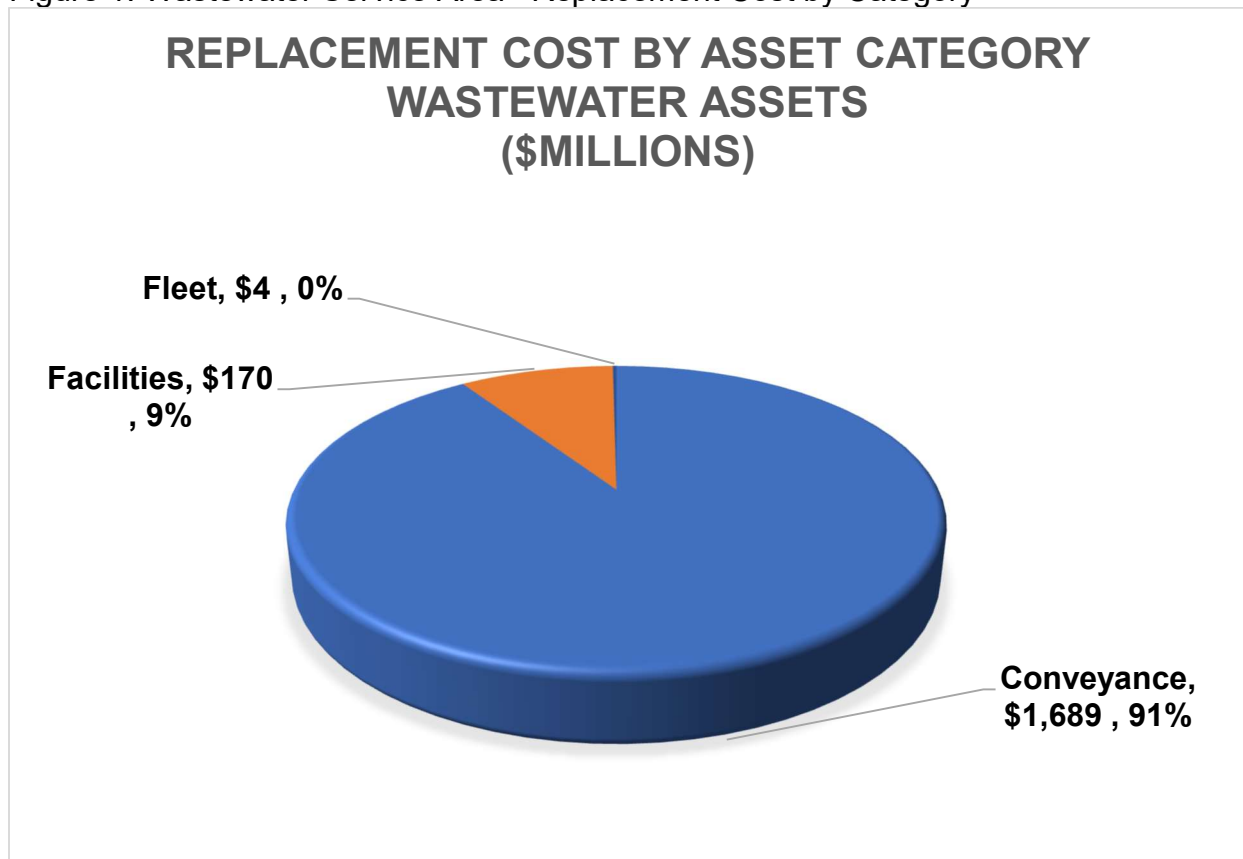


Table 2: Wastewater – Replacement Cost by Asset

Asset Category & Class	Asset	2023 Replacement Cost
Treatment		\$174,313,444
Facilities	Treatment Plant	\$143,366,677
	Pumping Stations	\$26,878,544
Fleet	Light duty trucks/van, heavy duty trucks, trailers, boat/carts	\$4,068,222
Conveyance		\$1,689,164,383
Pressure Pipe	Forcemains	\$32,759,068
Gravity Pipe	Mains	\$1,497,386,758
	Trunk	
	Siphon	
Ancillaries	Flushing Manholes	\$159,018,558
	Sanitary Manholes	

² Based on replacement cost of assets which have had condition assessments completed.

Asset Category & Class	Asset	2023 Replacement Cost
	Valve Chambers	
	Unclassified	
Wastewater Total		\$1,863,477,827

1.3 Asset Condition and Remaining Useful Life

The City's wastewater service area is currently rated in overall good condition. Where condition inspections have not been completed, age-based ratings were used. Based on replacement cost, 74% or \$1.4 billion are rated very good, 10% or \$187 million are good, 2% or \$32 million are fair and 14% or \$271 million are rated poor to very poor. Figure 2 and Table 3 provide condition details of the wastewater service area.

Figure 2: Wastewater - Distributed Condition and Replacement Cost

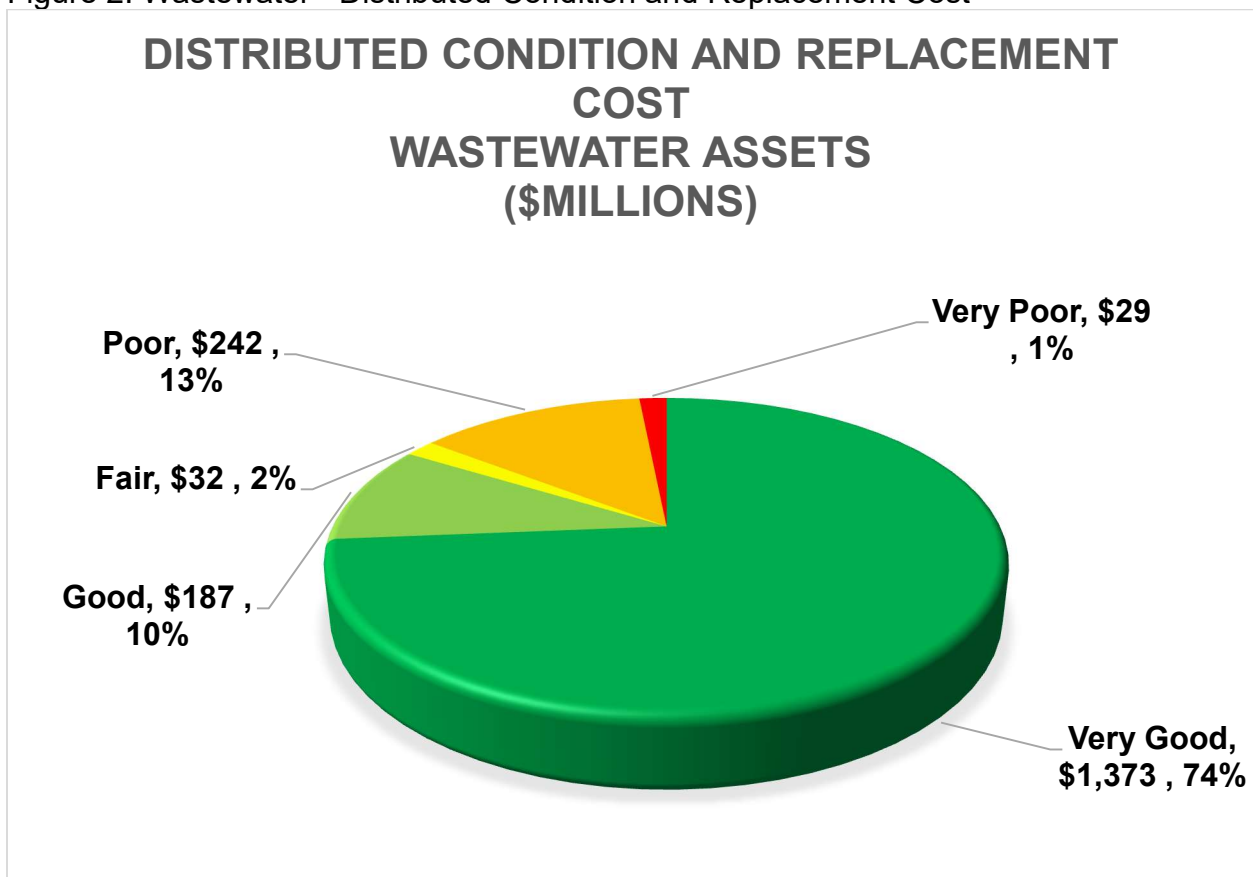


Table 3: Wastewater – Asset Condition Ratings

Asset Category & Class	Asset	2023 Condition Rating
Treatment		
Facilities	Treatment Plant	Good
	Pumping Stations	
Fleet	Light duty trucks/van, heavy duty trucks, trailers, boat/carts	Poor
Conveyance		
Pressure Pipe	Forcemains	Good
Gravity Pipe	Mains	Very Good
	Trunk	
	Siphon	
Ancillaries	Flushing Manholes	Poor
	Sanitary Manholes	
	Valve Chambers	
	Unclassified	
Wastewater Overall Condition ³		Good

Treatment

Facilities

Condition ratings for the wastewater treatment facilities are based on the most recent building condition assessments completed in 2021-2022 and use observed age of facility elements at the time of assessment. Other assets use an age-based rating methodology and have been reviewed by staff to ensure that it reflects the current conditions until detailed assessments are completed. The City plans to complete BCA's on a seven year cycle with the next round of assessments anticipated to be completed in 2028

Fleet

Condition ratings for fleet are based on both inspected conditions and age-based ratings. The City's fleet maintenance plan incorporates ministry requirements and industry best practices which aims to maintain a high level of vehicle health. Predictive processes are utilized when scheduling major repairs such as engine, transmission and

³ Weighted by replacement cost

axle repairs. This ensures that the right maintenance activities are being carried out at the correct time throughout the vehicle's life cycle.

Remaining Useful Life

The useful life of an asset is the estimated period over which the City expects to use the asset. Estimates are based on the calculated age or observed age where available, and do not take into consideration any betterments that extend the useful life of the asset(s). Ideally, as condition assessments are completed the 'observed' age would be used in calculating remaining useful life. The age of the Wastewater Service Area is variable and with efforts to extend the life by application of lifecycle treatments. Table 4 shows the Wastewater remaining useful life details.

Table 4: Wastewater Remaining Useful Life

Asset Inventory	Expected Useful Life (Yrs)⁴	Ave. Remaining Useful Life (Yrs)	Percent of Useful Life Remaining
Conveyance	75	21	28%
Facilities	28	9	34%
Fleet	10	0	0%
Wastewater Remaining Useful Life⁵	64	18	28%

1.4 Asset Risk Assessment

Currently, the consequences of failure for wastewater assets have been determined manually by City staff based on a standardized chart for consequence (found in Appendix B) which also took into consideration the pipe size, land use and the zoning surrounding the asset, where possible. Where condition assessment data isn't available, likelihood of failure was calculated using age of the asset.

Using the product of the scores for likelihood of failure (likelihood is higher as asset condition worsens) and the consequence of failure, the asset is assigned a risk rating using the ranges shown in the chart below:

Category	Range
High Risk	< 5
Medium Risk	5 – 20
Low Risk	> 20

The estimated replacement value of Wastewater high risk assets is \$105 million.

The City continues to prioritize the operational, maintenance and renewal needs of both the critical assets and high-risk assets to minimize health and safety risks and impacts to service delivery.

2.0 Levels of Service

This section will present levels of service as they are currently being provided by the City. Service area objective statements were developed by taking into consideration the goals, strategies and objectives defined in other overarching Council approved City

⁴ Uses average of asset classes/assets

⁵ Overall RUL and Percent Useful Life remaining are weighted by replacement cost

plans, studies and policies such as the Flood Reduction Master Plan and the Official Plan.

Stakeholder and technical levels of service, performance measures and current targets for the Wastewater service area are outlined in Table 5 below. Further development of the City's levels of service is underway in which the proposed levels of service and the affordability of the service will be analyzed and presented. Future versions of the Asset Management Plan will also include other proposed levels of service reporting requirements set forth in the Asset Management Planning for Municipal Infrastructure Regulation (O.Reg. 588/17).

Table 5: Levels of Service – Wastewater Assets

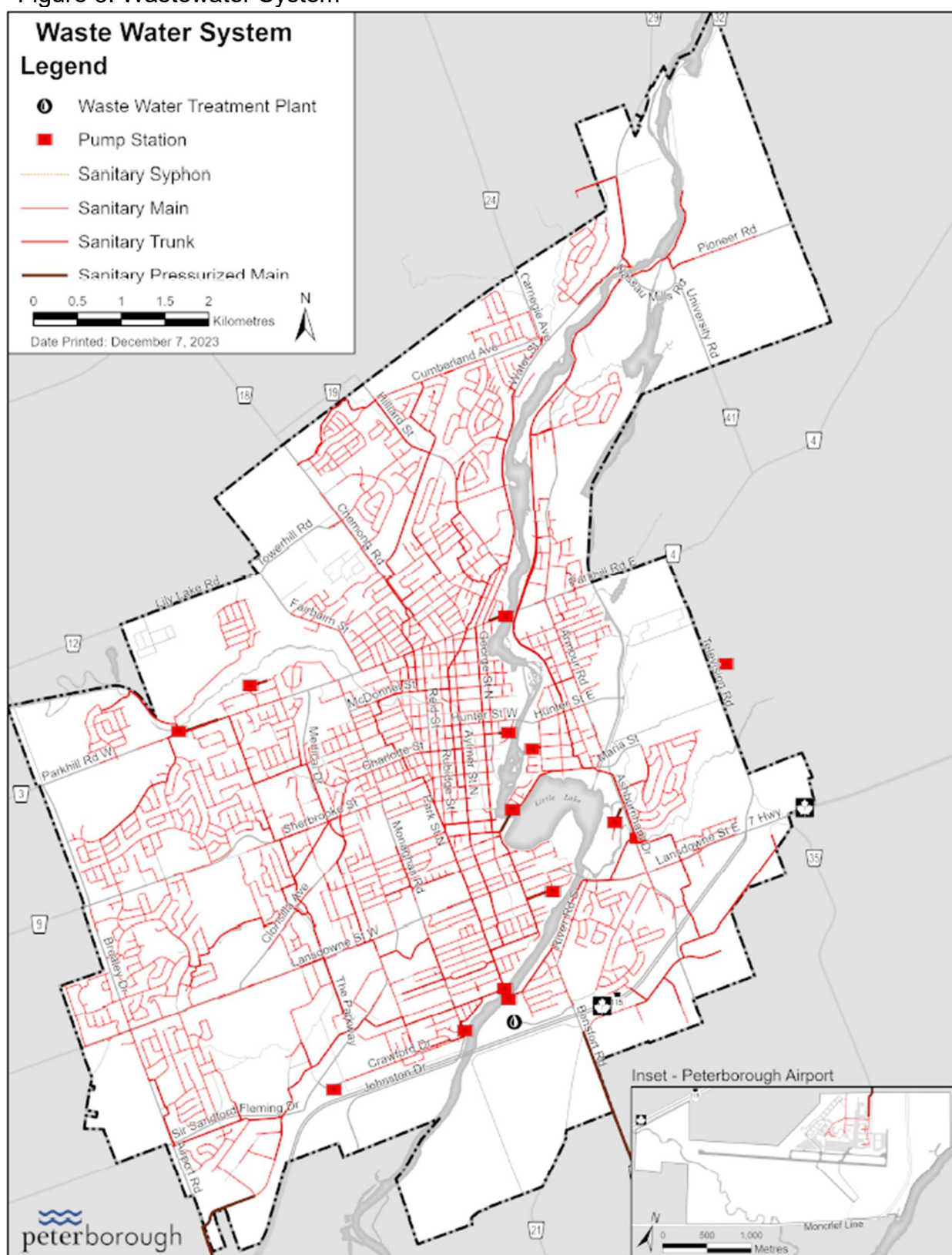
Asset Class: Wastewater - Conveyance, Treatment								
Service Objective Statement: The City will meet legislative requirements, while promoting safe and reliable infrastructure that protects the environment, public and property.								
Stakeholder Value/Service Attribute	Stakeholder LoS and Measures		Stakeholder Performance		Technical Measure		Technical Performance	
			Year of Measure				Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
Scope	A wastewater collection and treatment system that will protect the environment, public and property	Description/maps of areas that are connected to the wastewater system	See Figure 3: Waste-water System	See Figure 3: Waste-water System	% of properties connected to the municipal wastewater system	100% of properties connected to wastewater system	All parcels in the City = 27,090	All parcels in the City = 27,620
							Serviced Parcels in the City = 25,481	Serviced Parcels in the City = 26,082
							% of parcels serviced = 94.1%	% of parcels serviced = 94.4%
Safety	Wastewater system does not pose a health and safety risk onto stakeholders	Number of sewer backups into private property	222 reported backups into private property	159 Services, 4 Main	Pipes are inspected and flushed per year	All pipes are flushed on a 5-yr cycle	n/a - new measure description 2021: 1000km of pipe inspected and flushed per year	Target achieved
Reliability/Quality	Reliable wastewater service is provided with	>2 odour complaints per year	0 complaints	2 complaints	Number of by-passes at the WWTP into the river	Zero by-passes	Zero by-passes	Zero by-passes

Asset Class: Wastewater - Conveyance, Treatment								
Service Objective Statement: The City will meet legislative requirements, while promoting safe and reliable infrastructure that protects the environment, public and property.								
Stakeholder Value/Service Attribute	Stakeholder LoS and Measures		Stakeholder Performance		Technical Measure		Technical Performance	
			Year of Measure				Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
	minimal public impact				Percentage of Conveyance assets in poor or better condition	100%	n/a - not reported	97% (average of conveyance asset sub-classes)
					Percentage of Treatment assets in fair or better condition	100%	n/a - not reported	86%
Reliability/Quality	A wastewater collection and treatment system that will protect the environment, public and property	Description of how stormwater can get into sanitary sewers, causing sewage overflow into streets or	See PM Statement 1) below	See PM Statement 1) below	# of effluent violations per year due to wastewater discharge compared to the total # of properties connected to the system	Zero effluent violations	Zero effluent violations	4 occurrences: 26,082 properties connected to wastewater system

Asset Class: Wastewater - Conveyance, Treatment								
Service Objective Statement: The City will meet legislative requirements, while promoting safe and reliable infrastructure that protects the environment, public and property.								
Stakeholder Value/Service Attribute	Stakeholder LoS and Measures		Stakeholder Performance		Technical Measure		Technical Performance	
			Year of Measure				Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
		backup into homes						
PM Statement 1)	Inflow and Infiltration refers to rainwater and groundwater that enters the sanitary sewer through a variety of defects. Inflow sources allow rainwater to enter the sanitary sewer directly from the surface through improper plumbing and cross connections. Some examples include downspouts and roof drain connections and catch basin cross connections as well as former construction practices. Infiltration sources allows the groundwater to seep into the sanitary sewer through cracks or bad joints in sewer pipes and manholes as well as through the foundation drains of older buildings. A certain amount of inflow and infiltration is unavoidable and is accounted for in routine sewer design. However, when inflow and infiltration exceed design allowances, sewer capacity is consumed and may result in overflows, risks to health, damage to the property and the environment, and increased treatment and disposal costs.							
Reliability/ Quality	A wastewater collection and treatment system that will protect the environment,	Description of how sanitary sewers are designed to be resilient to	n/a – not reported	See PM Statement 2) below	# of connection-days per year due to backups	0 connection days per year: total number of properties	222:25,481 properties Or	163:26,082 or 0.006

Asset Class: Wastewater - Conveyance, Treatment								
Service Objective Statement: The City will meet legislative requirements, while promoting safe and reliable infrastructure that protects the environment, public and property.								
Stakeholder Value/Service Attribute	Stakeholder LoS and Measures		Stakeholder Performance		Technical Measure		Technical Performance	
			Year of Measure				Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
	public and property	avoid events described in 1) above			compared to total # of properties connected to the City		0.009	
PM Statement 2)	Calculations demonstrating that there is sufficient capacity in the proposed new system and the existing system downstream of the development must be presented where new flows will be introduced to the sanitary sewer system. For small developments with known downstream capacity issues and medium sized developments, capacity assessment is to be extended to the first trunk sewer (375mm in diameter and greater). Larger developments typically must continue the capacity assessment downstream into the trunk sanitary sewer system to a location as determined by the City's Water Resource Systems Division, typically on a case-by-case basis upon review of the additional flows versus known existing capacity constraints of the trunk sanitary sewer system. Calculations must be provided on an appropriate design chart and should be accompanied by legible sanitary sewer area plan showing catchment areas and land uses. In addition to design land use sewage loading, extraneous flows (inflow and in infiltration) at the maximum MECP standard are also required to be included in the sanitary sewer capacity assessment. Calculated peak flows should not exceed 80% of the ‘just full’ pipe capacity of new sewers.							
Reliability/ Quality	A wastewater collection and treatment system that will protect the environment, public and property	Description of the effluent that is discharged from the sewage treatment plant	See PM Statement 3) below	See PM Statement 3) below				

Figure 3: Wastewater System



3.0 Asset Management Strategies – Wastewater Assets

The Wastewater services strategy incorporates all wastewater assets. Options for which lifecycle activities that could potentially be undertaken are explored and analyzed in various studies and reports such as the Flood Reduction Master Plan (2005) and CCTV inspection reports. The following table below documents the set of planned actions or ‘activities’ that the City undertakes to sustain current levels of service, while managing risk at the lowest lifecycle cost. The City plans the necessary lifecycle activities at the required time and does not need to alter the *type* of activity undertaken. However, with limited funding available, the interval and timing of the necessary lifecycle activities are affected, which can have an overall impact on the performance of the asset(s) over its useful life.

Table 6: Wastewater – Asset Management Lifecycle Strategies

Strategy Type	Current Practice
Non-infrastructure Solutions Actions or policies that can lower costs or extend asset life (e.g. better integrated infrastructure planning and land use planning, demand management, insurance, process optimization, managed failures, etc.).	Updates of assumed data from CCTV program to improve data sets for management and modelling capacity
	Sanitary system design standards in place
	Linking the asset management plan to other studies, master plans and strategies
	Public consultation on levels of service
	Official Plan provides high level guidance to development and the inclusion of sanitary systems in development
	CCTV program to understand the condition of pipes and manholes
	Assumption process for subdivisions to minimize City risks and ensure development to City design standards
	Change the purpose of retired building structures to be used for new purposes
	Process changes to treatment to maximize equipment efficiency and performance
	Inflow and Infiltration (I&I) program[1] to increase capacity in conveyance network and at plant.
	Flow monitoring and rain gauges

Strategy Type	Current Practice
	Alarm system in place to notify of large storms
	Smoke testing to locate cross connections and downspout connections
	CCTV program to locate sites of I&I
	Manhole inspection started; to be finished in 2020
	Advanced operator program for treatment plant operators
	Support of PUC's wastewater conservation program
	Water meters for all users
	CCTV inspector training
	Flood reduction subsidy program to remove cross connections
	To assist with downspout disconnection
	Addition of downspout splash pads to reduce impact of water
	Public education program on website and media releases
	Modelling of system to understand effects of storms and hydraulic capacity of network
	Calibrated with flow monitor data and rain gauges
	Dedicated funding from Sanitary Sewer Reserve Fund using rates collected from Sanitary Sewer Service to improve and maintain sanitary system as a part of the Flood Reduction Program
Maintenance Activities Activities include regularly scheduled inspection and maintenance, or more significant repair and activities associated with unexpected events.	Pipe flushing during CCTV condition inspection program on a 6-year cycle
	Pipe grouting and reaming to remove roots and fix small cracks and joints
	Spot repair, sleeves and other trenchless maintenance based on CCTV program findings
	Preventative maintenance program based on manufactures specification for plant equipment
	Redundancy of key plant equipment

Strategy Type	Current Practice
	Emergency maintenance triggered by customer service line at public works primarily related to laterals
Renewals/Rehabilitation: Includes significant repairs designed to extend the life of the asset (e.g. the lining of iron watermain can defer the need for replacement).	Relining program for pipes based on CCTV program findings and pipe rehabilitation matrix
	Tank refurbishments at plant
	Reuse of retired building
	Pump rebuilds
	Motor rebuilds
	Purchase used equipment when possible
Replacement Activities that are expected to occur once an asset has reached the end of its useful life and renewal/rehabilitation is no longer an option.	Replacement of Collapsed pipes
	After a reline, pipes are replaced at end of life based on a matrix of CCTV inspection findings and risk
	Manholes replaced with pipes when warranted
	Replacement of sanitary pipes and ancillaries combined with other projects or utilities to reduce the cost and impact to other infrastructure
	Replace equipment for more efficient equipment to give better power savings and process efficiency
	Replace similar assets at the same time to save on bulk equipment purchases
	Combine replacements to happen during "Shutdown" periods
	Most equipment is run until failure with redundancy on hand to handle failed assets
	If repair is greater than 50% of the replacement cost the equipment is replaced
	Customer complaints may drive replacement of laterals
Disposals/Abandonment Policies Activities associated with disposing of an	Project coordination in combination with the age and condition to remove old infrastructure

Strategy Type	Current Practice
asset once it has reached the end of its useful life or is otherwise no longer needed by the municipality.	Forcemains abandoned in place
	Tanks are abandoned, filled and built over
	Equipment generally decommissioned at the end of their useful service life
	Process updates leads process equipment abandon strategy which is based on best practices
	Equipment decommissioned based on new legislation
	Some items sold for scrap
	Some older equipment is saved as backup for emergency use
	Dispose of equipment that no longer meets capacity
Expansion Programs Planned activities required to extend the services to previously un-serviced areas – or expand services to meet growth demands.	System expanded when city grows through subdivision developments
	Legislative changes in minimum design standards
	Capacity of the system no longer meets needs
	System modelled in MikeUrban software to understand capacity
	Ministry requirements updated
	Response to climate change
	Adapting to changes in industry and their waste
	Increased process efficiency
	Intensification programs
	Addition of backup generators at pump stations
Future Strategies	Expansion of redundancy for emergency management
	Tertiary Treatment Program (Effluent polishing)
	Digester replacement
	Improved manhole covers to reduce infiltration
	Raise low lying manholes to grade
	Trenchless pipe bursting for replacements
	Transformer replacement program for increased efficiency

Strategy Type	Current Practice
	Incorporating ground water levels and soil type information into pipe replacement matrix
	Predictive lateral and pipe maintenance
	Investigate forcemains for condition and capacity
	Provide redundancy for forcemains
	Manhole relining program
	Condition assessment of plant equipment
	Manhole grouting program
	Increase subsidy program to include backflow preventers, sump pit and pumps, and fixing clean-out covers to prevent basement flooding and reduce surcharges
	Locating pipes and manholes not inspected due to locate issues

3.1 Asset Management Strategies and Associated Risks

Strategic Risks

Strategic level risks are events that may impact the ability of the City to deliver asset management strategies and minimize costs.

Potential strategic level risks associated with the City's ability to effectively deliver established Wastewater services are:

- Insufficient funding levels
- Insufficient staffing and resources to responsibly implement lifecycle strategies
- Asset deterioration assessments/models are underestimated/miscalculated
- External/environmental factors such as climate change effects (more severe weather instances, increased demands due to growth)

Risk Trade Offs

If lifecycle activities (operations, maintenance, renewal, and other capital projects) are not undertaken, they may sustain or create risk consequences. These risk consequences may include (but not limited to):

- Public health and safety – assets not adequate/available for emergency response
- Further/accelerated asset deterioration
- Increased backlog of work
- Increased treatment costs
- Level of treatment changes requiring increased resources/costs (maintenance now needing replacement)
- Planned budget/needs forecast not a reflection of actual asset needs
- Additional assets/expansion of services required
- Reputation/image negatively affected

Due to the 2004 flood event a great deal of attention has been applied to minimizing service risks within the sanitary system. The ability to use dedicated funding has also allowed the City to apply funding continuously into the program and fully utilize best practises. Risks relating to asset failure are mitigated through condition assessment programs, maintenance programs (legislated and best practices) and scheduled renewal programs which ensure assets are in acceptable condition and are available to achieve the determined levels of services. Risks related to fleet asset failures are addressed through proactive fleet maintenance and adequate vehicle storage to ensure adequate service readiness.

All City services, including Wastewater services are reviewed and identified in the City's Business Continuity Plan (BCP) and prioritization process. The BCP identifies the key interruption impacts, recovery time objectives, dependencies, qualified resources

available and a resource back-up strategy should services be interrupted. The BCP is reviewed and updated regularly to ensure that critical services are not interrupted, minimizing risks.

The choice of strategy for maintaining Wastewater assets considers the risk of failure of the assets, the risk to service delivery and the risk to other services dependant on this service area. Strategies implemented are at the lowest cost in order to reduce the burden on the tax base and user fees where possible and to maintain the current levels of service.

A full detailed, documented risk analysis in which the identification of credible risks, the likelihood of the risk event occurring, the consequences should the event occur, development of a risk rating, evaluation of the risk and the development of a risk treatment plan for non-acceptable risks is planned and will be included in future versions of the asset management plan when completed.

Strategies implemented are primarily at the lowest cost in order to reduce the burden on the tax base and user fees in order to maintain the current levels of service at the lowest risk.

3.2 Lifecycle Models, Interventions, and Cost of Service:

Overview of Lifecycle Models

Service area lifecycle models have been developed⁶ in which asset intervention thresholds and associated costs for lifecycle activities (rehabilitation and replacement) are documented.

Lifecycle models are mathematical, statistical and logic models of planned actions and of asset deterioration over time. This helps the City to forecast required asset lifecycle activities and their impacts on levels of service, risk, and funding needs. In short, lifecycle models are mathematical representation of the City's *Lifecycle Activities*.

Overview of Interventions

Interventions represent the major lifecycle activities carried out for assets over their service life and are typically accounted for as part of the capital planning process. The term 'intervention threshold' or 'intervention trigger' are used interchangeably, and they describe a point in an asset's lifecycle when the intervention typically occurs.

When an asset degrades and an intervention threshold is reached, the asset will require treatment (i.e., repair or rehabilitation). After the treatment is applied, the performance

⁶ Request for Proposal RFP 22-22 Consulting Services to Support Asset Management Planning Updates

(condition) of that asset will increase to a higher value, at which point it will continue to degrade. This will extend the overall estimated service life (ESL) of the asset.

The costs associated with interventions can be used to establish capital funding needs and determine the most cost-effective solution to maintain level of service targets. Costs for thresholds were derived from the City's historical financial information for actual or similar interventions where available and applicable. Where replacement activities are determined, asset replacement costs were used.

3.3 Lifecycle Options Analysis and Costs of Service

The options analysis of the lifecycle activities that could be undertaken were reviewed with Wastewater subject matter experts. Lifecycle activity options were discussed and determined that the current planned activities are appropriate and the most cost-effective option(s). Details related to the Wastewater services available funding, investments and shortfalls can be found in Section 5.0 – Financial Summary.

Table 7 and Figure 4 below shows the Wastewater service area projected 10-year lifecycle costs (asset renewal and replacement activities required for existing assets) and performance to maintain current levels of service. For details on current levels of service descriptions, measures and targets and current performance, refer to Table 5 in Section 2 – Levels of Service of this attachment.

Lifecycle costs shown below were calculated based on current asset conditions and forecasted out over the 25-yr period using the recommended deterioration model for that asset/asset class. Where asset condition data was not available, age-based condition ratings were applied.

Table 7: Wastewater Lifecycle Associated Costs – Delivering Current Levels of Service, existing assets

Lifecycle Activity Costs - Wastewater Services Assets	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	Total 10-Yr
Wastewater Treatment	\$0	\$3,358,174	\$3,358,174	\$3,358,174	\$3,358,174	\$3,358,174	\$3,358,174	\$3,358,174	\$3,358,174	\$3,358,174	\$3,358,174	\$33,581,745
Wastewater Collection	\$0	\$6,357,600	\$6,357,600	\$6,357,600	\$6,357,600	\$6,357,600	\$6,357,600	\$6,357,600	\$6,357,600	\$6,357,600	\$6,357,600	\$63,576,003
Annual Total	\$0	\$6,357,600	\$6,357,600	\$6,357,600	\$6,357,600	\$6,357,600	\$6,357,600	\$6,357,600	\$6,357,600	\$6,357,600	\$6,357,600	\$97,157,748
Average Annual Lifecycle Cost	\$9,715,775	\$9,715,775	\$9,715,775	\$9,715,775	\$9,715,775	\$9,715,775	\$9,715,775	\$9,715,775	\$9,715,775	\$9,715,775	\$9,715,775	

Based on the lifecycle assessment for Wastewater services assets (for renewal and replacement), it is estimated that the City would need to spend an average of \$9.7 million per year to carry out the required lifecycle activities to maintain current levels of service.

Figure 4: 10-Year Forecasted Performance for Maintaining Levels of Service – Wastewater Services

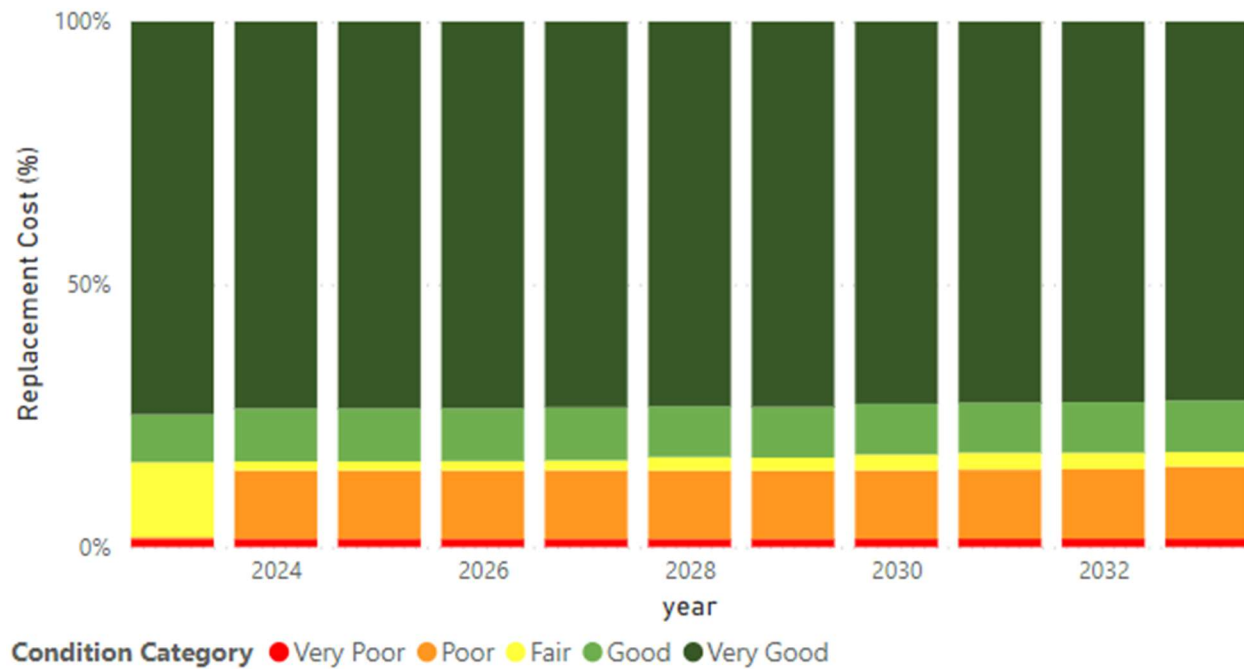


Figure 4 above illustrates the performance (condition) of Wastewater treatment and collection assets over the 10-year forecast. The estimated average combined annual expenditures to maintain these conditions is approximately \$9.7 million.

Attachment #4: Transit Service Area



Infrastructure Value	\$115M	
Annual Renewal Needs	\$4.1M	
Overall Condition	3.0	Fair
High Risk Asset Value	\$23M	20%
Trend	➡	

1.0 Summary of the Transit Service Area

Asset classes that fall under the transit service area include fleet, transit facilities, linear assets (access lanes and driveways) and miscellaneous assets which include bus stops and shelters (including pads), bus fareboxes and equipment and software. Condition rating trends are neutral from the previous year and remain Fair. The Simcoe St. parking garage/bus terminal facility is a shared facility between the transit and the roads & related assets service area (parking services). Details are reported in this section until further analysis is completed which will allocate the correct portion of assets into the respective service area.

Annual renewal needs are based on lifecycle management strategies and represent the estimated amount of capital the City needs to reinvest for replacement of its existing asset inventory on an annual basis over the next 10 years to sustain the current levels of service (based on 25-yr investment forecast).

Table 1 details the City of Peterborough's inventory for the transit service area.

1.1 Inventory Details

Table 1: Transit Service Area Asset Inventory

Asset Category & Class	2023 Quantity	Unit of Measure
Fleet		
Bus – Conventional	61	Each
Accessible Van	13	Each
Transit Facilities		
Transit Garage - 200 Townsend St.	4,045	Sq.m

Asset Category & Class	2023 Quantity	Unit of Measure
Simcoe St. Parking Garage/Bus Terminal - 190 Simcoe St.	20,129	Sq.m
Bus Storage – 182 Townsend St.	33,100	Each
Transit Linear Assets		
Access/Driveways	1	Each
Miscellaneous		
Bus Stops	637	Each
Fareboxes & Equipment	Pooled	Each
Pre-Board announcement	Pooled	Each
Stop announcement signs	Pooled	Each
Software	Pooled	Each

1.2 Replacement Costs

The estimated year end 2023 replacement costs for the transit service area totalled \$115 million. Replacement costs were determined using different valuation methods, such as unit cost multipliers based on recent construction projects or replacements, condition assessments or historical costs inflated to 2023 where recent assessments or costing information was not available.

Figure 1: Transit Service Area –Replacement Cost by Asset Class

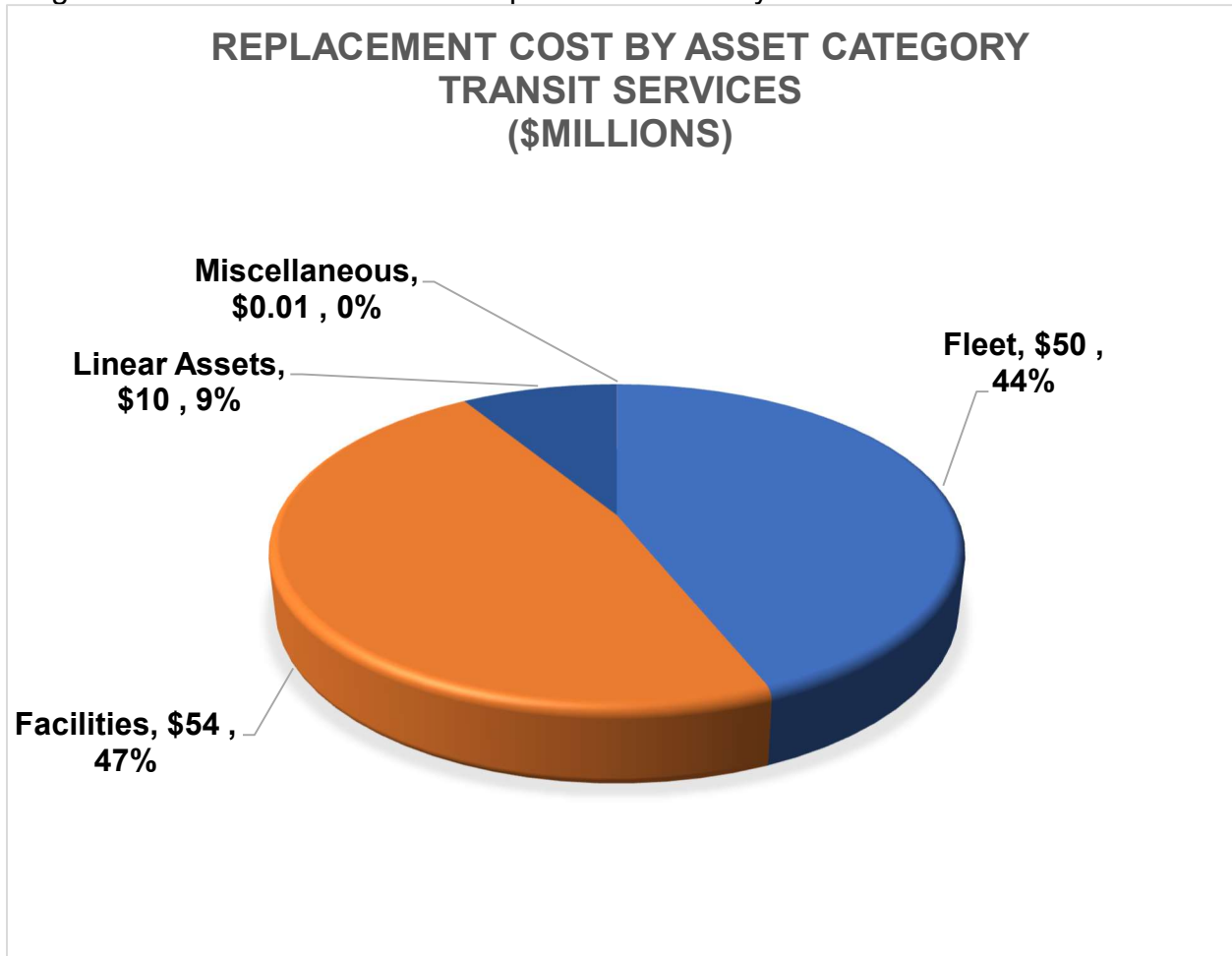


Table 2: Transit – Replacement Cost by Asset Sub-Class

Asset Class & Sub-Class	2023 Replacement Cost
Fleet	\$54,405,167
Bus	\$52,740,857
Accessible Van	\$1,664,310
Transit Facilities	\$50,031,888
Transit Garage - 200 Townsend St.	\$13,560,610
Simcoe St. Parking Garage/Bus Terminal - 190 Simcoe St.	\$31,051,728
Bus Storage – 182 Townsend St.	\$5,419,549
Transit Linear Assets	\$114,711
Access/Driveways	\$114,711
Miscellaneous	\$10,066,687
Bus Stops	\$7,432,429
Fareboxes & Equipment	\$2,327,272
Pre-board announcement	\$129,150
Stop announcement sign	\$77,000

Asset Class & Sub-Class	2023 Replacement Cost
Software	\$100,836
Transit Total	\$114,618,453

1.3 Asset Condition and Remaining Useful Life

The City's transit service area is currently rated in overall fair condition. Where condition inspections have not been completed, age-based ratings were used. Based on replacement cost, 11% or \$12 million are in very good condition, 17% or \$20 million are in good condition, 45% or \$52 million are Fair and 27% or \$21 million in poor to very poor condition. Figure 2 and Table 3 provide condition details of the transit service area.

Figure 2: Transit - Distributed Condition and Replacement Cost

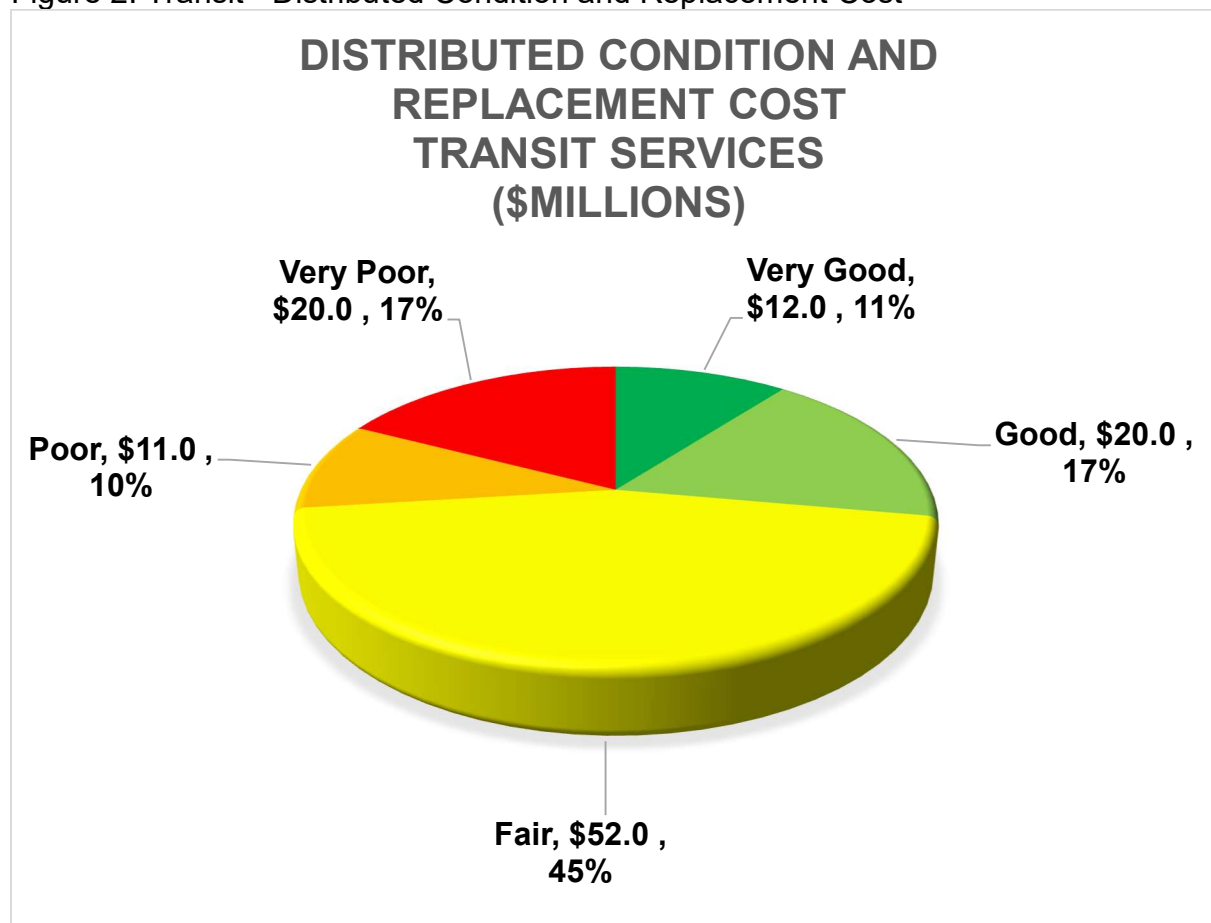


Table 3: Transit – Asset Class Condition Ratings

Asset Class & Sub-Class	2023 Condition Rating
Fleet	
Conventional Bus	Fair
Accessible Van	Good
Transit Facilities	
Transit Garage - 200 Townsend St.	Very Good
Simcoe St. Parking Garage/Bus Terminal - 190 Simcoe St.	Fair
Bus Storage – 182 Townsend St.	Very Poor
Transit Linear Assets	

Asset Class & Sub-Cass	2023 Condition Rating
Access/Driveways	Fair
Miscellaneous	
Bus Stops	Fair
Fareboxes & Equipment	Very Good
Pre-board announcement	Very Good
Stop announcement signs	Very Good
Software	Very Good
Transit Overall Condition¹	Fair

Fleet

Transit fleet condition ratings are based on both age and recommended ratings provided by staff. Estimated useful lives of transit fleet are 16 years for conventional buses and 18 years for accessible vans. The City currently has a target average age 18 years prior to replacing a bus without having to carry out traditional bus refurbishment. The City's fleet maintenance plan incorporates ministry requirements and industry best practices which maintains a high level of vehicle health. Predictive processes are utilized when scheduling major repairs such as engine, transmission and axle repairs. This ensures that the right maintenance activities are being carried out at the correct time throughout the vehicle's life cycle.

Climate Change Considerations

New fleet buses come equipped with Nova Bus' clean diesel propulsion system which includes a proprietary electric engine cooling system. Use of this system results in significant fuel savings, reduced greenhouse gas emissions and competitive life cycle costs when compared to conventional diesel-powered buses. Continuing to reduce the age of the fleet will contribute to meeting corporate greenhouse gas emission targets. As well, staff continue to review industry technology and opportunities for alternate fuel vehicles, which fit the Peterborough context.

Transit Facilities

Condition ratings for the Transit Garage and Simcoe St. Parking Garage/Bus Terminal are based on the available building condition assessments completed in 2021-2022 and use observed age of facility elements at the time of assessment. High level condition rating for the Bus Storage at 182 Townsend St. have been provided by internal staff. Individual facility BCA's will be updated on a 7-year cycle and are anticipated to be completed in 2028.

A facility that is rated poor or worse does not represent a hazard but rather represents that the facility is not performing as intended, at the end of its useful life or have significant deferred maintenance/capital costs relative to the overall replacement cost of the facility.

¹ Weighted by replacement cost

Simcoe St. Parking Garage/Bus Terminal

The parking garage/bus terminal at 190 Simcoe St., currently rated in fair condition, underwent a structural review in 2013 which identified major structural and mechanical capital needs which were completed in 2016 at an estimated \$790,000 (Phase 1 of second rehab program). Major works included replacing deteriorated concrete on structural beams, updating the drainage systems, localized repairs to the concrete deck surface, waterproofing systems and expansion joint repairs. An updated structural review in 2017 identified a further \$2.3 million in work to upgrade and replace the waterproofing system and repair deteriorated concrete in the structure.

The facility was constructed in 1974 as a parking garage and was initially designed for smaller buses serving fewer transit trips than the service provides today. Currently the transit terminal configuration and size are not suited to meet the current operating needs. The Downtown Transit Hub Plan is currently underway and will review and evaluate candidate sites for the new transit garage site along with concept plans and identify the most suitable location and design for a downtown terminal.

Transit Garage

The transit garage facility located at 200 Townsend St. is currently rated very good. Funds requested in 2020 at an estimated \$1.0 million will be used for minor upgrades to the garage to extend its service life until a new garage can be constructed.

The transit garage is only capable of storing 42 buses indoors which does not allow for enough storage of 55 buses. In 2018, Public Works operations, including major bus maintenance activities, moved from the 182 Townsend Street location to the new location at 791 Webber Avenue. With the Webber Ave. yard not being large enough to incorporate a new bus storage facility onsite, buses will continue to be stored at the 200 Townsend St. and 182 Townsend St. location and at the new PW Yard on Webber Ave, albeit outdoors, until further plans are developed regarding a new Transit garage location.

Outdoor bus storage does not allow the vehicles to be properly washed and cleaned at the end of the day to ensure that interior surfaces and the advanced accessibility features (kneeling buses, accessible ramps) do not freeze up during the winter. The inability to properly service and maintain the buses reduces the life expectancy and increases longer term maintenance costs. Currently, staff are required to shuttle the buses from the storage facility to the Webber Ave. Public Works yard for maintenance work. Funds in 2017 were used to undertake a transit garage relocation study, complete design work for the selected location and secure necessary approvals allowing for construction to proceed once funding is available.

Miscellaneous Assets

Assets within the miscellaneous asset class are primarily rated in fair to very good condition. The proposed capital budget includes the Transit Stop Shelter project with an estimated total project cost of \$0.1 million over the 2020-2023 capital forecast. This project was initiated in 2017 as part of the Public Transit Infrastructure Funding (PTIF) received from the federal government. The program will allow existing transit stops to

be upgraded and the install of new transit shelters to accommodate various levels of passenger demand. The shelter upgrades enhance accessibility by being designed barrier free and to accommodate passengers with mobility devices.

Remaining Useful Life

The following summarizes the Transit service area remaining useful life. The useful life of an asset is the estimated period over which the City expects to use the asset. Estimates are based on the calculated age (not observed age) and do not take into consideration any betterments that extend the useful life of the asset(s). Ideally, as condition assessments are completed the 'observed' age would be used in calculating remaining useful life. The ages of the transit service area assets are variable and with efforts to extend the life by application of lifecycle treatments. Table 4 shows the transit remaining useful life details.

Table 4: Transit Remaining Useful Life

Asset Inventory	Expected Useful Life (Yrs)²	Ave. Remaining Useful Life (Yrs)	Percent of Useful Life Remaining
Transit Facilities	45	0	0%
Fleet	11	0	0%
Miscellaneous	13	0	0%
Transit Remaining Useful Life³	33	0	0%

1.4 Asset Risk Assessment

The consequences of failure for Transit assets have been determined manually by City staff based on a standardized chart for consequence (found in Appendix B). The assessment considers environmental, economical, social, life safety, legislation and corporate reputation as factors when scoring consequence.

Using the product of the scores for likelihood of failure (likelihood is higher as asset condition worsens) and the consequence of failure, the asset is assigned a risk rating using the ranges shown in the chart below:

Category	Range
High Risk	< 5
Medium Risk	5 – 20
Low Risk	> 20

The estimated replacement value of Transit services high risk assets is \$23 million.

² Uses average of asset classes/assets

³ Overall RUL and Percent Useful Life remaining are weighted by replacement cost

The City continues to prioritize the operational, maintenance and renewal needs of both the critical assets and high-risk assets to minimize health and safety risks and impacts to service delivery.

2.0 Levels of Service

This section will present levels of service as they are currently being provided by the City. Service area objective statements were developed by taking into consideration the goals, strategies and objectives defined in other overarching Council approved City plans, studies and policies such as the 2022 Transportation Master Plan, the 2012 Public Transit Operations Review and the Official Plan.

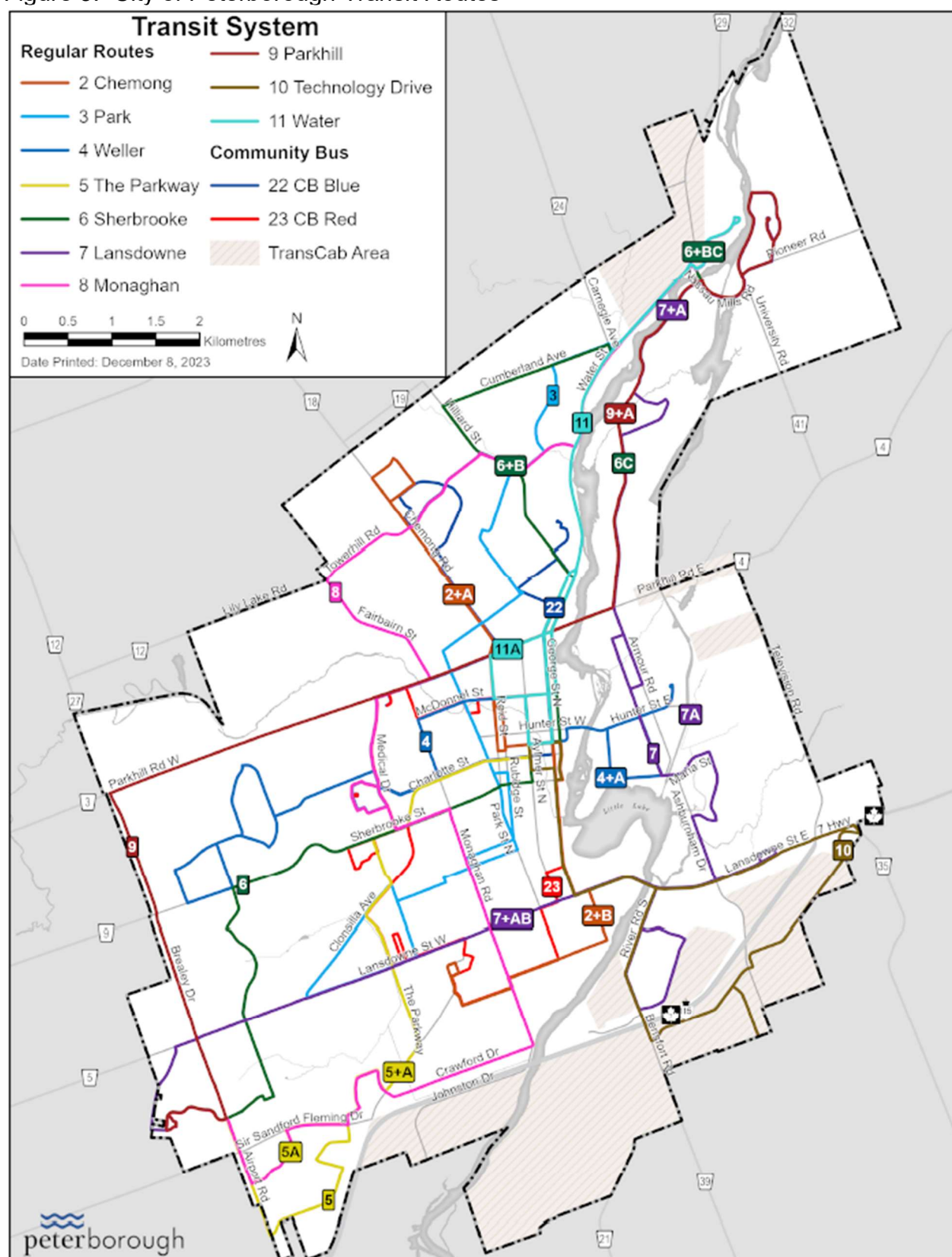
Stakeholder and technical levels of service, performance measures and current targets for the Transit service area are outlined in Table 5 below. Further development of the City's levels of service is underway in which the proposed levels of service and the affordability of the service will be analyzed and presented. Future versions of the asset management plan will also include other proposed levels of service reporting requirements set forth in the Asset Management Planning for Municipal Infrastructure Regulation (O.Reg. 588/17).

Table 5: Levels of Service – Transit Service Area

Asset Class: Transit								
Service Objective Statement: The City strives to provide a high quality, accessible and affordable service that provides access to the city.								
Stakeholder Value/Service Attribute	Stakeholder LoS and Measures		Stakeholder Performance		Technical Measure		Technical Performance	
			Year of Measure				Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
Scope/Availability	A transit system with access to all areas of the City.	Map showing the extent of the transit route system throughout the City	See Figure 3: Peterborough Transit Routes	See Figure 3: Peterborough Transit Routes	Access to a service is provided to customers by providing bus stops within distance of addresses	90% percent of population is within 450m of a bus stop	95% of population is within 450m of bus stop	97% of population is within 450m of bus stop
					Provide various routes and services to suit ridership needs	Maintain current available routes and services	4 Services - 10 Regular Routes, Community Bus Service , Trans-Cab Service, Snow Routes	4 Services - 10 Regular Routes, Community Bus Service , Trans-Cab Service, Snow Routes
					Conventional Bus Vehicle hours per person	1.4 vehicle hours	1.77 vehicle hours	1.70 vehicle hours
Reliability/Quality	Providing reliable Transit that meets the	Transit facilities and assets are	n/a - new measure	Transit facilities and assets are	Number of facilities with overall condition	3 Facilities	n/a - new measure	2 Facilities

Asset Class: Transit								
Service Objective Statement: The City strives to provide a high quality, accessible and affordable service that provides access to the city.								
Stakeholder Value/Service Attribute	Stakeholder LoS and Measures		Stakeholder Performance		Technical Measure		Technical Performance	
			Year of Measure				Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
	needs of the community	maintained in a state of good repair		proactively maintained and reliable for intended use	rating of 'Fair' or better			
					Percentage of vehicles that past their useful life	Max 10%	n/a - new measure	14%
					Unassigned ratio of vehicles	Max 15%	n/a - new measure	Conventional Bus: 10% Wheelchair Access: 10%
					Average Fleet Vehicle Age (Conventional Buses)	Average of 10 years	Average of 8 years	Average of 12 years
Accessibility (Specialized accessible buses)	Door to door service is available to registered users	Availability of accessible transit service throughout the City	Door to door service is available	Door to door service is available	Specialized Bus Vehicle hours per person	Min 0.2 vehicle hours	0.22 vehicle hours	0.33 vehicle hours

Figure 3: City of Peterborough Transit Routes



3.0 Asset Management Strategies – Transit Service Area

The transit strategy will primarily focus on the fleet assets with some strategies for the building assets. Options for which lifecycle activities that could potentially be undertaken have been explored in various studies and reports such as the Transportation Master Plan, Transit Route Review and Long-Term Growth Study. The following table below documents the set of planned actions or ‘activities’ that the City undertakes to sustain current levels of service, while managing risk at the lowest lifecycle cost. The City plans the necessary lifecycle activities at the required time and does not need to alter the *type* of activity undertaken. However, with limited funding available, the interval and timing of the necessary lifecycle activities are affected, which can have an overall impact on the performance of the asset(s) over its useful life.

Table 6: Transit – Asset Management Lifecycle Strategies

Strategy Type	Current Practice
Non-infrastructure Solutions Actions or policies that can lower costs or extend asset life (e.g. better integrated infrastructure planning and land use planning, demand management, insurance, process optimization, managed failures, etc.).	Older fleet rotated into daily driving fleet less often
	Extended warrantee provisions in purchasing process
	Linking the asset management plan to other studies, master plans and strategies
	Public consultation on levels of service
	High priority in procurement for purchasing fleet compatible with current fleet to improve parts and maintenance costs
	Training programs for mechanics and operators to optimally maintain and operate vehicles
	Redundancy of parts and fleet for the system
	Annual contribution made to transit management budget from operational budget to prepare for repairs and replacements
Maintenance Activities Activities include regularly scheduled inspection and maintenance, or more significant repair and activities associated with unexpected events.	Budget yearly for accessibility upgrades
	High standard for preventative maintenance that exceeds the Original Equipment Manufacturer (OEM) schedule
	Biannual government inspections legislated
	Annual HVAC, Undercoating, Mirror Replacement programs
	Fluid monitoring with lab analysis performed every other service to gain insight of future failures
	Third party tire checks 2x a year
	Monitor OEM bulletins/recalls and be ready to replace and repair

Strategy Type	Current Practice
	Facilities are part of the corporate wide facility preventative maintenance program
Renewals/Rehabilitation: Includes significant repairs designed to extend the life of the asset (e.g. the lining of iron watermain can defer the need for replacement).	Software license upgrades yearly to ensure system works and meets applicable legislation and standards for Stop Call system
	Reactive renewals program
	Reuse of tire casings
	Transit vehicles have an engine overhaul at mid-life (approximately 5 years of age).
	Refurbishment line item on budget
	Retrofitting buildings to automated systems
Replacement Activities that are expected to occur once an asset has reached the end of its useful life and renewal/rehabilitation is no longer an option.	Subject to funding, schedule made yearly
	18-year bus replacement cycle (standard in industry as best practice life cycle)
	Use gas tax when available to replace fleet
	Facility components replaced when at end of useful life through capital planning/business case
	Transit procurement initiative to allow for joint procurement of various transit related vehicles and equipment
Disposals/Abandonment Policies Activities associated with disposing of an asset once it has reached the end of its useful life or is otherwise no longer needed by the municipality.	Sell problematic fleet (very rare)
	Auction retired fleet
	Facilities that are no longer needed for the intended service are either sold, re-purposed or demolition.
Expansion Programs Planned activities required to extend the services to previously un-serviced areas – or expand services to meet growth demands.	Use transit reserve potentially when required
	Cost recovery contract programs used for expansion programs for post secondary school routes
	Tie accessible stop improvement program to road reconstructions
Future Strategies	Review alternate fuels periodically for potential use
	Consider electric vehicles
	Updating the vehicle storage to increase fleet capacity
	Expanding the use of sponsorship to fund projects
	Adding real-time GPS to buses

Strategy Type	Current Practice
	Reviewing partnership with MetroLinx for fleet purchases if feasible in the long term and with customization fees

3.1 Asset Management Strategies and Associated Risks

Strategic Risks

Strategic level risks are events that may impact the ability of the City to deliver asset management strategies and minimize costs.

Potential strategic level risks associated with the City's ability to effectively deliver established Transit services are:

- Insufficient funding levels
- Insufficient staffing and resources to responsibly implement lifecycle strategies
- Asset deterioration assessments/models are underestimated/miscalculated
- External/environmental factors such as climate change effects (more severe weather instances, increased demands due to growth)

Risk Trade Offs

If lifecycle activities (operations, maintenance, renewal, and other capital projects) are not undertaken, they may sustain or create risk consequences. These risk consequences may include (but not limited to):

- Public health and safety – assets not adequate/available for emergency response
- Further/accelerated asset deterioration
- Increased backlog of work
- Increased treatment costs
- Level of treatment changes requiring increased resources/costs (maintenance now needing replacement)
- Planned budget/needs forecast not a reflection of actual asset needs
- Additional assets/expansion of services required
- Reputation/image negatively affected

Potential risks associated with the City's ability to effectively deliver established service levels are:

- Insufficient funding levels
- Insufficient staffing and resources to responsibly implement lifecycle strategies
- Asset deterioration assessments/models are underestimated/miscalculated
- External/environmental factors such as climate change effects (more severe weather instances, increased demands due to growth)

Impacts associated with above risks include:

- Further/accelerated asset deterioration
- Increased backlog of work

- Increased treatment costs
- Level of treatment changes requiring increased resources/costs (maintenance now needing replacement)
- Planned budget/needs forecast not reflective of actual asset needs
- Additional assets/expansion of services required
- Reputation/image negatively affected

All City services, including Transit services are reviewed and identified in the City's Business Continuity Plan (BCP) and prioritization process. The BCP identifies the key interruption impacts, recovery time objectives, dependencies, qualified resources available and a resource back-up strategy should services be interrupted. The BCP is reviewed and updated regularly to ensure that critical services are not interrupted, minimizing risks.

The choice of strategy for maintaining Transit assets considers the risk of failure of the assets, the risk to service delivery and the risk to other services dependant on this service area. Strategies implemented are at the lowest cost in order to reduce the burden on the tax base and user fees where possible and to maintain the current levels of service.

A full detailed, documented risk analysis in which the identification of credible risks, the likelihood of the risk event occurring, the consequences should the event occur, development of a risk rating, evaluation of the risk and the development of a risk treatment plan for non-acceptable risks is planned and will be included in future versions of the asset management plan when completed.

Strategies implemented are primarily at the lowest cost in order to reduce the burden on the tax base and user fees in order to maintain the current levels of service at the lowest risk.

3.2 Lifecycle Models, Interventions, and Cost of Service:

Overview of Lifecycle Models

Service area lifecycle models have been developed⁴ in which asset intervention thresholds and associated costs for lifecycle activities (rehabilitation and replacement) are documented.

Lifecycle models are mathematical, statistical and logic models of planned actions and of asset deterioration over time. This helps the City to forecast required asset lifecycle

⁴ Request for Proposal RFP 22-22 Consulting Services to Support Asset Management Planning Updates

activities and their impacts on levels of service, risk, and funding needs. In short, lifecycle models are mathematical representation of the City's *Lifecycle Activities*.

Overview of Interventions

Interventions represent the major lifecycle activities carried out for assets over their service life and are typically accounted for as part of the capital planning process. The term 'intervention threshold' or 'intervention trigger' are used interchangeably, and they describe a point in an asset's lifecycle when the intervention typically occurs.

When an asset degrades and an intervention threshold is reached, the asset will require treatment (i.e., repair or rehabilitation). After the treatment is applied, the performance (condition) of that asset will increase to a higher value, at which point it will continue to degrade. This will extend the overall estimated service life (ESL) of the asset.

The costs associated with interventions can be used to establish capital funding needs and determine the most cost-effective solution to maintain level of service targets. Costs for thresholds were derived from the City's historical financial information for actual or similar interventions where available and applicable. Where replacement activities are determined, asset replacement costs were used.

3.3 Lifecycle Options Analysis and Costs of Service

The options analysis of the lifecycle activities that could be undertaken were reviewed with Transit services subject matter experts. Lifecycle activity options were discussed and determined that the current planned activities are appropriate and the most cost-effective option(s). Details related to the Transit services available funding, investments and shortfalls can be found in Section 5.0 – Financial Summary.

Table 7 and Figure 3 below shows the Transit service area projected 10-year lifecycle costs (asset renewal and replacement activities required for existing assets) and performance to maintain current levels of service. For details on current levels of service descriptions, measures and targets and current performance, refer to Table 5 in Section 2 – Levels of Service of this attachment.

Lifecycle costs shown below were calculated based on current asset conditions and forecasted out over the 10-yr period using the recommended deterioration model for that asset/asset class. Where asset condition data was not available, age-based condition ratings were applied.

Table 7: Transit Services 10-Year Lifecycle Associated Costs - Delivering Current Levels of Service

Lifecycle Activity Costs - Transit Services Assets	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	Total 10-Yr
Transit	\$0	\$4,058,986	\$4,058,986	\$4,058,986	\$4,058,986	\$4,058,986	\$4,058,986	\$4,058,986	\$4,058,986	\$4,058,986	\$4,058,986	\$40,589,861
Annual Total	\$0	\$4,058,986	\$4,058,986	\$4,058,986	\$4,058,986	\$4,058,986	\$4,058,986	\$4,058,986	\$4,058,986	\$4,058,986	\$4,058,986	\$40,589,861
Average Annual Lifecycle Cost	\$0	\$4,058,986	\$4,058,986	\$4,058,986	\$4,058,986	\$4,058,986	\$4,058,986	\$4,058,986	\$4,058,986	\$4,058,986	\$4,058,986	

Based on the lifecycle assessment for Transit assets (for renewal and replacement), it is estimated that the City would need to spend an average of \$4.1 million per year to carry out the required lifecycle activities to maintain current levels of service.

Figure 4: 10-Year Forecasted Performance for Maintaining Levels of Service – Transit Services

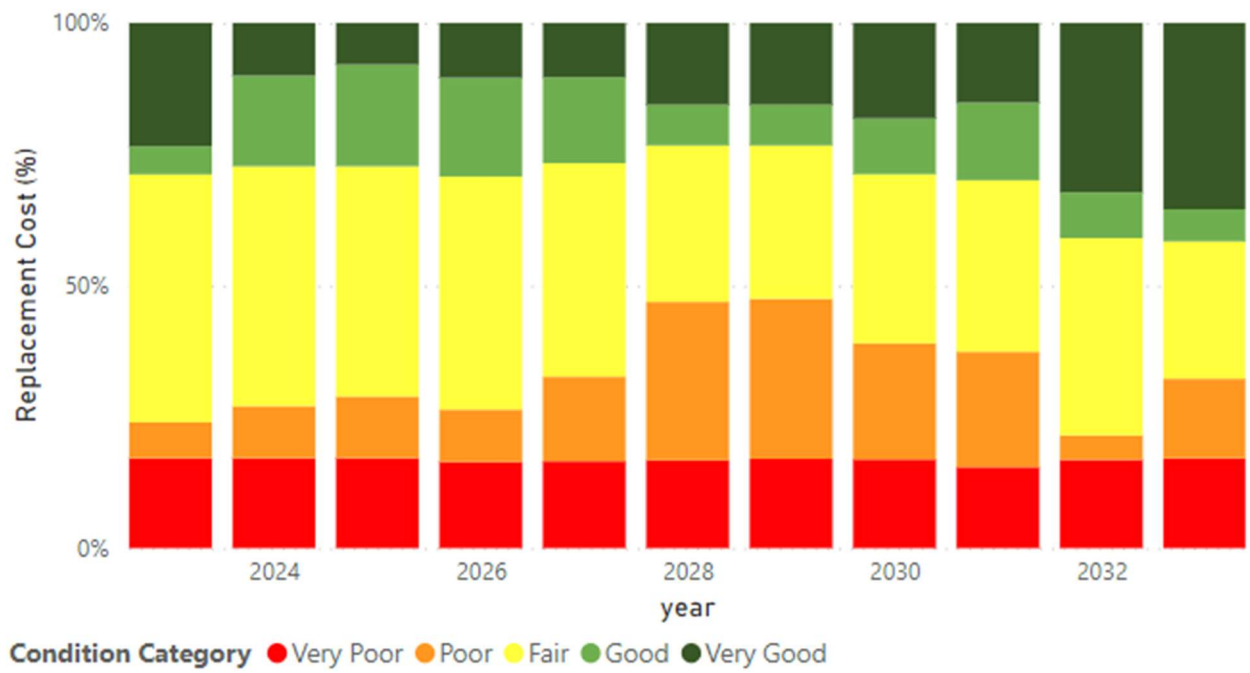



Figure 4 above illustrates the performance (condition) of Transit Services assets over the 10-year forecast. The estimated average combined annual expenditures to maintain these conditions is approximately \$4.1 million.

Attachment #5: Solid Waste Management Service Area



Infrastructure Value	\$57.5M	
Annual Renewal Needs	\$1.1M	
Overall Condition	3.0	Fair
High Risk Asset Value	\$10M	17%
Trend		

1.0 Summary of Solid Waste Management

Asset classes that fall under the solid waste management service area are facilities (landfill and surrounding buffer zones), houses on the landfill buffer land, Hazardous Household Waste Depot at 400 Pido Rd., Recycling Centre at 390 Pido Rd., fleet vehicles and equipment.

Annual renewal needs are based on lifecycle management strategies and represent the estimated amount of capital the City needs to reinvest in its existing asset inventory on an annual basis over the next 10 years to sustain the current levels of service (based on 25-yr investment forecast).

Table 1 below details the City of Peterborough's inventory for the solid waste management service area. The force mains that move leachate from the landfill to the wastewater treatment plant have been included in the wastewater analysis.

1.1 Inventory Details

Table 1: Solid Waste Management Asset Inventory

Asset Class	2023 Quantity	Unit of Measure
Facilities		
Landfill	411,365	Sq.m
Hazardous Waste Depot	169	Sq.m

Asset Class	2023 Quantity	Unit of Measure
Recycling Centre	44,052	Sq.m
Access Drive/Roadways	1	Each
Fleet		
Garbage Trucks	18	Each
Light Duty Truck	2	Each
Land		
Landfill Buffer	969	Sq.m

1.2 Replacement Costs

The estimated year end 2023 replacement costs for the solid waste management service area totalled \$58.4 million. Replacement costs were determined using different valuation methods, such as unit cost multipliers based on recent construction projects, condition assessments or historical costs inflated to 2023 where recent assessments or costing information was not available.

Figure 1: Solid Waste Management –Replacement Cost by Asset Class

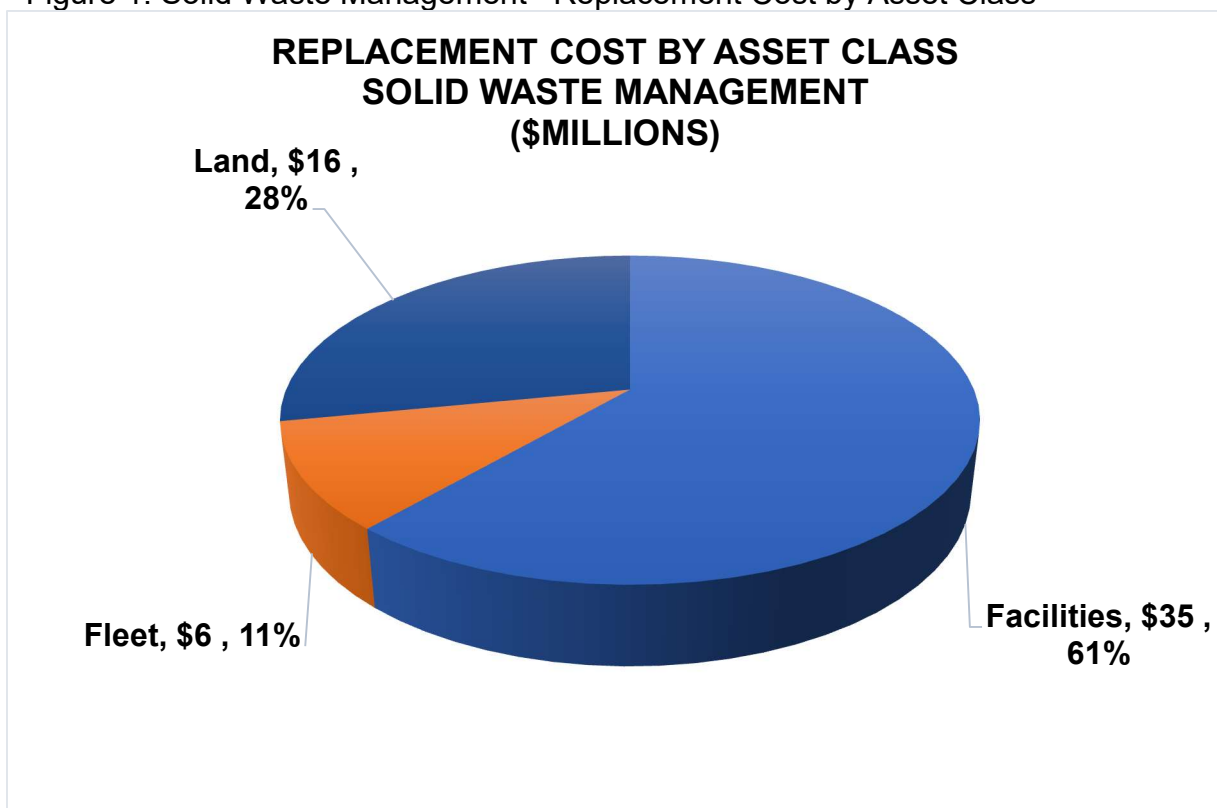


Table 2: Solid Waste Management – Replacement Costs by Asset Class

Asset Category & Class	2023 Replacement Cost
Facilities	\$34,822,609
Landfill	\$24,198,800
Hazardous Waste Depot	\$157,598
Recycling Centre	\$9,759,602
Access Drive/Roadways	\$706,610
Fleet	\$6,435,811
Garbage Trucks	\$6,354,992
Light Duty Truck	\$80,819
Land	\$16,236,878
Landfill Buffer	\$16,236,878
Solid Waste Management Total	\$57,495,299

1.3 Asset Condition and Remaining Useful Life

The City's solid waste management service area is currently rated in overall fair condition (weighted average). A building condition assessment was completed for the Recycling Centre and Landfill Scale house in 2021-2022 and is anticipated to be updated in 2028. Where building condition assessments are not completed, age-based ratings or recommended high level ratings by staff are applied. Based on replacement cost, 23% or \$13 million are rated very good, 31% or \$18 million are rated good, 24% or \$14 million are fair and 22% or \$13 million are rated poor to very poor. Figure 2 and Table 3 provide condition details of the solid waste management service area.

Figure 2: Solid Waste Management - Distributed Condition and Replacement Cost

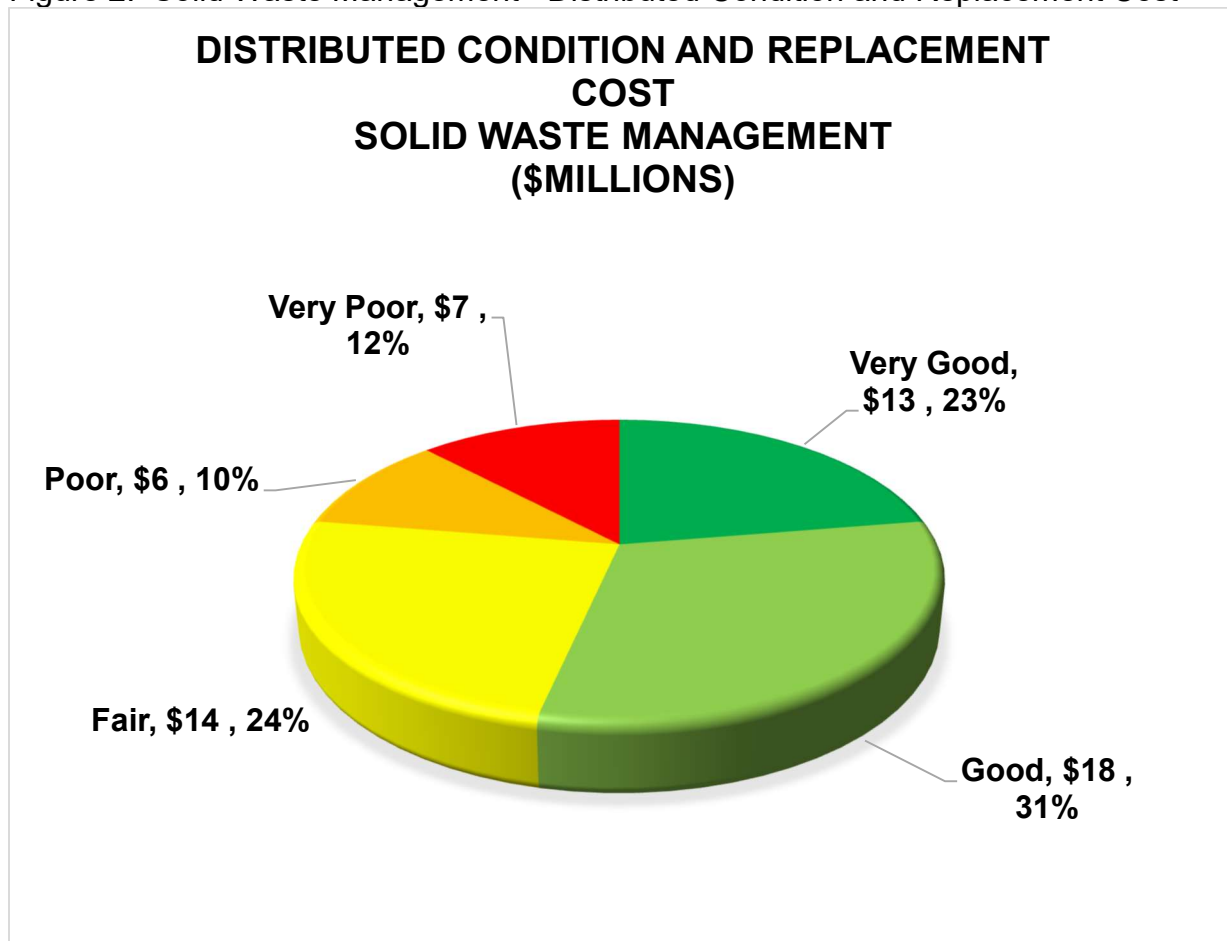


Table 3: Solid Waste Management – Asset Class Condition Ratings

Asset Category & Class	2023 Condition Rating
Facilities	
Landfill	Fair
Hazardous Waste Depot	Poor
Recycling Centre	Fair
Access Drive/Roadways	Fair
Fleet	
Garbage Trucks	Poor
Light Duty Truck	Very Good
Land	
Landfill Buffer	Very Good
Solid Waste Management Overall Condition¹	Fair

¹ Weighted by replacement cost

Facilities

Solid waste facilities are rated in overall good condition. The City of Peterborough and County of Peterborough entered into an agreement in 2002 to jointly own and operate the Bensfort Rd Landfill on a 50-50 cost share basis. The Hazardous Waste Depot, Recycling Centre and Landfill site are currently rated good (high level recommendation by City staff). Landfill assets include weigh scales, rental properties (houses) surrounding the landfill, sitework/roadways, gas capture system and leachate system. Cell 2 of the north fill area is nearing completion and will be capped in 2020. Cell 3 will continue to receive waste for an estimated four to five more years with Cell 4 design and construction planning anticipated to start in 2020.

Fleet

Solid Waste Management fleet ratings are based on both age and recommended ratings provided by staff. Fleet vehicles include garbage trucks and light duty pick up trucks. The City's fleet maintenance plan incorporates ministry requirements and industry best practices which maintains a high level of vehicle health. Predictive processes are utilized when scheduling major repairs such as engine, transmission and axle repairs. This ensures that the right maintenance activities are being carried out at the correct time throughout the vehicle's life cycle.

Remaining Useful Life

The following summarizes the solid waste management service area remaining useful life. The useful life of an asset is the estimated period over which the City expects to use the asset. Estimates are based on the calculated age (not observed age) and do not take into consideration any betterments that extend the useful life of the asset(s). Ideally, as condition assessments are completed the 'observed' age would be used in calculating remaining useful life. The age of the solid waste management service area is variable and with efforts to extend the life by application of lifecycle treatments, there isn't necessarily a linear relationship between age and condition. Table 4 shows the solid waste management remaining useful life details.

Table 4: Solid Waste Management Remaining Useful Life

Asset Inventory	Expected Useful Life (Yrs)²	Ave. Remaining Useful Life (Yrs)	Percent of Useful Life Remaining
Facilities	33	12	36%
Fleet	10	0	0%
Land Buffer	189	166	88%
Solid Waste Remaining Useful Life³	40	20	49%

1.4 Asset Risk Assessment

Currently, the consequences of failure for solid waste assets have been determined manually by City staff based on a standardized chart for consequence (found in Appendix B). The condition of the assets (inspected where available) was used to evaluate the likelihood that an asset would fail.

Using the product of the scores for likelihood of failure (likelihood is higher as asset condition worsens) and the consequence of failure, the asset is assigned a risk rating using the ranges shown in the chart below:

Category	Range
High Risk	< 5
Medium Risk	5 – 20
Low Risk	> 20

The estimated replacement value of Solid Waste high risk assets is \$10 million.

The City continues to prioritize the operational, maintenance and renewal needs of both the critical assets and high-risk assets to minimize health and safety risks and impacts to service delivery.

2.0 Levels of Service

This section will present levels of service as they are currently being provided by the City. Service area objective statements were developed by taking into consideration the goals, strategies and objectives defined in other overarching Council approved City

² Uses average of asset classes/assets

³ Overall RUL and Percent Useful Life remaining are weighted by replacement cost

plans, studies and policies such as the 2022 City of Peterborough Waste Management Master Plan Update.

Stakeholder and technical levels of service, performance measures and current targets for the Solid Waste service area are outlined in Table 5 below. Further development of the City's levels of service is underway in which the proposed levels of service and the affordability of the service will be analyzed and presented. Future versions of the Asset Management Plan will also include other proposed levels of service reporting requirements set forth in the Asset Management Planning for Municipal Infrastructure Regulation (O.Reg. 588/17).

Table 5: Levels of Service – Solid Waste Management Service Area

Service Area: Solid Waste Management								
Service Objective Statement: The City strives to manage solid waste in an environmentally and fiscally sustainable manner that is responsive, reliable and available to all, along with meeting legislative requirements.								
Stakeholder Value/Service Attribute	Stakeholder LoS and Measures		Stakeholder Performance		Technical Measure		Technical Performance	
			Year of Measure				Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
Responsiveness	Waste is not missed during allocated pick-up times	Average number of complaints per month	12.5 Recycling complaints/month 54 Garbage complaints/month 13 Green waste complaints/month	No update available	Compliance with Ministry of the Environment and Climate Change	100% Compliance based on Audits/Inspections	Compliant	No update available
					Minimum collected tonnage of recycling, organics, and household hazardous waste	11,975 tonnes of recycling collected, 6,640 tonnes of organics collected, 240 hazardous waste collected	7,281 tonnes recyclables. 6,735 tonnes leaf and yard waste; 1,659 tonnes of organics; 337 tonnes of hazardous waste	No update available

Service Area: Solid Waste Management								
Service Objective Statement: The City strives to manage solid waste in an environmentally and fiscally sustainable manner that is responsive, reliable and available to all, along with meeting legislative requirements.								
Scope/Availability	Facilities are available during business operation hours	Facilities open during the hours of 8:00am-4:30pm Monday to Friday	Household Hazardous Waste Depot open Wednesday to Saturday from 8:00am-4:00pm Landfill open from 8:00am-4:45pm Monday to Friday and Saturday 8:00am-3:45pm	Household Hazardous Waste Depot open Wednesday to Saturday from 8:00am-4:00pm Landfill open from 8:00am-4:45pm Monday to Friday and Saturday 8:00am-3:45pm	Percent of waste diverted from the Landfill	Minimum 40% of waste diverted	55% of waste diverted	No update available
Reliability/Quality	Providing reliable solid waste management facilities and assets that meet the needs of the community	Solid waste management facilities and assets are maintained in a state of good repair	Solid waste management facilities assets are proactively maintained and reliable for intended use	Solid waste management facilities assets are proactively maintained and reliable for intended use	Number of facilities with FCI of 10% or better	2 Facilities	n/a - not reported	1 Facility
					Percentage of vehicles that past their useful life	Max 10%	n/a - not reported	50%
					Unassigned ratio of Vehicles	Max 10%	n/a - not reported	10%

3.0 Asset Management Strategies – Solid Waste Management

Solid waste management includes the collection and transport of waste and the processing of that waste. Recycling and hazardous waste management have been contracted out to external agencies. Most of the strategies currently in place for these streams have been explored and analyzed by the contractor however the City remains involved to ensure current levels of service are maintained. The following table below documents the set of planned actions or ‘activities’ that the City undertakes to sustain current levels of service, while managing risk at the lowest lifecycle cost. The City plans the necessary lifecycle activities at the required time and does not need to alter the *type* of activity undertaken. However, with limited funding available, the interval and timing of the necessary lifecycle activities are affected, which can have an overall impact on the performance of the asset(s) over its useful life.

Table 6: Solid Waste Management – Asset Management Lifecycle Strategies

Strategy Type	Current Practice
Non-infrastructure Solutions Actions or policies that can lower costs or extend asset life (e.g. better integrated infrastructure planning and land use planning, demand management, insurance, process optimization, managed failures, etc.).	Training of backup staff for landfill staff coverage.
	Ensure that contracted staff at recycling and hazardous waste facilities training is renewed yearly.
	Linking the asset management plan to other studies, master plans and strategies
	Public consultation on levels of service
	Yearly inspection programs for the landfill,
	Regulations require some inspections more frequently.
	Hourly tracking of equipment usage.
	CCTV program for leachate system.
	Property Management division inspects rental properties in landfill buffer.
Maintenance Activities Activities include regularly scheduled inspection and maintenance, or more significant repair and activities associated with unexpected events.	Contractors apply an approved preventative maintenance program for equipment.
	Scales are calibrated and checked twice a year.
	Facility maintenance for recycling centre is currently Ad Hoc.
	Landfill inspections trigger maintenance program changes at landfill.
	Hours of operations are tracked and trigger preventative maintenance activities.
	Leachate collection system maintained based on Environmental Compliance Approval (ECA) requirements.

Strategy Type	Current Practice
	Garbage Truck fleet is part of the City's fleet management program for maintenance.
Renewals/Rehabilitation: Includes significant repairs designed to extend the life of the asset (e.g. the lining of iron watermain can defer the need for replacement).	Ad Hoc renewals at hazardous waste depot.
	Recycling centre rehabilitations managed by the City Facility Manager.
	Rental properties maintained by City Facility Manager.
	Pumps in leachate system are rebuilt.
	Completed based on review of records gathered from operating/maintenance activities. If issues are identified by O&M activities, then the asset is scheduled for renewal/rehabilitation
Replacement Activities that are expected to occur once an asset has reached the end of its useful life and renewal/rehabilitation is no longer an option.	Replacement of landfill equipment is determined by age of the asset, the number of hours in service and the cost of continued maintenance.
	Fleet is replaced based on the age of the assets.
	Service truck is traded in when replaced.
	Facility assets are replaced based on actual findings and recommendations from building condition assessments or during in-field inspections by staff during maintenance activities.
Disposals/Abandonment Policies Activities associated with disposing of an asset once it has reached the end of its useful life or is otherwise no longer needed by the municipality.	Dispose of assets when cost of maintenance is greater than value or replacement parts are no longer available.
	Compost site at Harper road to be abandoned in 2019 based on ECA.
	Landfill once closed will be maintained by the City for environmental purposes for 175 years.
	Landfill will be retired once capacity has been reached.
	Rental properties sold/removed based on cost to maintain vs. revenue from rental generated.
Expansion Programs Planned activities required to extend the services to previously un-serviced areas – or expand services to meet growth demands.	Consultation regarding waste disposal capacity capabilities in 4-5 years.
Future Strategies	Provincial regulation changes may lead to city no longer managing materials recycling facilities in the future.

Strategy Type	Current Practice
	The Province currently proposing many changes to solid waste management the City and County are preparing to be ready for these changes.
	Source separated organics to be introduced to the City once a site, process and fleet are in place.

3.1 Asset Management Strategies and Associated Risks

Strategic Risks

Strategic level risks are events that may impact the ability of the City to deliver asset management strategies and minimize costs.

Potential strategic level risks associated with the City's ability to effectively deliver established Emergency Services are:

- Insufficient funding levels
- Insufficient staffing and resources to responsibly implement lifecycle strategies
- Asset deterioration assessments/models are underestimated/miscalculated
- External/environmental factors such as climate change effects (more severe weather instances, increased demands due to growth)
- Changes to Regulatory/Legislated standards

Risk Trade Offs

If lifecycle activities (operations, maintenance, renewal, and other capital projects) are not undertaken, they may sustain or create risk consequences. These risk consequences may include (but not limited to):

- Public health and safety – assets not adequate/available for emergency response
- Further/accelerated asset deterioration
- Increased backlog of work
- Increased treatment costs
- Level of treatment changes requiring increased resources/costs (maintenance now needing replacement)
- Planned budget/needs forecast not a reflection of actual asset needs
- Additional assets/expansion of services required
- Reputation/image negatively affected

Risks relating to asset failure are mitigated through condition assessment programs, maintenance programs (legislated and best practices) and scheduled renewal programs which ensure assets are in acceptable condition and are available to achieve the determined levels of services. Risks related to fleet asset failures are addressed through proactive fleet maintenance and adequate vehicle storage to ensure adequate service readiness.

The solid waste management actively invests in maintaining the landfill assets in order to meet provincial regulations. The recycling and hazardous waste management programs are primarily based on contracts. It is recommended to align asset management lifecycle strategies with capital plans highlighting the impact that budget

decisions have on the condition, useful life, maintenance costs, future rehabilitation/replacement funding needs, levels of service and risk/liability.

All City services, including Solid Waste Management are reviewed and identified in the City's Business Continuity Plan (BCP) and prioritization process. The BCP identifies the key interruption impacts, recovery time objectives, dependencies, qualified resources available and a resource back-up strategy should services be interrupted. The BCP is reviewed and updated regularly to ensure that critical services are not interrupted, minimizing risks.

The choice of strategy for maintaining Solid Waste Management assets considers the risk of failure of the assets, the risk to service delivery and the risk to other services dependant on this service area. Strategies implemented are at the lowest cost in order to reduce the burden on the tax base and user fees where possible and to maintain the current levels of service.

A full detailed, documented risk analysis in which the identification of credible risks, the likelihood of the risk event occurring, the consequences should the event occur, development of a risk rating, evaluation of the risk and the development of a risk treatment plan for non-acceptable risks is planned and will be included in future versions of the asset management plan when completed.

3.2 Lifecycle Models, Interventions, and Cost of Service:

Overview of Lifecycle Models

Service area lifecycle models have been developed⁴ in which asset intervention thresholds and associated costs for lifecycle activities (rehabilitation and replacement) are documented.

Lifecycle models are mathematical, statistical and logic models of planned actions and of asset deterioration over time. This helps the City to forecast required asset lifecycle activities and their impacts on levels of service, risk, and funding needs. In short, lifecycle models are mathematical representation of the City's *Lifecycle Activities*.

Overview of Interventions

Interventions represent the major lifecycle activities carried out for assets over their service life and are typically accounted for as part of the capital planning process. The term 'intervention threshold' or 'intervention trigger' are used interchangeably, and they describe a point in an asset's lifecycle when the intervention typically occurs.

⁴ Request for Proposal RFP 22-22 Consulting Services to Support Asset Management Planning Updates

When an asset degrades and an intervention threshold is reached, the asset will require treatment (i.e., repair or rehabilitation). After the treatment is applied, the performance (condition) of that asset will increase to a higher value, at which point it will continue to degrade. This will extend the overall estimated service life (ESL) of the asset.

The costs associated with interventions can be used to establish capital funding needs and determine the most cost-effective solution to maintain level of service targets. Costs for thresholds were derived from the City's historical financial information for actual or similar interventions where available and applicable. Where replacement activities are determined, asset replacement costs were used.

3.3 Lifecycle Options Analysis and Costs of Service

The options analysis of the lifecycle activities that could be undertaken were reviewed with Solid Waste Management subject matter experts. Lifecycle activity options were discussed and determined that the current planned activities are appropriate and the most cost-effective option(s). Details related to Solid Waste Management available funding, investments and shortfalls can be found in Section 5.0 – Financial Summary.

Table 7 and Figure 3 below shows the Solid Waste Management service area projected 10-year lifecycle costs (asset renewal and replacement activities required for existing assets) and performance to maintain current levels of service. For details on current levels of service descriptions, measures and targets and current performance, refer to Table 5 in Section 2 – Levels of Service of this attachment.

Lifecycle costs shown below were calculated based on current asset conditions and forecasted out over the 10-yr period using the recommended deterioration model for that asset/asset class. Where asset condition data was not available, age-based condition ratings were applied.

Table 7: Solid Waste Management Lifecycle Associated Costs – Delivering Current Levels of Service, existing assets

Lifecycle Activity Costs - Solid Waste Mgmt. Assets	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	Total 10-Yr
Solid Waste Management Assets	\$0	\$1,132,588	\$1,132,588	\$1,132,588	\$1,132,588	\$1,132,588	\$1,132,588	\$1,132,588	\$1,132,588	\$1,132,588	\$1,132,588	\$11,325,876
Annual Total	\$0	\$1,132,588	\$1,132,588	\$1,132,588	\$1,132,588	\$1,132,588	\$1,132,588	\$1,132,588	\$1,132,588	\$1,132,588	\$1,132,588	\$11,325,876
Average Annual Lifecycle Cost	\$1,132,588	\$1,132,588	\$1,132,588	\$1,132,588	\$1,132,588	\$1,132,588	\$1,132,588	\$1,132,588	\$1,132,588	\$1,132,588	\$1,132,588	

Based on the lifecycle assessment for Emergency services assets (for renewal and replacement), it is estimated that the City would need to spend an average of \$1.1 million per year to carry out the required lifecycle activities to maintain current levels of service.

Figure 3: 10-Year Forecasted Performance for Maintaining Levels of Service – Solid Waste Management

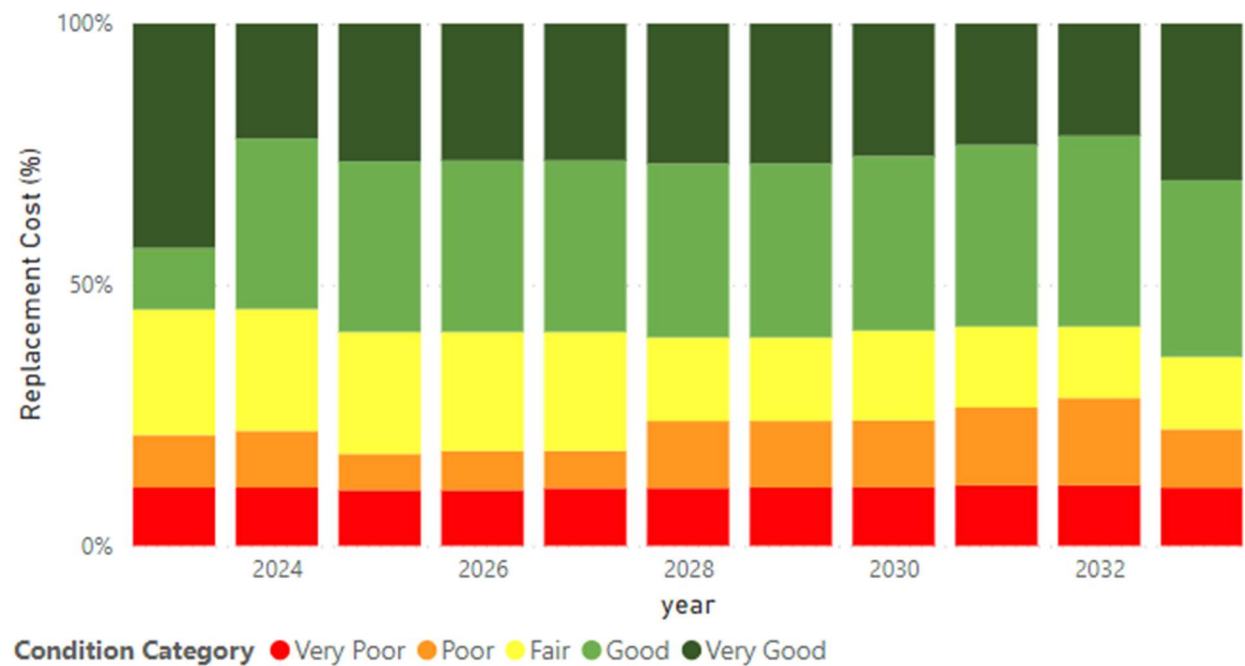


Figure 3 above illustrates the performance (condition) of Solid Waste assets over the 10-year forecast. The estimated average combined annual expenditures to maintain the above conditions is approximately \$1.1M.

Attachment #6: Community Housing Service Area



Infrastructure Value	\$326M	
Annual Renewal Needs	\$9.6	
Overall Condition	2.0	Poor
High Risk Asset Value	\$31.9M	10%
Trend	➡	

1.0 Summary of Community Housing

Asset classes that fall under the Community Housing service area include detached homes, semi-detached, townhomes and apartments. Currently, the housing stock owned by the City of Peterborough consists of Rent-Geared-to-Income (RGI) units and affordable housing units. Annual renewal needs are based on lifecycle management strategies and represent the estimated amount of capital the City needs to reinvest in its existing inventory on an annual basis over the next 10 years to sustain the current levels of service (based on the 25-yr investment forecast). Trends are neutral with no significant improvement in conditions primarily due to the large backlog of deferred work.

1.1 Inventory Details

Table 1 details the City of Peterborough's inventory for the Community Housing service area

Table 1: Community Housing Service Area Asset Inventory

Asset Class	2023 Quantity (units)	Unit of Measure
Detached/Semi Detached Homes	44	Units
Townhomes	466	Units
Apartments	627	Units
Total	1,137	Units

1.2 Replacement Costs

The estimated year end 2023 replacement costs for the Community Housing service area totalled \$326.3 million. Replacement costs were determined using construction unit cost multipliers for the different types of facility element. Unit costs are taken from the current asset management & planning software solution¹ database and inflated (2023 dollars) to determine the updated facility replacement costs.

Table 2: Community Housing – Replacement Cost by Facility Element Asset Class

Asset Class	2023 Replacement Cost
Substructures	\$52,084,735
Shell	\$139,582,144
Interior Finishes	\$68,837,138
Services – electrical and mechanical	\$45,635,643
Equipment and Furnishings	\$2,624,428\$
Special Construction	\$116,567
Sitework	\$17,428,282
Community Housing Overall Replacement Cost	\$326,308,937

¹ PHC is currently using Ameresco's AssetPlanner

1.3 Asset Condition and Remaining Useful Life

The Community Housing service area is currently rated in overall poor condition (weighted by replacement cost). The most recent BCA's for the housing portfolio was last completed in 2020. Based on replacement cost, 3% or \$9.8 million are very good, 5% or \$16.9 million are good, 30% or \$98.1 million are rated fair, and 62% or \$15.6 million are rated poor and very poor Figure 1 and Table 3 provide condition details of the social housing service area.

Figure 1: Community Housing - Distributed Condition and Replacement Cost

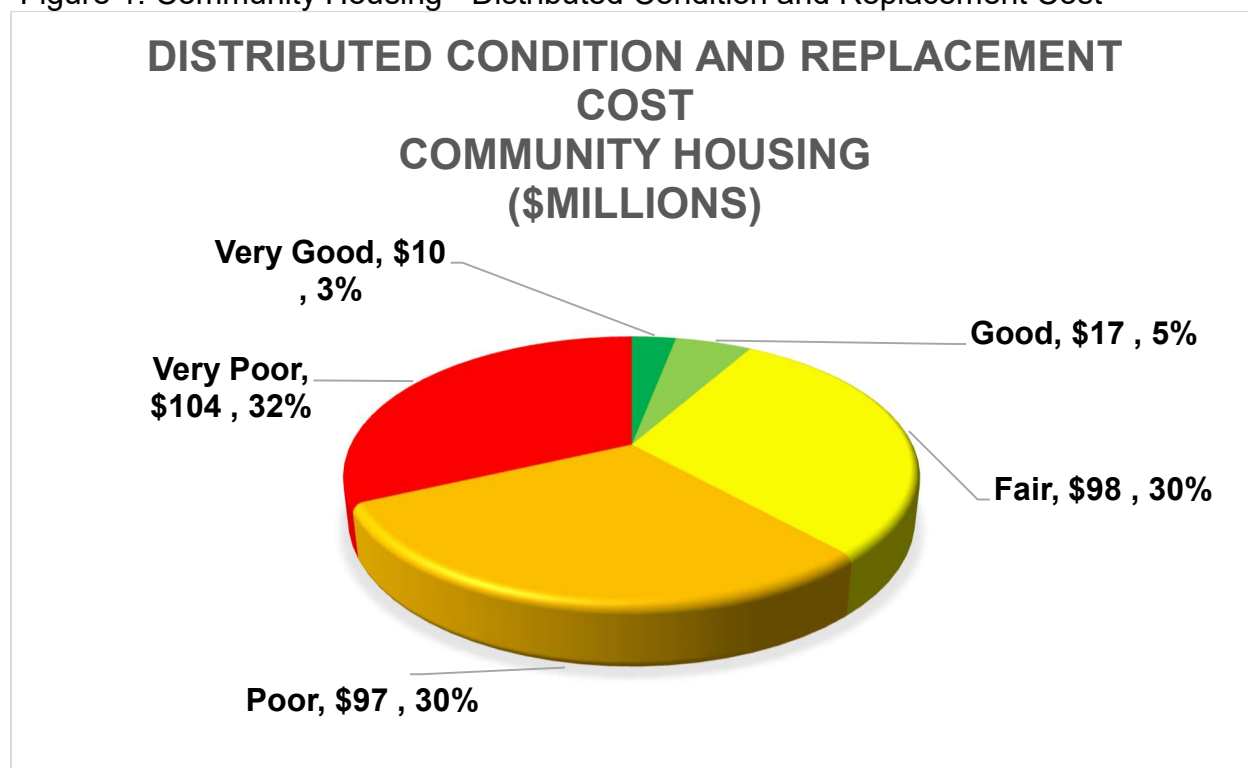


Table 3: Community Housing – Asset Class Condition Ratings

Asset Class	2023 Condition Rating
Substructures	Fair
Shell	Poor
Interior Finishes	Poor
Services – electrical and mechanical	Poor
Equipment and Furnishings	Very Poor
Special Construction	Very Poor
Sitework	Poor
Community Housing Overall Condition ²	Poor

² Weighted by replacement cost

Condition Ratings

Condition ratings for each asset class were calculated using data in the asset management & planning software system. Condition ratings are based on observed age-based ratings which provide actual condition of the assets at the time of the assessment. Building condition assessments (BCA'S) are anticipated to be undertaken every five to seven years (includes both City and County of Peterborough housing sites). In conjunction with the City's asset management strategy, BCA's will significantly improve monitoring of Community Housing providers' capital reserves as well as identify capital repair needs and provide capacity to pay.

Remaining Useful Life

The following summarizes the Community Housing service area remaining useful life. The useful life of an asset is the estimated period over which the City expects to use the asset. Estimates are based on the average of the observed age and do not take into consideration any betterments that extend the useful life of the asset(s). Facility assets shown in Table 4 below are based primarily on the on an average life span for facility structures of 75 years. The age of the Community Housing service area is variable and with efforts to extend the life by application of lifecycle treatments, there isn't necessarily a linear relationship between age and condition. Table 4 shows the social housing remaining useful life details.

Table 4: Community Housing Remaining Useful Life

Asset Inventory	Expected Useful Life (Yrs)	Ave. Remaining Useful Life (Yrs)	Percent of Useful Life Remaining
Facilities	41	6	15%
Community Housing Remaining Useful Life ³	41	6	15%

1.4 Asset Risk Assessment

The consequences of failure for Community Housing assets have been determined manually by City staff based on a standardized chart for consequence (found in Appendix B). The assessment considers environmental, economical, social, life safety, legislation and corporate reputation as factors when scoring consequence.

Using the product of the scores for likelihood of failure (likelihood is higher as asset condition worsens) and the consequence of failure, the asset is assigned a risk rating using the ranges shown in the chart below:

³ Overall RUL and Percent Useful Life remaining are weighted by replacement cost

Category	Range
High Risk	< 5
Medium Risk	5 – 20
Low Risk	> 20

The estimated replacement value of Community Housing high risk assets is \$31.9 million.

The City continues to prioritize the operational, maintenance and renewal needs of both the critical assets and high-risk assets to minimize health and safety risks and impacts to service delivery.

2.0 Levels of Service

This section will present levels of service as they are currently being provided by the City. Service area objective statements were developed by taking into consideration the goals, strategies and objectives defined in other overarching Council approved City plans, studies and policies such as the Peterborough 10-Year Housing and Homelessness Plan and its latest update in 2022.

Stakeholder and technical levels of service, performance measures and current targets for the Community Housing service area are outlined in Table 5 below. Further development of the City's levels of service is underway in which the proposed levels of service and the affordability of the service will be analyzed and presented. Future versions of the Asset Management Plan will also include other proposed levels of service reporting requirements set forth in the Asset Management Planning for Municipal Infrastructure Regulation (O.Reg. 588/17).

Table 5: Levels of Service – Community Housing

Service Objective Statement: The Peterborough Housing Corporation strives to be recognized as a community leader and housing provider of choice that delivers safe, quality and affordable accomodations to engage residents in a vibrant and inclusive community.								
Stakeholder Value/Service Attribute	Stakeholder LoS and Measures		Stakeholder Performance		Technical Measure		Technical Performance	
			Year of Measure				Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
Efficiency	Workorders responded to in a timely manner	All work orders are responded to within 24 hours of submission	100% of work orders responded to within 24 hrs		Number of households on waiting list for housing	Less than 1000 households waiting for housing	1339 households seeking placement	1848
Reliability/Quality	Providing reliable and high-quality Community Housing that meets the needs of the community	Community Housing is maintained in a state of good repair	Facilities are proactively maintained and reliable for intended use	Facilities are proactively maintained and reliable for intended use	Maintain a minimum facility condition rating	Average facility condition rating of 'Fair' or better.	Poor	Fair
					Average Facility Condition Index (FCI) value for all facilities	Fair (Between 5% and 10%)	n/a - not reported	6.48% (Fair)
					Number of facilities with FCI of 10% or better	All community housing Facilities (100%)	n/a - not reported	84%

3.0 Asset Management Strategies – Community Housing

The following table describes the current strategies and activities for the Community Housing service area to maintain the current levels of service. Options for which lifecycle activities that could potentially be undertaken are analyzed when an asset is no longer meeting service levels or its intended purpose. An asset will either be rehabilitated (for the interim or for the long term) or eliminated through sale or demolition. The lifecycle strategies below consider the useful life of the assets and assumes the investment costs over the lifecycle of the assets, including capital, operating costs such as energy, maintenance, financing costs and other relevant costs.

Table 6: Community Housing – Asset Management Lifecycle Strategies

Strategy Type	Current Practice
Non-infrastructure Solutions Actions or policies that can lower costs or extend asset life (e.g. better integrated infrastructure planning and land use planning, demand management, insurance, process optimization, managed failures, etc.).	PHC review of housing in 2015 for suitability, and sustainability Capital Financing and Community Revitalization Plan to understand demand, needs and develop direction
	Model suites available to view by prospective customers
	Linking the asset management plan to other studies, master plans and strategies
	Public consultation on levels of service
	Reduces vacancy
	Help prospective customers determine if the suite will suit their needs
	PHC organizes capital projects in groups to reduce the costs or with other housing organizations
	Non-smoking policy in Affordable Housing Units Portfolio and new units to reduce damage to units
	Bulk tendering for the supply of property insurance and gas utilities
	Stakeholder (The City) reports to secure funding that include
	Creative capital planning strategies
	Identification and cultivation of partnerships

Strategy Type	Current Practice
	Partner specific plans
	Maintaining, and updating maintenance training and certifications for maintenance staff
	Financing strategy to save some capital budget yearly for unplanned maintenance activities fund
Maintenance Activities Activities include regularly scheduled inspection and maintenance, or more significant repair and activities associated with unexpected events.	Legislative maintenance programs for Fire safety implemented
	Have onsite personnel for maintenance of units
	Some personnel are shared between sites
	Seasonal maintenance activities tendered
	Have a dedicated carpentry shop to work on cabinetry, doors, windows and other housing carpentry
	Introduced a modern computerize maintenance management system (CMMS) to track work orders and staff time
Renewals/Rehabilitation: Includes significant repairs designed to extend the life of the asset (e.g. the lining of iron watermain can defer the need for replacement).	Carpet replacement program to replace with longer life span flooring
	Energy efficiency renewals strategy to improve housing energy costs
	Seek to renew assets with modern and resilient materials
	Responsive renewals/rehabilitation when tenant vacates facility
	Targeted renewals in programs such as performing all renewals of specific items over a period, area, or floor
Replacement Activities that are expected to occur once an asset has reached the end of its useful life and renewal/rehabilitation is no longer an option.	End of debenture period could trigger replacement of a unit
	Replace assets when they reach the end of their service lives

Strategy Type	Current Practice
Disposals/Abandonment Policies Activities associated with disposing of an asset once it has reached the end of its useful life or is otherwise no longer needed by the municipality.	Properties sold based on not meeting housing needs any more (unit size or location)
	Sell properties deemed too expensive to continue to maintain
	Sell properties when market changes make a property attractive for sale such as location, local service changes, school locations or access to health care
Expansion Programs Planned activities required to extend the services to previously un-serviced areas – or expand services to meet growth demands.	Expand properties deemed needed for redevelopment using Ontario's Places to Grow density targets as a guide
	Expand locations that have marketable qualities (same as the market changes in disposals)
	Expansion limited to municipal bylaws and regulations
	Some properties have limitations due to local environment and size for future expansion
	Expansion requires access to debt funding, municipal/provincial/federal funding opportunities
	Creative capital planning applied to seek expansion
Future Strategies	Looking into bulk purchasing agreement for energy utilities
	Seeking opportunities to find energy efficiency and generation where possible including green energy
	Intensification of units/properties during site redevelopments
	Adjust development layouts to increase emergency response access and community development
	Increase accessibility of units when redeveloped
	Debuture period ending opening opportunities for investigating new strategies for housing needs
	Using social bonds for housing strategies

3.1 Asset Management Strategies and Associated Risks

Strategic Risks

Strategic level risks are events that may impact the ability of the City to deliver asset management strategies and minimize costs.

Potential strategic level risks associated with the City's ability to effectively deliver established Community Housing services are:

- Insufficient funding levels
- Insufficient staffing and resources to responsibly implement lifecycle strategies
- Asset deterioration assessments/models are underestimated/miscalculated
- External/environmental factors such as climate change effects (more severe weather instances, increased demands due to growth)

Risk Trade Offs

If lifecycle activities (operations, maintenance, renewal, and other capital projects) are not undertaken, they may sustain or create risk consequences. These risk consequences may include (but not limited to):

- Public health and safety – assets not adequate/available for emergency response
- Further/accelerated asset deterioration
- Increased backlog of work
- Increased treatment costs
- Level of treatment changes requiring increased resources/costs (maintenance now needing replacement)
- Planned budget/needs forecast not a reflection of actual asset needs
- Additional assets/expansion of services required
- Reputation/image negatively affected

Risks relating to asset failure are mitigated through condition assessment programs, maintenance programs (legislated and best practices) and scheduled renewal programs which ensure assets are in acceptable condition and are available to achieve the determined levels of services.

Assets within the facility that are associated with the safety, health, and well being of the tenants (e.g. building shell, stairs, structural, fire & life safety, and elevating devices) are considered high-risk due to the nature of the service it provides to the tenants. These are considered priority projects for repair/replacement relative to other non-high-risk assets. Where health and life safety factors are not an issue, projects are prioritized based on established criteria. In undertaking repair, preventative maintenance and capital work, it is the City's policy to consider energy conservation measures where possible.

All City services, including Community Housing services are reviewed and identified in the City's Business Continuity Plan (BCP) and prioritization process. The BCP identifies the

key interruption impacts, recovery time objectives, dependencies, qualified resources available and a resource back-up strategy should services be interrupted. The BCP is reviewed and updated regularly to ensure that critical services are not interrupted, minimizing risks.

A full detailed, documented risk analysis in which the identification of credible risks, the likelihood of the risk event occurring, the consequences should the event occur, development of a risk rating, evaluation of the risk and the development of a risk treatment plan for non-acceptable risks is planned and will be included in future versions of the asset management plan when completed.

3.2 Lifecycle Models, Interventions, and Cost of Service

Overview of Lifecycle Models

Service area lifecycle models have been developed⁴ in which asset intervention thresholds and associated costs for lifecycle activities (rehabilitation and replacement) are documented.

Lifecycle models are mathematical, statistical and logic models of planned actions and of asset deterioration over time. This helps the City to forecast required asset lifecycle activities and their impacts on levels of service, risk, and funding needs. In short, lifecycle models are mathematical representation of the City's *Lifecycle Activities*.

Overview of Interventions

Interventions represent the major lifecycle activities carried out for assets over their service life and are typically accounted for as part of the capital planning process. The term 'intervention threshold' or 'intervention trigger' are used interchangeably, and they describe a point in an asset's lifecycle when the intervention typically occurs.

When an asset degrades and an intervention threshold is reached, the asset will require treatment (i.e., repair or rehabilitation). After the treatment is applied, the performance (condition) of that asset will increase to a higher value, at which point it will continue to degrade. This will extend the overall estimated service life (ESL) of the asset.

The costs associated with interventions can be used to establish capital funding needs and determine the most cost-effective solution to maintain level of service targets. Costs for thresholds were derived from the City's historical financial information for actual or similar interventions where available and applicable. Where replacement activities are determined, asset replacement costs were used.

⁴ Request for Proposal RFP 22-22 Consulting Services to Support Asset Management Planning Updates

3.3 Lifecycle Options Analysis and Costs of Service

The options analysis of the lifecycle activities that could be undertaken were reviewed with the Community Housing services subject matter experts. Lifecycle activity options were discussed and determined that the current planned activities are appropriate and the most cost-effective option(s). Details related to the Community Housing available funding, investments and shortfalls can be found in Section 5.0 – Financial Summary.

Table 7 and Figure 2 below shows the Community Housing projected 10-year lifecycle costs (asset renewal and replacement activities required for existing assets) and performance to maintain current levels of service. For details on current levels of service descriptions, measures and targets and current performance, refer to Table 5 in Section 2 – Levels of Service of this attachment.

Lifecycle costs shown below were calculated based on current asset conditions and forecasted out over the 10-yr period using the recommended deterioration model for that asset/asset class. Where asset condition data was not available, age-based condition ratings were applied.

Table 7: Community Housing Lifecycle Associated Costs – Delivering Current Levels of Service, existing assets

Lifecycle Activity Costs - Community Housing	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	Total 10-Yr
Housing Facility Assets	\$0	\$9,569,131	\$9,569,131	\$9,569,131	\$9,569,131	\$9,569,131	\$9,569,131	\$9,569,131	\$9,569,131	\$9,569,131	\$9,569,131	\$95,691,309
Annual Total	\$0	\$9,569,131	\$9,569,131	\$9,569,131	\$9,569,131	\$9,569,131	\$9,569,131	\$9,569,131	\$9,569,131	\$9,569,131	\$9,569,131	\$95,691,309
Average Annual Lifecycle Cost	\$9,569,131	\$9,569,131	\$9,569,131	\$9,569,131	\$9,569,131	\$9,569,131	\$9,569,131	\$9,569,131	\$9,569,131	\$9,569,131	\$9,569,131	

Based on the lifecycle assessment for Community Housing assets (for renewal and replacement), it is estimated that the City would need to spend an average of \$9.6 million per year to carry out the required lifecycle activities to maintain current levels of service.


Figure 2: 10-Year Forecasted Performance for Maintaining Levels of Service – Community Housing



Figure 2 above illustrates the performance (condition) of Community Housing assets over the 10-year forecast. The estimated average combined annual expenditures to maintain the above conditions is approximately \$9.6 million.

Attachment #7: Recreation



Infrastructure Value	\$227M	
Annual Renewal Needs	\$5.0M	
Overall Condition	3.0	Fair
High Risk Asset Value	\$32M	14%
Trend		

1.0 Summary of Recreation

Recreation assets include Aquatics & Equipment, Arenas, the Marina, & Recreation Facilities, Parks Buildings, Parks Amenities and Recreational Land – Developed Parkland locations. The Plan now covers all of Recreation service area assets where previous iterations of the Plan only covered the Arenas service area. Annual renewal needs are based on lifecycle management strategies and represent the estimated amount of capital the City needs to reinvest in its existing asset inventory on an annual basis over the next 10 years to sustain the current levels of service (based on the 25-yr investment forecast). Condition rating trends remain neutral from the previous reported Plan, with an overall condition rating of fair.

1.1 Inventory Details

Table 1 details the City of Peterborough's Recreation inventory:

Table 1: Recreation Asset Inventory

Asset Category & Class	2023 Quantity	Unit of Measure
Aquatics & Equipment		
Splash Pads and Wading Pools	10	Each
Public Beaches	2	Each
Arenas and Recreation Facilities		
Peterborough Memorial Centre	11,082	Sq.m
Morrow Park (total)	4,033	Sq.m
Bi-Centennial Building (Gymnastics Club)	620	Sq.m
Multi-purpose Building (Morrow Building)	2,125	Sq.m
Peterborough Agricultural Office	76	Sq.m
East Horse Barn	627	Sq.m
West Horse Barn	586	Sq.m

Asset Category & Class	2023 Quantity	Unit of Measure
Events Equipment	13	Each
Marinas	1	Each
Community and Wellness Centres	2	Each
Park Amenities		
Wharfs & Barges	4	Each
Boat ramps	5	Each
Baseball Diamonds	23	Each
Rectangular Fields	10	Each
Tennis Courts	8	Each
Basketball Courts	24	Each
Play Equipment	60	Each
Lacrosse Bowls	1	Each
Picnic Shelters/Pavilions	3	Each
Skate Parks	1	Each
Parking Lots	11	Each
Park Lighting & Signs	Pooled	Pooled
Park Bleachers & Seating	Pooled	Pooled
Park Buildings		
Boathouses	2	Each
Changerooms/Washrooms	10	Each
Maintenance Buildings	1	Each
Fieldhouses	1	Each
Parkland		
Regional Parks	12	Each
Community Parks	38	Each
Neighbourhood Parks	79 total (12 embedded in Regional Parks)	Each
Pocket Parks	14	Each

1.2 Replacement Costs

The estimated year end 2023 replacement costs for Recreation totalled \$227 million. Replacement costs for Recreation assets were taken from multiple sources including development charge studies, Parks and Open Space Studies, financial records and historical costs inflated to 2023 dollars. Inventory counts for various parks and open spaces (land) throughout the City have been shown for information purposes. Replacement costs for land have not been included in the overall analysis.

Figure 1: Recreation – Replacement Cost by Subservice

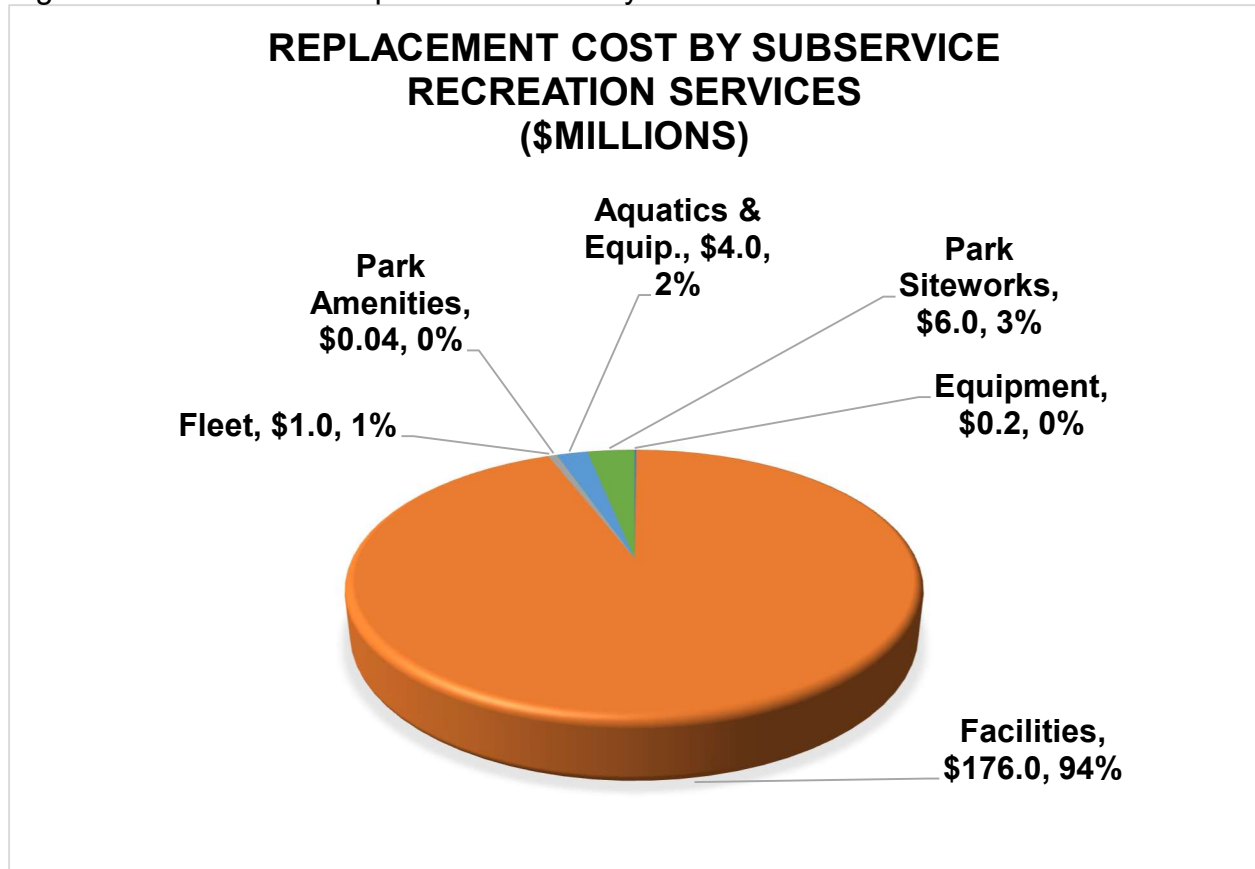


Table 2: Recreation – Replacement Cost by Asset Sub-Class

Asset Category & Class	2023 Replacement Cost
Aquatics & Equipment	
Splash Pads and Wading Pools	\$3,693,866
Public Beaches	\$237,313
Arenas and Recreation Facilities	
Arenas	\$96,851,816
Events Equipment	\$210,000
Fleet (zamboni, light duty trucks)	\$1,115,000
Morrow Park	\$16,851,474
Community and Wellness Centres	\$53,025,117
Park Amenities	
Park Structures (Picnic shelters, pavilions, wharfs & barges)	\$2,187,402
Park Bleachers & Seating	\$181,947
Structures (boat ramps)	\$871,807
Fields & Sports Pads	\$29,666,775
Playgrounds & Water Plays	\$7,314,801
Park Facilities	
Boathouses	\$2,214,734

Asset Category & Class	2023 Replacement Cost
Changerooms/Washrooms	\$4,207,148
Maintenance Buildings	\$302,917
Fieldhouses	\$405,516
Marinas	\$2,337,322
Park Siteworks	
Parking Lighting & Signs	\$4,247,277
Parking Lots	\$1,322,008
Recreation Total	\$227,243,924

1.3 Asset Condition and Remaining Useful Life

The overall condition rating for Recreation is currently rated fair. Recreation facilities that have had building condition assessments (previously completed in 2021-2022) have ratings shown from the assessments otherwise all other assets are rated using an age-based methodology. Based on replacement cost, 7% or \$17M are rated very good, 29% or \$67 million in good condition, 40% or \$91 million in fair condition and 24% or \$54 million in poor to very poor condition. Figure 2 and Table 3 provide condition details of the Recreation assets.

Figure 2: Recreation - Distributed Condition and Replacement Cost

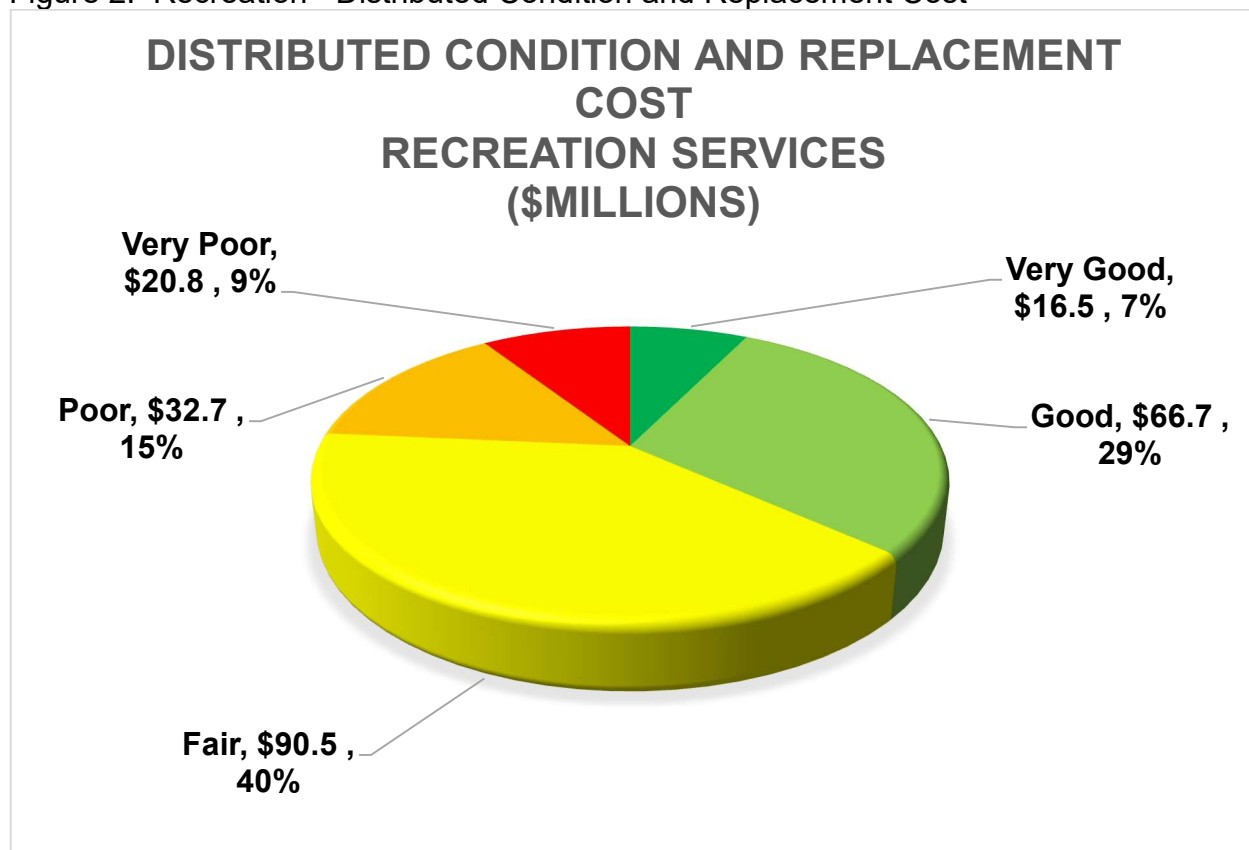


Table 3: Recreation – Asset Class Condition Ratings

Asset Class	2023 Condition Rating
Aquatics & Equipment	
Splash Pads & Wading Pools	Good
Public Beaches	Good
Arenas and Recreation Facilities	
Facilities	Fair
Equipment	Fair
Fleet	Fair
Park Amenities	
Fields and Sports Pads	Fair
Park Bleachers and Seating	Good
Park Structures	Fair
Playgrounds & Water Plays	Poor
Structures	Fair
Park Facilities	
Boathouses	Good
Marinas	Poor
Maintenance Buildings	Fair
Fieldhouses	Fair
Park Siteworks	
Parking Lighting & Signs	Poor
Parking Lots	Poor
Recreation Overall Condition	Fair

Aquatics & Equipment

Condition ratings for the aquatics and equipment assets are age-based ratings provided by City staff based on expert knowledge of the assets as they currently exist.

Arenas and Recreation Facilities

Condition ratings for the arena and recreation facilities are based on the most recent building condition assessments completed in 2021-2022 and use observed age of the facility elements at the time of the assessment. Other assets use an age-based rating methodology and have been reviewed by staff to ensure that it reflects the current conditions until detailed assessments are completed. The City plans to complete BCA's on a seven to ten year cycle with the next round of assessments anticipated to be completed in 2028.

Condition ratings for events equipment and fleet is currently rated overall fair, as assessed based on age. Ice resurfacing equipment condition ratings have been calculated based on the age and volume of usage of the equipment, assuming a standard average life cycle of ten years.

The Peterborough Marina operation includes a 92-slip marina operating over a six-month period, receiving 900-1,000 boats annually. The Marina has been identified as a need for expansion as it has exhausted its functional space. The expansion is necessary to provide growth opportunities and attract more transient boater tourism to Peterborough.

The Peterborough Sport and Wellness Centre is a leisure recreational complex that offers community recreational programs and services, lifestyle wellness fitness program. The facility includes leisure and therapy pools; exercise studio, fitness centre, three gymnasiums, child minding room and three meeting rooms. The PSWC services the City of Peterborough and surrounding community to the full-time student body at Sutherland Campus, in partnership with Fleming College.

Parks

In 2019 a Parks and Open Space Assessment was completed. The purpose of the assessment was to provide a document on the findings of the current state of the existing parks and open spaces in Peterborough (focusing on neighbourhood parkland) and develop a Park Development Standards document. The Assessment document recommended solutions to improve quality and access to the City's existing and future parkland.

As part of the assessment, quantity, quality/functionality and accessibility to neighbourhood parks were evaluated. Findings show that overall, the City is below the recommended standard for quantity of neighbourhood parks per Planning Area (minimum 1 HA/1,000 population). Quality and functionality of parks were assessed using a 'minimum' and 'variable' design feature and standards guide. All these aspects were integrated into a 'Park Equity' assessment methodology in which the quality, access (to parkland) and inclusivity (the degree to which ALL residents can access parks and open spaces) of all parks were evaluated. As a result, a prioritized list of 43 parks in need for was provided to the City for consideration.

Remaining Useful Life

The following summarizes Recreation assets remaining useful life. The useful life of an asset is the estimated period over which the City expects to use the asset. Estimates are based on the calculated age (not observed age) and do not take into consideration any betterments that extend the useful life of the asset(s). Ideally, as condition assessments are completed the 'observed' age would be used in calculating remaining useful life. The ages of Recreation assets are variable and with efforts to extend the life by application of lifecycle treatments, there isn't necessarily a linear relationship between age and condition.

The City had a lease with the Gymnastics Club (end date of September 2020). Future plans include re-purposing the Bi-Centennial Building at Morrow Park as a City storage facility due to the mechanical/plumbing and electrical elements reaching the end of life.

Table 4 shows the Recreation service area remaining useful life details.

Table 4: Recreation Remaining Useful Life

Asset Inventory	Expected Useful Life (Ave Yrs.) ¹	Ave. Remaining Useful Life (Yrs.)	Percent of Useful Life Remaining
Aquatics & Equipment			
Splash Pads and Wading Pools	50	28	56%
Public Beaches	100	68	68%
Recreation Facilities			
Arenas, Park Facilities, Other recreation facilities	33	20	39%
Equipment			
Events Equipment	10	0	0%
Fleet			
Zambonis and light duty vehicles	10	1	13%
Park Amenities			
Fields and Sports Pads	24	4	15%
Park Bleachers and Seating			
Park Structures			
Playgrounds & Water Plays			
Structures			
Park Siteworks			
Park Utilities	29	0	0%
Recreation Remaining Useful Life	32	12	37%

¹ Uses average of asset classes/assets

1.4 Asset Risk Assessment

The consequences of failure for Recreation assets have been determined manually by City staff based on a standardized chart for consequence (found in Appendix B). The assessment considers environmental, economical, social, life safety, legislation and corporate reputation as factors when scoring consequence.

Using the product of the scores for likelihood of failure (likelihood is higher as asset condition worsens) and the consequence of failure, the asset is assigned a risk rating using the ranges shown in the chart below:

Category	Range
High Risk	< 5
Medium Risk	5 – 20
Low Risk	> 20

The estimated replacement value of Recreation high risk assets is \$31.8 million.

The City continues to prioritize the operational, maintenance and renewal needs of both the critical assets and high-risk assets to minimize health and safety risks and impacts to service delivery.

2.0 Levels of Service

This section will present levels of service as they are currently being provided by the City. Service area objective statements were developed by taking into consideration the goals, strategies and objectives defined in other overarching Council approved City plans, studies and policies such as the Official Plan (April 2023) and the 2019 Assessment of Parks and Open Spaces.

Stakeholder and technical levels of service, performance measures and current targets for Recreation are outlined in Table 5 below. Further development of the City's levels of service is underway in which the proposed levels of service and the affordability of the service will be analyzed and presented. Future versions of the asset management plan will also include other proposed levels of service reporting requirements set forth in the Asset Management Planning for Municipal Infrastructure Regulation (O.Reg. 588/17).

Table 5: Levels of Service – Recreation

Asset Class: Recreation – Arenas and Recreation Facilities								
Service Objective Statement: The City will strive to ensure that reliable, quality facilities are provided and affordable ice times are available.								
Stakeholder Value/Service Attribute	Stakeholder LoS and Measures		Stakeholder Performance		Technical Measure		Technical Performance	
			Year of Measure				Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
Availability	Primetime hour usage is within specified capacity range	Primetime hour usage between 80%-90% capacity	95% capacity		Provision of ice time to community	1 ice surface for every 11,000 people	1 ice surface to 14,167 people	1 ice surface to 16,730 people
	Provision of Recreation and Culture Facilities	Available Recreation Facilities with indoor swimming pool	3 Facilities (1 indoor swimming pool)	3 Facilities (1 indoor swimming pool)	Ratio of indoor pools to current population	1:25,000 population	1:85,000 population	1:83,651 population
Affordability	Ice rental is affordable for customers	Cost per hour for ice time is max. \$206/hr for adult and \$178/hr for youths (incl. HST)	\$206.25/hr for adults (incl. HST) \$178.71/hr for youths (incl. HST)	\$238.90/hr for adults (incl. HST) \$207.03/hr for youths (incl. HST)	Average arena facility condition rating	Minimum condition rating of Fair	Fair	Fair
Reliability/Quality	All Arenas and Recreation Facilities are maintained in a	Arena and Recreation Facilities are proactively	All recreation and arena facilities are proactively	All recreation and arena facilities are proactively	Average Facility Condition Index (FCI) value Arenas and Recreation Facilities	Minimum Fair (5% - 10%)	n/a – not reported	8% (Fair)

Asset Class: Recreation – Arenas and Recreation Facilities								
Service Objective Statement: The City will strive to ensure that reliable, quality facilities are provided and affordable ice times are available.								
Stakeholder Value/Service Attribute	Stakeholder LoS and Measures		Stakeholder Performance		Technical Measure		Technical Performance	
			Year of Measure				Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
	state of good repair	maintained and reliable for intended use	maintained and reliable for intended use.	maintained and reliable for intended use.	Number of facilities with FCI or 10% or better	6 Facilities	n/a – not reported	3 Facilities (1 Facility with no BCA)
					Percentage of Arena fleet (zamboni) in poor or better condition	100% of fleet replacement value	n/a – not reported	52% of Fleet CRV is rated poor or better.
Climate Leadership	Facilities are energy efficient and demonstrate leadership on climate action	Facilities that meet our environmental objective	Facilities strive to lower energy usage by installing energy conservation measures that improve energy efficiency to reduce GHG emissions	Facilities strive to lower energy usage by installing energy conservation measures that improve energy efficiency to reduce GHG emissions.	Annual energy consumption per Sq.m	1.65 GJ/m2	n/a – not reported	1.59 GJ/m2

Asset Class: Recreation – Parks								
Service Objective Statement: The City will strive to provide a public park system that provides opportunites for physical recreation, socialization, cultural pursuits, community identification, active transportation, nature appreciation and education.								
Stakeholder Value/Service Attribute	Stakeholder LoS and Measures		Stakeholder Performance		Technical Measure		Technical Performance	
			Year of Measure				Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
Scope/Availability	Provide public park and open space system within the City	Classifications of parkland and open spaces available	12 Regional Parks	12 Regional Parks	Average Ratio of neighborhood parks to current population	1 hectare/1,000 population	0.75ha/1,000 pop	0.76ha/1,000 pop
			38 Community Parks	38 Community Parks	Ratio of outdoor aquatic facilities to current population	1:25,000 of pop. for pools	1:85,000 of pop. for pools	1:83,651 of pop. for pools
			67 Neighbourhood Parks (plus 12 embedded in Regional Parks)	67 Neighbourhood Parks (plus 12 embedded in Regional Parks)		1:7,500 of pop. for splash pads/wading pools	1:9,444 for splash pads/wading pools	1:9,295 for splash pads/wading pools
			14 Pocket Parks	14 Pocket Parks		Ratio of play equipment to current population	1:1,500 of population	n/a – not reported
Reliability/Quality	Providing reliable and high-quality recreation facilities and parks that meet	All recreation facilities and parks amenities are maintained in a state of good repair	Recreation facilities and parks amenities are proactively maintained and	Recreation facilities and parks amenities are proactively maintained and	Meet minimum design standards for neighborhood parks	Meet minimum design standards	n/a – not reported	43 neighborhood parks not meeting minimum design standard

Asset Class: Recreation – Parks								
Service Objective Statement: The City will strive to provide a public park system that provides opportunit ies for physical recreation, socialization, cultural pursuits, community identification, active transportation, nature appreciation and education.								
Stakeholder Value/Service Attribute	Stakeholder LoS and Measures		Stakeholder Performance		Technical Measure		Technical Performance	
			Year of Measure				Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
	the needs of the community		reliable for intended use	reliable for intended use	Park Facilities with condition rating of poor or better	15 Facilities	n/a – not reported	13 Facilities
					Percentage of Parks Amenities assets in poor or better condition	100% of parks amenities rated poor or better.	n/a – not reported	70%

3.0 Asset Management Strategies – Recreation

The following table describes the current, preferred strategies and activities for the Recreation service area to maintain the current levels of service. Options for which lifecycle activities that could potentially be undertaken have been explored in various needs studies and reports such as the Arenas Needs Study, the Outdoor Water Play Facilities 10 Year Capital Strategy and the Parks and Open Space Assessment. The following table below documents the set of planned actions or ‘activities’ that the City undertakes to sustain current levels of service, while managing risk at the lowest lifecycle cost. The City plans the necessary lifecycle activities at the required time and does not need to alter the *type* of activity undertaken. However, with limited funding available, the interval and timing of the necessary lifecycle activities are affected, which can have an overall impact on the performance of the asset(s) over its useful life.

Table 6: Recreation – Asset Management Lifecycle Strategies

Strategy Type	Current Practice
Non-infrastructure Solutions Actions or policies that can lower costs or extend asset life (e.g. better integrated infrastructure planning and land use planning, demand management, insurance, process optimization, managed failures, etc.).	Linking the asset management plan to other studies, master plans and strategies
	Public consultation on levels of service
	<u>Arenas & Recreation Facilities</u>
	Programs are rotated to arenas in order to make use of facilities that have the appropriate resources
	Staffing changed during events to create staffing efficiency
	Rotate older equipment into backup pool
	Share mobile equipment between the Arena facilities and the Wellness Centre
	Investigations into when the cost to maintain is greater than the cost to replace
	Arena needs studies to assess how the services are being delivered to the community and what the needs of the community are

Strategy Type	Current Practice
	Building Condition Assessments completed on a 7-year cycle
	<u>Parks (Aquatics, Equipment, Buildings, Amenities)</u>
	Development of Parks and Open Spaces study (2019) to understand needs and develop rejuvenation strategy
	Implement Outdoor Water Play Facilities 10-Year Capital Strategy
	Program reviews increase in frequency as a facility ages
	Conduct needs assessments to identify areas of need for new waterplay equipment
Maintenance Activities Activities include regularly scheduled inspection and maintenance, or more significant repair and activities associated with unexpected events.	Parks assets are inspected bi-annually by staff at the beginning of season and end of season. These inspections include equipment that is not under the umbrella of the building condition assessment program (ex. Zambonis).
	Building Condition Assessments completed on a 7-year cycle
	<u>Arenas & Recreation Facilities</u>
	Preventative maintenance programs for Ice Plants and HVAC and mechanical systems which also include efficiency tests
	Maintenance Check Logs for all mobile equipment, compressor rooms and facility maintenance activities
	Public works maintenance program for fleet
	Structural reviews of all load bearing assets above head height and flooring

Strategy Type	Current Practice
	Predictive maintenance program in place for critical assets.
	<u>Parks (Aquatics, Equipment, Buildings, Amenities)</u>
	Preventive maintenance program for playgrounds, basketball courts, and beaches and waterways. City has 2 permanent parks staff, they don't have people/funding.
	Maintenance as needed for baseball diamonds and irrigation systems.
	Predictive maintenance program in place for critical assets.
	Redundancy in equipment to allow rotations and minimize reactive maintenance downtime
Renewals/Rehabilitation: Includes significant repairs designed to extend the life of the asset (e.g. the lining of iron watermain can defer the need for replacement).	<u>Arenas & Recreation Facilities</u>
	Upgrading to high efficiency mechanical equipment changed the use of the system and improved the service it delivered
	Addition of cold-water flood systems for ice resurfacing. Eliminate potential hot water requirements and equipment
	Updated to new building codes when asset needs renewals
	Upgrading projects focus on removing asset exposure to elements
	Updating of refrigeration plant equipment and components based on life cycle analysis
Replacement Activities that are expected to occur once an asset	<u>Arenas & Recreation Facilities</u>
	Combine projects to include the investigations, renewals and replacements

Strategy Type	Current Practice
has reached the end of its useful life and renewal/rehabilitation is no longer an option.	Replace large assets based on condition or efficiency
	Operating vs. Replacement cost to strategize
	Review engineering specifications to plan for future replacements
	Replacement programs include groups of assets from several facilities to reduce costs
	Replacements considered within the context of the facility
	Building codes updates drive programs for replacement of assets
	<u>Parks (Aquatics, Equipment, Buildings, Amenities)</u>
	To eliminate the need of lifeguards, reduce operating costs and extend the waterplay season, phase out wading pools and replace with splash pads
	Replace spray posts with in-ground geysers to reduce vandalism occurrences and still provide the same flexibility of use
	Replacement considered when age and condition do not meet minimum standards or capacity of facility (based on public use) has been reached
Disposals/Abandonment Policies Activities associated with disposing of an asset once it has reached the end of its useful life or is otherwise no longer needed by the municipality.	<u>Arenas & Recreation Facilities</u>
	No updates made to facilities deemed beyond service life
	Trade in old ice machines as a part of procurement process to reduce the cost of new machines
	Scheduled tear downs and reviews rotated across facilities

Strategy Type	Current Practice
	<u>Parks (Aquatics, Equipment, Buildings, Amenities)</u>
	Phase out wading pools and replace with splash pads due to limited time for use, higher operating costs and need for lifeguards
	Considered when age and condition do not meet minimum standards and capacity of facility (based on public use) has been reached
Expansion Programs Planned activities required to extend the services to previously un-served areas – or expand services to meet growth demands.	<u>Arenas & Recreation Facilities</u>
	Automation for doors added where possible to reduce wear and tear on walls, door frames, glass and accessible opening switches
	Light replacement program to LED lights to provide a greater return on investment
	Seek partnerships with schools and private industry to expand with shared costs
	Building code changes often drive expansion programs to meet new codes
	Arena service expectations have changed since buildings constructed leading to the need for expansion
	Changes to accessibility requirements for public buildings drive expansions, use grants where possible to meet these requirements
	Gender inclusive projects to increase the availability and opportunity for co-ed sports
	Professional Sports League requirements for sports facilities to remain compliant
	Adding multi-purpose rooms to facilities to improve use during off seasons and for other events

Strategy Type	Current Practice
	Keeping more mobile equipment available to increase the redundancy
	Expansion of renewable energy programs and systems to reduce energy costs for operation
	Seek out and apply for appropriate grants to upgrade facilities to new codes and standards
	<u>Parks (Aquatics, Equipment, Buildings, Amenities)</u>
	Increased demand at Beavermead park from growth/Little Lake Master Plan implementation requires additional splash pad for maintaining levels of service
	Install splash pads in the southwest and west areas of the City to meet growth demands
	As opportunities arise, purchase land to create new Neighbourhood parks or enlarge a small/school site
	Where feasible, develop a portion of a Community Park or a Regional Park to provide Neighbourhood park functions
	Alignment of capital plan with studies and master plans to help help project long term needs
	Improve usability and appeal of poor quality Neighbourhood parks through redevelopment and if possible and required, through enlargement
	The City also hears from facility user groups, who express their increasing needs for additional facilities, to accommodate growth.
Future Strategies	<u>Arenas & Recreation Facilities</u>

Strategy Type	Current Practice
	Follow more recommendations from the Arena Needs Study and Vision 2025, A 10-Year Strategic Plan for Recreation, Parks, Arena and Culture (2016)
	Seek out new partnership opportunities to share the cost of development
	Naming rights and sponsorship partners for additional service funding
	<u>Parks (Aquatics, Equipment, Buildings, Amenities)</u>
	Carry out needs assessments to help identify best suited locations for additional waterplay assets to meet demands/levels of service
	Partner with school boards to enhance a portion of a school site to meet functions of a Neighbourhood Park
	Utilize signalized crosswalks and intersections to reduce barrier effect created by major roads for easier access to recreational locations
	Seek opportunities to increase the integration of services among major providers (school boards, Peterborough County, community groups, commercial sector, neighbouring townships, etc.)

3.1 Asset Management Strategies and Associated Risks

Strategic Risks

Strategic level risks are events that may impact the ability of the City to deliver asset management strategies and minimize costs.

Potential strategic level risks associated with the City's ability to effectively deliver established Recreation Services are:

- Insufficient funding levels
- Insufficient staffing and resources to responsibly implement lifecycle strategies
- Asset deterioration assessments/models are underestimated/miscalculated
- External/environmental factors such as climate change effects (more severe weather instances, increased demands due to growth)

Risk Trade Offs

If lifecycle activities (operations, maintenance, renewal, and other capital projects) are not undertaken, they may sustain or create risk consequences. These risk consequences may include (but not limited to):

- Public health and safety – assets not adequate/available for emergency response
- Further/accelerated asset deterioration
- Increased backlog of work
- Increased treatment costs
- Level of treatment changes requiring increased resources/costs (maintenance now needing replacement)
- Planned budget/needs forecast not a reflection of actual asset needs
- Additional assets/expansion of services required
- Reputation/image negatively affected

Risks relating to asset failure are mitigated through condition assessment programs, maintenance programs (legislated and best practices) and scheduled renewal programs which ensure assets are in acceptable condition and are available to achieve the determined levels of services. Risks related to fleet asset failures are addressed through proactive fleet maintenance and adequate vehicle storage to ensure adequate service readiness.

All City services, including Recreation services are reviewed and identified in the City's Business Continuity Plan (BCP) and prioritization process. The BCP identifies the key interruption impacts, recovery time objectives, dependencies, qualified resources available and a resource back-up strategy should services be interrupted. The BCP is reviewed and updated regularly to ensure that critical services are not interrupted, minimizing risks.

The choice of strategy for maintaining Recreation assets considers the risk of failure of the assets, the risk to service delivery and the risk to other services dependant on this service

area. Strategies implemented are at the lowest cost in order to reduce the burden on the tax base and user fees where possible and to maintain the current levels of service.

Risks associated with Recreation strategies are primarily related to growth and ensuring sustainable funding is available to meet growth demands and maintain levels of service. Strategic plans discuss the implications of growth and that there will be increasing demand from all generations and age groups for most types of leisure pursuits, since the population could increase by as much as 36,500 between 2011 and 2041. The most significant increase in demand should come from the age groups that will exhibit the most growth, namely the 55 and older age group. This implies that activities of interest to that generation will increase significantly in demand by 2041 and the service level of supporting facilities will have to be increased. Activity examples include: the performing arts, hand crafts and other creative arts, attending concerts, festivals and community events, walking for fitness and pleasure, bicycling, all manner of health and wellness programming and therapeutic aquatic programming, nature appreciation and associated activities, visiting museums and historic sites - and appreciating cultural heritage and, gentle individual and team sports (e.g., pickleball, badminton, casual skating, swimming, dancing, walking for pleasure, fitness).

A full detailed, documented risk analysis in which the identification of credible risks, the likelihood of the risk event occurring, the consequences should the event occur, development of a risk rating, evaluation of the risk and the development of a risk treatment plan for non-acceptable risks is planned and will be included in future versions of the asset management plan when completed.

Strategic Priorities

The Council approved Vision 2025 strategic plan provides direction to assist decision making for the Recreation service area. Projects proposed for the capital budget are prioritized if they are aligned with of the following strategic directions (no order of priority):

- 1) Continue to move toward an increasingly collaborative and better integrated recreation and culture delivery system;
- 2) Provide an increasingly enhanced and better-connected park and open space system
- 3) Continue to provide quality recreation and culture facilities
- 4) Continue to provide quality recreation and culture programming, community events and sport tournaments

Recommended actions based on these strategic directions and objectives in the Vision 2025 Action Plan have informed the 10-year capital budget estimates and are brought forward for consideration through the annual budget deliberation process.

3.2 Lifecycle Models, Interventions, and Cost of Service:

Overview of Lifecycle Models

Service area lifecycle models have been developed² in which asset intervention thresholds and associated costs for lifecycle activities (rehabilitation and replacement) are documented.

Lifecycle models are mathematical, statistical and logic models of planned actions and of asset deterioration over time. This helps the City to forecast required asset lifecycle activities and their impacts on levels of service, risk, and funding needs. In short, lifecycle models are mathematical representation of the City's *Lifecycle Activities*.

Overview of Interventions

Interventions represent the major lifecycle activities carried out for assets over their service life and are typically accounted for as part of the capital planning process. The term 'intervention threshold' or 'intervention trigger' are used interchangeably, and they describe a point in an asset's lifecycle when the intervention typically occurs.

When an asset degrades and an intervention threshold is reached, the asset will require treatment (i.e., repair or rehabilitation). After the treatment is applied, the performance (condition) of that asset will increase to a higher value, at which point it will continue to degrade. This will extend the overall estimated service life (ESL) of the asset.

The costs associated with interventions can be used to establish capital funding needs and determine the most cost-effective solution to maintain level of service targets. Costs for thresholds were derived from the City's historical financial information for actual or similar interventions where available and applicable. Where replacement activities are determined, asset replacement costs were used.

3.3 Lifecycle Options Analysis and Costs of Service

The options analysis of the lifecycle activities that could be undertaken were reviewed with the Recreation services subject matter experts. Lifecycle activity options were discussed and determined that the current planned activities are appropriate and the most cost-effective option(s). Details related to the Recreation services available funding, investments and shortfalls can be found in Section 5.0 – Financial Summary.

Table 7 and Figure 3 below shows the Recreation services area projected 10-year lifecycle costs (asset renewal and replacement activities required for existing assets) and performance to maintain current levels of service. For details on current levels of service descriptions, measures and targets and current performance, refer to Table 5 in Section 2 – Levels of Service of this attachment.

² Request for Proposal RFP 22-22 Consulting Services to Support Asset Management Planning Updates

Lifecycle costs shown below were calculated based on current asset conditions and forecasted out over the 10-yr period using the recommended deterioration model for that asset/asset class. Where asset condition data was not available, age-based condition ratings were applied.

Table 7: Recreation Services Lifecycle Associated Costs – Delivering Current Levels of Service, existing assets

Lifecycle Activity Costs - Recreation Assets	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	Total 10-Yr
Aquatics and Equipment	\$0	\$49,968	\$49,968	\$49,968	\$49,968	\$49,968	\$49,968	\$49,968	\$49,968	\$49,968	\$49,968	\$499,677
Arenas and Facilities	\$0	\$2,854,059	\$2,854,059	\$2,854,059	\$2,854,059	\$2,854,059	\$2,854,059	\$2,854,059	\$2,854,059	\$2,854,059	\$2,854,059	\$28,540,595
Parks	\$0	\$2,052,388	\$2,052,388	\$2,052,388	\$2,052,388	\$2,052,388	\$2,052,388	\$2,052,388	\$2,052,388	\$2,052,388	\$2,052,388	\$20,523,877
Annual Total	\$0	\$4,956,415	\$4,956,415	\$4,956,415	\$4,956,415	\$4,956,415	\$4,956,415	\$4,956,415	\$4,956,415	\$4,956,415	\$4,956,415	\$49,564,149
Average Annual Lifecycle Cost	\$4,956,415	\$4,956,415	\$4,956,415	\$4,956,415	\$4,956,415	\$4,956,415	\$4,956,415	\$4,956,415	\$4,956,415	\$4,956,415	\$4,956,415	

Based on the lifecycle assessment of Recreation services assets (for renewal and replacement), it is estimated that the City would need to spend an average of \$5.0 million per year to carry out the required lifecycle activities to maintain current levels of service.

Figure 3: 10-Year Forecasted Performance for Maintaining Levels of Service – Recreation Services

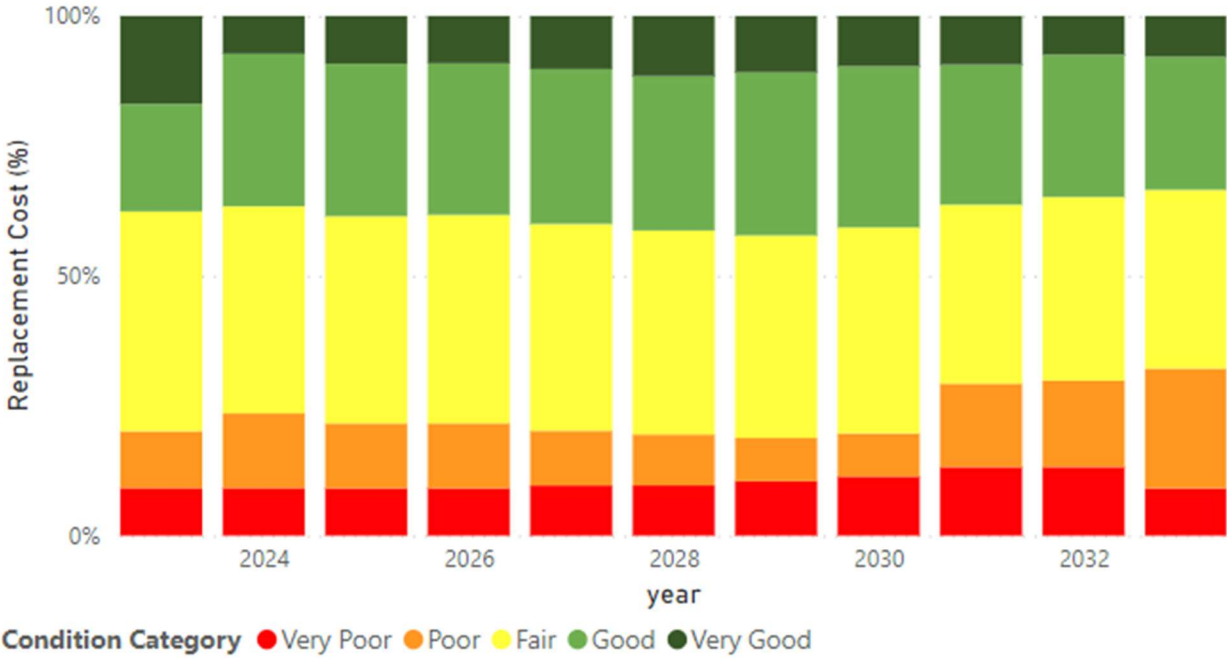



Figure 3 above illustrates the performance (condition) of Recreation assets over the 10-year forecast. The estimated average combined annual expenditures to maintain these conditions is approximately \$5.0M.

Attachment #8: Airport Service Area



Infrastructure Value	\$92.2M	
Annual Renewal Needs	\$2.1M	
Overall Condition	4.0	Good
High Risk Asset Value	\$39M	42%
Trend		

1.0 Summary of Airport Service Area

The Peterborough Airport is an aviation industrial park, a service to area businesses, and a community gateway for the public, tourism, business and general aviation. The Peterborough Airport contains 20 businesses and educational institutions, employing over 500 full-time plus seasonal employees. Seneca College School of Aviation and Flight Technology is also located at the Airport with 150 to 200 students attending classes. Major improvements and expansions have been made since the purchase of the Airport in 1967, with the most recent major expansion including the addition of a 2,000 ft paved crosswind runway and supporting parallel taxiway and a 1,000 ft extension of Bravo taxiway.

Asset classes that fall under the Airport service area are facilities and airport support assets which include airside and groundside assets. Airside assets consist of airfield lighting, aprons, tie down areas, runways and taxiways. Groundside assets consist of food service assets and land improvements (fencing, hardscaping, access roadways, outdoor lighting & signs and parking lots, etc.). Annual renewal needs are based on lifecycle management strategies and represent the estimated amount of capital the City needs to reinvest in its existing asset inventory on an annual basis over the next 10 years to sustain the current levels of service (based on the 25-yr investment forecast).

1.1 Inventory Details

Table 1 details the City of Peterborough's inventory for the Airport service area

Table 1: Airport Asset Inventory

Asset Category and Class	2023 Quantity	Unit of Measure
Facilities		
Airport Beacon Tower	1	Each
Operations Centre	1	Each
Airport Pumping Station	1	Each
Airport Terminal	511	Sq.m
Field Electrical Centre	1	Each
Airport Support Assets		
Airside Assets	29	Each
Groundside Assets	8	each

1.2 Replacement Costs

The estimated year end 2023 replacement costs for the Airport service area totalled \$92.2 million. Replacement costs were taken in combination of the City's most recent building condition assessments (2021-2022) and using other valuation methods, such as unit cost multipliers based on recent construction projects or historical costs inflated to 2023 where recent assessments or costing information was not available.

Figure 1: Airport Service Area –Replacement Cost by Asset Class

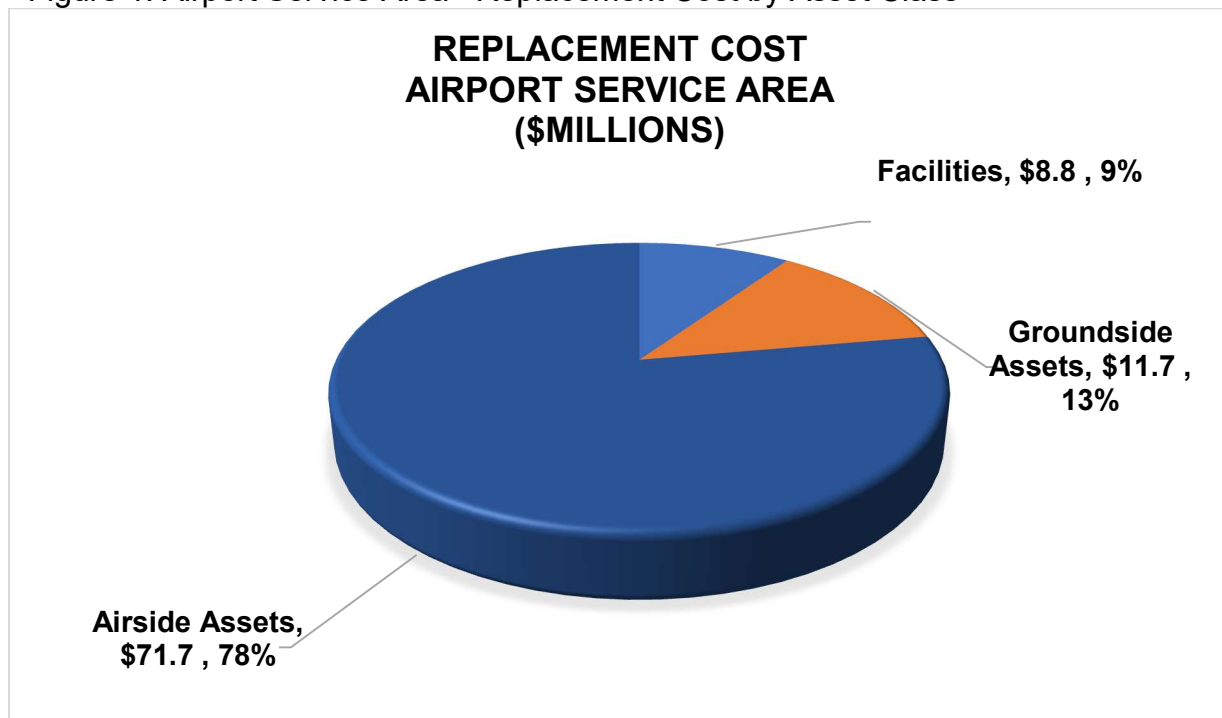


Table 2: Airport – Replacement Cost by Asset Class

Asset Class	2023 Replacement Cost
Facilities	
Airport Beacon Tower	\$74,865
Operations Centre	\$2,473,949
Airport Pumping Station	\$1,018,195
Airport Terminal	\$4,706,513
Field Electrical Centre	\$494,868
Airport Support Assets	
Airside Asset	\$71,671,440
Groundside Assets	\$11,749,998
Airport Total	\$92,189,828

1.3 Asset Condition and Remaining Useful Life

The City's Airport service area is currently rated in overall good condition. Facility ratings shown based on the most recent building condition assessments completed in 2021-2022 and use observed age of facility elements at the time of assessment. Other assets use an age-based rating methodology and have been reviewed by staff to ensure that it reflects the current conditions until detailed assessments are completed. Based on replacement cost, 5% or \$4.7 million are rated very good, 84% or \$77.8 million are rated good, 10% or \$9.0 million are rated fair and 1% or \$0.7 million are rated poor and very poor. Figure 2 and Table 3 provide condition details of the Airport service area.

Figure 2: Airport - Distributed Condition and Replacement Cost

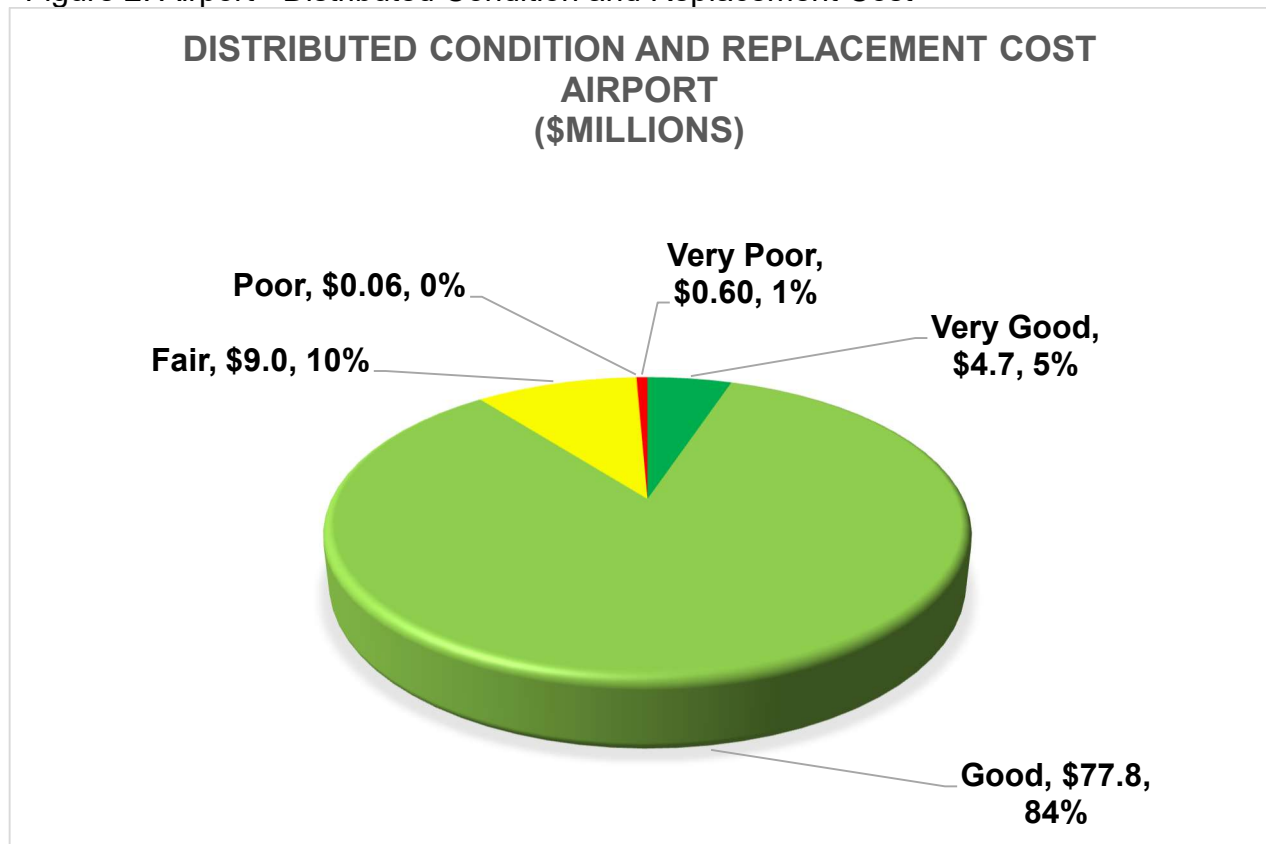


Table 3: Airport – Asset Class Condition Ratings

Asset Class	2023 Condition Rating
Facilities	
Airport Beacon Tower	Good
Operations Centre	Very Good
Airport Pumping Station	Good
Airport Terminal	Very Good
Field Electrical Centre	Very Good
Airport Support Assets	
Airside Asset	Good
Groundside Assets	Fair
Airport Overall Condition¹	Good

¹ Weighted by replacement value

Remaining Useful Life

The following summarizes the Airport service area remaining useful life. The useful life of an asset is the estimated period over which the City expects to use the asset. Estimates are based on a combination of the calculated age which do not take into consideration any betterments that extend the useful life of the asset(s) and observed age (for facilities only). The age of the Airport service area is variable and with efforts to extend the life by application of lifecycle treatments. Table 4 shows the airport remaining useful life details.

Table 4: Airport Remaining Useful Life²

Asset Inventory	Ave. Expected Useful Life (Yrs.)	Ave. Remaining Useful Life (Yrs)	Percent of Useful Life Remaining
Facilities			
Airport Beacon Tower	30	16	54%
Operations Centre	31	17	57%
Airport Pumping Station	35	15	44%
Airport Terminal	30	18	58%
Field Electrical Centre	37	25	31%
Airport Support Assets			
Airside Asset	29	16	54%
Groundside Assets	21	10	48%
Airport Overall	31	17	55%

² ESL, RUL, and percent of useful life remaining are based on calculated average of asset classes

1.4 Asset Risk Assessment

Currently, the consequences of failure for Airport assets have been determined manually by City staff based on a standardized chart for consequence (found in Appendix C). The assessment considers environmental, economical, social, life safety, legislation and corporate reputation as factors when scoring consequence.

Using the product of the scores for likelihood of failure (likelihood is higher as asset condition worsens) and the consequence of failure, the asset is assigned a risk rating using the ranges shown in the chart below:

Category	Range
High Risk	< 5
Medium Risk	5 – 20
Low Risk	> 20

The estimated replacement value of Airport services high risk assets is \$39.1 million.

The City continues to prioritize the operational, maintenance and renewal needs of both the critical assets and high-risk assets to minimize health and safety risks and impacts to service delivery.

2.0 Levels of Service

This section will present levels of service as they are currently being provided by the City. Service area objective statements were developed by taking into consideration the goals, strategies and objectives defined in other overarching Council approved City plans, studies, and policies such as the Official Plan.

Stakeholder and technical levels of service, performance measures and current targets for the Airport service area are outlined in Table 5 below. Further development of the City's levels of service is underway in which the proposed levels of service and the affordability of the service will be analyzed and presented. Future versions of the Asset Management Plan will also include other proposed levels of service reporting requirements set forth in the Asset Management Planning for Municipal Infrastructure Regulation (O.Reg. 588/17).

Table 5: Levels of Service – Airport

Asset Class: Airport								
Service Objective Statement: The City strives to deliver a safe and compliance airport service, accessible to diverse tenants and users, accompanied by reliable customer service while minimizing disturbances to neighbours.								
Stakeholder Value/Service Attribute	Stakeholder LoS and Measures		Stakeholder Performance		Technical Measure		Technical Performance	
	Stakeholder LoS Statement	Stakeholder Performance Measure	Year of Measure		Technical PM	Target	Year of Measure	
			2021	2023			2021	2023
Availability	Service is not denied for reasons other than accident/incidents and maintenance	No occurrences where service is denied	10 runway closures Incidents & construction	16 runway closures 8 - Incidents 8 - Maintenance	Staff coverage during published hours of operation	100% Coverage during published hours of operations	100%	100%
	Serviced Land is available for leasing	Lot absorption of at least 1 new build per year	21.5 acres of serviced lots available	21.0 acres of service lots available	Number of tenant buildings	Greater than 44	44 tenant buildings	45 tenant buildings
	Aircraft movements per year (movement classified as landing or take-off)	Annual aircraft movements	45,600 aircraft movements	47,781 aircraft movements	Complaints per 1000 aircraft movements	Less than 35	76.5	15
		Number of jet & turbine movements	587 Jet/Turbine Movements	882 Jet/Turbine Movements	Year over year increase in percentage of movements	3% of total movements	1.29%	1.85%
	Reliability/Quality	Airport facility and assets are maintained in a state of good repair	Airport facility and assets are proactively	Airport facility and assets are proactively	Average Facility Condition Index (FCI) value for all facilities	Minimum Good (0% - 5%)	n/a - not reported	0.23% (Good)

Asset Class: Airport								
Service Objective Statement: The City strives to deliver a safe and compliance airport service, accessible to diverse tenants and users, accompanied by reliable customer service while minimizing disturbances to neighbours.								
Stakeholder Value/Service Attribute	Stakeholder LoS and Measures		Stakeholder Performance		Technical Measure		Technical Performance	
			Year of Measure				Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
			maintained and reliable for intended use	maintained and reliable for intended use	Percentage of Airside Assets in fair or better condition (CRV \$)	100%	n/a - not reported	99%
					Percentage of Groundside Assets in fair or better condition (CRV \$)	70%	n/a - not reported	100%
Climate Leadership	Facilities are energy efficient and demonstrate leadership on climate action	Facilities that meet our environmental objective	Facilities strive to lower energy usage by installing energy conservation measures that improve energy efficiency to reduce GHG emissions	Facilities strive to lower energy usage by installing energy conservation measures that improve energy efficiency to reduce GHG emissions	Annual energy consumption per Sq.m	Energy Use Intensity (EUI) of 0.86 GJ/m2 or less	n/a - not reported	1.23 GJ/m2

3.0 Asset Management Strategies – Airport

The Airport strategy considers facilities and Airport support assets (airside and groundside assets). For leased lands, only the servicing infrastructure is considered for development of strategy. The following table documents the set of planned actions or ‘activities’ that the City undertakes for each asset class to sustain current levels of service, while managing risk at the lowest lifecycle cost. The City plans the necessary lifecycle activities at the required time and does not need to alter the *type* of activity undertaken. However, with limited funding available, the interval and timing of the necessary lifecycle activities are affected, which can have an overall impact on the performance of the asset(s) over its useful life.

Table 6: Airport – Asset Management Lifecycle Strategies

Strategy Type	Current Practice
Non-infrastructure Solutions Actions or policies that can lower costs or extend asset life (e.g. better integrated infrastructure planning and land use planning, demand management, insurance, process optimization, managed failures, etc.).	Operational inspections carried out daily
	Linking the asset management plan to other studies, master plans and strategies
	Public consultation on levels of service
	Implementation of Wildlife Management Plan
	Cyclical runway friction testing
	Pavement condition assessments yearly
	Hazard identification with Safety Management System
Maintenance Activities Activities include regularly scheduled inspection and maintenance, or more significant repair and activities associated with unexpected events.	Repair, clean, treat or remove concerns identified in daily inspections
	Level lights monthly
	Airside pavement sweeping
	Grass maintained to Wildlife Management Plan specifications
	Winter restoration of friction levels on runways
	Snow clearing including bank removals
	Ground-side roads sanded and maintained during winter to remain open

Strategy Type	Current Practice
	Tree cutting and removal to protect Obstacle Limitation Zone
	Winter runway monitoring
	Plant removals
	Crack-sealing to ensure pavement condition rating for operation
	Repair of drainage structures should any cracking or heaving take place
	Lights and signs replaced immediately upon failure
	Line painting
Renewals/Rehabilitation: Includes significant repairs designed to extend the life of the asset (e.g. the lining of iron watermain can defer the need for replacement).	Rebuild subsurface and repave sections of runway if sections fail code specifications
	Rehabilitation of internal road commercial area
	20-year plan to fully renew asphalt surface
Replacement Activities that are expected to occur once an asset has reached the end of its useful life and renewal/rehabilitation is no longer an option.	Replacement of assets at end of their service life.
Disposals/Abandonment Policies Activities associated with disposing of an asset once it has reached the end of its useful life or is otherwise no longer needed by the municipality.	-
	Properties purchased for expansion as they become available

Strategy Type	Current Practice
<p>Expansion Programs Planned activities required to extend the services to previously un-serviced areas – or expand services to meet growth demands.</p>	Watermain and Sanitary sewer upgrades to accommodate growth.
	Commercial and General Aviation Lots prepared for leasing
	Strategic Development Plan recommendations followed
	Bravo Taxiway extension as airport growth requires for safe operations
	Passing Area on Apron III
	Upgrade Runway Designation to Non-Precision (to support lower landing minima for flying by instrument flight rules)
	Construct access roads to new lots
	Rehabilitation of internal road commercial area
	Environmental Assessments for future development areas
	Growth requirements
	Expansion of terminal building to meet increased demand.
	Widening of primary runway from 100 to 150 ft to improve service.
	Extension of taxiway system to full length of runway to improve safety and efficiency.
	Emergency access road at west end of runway
Future Strategies	Strategic development plan completed in 2017 complimenting and updating the master plan

Strategy Type	Current Practice
	Servicing studies for new tenants to ensure future water and sewer needs are met
	Land Development review for farmlands owned to generate revenue

3.1 Asset Management Strategies and Associated Risks

Strategic Risks

Strategic level risks are events that may impact the ability of the City to deliver asset management strategies and minimize costs.

Potential strategic level risks associated with the City's ability to effectively deliver established Airport services are:

- Insufficient funding levels
- Insufficient staffing and resources to responsibly implement lifecycle strategies
- Asset deterioration assessments/models are underestimated/miscalculated
- External/environmental factors such as climate change effects (more severe weather instances, increased demands due to growth)

Risk Trade Offs:

If lifecycle activities (operations, maintenance, renewal, and other capital projects) are not undertaken, they may sustain or create risk consequences. These risk consequences may include (but not limited to):

- Public health and safety – assets not adequate/available for emergency response
- Further/accelerated asset deterioration
- Increased backlog of work
- Increased treatment costs
- Level of treatment changes requiring increased resources/costs (maintenance now needing replacement)
- Planned budget/needs forecast not a reflection of actual asset needs
- Additional assets/expansion of services required
- Reputation/image negatively affected

Risks relating to asset failure are mitigated through condition assessment programs, maintenance programs (legislated and best practices) and scheduled renewal programs which ensure assets are in acceptable condition and are available to achieve the determined levels of services. Risks related to fleet asset failures are addressed through proactive fleet maintenance and adequate vehicle storage to ensure adequate service readiness.

All City services, including Airport services are reviewed and identified in the City's Business Continuity Plan (BCP) and prioritization process. The BCP identifies the key interruption impacts, recovery time objectives, dependencies, qualified resources available and a resource back-up strategy should services be interrupted. The BCP is reviewed and updated regularly to ensure that critical services are not interrupted, minimizing risks.

The choice of strategy for maintaining Airport services assets considers the risk of failure of the assets, the risk to service delivery and the risk to other services dependant on this service area. Strategies implemented are at the lowest cost in order to reduce the burden on the tax base and user fees where possible and to maintain the current levels of service.

A full detailed, documented risk analysis in which the identification of credible risks, the likelihood of the risk event occurring, the consequences should the event occur, development of a risk rating, evaluation of the risk and the development of a risk treatment plan for non-acceptable risks is planned and will be included in future versions of the asset management plan when completed.

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3.2 Lifecycle Models, Interventions, and Cost of Service:

Overview of Lifecycle Models

Service area lifecycle models have been developed³ in which asset intervention thresholds and associated costs for lifecycle activities (rehabilitation and replacement) are documented.

Lifecycle models are mathematical, statistical and logic models of planned actions and of asset deterioration over time. This helps the City to forecast required asset lifecycle activities and their impacts on levels of service, risk, and funding needs. In short, lifecycle models are mathematical representation of the City's *Lifecycle Activities*.

Overview of Interventions

Interventions represent the major lifecycle activities carried out for assets over their service life and are typically accounted for as part of the capital planning process. The term 'intervention threshold' or 'intervention trigger' are used interchangeably, and they describe a point in an asset's lifecycle when the intervention typically occurs.

When an asset degrades and an intervention threshold is reached, the asset will require treatment (i.e., repair or rehabilitation). After the treatment is applied, the performance (condition) of that asset will increase to a higher value, at which point it will continue to degrade. This will extend the overall estimated service life (ESL) of the asset.

The costs associated with interventions can be used to establish capital funding needs and determine the most cost-effective solution to maintain level of service targets. Costs for thresholds were derived from the City's historical financial information for actual or similar interventions where available and applicable. Where replacement activities are determined, asset replacement costs were used.

3.3 Lifecycle Options Analysis and Costs of Service

The options analysis of the lifecycle activities that could be undertaken were reviewed with the Airport service area subject matter experts. Lifecycle activity options were discussed and determined that the current planned activities are appropriate and the most cost-effective option(s). Details related to the Airport service area available funding, investments and shortfalls can be found in Section 5.0 – Financial Summary.

Table 7 and Figure 3 below shows the Airport service area projected 10-year lifecycle costs (asset renewal and replacement activities for existing assets) and performance to maintain current levels of service. For details on current levels of service

³ Request for Proposal RFP 22-22 Consulting Services to Support Asset Management Planning Updates

descriptions, measures and targets and current performance, refer to Table 5 in Section 2 – Levels of Service of this attachment.

Lifecycle costs shown below were calculated based on current asset conditions and forecasted out over the 10-yr period using the recommended deterioration model for that asset/asset class. Where asset condition data was not available, age-based condition ratings were applied.

Table 7: Airport Lifecycle Associated Costs – Delivering Current Levels of Service, existing assets.

Lifecycle Activity Costs - Airport Assets	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	Total 10-Yr
Airport Assets	\$0	\$2,055,724	\$2,055,724	\$2,055,724	\$2,055,724	\$2,055,724	\$2,055,724	\$2,055,724	\$2,055,724	\$2,055,724	\$2,055,724	\$20,557,236
Annual Total	\$0	\$2,055,724	\$2,055,724	\$2,055,724	\$2,055,724	\$2,055,724	\$2,055,724	\$2,055,724	\$2,055,724	\$2,055,724	\$2,055,724	\$20,557,236
Average Annual Lifecycle Cost	\$2,055,724	\$2,055,724	\$2,055,724	\$2,055,724	\$2,055,724	\$2,055,724	\$2,055,724	\$2,055,724	\$2,055,724	\$2,055,724	\$2,055,724	

Based on the lifecycle assessment for Airport assets (for renewal and replacement), it is estimated that the City would need to spend an average of \$2.1M per year to carry out the required lifecycle activities to maintain current levels of service.

Figure 3: 10-Year Forecasted Performance for Maintaining Levels of Service

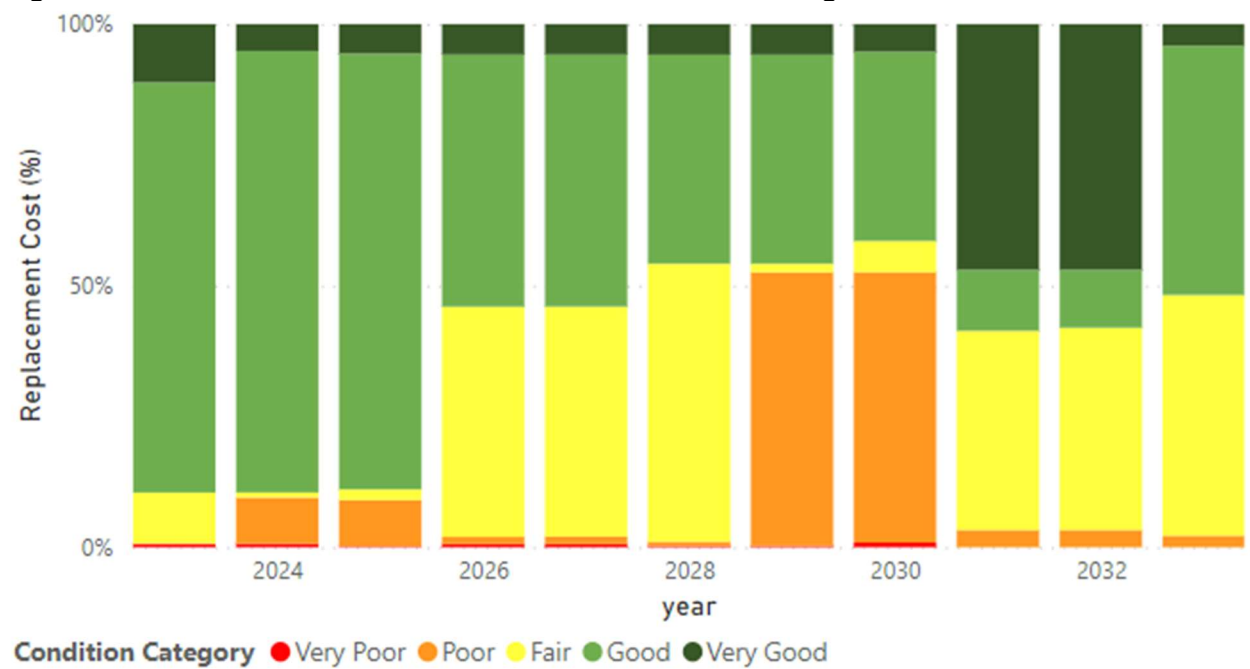



Figure 3 above illustrates the performance (condition) of Airport assets over the 10-year forecast. The estimated average annual expenditures to maintain these conditions is approximately \$2.1 million.

Attachment #9: Urban Forest Service Area



Infrastructure Value	\$169.3M	
Annual Renewal Needs	\$6.2M	
Overall Condition	3.0	Fair
High Risk Asset Value	\$7M	4%
Trend		

1.0 Summary of Urban Forest

Asset classes that fall under the urban forest service area include street trees, park and open space trees, fleet and tree maintenance equipment. The urban forest is an often-overlooked critical asset class. This asset assists in the protection of water sources, flood management, protection from erosion and provides public health benefits.

Annual renewal needs shown are based on lifecycle management strategies and represent the estimated amount of capital the City needs to reinvest in its existing asset inventory on an annual basis over the next 10 years to sustain the current levels of service (based on the 25-yr investment forecast). Condition rating trends show a slight decline since the last reported Plan due to the addition of park and open space trees to the inventory, and changes in condition/valuation methodologies.

1.1 Inventory Details

The tree inventory currently includes trees on public right of ways and in parks and open spaces. Over time this inventory will include complex trees and trees in forest stands.

Table 1 details the City of Peterborough's inventory for the urban forest service area.

Table 1: Urban Forest Asset Inventory

Asset Category & Class	2023 Quantity	Unit of Measure
Trees		
Street Trees, Park & Open Space Trees	31,111	Each

Asset Category & Class	2023 Quantity	Unit of Measure
Fleet		
Vehicles	3	Each
Equipment		
Tree pruning equipment	5	Each

1.2 Replacement Costs

The estimated year end 2023 replacement costs for the Urban Forest service area totalled \$169.3 million. Replacement costs of trees were calculated using the 'CTLA trunk formula method'. The CTLA method is based on measuring the trunk cross-sectional area and multiplying it by a monetary value per square centimetre, based on the species of the tree. Fleet and Equipment replacement costs are based on original purchase cost and escalated to current day value.

Figure 1: Urban Forest Service Area –Replacement Cost by Asset Class

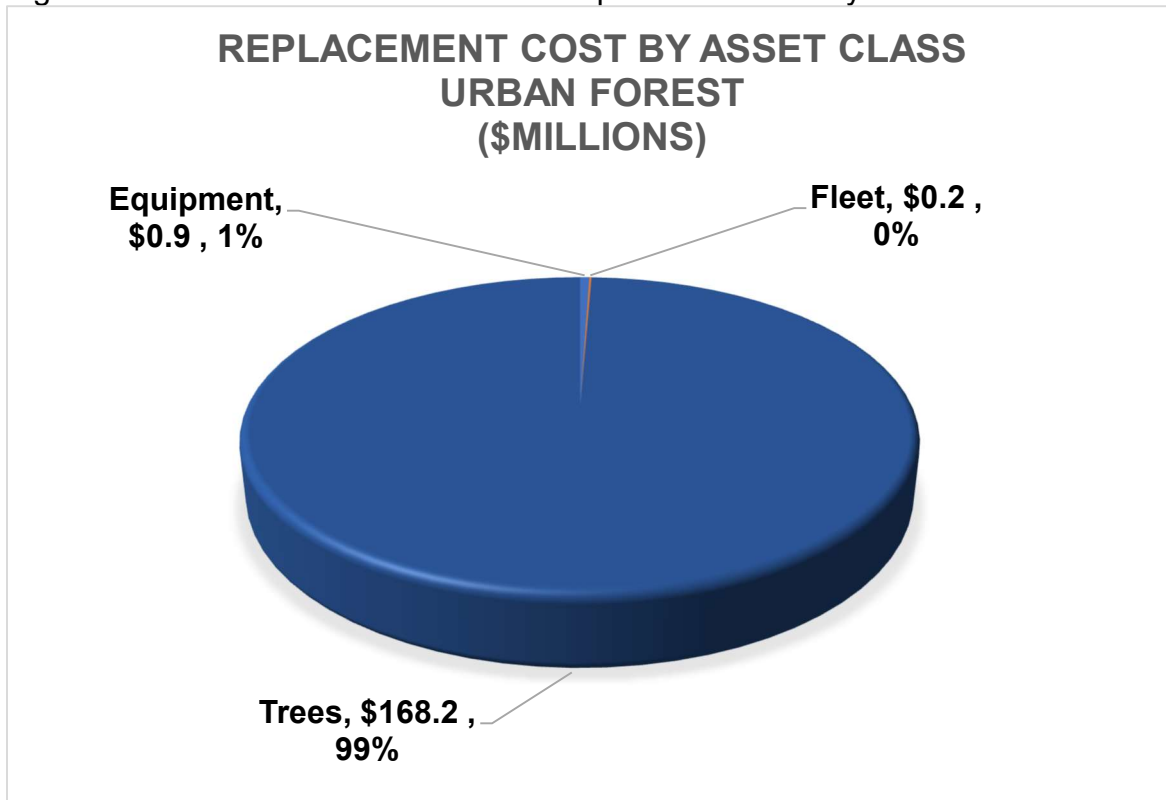


Table 2: Urban Forest – Replacement Cost by Sub-Class

Asset Category & Class	2023 Replacement Cost
Trees	
Street Trees	\$145,284,602
Park and Open Space Trees	\$22,955,784

Asset Category & Class	2023 Replacement Cost
Fleet	
Vehicles	\$221,125
Equipment	
Tree pruning equipment	\$852,878
Urban Forest Total	\$ 169,314,389

1.3 Asset Condition and Remaining Useful Life

The City's Urban Forest service area is currently rated in overall fair condition. Condition assessments ratings for trees were assigned using the physiological condition data found in the City's tree inventory database. Where no physiological data is available, age-based condition ratings were estimated. Fleet and equipment condition ratings have been assessed based on age. Based on asset replacement value, 47% or \$79.4 million are in good condition, 35% or \$59 million in fair condition and 19% or \$32 million in poor to very poor condition. Figure 2 and Table 3 provide overall condition details of the Urban Forest service area.

Figure 2: Urban Forest - Distributed Condition and Replacement Cost

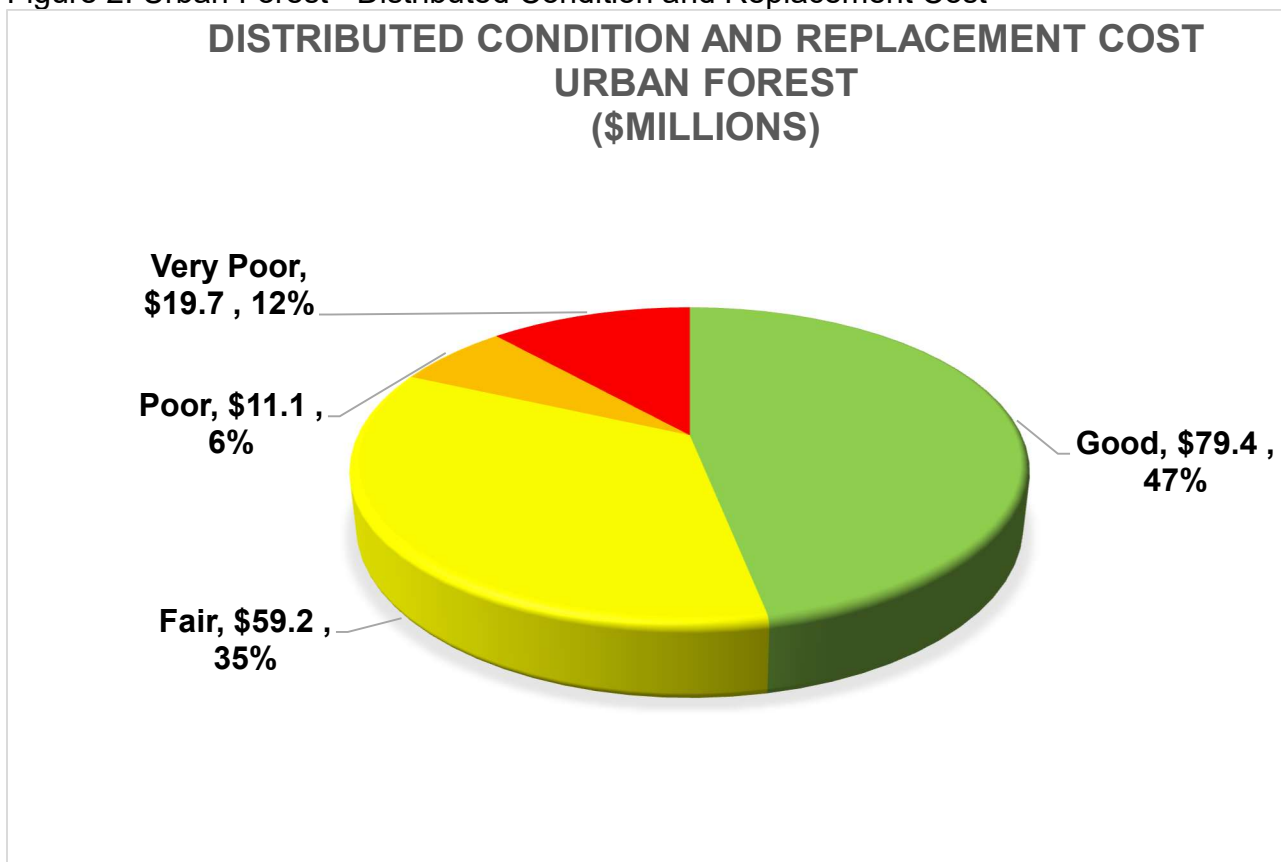


Table 3: Urban Forest – Asset Class Condition Ratings

Asset Category & Class	2023 Condition Rating
Trees	
Street Trees	Fair
Park and Open Space Trees	Poor
Fleet	
Vehicles	Poor
Equipment	
Tree pruning equipment	Poor
Urban Forest Overall Condition¹	Fair

Remaining Useful Life

Table 4 shows the Urban Forest remaining useful life details.

Table 4: Urban Forest Remaining Useful Life²

Asset Inventory	Ave. Expected Useful Life (Yrs)	Ave. Remaining Useful Life (Yrs)	Percent of Useful Life Remaining
Trees			
Street Trees	18	0	0%
Park and Open Space Trees	34	10	31%
Fleet			
Vehicles	10	0	0%
Equipment			
Tree pruning equipment	15	0	0%
Urban Forest Overall	20	0	0%

¹ Weighted by replacement value.

² ESL, RUL, and percent of useful life remaining are based on calculated average of asset classes

1.4 Asset Risk Assessment

Currently, the consequences of failure for Urban Forest assets have been determined manually by City staff based on a standardized chart for consequence (found in Appendix C). The assessment considers environmental, economical, social, life safety, legislation and corporate reputation as factors when scoring consequence.

Using the product of the scores for likelihood of failure (likelihood is higher as asset condition worsens) and the consequence of failure, the asset is assigned a risk rating using the ranges shown in the chart below:

Category	Range
High Risk	< 5
Medium Risk	5 – 20
Low Risk	> 20

The estimated replacement value of Urban Forest high risk assets is \$9.0 million.

The City continues to prioritize the operational, maintenance and renewal needs of high-risk assets to minimize health and safety risks and impacts to service delivery.

2.0 Levels of Service

This section will present levels of service as they are currently being provided by the City. Service area objective statements were developed by taking into consideration the goals, strategies and objectives defined in other overarching Council approved City plans, studies and policies such as the 2011 Urban Forest Strategic Plan and the 2013 Emerald Ash Borer Management Plan, etc.

Stakeholder and technical levels of service, performance measures and current targets for the Urban Forest service area are outlined in Table 5 below. Further development of the City's levels of service is underway in which the proposed levels of service and the affordability of the service will be analyzed and presented. Future versions of the Asset Management Plan will also include other proposed levels of service reporting requirements set forth in the Asset Management Planning for Municipal Infrastructure Regulation (O.Reg. 588/17).

Table 5: Levels of Service – Urban Forest

Asset Class: Urban Forest								
Service Objective Statement: The City is committed to managing the urban forest by promoting community stewardship and strategic practice to preserve, renew and enhance the essential resource								
Stakeholder Value/Service Attribute	Stakeholder LoS and Measures		Stakeholder Performance		Technical Measure		Technical Performance	
			Year of Measure				Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
Safety	Maintenance of the street trees and potentially dangerous trees	The City will maintain the street trees by pruning and removal of dangerous trees	328 pruned, 463 removed	Removals: 367 trees 660 ash trees Total:1,027 214 Pruned	Service requests are processed and reviewed	Review and process a minimum of 2,700 service requests	1422	2207
Sustainability	New trees planted yearly	Greater than 500 trees planted yearly	400 trees planted	515 trees planted	All street trees within City limits inspected	All of current tree inventory inspected	All trees have been inspected	All trees have been inspected
	Trees are treated for Emerald Ash Borer	Greater than 650 trees treated yearly	831 trees treated	750 trees treated				
	Preservation of tree canopy to support community health and well being	Percent of urban forest tree canopy within the City	n/a - not reported	30% of urban forest tree canopy				

Asset Class: Urban Forest								
Service Objective Statement: The City is committed to managing the urban forest by promoting community stewardship and strategic practice to preserve, renew and enhance the essential resource								
Stakeholder Value/Service Attribute	Stakeholder LoS and Measures		Stakeholder Performance		Technical Measure		Technical Performance	
			Year of Measure				Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
Reliability/Quality	Providing quality Urban Forest assets that meet the needs of the community	Urban Forest assets are maintained in a state of good repair	Urban Forest assets are maintained and reliable for intended use	Urban Forest assets are maintained and reliable for intended use	Percentage of Trees in poor or better condition	100% of trees in poor or better condition	n/a - not reported	94%
					Percentage of vehicles that past their useful life	Max 5%	n/a - not reported	0%

3.0 Asset Management Strategies – Urban Forest

The urban forest has two distinct but united strategies. One strategy considers maintaining the health of the City's trees; and the other seeks to grow the urban forestry and the replacement of the urban forest. The following table describes the current, preferred strategies and activities for the Urban Forest service area to maintain the current levels of service, while managing risk. Options for which lifecycle activities that could potentially be undertaken at the lowest cost are reviewed and compared when developing annual budgets. The City plans the necessary lifecycle activities at the required time and does not need to alter the *type* of activity undertaken. However, with limited funding available, the interval and timing of the necessary lifecycle activities are affected, which can have an overall impact on the performance of the asset(s) over its useful life.

Table 6: Urban Forest – Asset Management Lifecycle Strategies

Strategy Type	Current Practice
Non-infrastructure Solutions Actions or policies that can lower costs or extend asset life (e.g. better integrated infrastructure planning and land use planning, demand management, insurance, process optimization, managed failures, etc.).	· Updating Arborist training
	· Linking the asset management plan to other studies, master plans and strategies
	· Public consultation on levels of service
	· Public education in the field regarding the importance of the urban forest
	· Public relations and education around treatments
	· Routine inspections of trees and inspections triggered by calls from citizens/businesses
	· General inspections
	· Use of species approval list for developers
	· Web education program
	· Holding developers accountable for planting via new planting inspections
	· Cityworks (computerized maintenance management software) upgraded
	· Improved maintenance record keeping
	· Cityworks modelling

Strategy Type	Current Practice
	<ul style="list-style-type: none"> Enforcement of tree bylaws[1]
Maintenance Activities Activities include regularly scheduled inspection and maintenance, or more significant repair and activities associated with unexpected events.	<ul style="list-style-type: none"> Pruning activities (currently reactive) Treatments for pest control and elimination Safety maintenance (hanger and split removals) Crown raising Crown cleaning (dead wooding) Watering of young trees Mulching and weeding Updating/maintaining equipment
Renewals/Rehabilitation: Includes significant repairs designed to extend the life of the asset (e.g. the lining of iron watermain can defer the need for replacement).	<ul style="list-style-type: none"> Pruning of suckers Cabling of trees Emerald Ash Borer Management Plan/Treatment
Replacement Activities that are expected to occur once an asset has reached the end of its useful life and renewal/rehabilitation is no longer an option.	<ul style="list-style-type: none"> One for one strategy for dead or dying trees Three for one tree replacement plan for any single healthy tree removed on private property
Disposals/Abandonment Policies Activities associated with disposing of an asset once it has reached the end of its useful life or is otherwise no longer needed by the municipality.	<ul style="list-style-type: none"> Field cost-benefit analysis of pruning vs. removal Fee for removal of healthy trees[2] on public property Removals of trees are completed based on health and safety risks. Engineering infrastructure conflicts due to repairs, upgrades, and replacements Ash tree removals to control the spread of emerald ash borers
Expansion Programs Planned activities required to extend the services to previously un-served areas – or expand services to meet growth demands.	<ul style="list-style-type: none"> Strategic Planning using Urban Forest Strategic Plan (UFSP) Leaf-on aerials to determine planting areas for optimum canopy growth

Strategy Type	Current Practice
	<ul style="list-style-type: none"> · Partnership planting programs · Otonabee Regional Conservation Authority (ORCA) · TreesCanada · Inventory gap filing program · Expanding the wood utilization program from ash trees to other lumber · Implement “no net loss of canopy” from UFSP
Future Strategies	<ul style="list-style-type: none"> · Fertilization program for young trees · Greater public education on tree value · Setting an inspection schedule · Update the species approval list · Remove and replant trees which are not the best choices for urban forestry · Change pruning schedule to be more proactive · Cost of removals billed to the organization whom removed the tree (Utilities etc.) · Planting locations identified through models · Succession planning for planting and removals · Donor program for memorials · Climate change planning · Update the forestry job descriptions · Update the urban forest bylaw 1982-82 · Develop a heritage tree program · License the arborists

3.1 Asset Management Strategies and Associated Risks

Strategic Risks

Strategic level risks are events that may impact the ability of the City to deliver asset management strategies and minimize costs.

Potential strategic level risks associated with the City's ability to effectively deliver established Recreation Services are:

- Insufficient funding levels
- Insufficient staffing and resources to responsibly implement lifecycle strategies
- Asset deterioration assessments/models are underestimated/miscalculated
- External/environmental factors such as climate change effects (more severe weather instances, increased demands due to growth)

Risk Trade Offs

If lifecycle activities (operations, maintenance, renewal, and other capital projects) are not undertaken, they may sustain or create risk consequences. These risk consequences may include (but not limited to):

- Public health and safety – assets not adequate/available for emergency response
- Further/accelerated asset deterioration
- Increased backlog of work
- Increased treatment costs
- Level of treatment changes requiring increased resources/costs (maintenance now needing replacement)
- Planned budget/needs forecast not a reflection of actual asset needs
- Additional assets/expansion of services required
- Reputation/image negatively affected

The urban forest service area has many concerns about the cost to maintain the current urban forest. Currently there is a single team of arborist responsible for service calls and to complete maintenance activities as deemed necessary. This has left the program in a position of only reactive work.

Trees do not follow the standard degradation curves of other non-living assets and generally remain healthy for most of their natural life then rapidly decline. A major consideration for the urban forest team is planning for tree replacement using succession planning. This means that sometimes a healthy tree should be removed early so that the replacement of trees in subdivisions creates an urban forest of different ages, and species of trees. This creates a healthy natural environment which is more resistant to pests and disease. This concept may seem to be against best practices in other areas of infrastructure asset management which would seek to extend the life of an asset rather than actively remove good assets.

From the strategic end, the urban forest canopy has been showing a downward trend. The urban forest strategic plan set out to have a goal of 30% canopy cover for the city overall. However, city development and tree removals (for safety reasons) have led to a reduction in canopy cover. The urban forest strategic plan recommends that the City apply a replacement ratio of 3 to 1 for all healthy trees that are removed. Currently this replacement ratio has been closer to 1 to 1. Young trees do not have the same canopy for up to 25 years as healthy mature trees and the rate of death of a tree is higher while the tree is young. The City recently implemented bylaws to improve the overall canopy on private property.

3.2 Lifecycle Models, Interventions, and Cost of Service:

Overview of Lifecycle Models

Service area lifecycle models have been developed³ in which asset intervention thresholds and associated costs for lifecycle activities (rehabilitation and replacement) are documented.

Lifecycle models are mathematical, statistical and logic models of planned actions and of asset deterioration over time. This helps the City to forecast required asset lifecycle activities and their impacts on levels of service, risk, and funding needs. In short, lifecycle models are mathematical representation of the City's *Lifecycle Activities*.

Overview of Interventions

Interventions represent the major lifecycle activities carried out for assets over their service life and are typically accounted for as part of the capital planning process. The term 'intervention threshold' or 'intervention trigger' are used interchangeably, and they describe a point in an asset's lifecycle when the intervention typically occurs.

When an asset degrades and an intervention threshold is reached, the asset will require treatment (i.e., repair or rehabilitation). After the treatment is applied, the performance (condition) of that asset will increase to a higher value, at which point it will continue to degrade. This will extend the overall estimated service life (ESL) of the asset.

The costs associated with interventions can be used to establish capital funding needs and determine the most cost-effective solution to maintain level of service targets. Costs for thresholds were derived from the City's historical financial information for actual or similar interventions where available and applicable. Where replacement activities are determined, asset replacement costs were used.

³ Request for Proposal RFP 22-22 Consulting Services to Support Asset Management Planning Updates

3.3 Lifecycle Options Analysis and Costs of Service

The options analysis of the lifecycle activities that could be undertaken were reviewed with the Urban Forest services subject matter experts. Lifecycle activity options were discussed and determined that the current planned activities are appropriate and the most cost-effective option(s). Details related to the Urban Forest services available funding, investments and shortfalls can be found in Section 5.0 – Financial Summary.

Table 7 and Figure 3 below shows the Urban Forest projected 10-year lifecycle costs (asset renewal and replacement activities required for existing assets) and performance to maintain current levels of service. For details on current levels of service descriptions, measures and targets and current performance, refer to Table 5 in Section 2 – Levels of Service of this attachment.

Lifecycle costs shown below were calculated based on current asset conditions and forecasted out over the 10-yr period using the recommended deterioration model for that asset/asset class. Where asset condition data was not available, age-based condition ratings were applied.

Table 7: Urban Forest 10-Year Lifecycle Associated Costs - Delivering Current Levels of Service

Lifecycle Activity Costs - Urban Forest Assets	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	otal 10-Yr
Urban Forest Assets	\$0	\$6,219,126	\$6,219,126	\$6,219,126	\$6,219,126	\$6,219,126	\$6,219,126	\$6,219,126	\$6,219,126	\$6,219,126	\$6,219,126	\$62,191,257
Annual Total	\$0	\$6,219,126	\$6,219,126	\$6,219,126	\$6,219,126	\$6,219,126	\$6,219,126	\$6,219,126	\$6,219,126	\$6,219,126	\$6,219,126	\$62,191,257
Average Annual Lifecycle Cost	\$6,219,126	\$6,219,126	\$6,219,126	\$6,219,126	\$6,219,126	\$6,219,126	\$6,219,126	\$6,219,126	\$6,219,126	\$6,219,126	\$6,219,126	

Based on the lifecycle assessment for the Urban Forest assets (for renewal and replacement), it is estimated that the City would need to spend an average of \$6.2 million per year to carry out the required lifecycle activities to maintain current levels of service.

Figure 3: 10-Year Forecasted Performance for Maintaining Levels of Service – Urban Forest

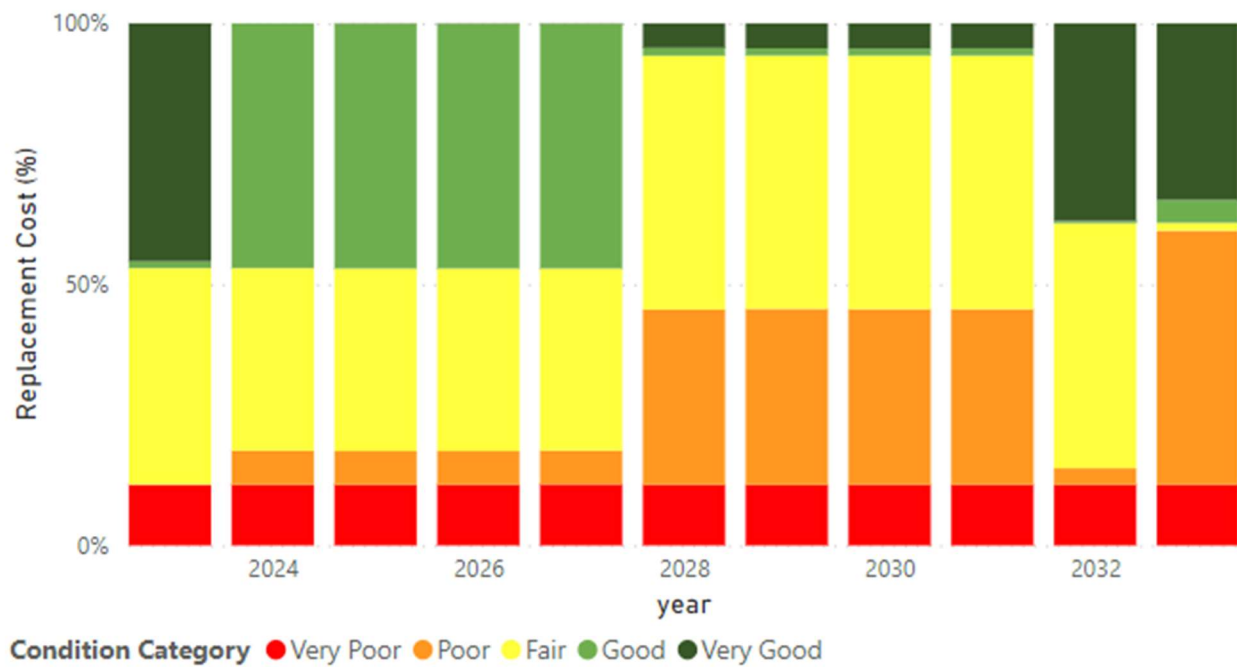



Figure 3 above illustrates the performance (condition) of Urban Forest assets over the 10-year forecast. The estimated average combined annual expenditures to maintain these conditions is approximately \$6.2 million.

Attachment #10: Social Services – Childcare Service Area



Infrastructure Value	\$1.2M	
Annual Renewal Needs	\$16.2K	
Overall Condition	5.0	Very Good
High Risk Asset Value	\$0.3M	24%
Trend		

1.0 Summary of Childcare Services Facilities

The Peterborough Daycare Centre facility is a 4,390 square foot facility originally constructed in 1972 and acquired by the City in 1989. The City directly owns and operates the Peterborough Daycare Centre which offers full day care for up to 49 children between the ages of eighteen months to six years old at this location. Although not owned facilities, the City also operates an additional full day childcare program for children (between 18 months and 6 years old) and two school age programs (JK through to grade 6) at three other leased locations. Annual renewal needs are based on lifecycle management strategies and represent the estimated amount of capital the City needs to reinvest in its existing asset inventory on an annual basis over the next 10 years to sustain the current levels of service (based on the 25-yr investment forecast). Condition rating trends remain neutral since the last reported Plan with an overall condition rating of Very Good.

Table 1 details the City's inventory for Daycare facilities.

1.1 Inventory Details

Table 1: Peterborough Daycare

Asset Class & Sub-class	2023 Quantity	Unit of Measure
Daycare Facility		
Peterborough Daycare Centre, 127 Aylmer St. S	4,390	Sq. Ft

1.2 Replacement Costs

The estimated year end 2023 replacement costs for Peterborough Daycare Centre totalled \$1.2 million. Replacement costs have been determined using the elemental replacement costs as reported in the most recent building condition assessment (BCA) completed in 2019 and inflated to 2023 dollars.

Figure 1: Peterborough Daycare Centre – Replacement Cost by Element

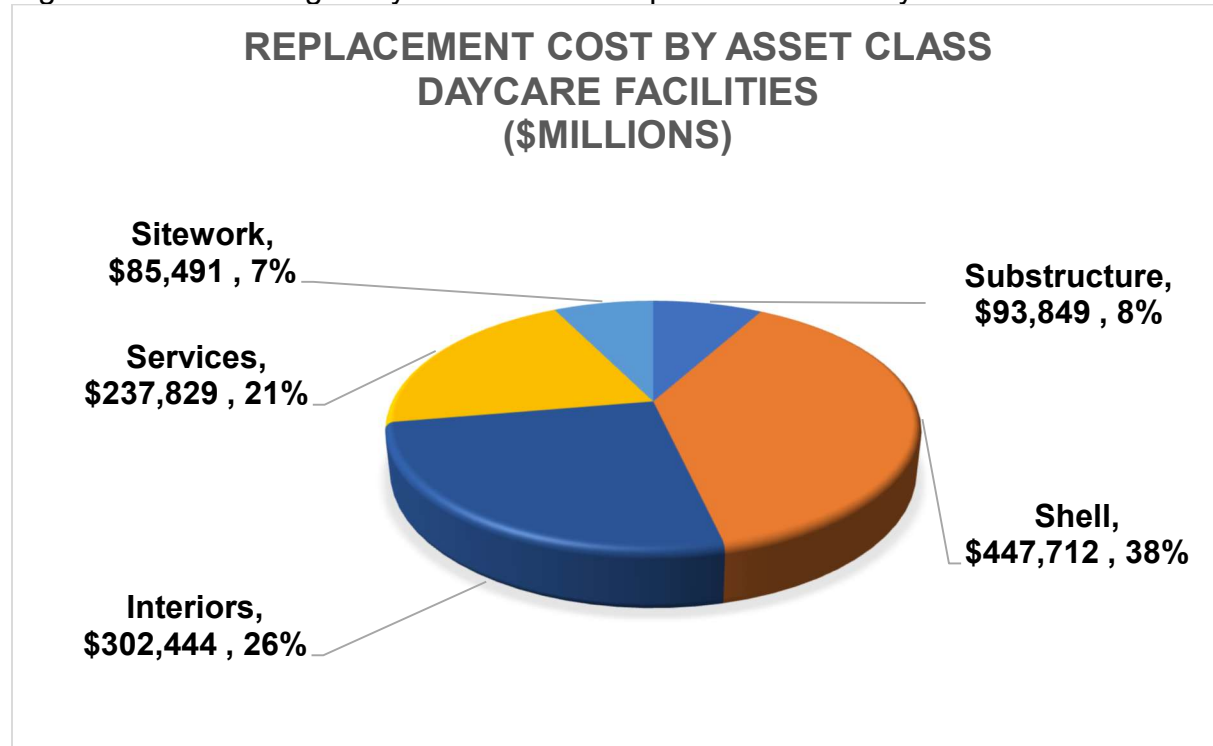


Table 2: Peterborough Daycare Centre - Replacement Costs by Building Element Classification

Building Element Classification	2023 Replacement Cost
A - Substructure	\$93,849
B - Shell	\$447,712
C - Interiors	\$302,444
D - Services	\$237,829
G - Sitework	\$85,491
Daycare Centre Total	\$1,167,325

1.3 Asset Condition and Remaining Useful Life

The overall condition rating for the Peterborough Daycare Centre is currently rated very good. Condition ratings are based on the most recent building condition assessment information available (2019). At the time of data gathering and assessment for this Plan, the most current BCA was not available for analysis at the time (completed in 2021/2022). The next iteration of the Plan will report updated replacement costs and conditions as found in the 2021/2022 BCA. The City plans to complete BCA's on a seven to ten year cycle with the next round of assessments anticipated to be completed in 2028.

Based on replacement cost, 64% or \$0.8 million are rated very good, 19% or \$0.2 million rated good and 17% or \$0.2 million rated fair. Figure 2 and Table 3 provide condition details of the Daycare building.

The current layout of the Peterborough Daycare Centre has presented challenges for staff to carry out day-to-day program activities. Since original construction, the facility has not had significant upgrades and/or renovations completed to accommodate evolving childcare program needs. Future plans for the facility and childcare programs offered are currently being reviewed by City staff.

Figure 2: Peterborough Daycare Centre - Distributed Condition and Replacement Cost

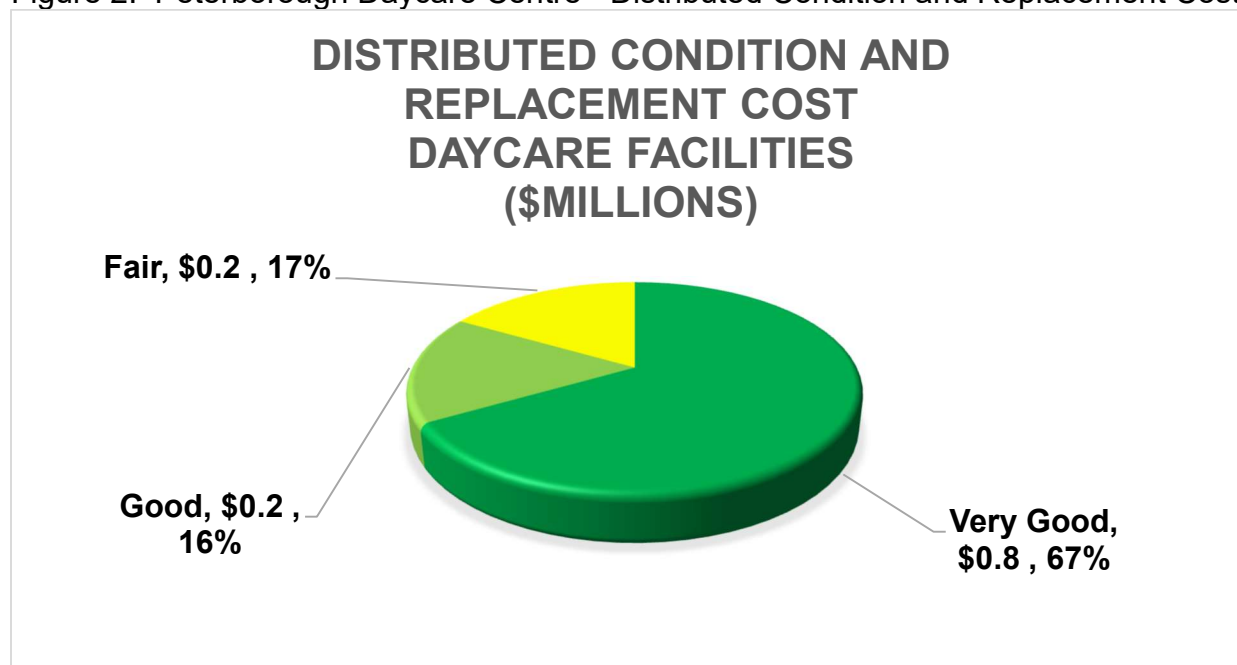


Table 3: Peterborough Daycare Centre - Asset Condition Ratings

Building Element Classification	2023 Overall Condition Rating
A - Substructure	Good
B - Shell	Good

Building Element Classification	2023 Overall Condition Rating
C - Interiors	Very Good
D - Services	Very Good
G - Sitework	Very Good
Daycare Overall Condition Rating	Very Good

Remaining Useful Life

The following summarizes the Daycare building element average useful life and average remaining useful life. The useful life of an asset is the estimated period over which the City expects to use the asset. Estimates are primarily based on the observed age (where condition assessments have been completed) and take into consideration any betterments that extend the useful life of the asset(s). Ideally, as condition assessments are completed the 'observed' age will be used in calculating remaining useful life. The ages of the assets are variable and with efforts to extend the life by application of lifecycle treatments, there isn't necessarily a linear relationship between age and condition.

Table 4 shows the Daycare facility average remaining useful life details by building element.

Table 4: Peterborough Daycare Remaining Useful Life¹

Asset Inventory	Ave. Expected Useful Life (Yrs.)	Ave. Remaining Useful Life (Yrs.)	Percent of Useful Life Remaining
Daycare Facility – Building			
Peterborough Daycare Centre, 127 Aylmer St. S	43	23	53%
Peterborough Daycare Centre Average Remaining Useful Life	43	23	53%

1.4 Asset Risk Assessment

The consequences of failure for Daycare facility assets have been determined manually by City staff based on a standardized chart for consequence (found in Appendix B). The assessment considers environmental, economical, social, life safety, legislation and corporate reputation as factors when scoring consequence.

Using the product of the scores for likelihood of failure (likelihood is higher as asset condition worsens) and the consequence of failure, the asset is assigned a risk rating using the ranges shown in the chart below:

¹ Uses average of asset classes (building elements)

Category	Range
High Risk	< 5
Medium Risk	5 – 20
Low Risk	> 20

The estimated replacement value of the Daycare facility high risk assets is \$0.3 million.

The City continues to prioritize the operational, maintenance and renewal needs of both the critical assets and high-risk assets to minimize health and safety risks and impacts to service delivery.

2.0 Levels of Service

This section will present levels of service as they are currently being provided by the City. Service area objective statements were developed by taking into consideration Ontario's vision for the early years and childcare in which the City of Peterborough is aligning itself with, as well as the City's standards in facility maintenance.

The City of Peterborough follows the guiding principles as those outlined in the EarlyON Child and Family Centre programs. They are intended to guide the development, delivery and evaluation of EarlyON Child and Family Centre programs.

Stakeholder and technical levels of service, performance measures and current targets for the Childcare service area are outlined in Table 5 below. Further development of the City's levels of service is underway in which the proposed levels of service and the affordability of the service will be analyzed and presented. Future versions of the Asset Management Plan will also include other proposed levels of service reporting requirements set forth in the Asset Management Planning for Municipal Infrastructure Regulation (O.Reg. 588/17).

Table 5: Levels of Service – Childcare

Asset Class: Childcare								
Service Objective Statement: The City will strive to provide families access to high quality and accessible childcare and early learning that fosters success for every child.								
Stakeholder Value/Service Attribute	Stakeholder LoS and Measures		Stakeholder Performance		Technical Measure		Technical Performance	
			Year of Measure				Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
Reliability/Quality	Providing reliable and high-quality Daycare Facilities that meet the needs of the community	Daycare Facilities are maintained in a state of good repair	The City of Peterborough directly owns and operates: Full day childcare program for children 18 months to 6 years old at Peterborough Childcare Centre	The City of Peterborough directly owns and operates: Full day childcare program for children 18 months to 6 years old at Peterborough Childcare Centre	Condition of Childcare Facility	Minimum facility condition rating of 'Fair'	Very Good	Very Good

Asset Class: Childcare								
Service Objective Statement: The City will strive to provide families access to high quality and accessible childcare and early learning that fosters success for every child.								
Stakeholder Value/Service Attribute	Stakeholder LoS and Measures		Stakeholder Performance		Technical Measure		Technical Performance	
			Year of Measure				Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
			The City of Peterborough directly operates: Full day childcare program for children 18 months to 6 years at Pearson Child Care Centre and school age programs at Edmison Heights Elementary and Westmount Elementary for kids JK through to Grade 6	The City of Peterborough directly operates: Full day childcare program for children 18 months to 6 years at Pearson Child Care Centre and school age programs at Edmison Heights Elementary and Westmount Elementary for kids JK through to Grade 6	Average Facility Condition Index (FCI) value for all facilities	Minimum Fair (5% - 10%)	n/a – not reported	Fair (8%) ²

² FCI is calculated using current conditions of the Childcare facility and not 2019 BCA which is outdated and does not reflect current conditions of the facility.

Asset Class: Childcare								
Service Objective Statement: The City will strive to provide families access to high quality and accessible childcare and early learning that fosters success for every child.								
Stakeholder Value/Service Attribute	Stakeholder LoS and Measures		Stakeholder Performance		Technical Measure		Technical Performance	
			Year of Measure				Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
Climate Leadership	Facilities are energy efficient and demonstrate leadership on climate action	Facilities meet our environmental objective	Facilities strive to lower energy usage by installing energy conservation measures that improve energy efficiency to reduce GHG emissions	Facilities strive to lower energy usage by installing energy conservation measures that improve energy efficiency to reduce GHG emissions	Annual energy consumption per Sq.m	Energy Use Intensity (EUI) of 0.71 GJ/m2 or less	n/a - not reported	0.97 GJ/m2

3.0 Asset Management Strategies – Peterborough Daycare Centre

The Peterborough Daycare assets include the facility and all associated building elements. The following table describes the current strategies and activities for the Peterborough Daycare Centre to maintain the current levels of service, while managing risk at the lowest lifecycle cost. The City plans the necessary lifecycle activities at the required time and does not need to alter the *type* of activity undertaken. However, with limited funding available, the interval and timing of the necessary lifecycle activities are affected, which can have an overall impact on the performance of the asset(s) over its useful life.

Table 6: Daycare Facility – Asset Management Lifecycle Strategies

Strategy Type	Current Practice
Non-infrastructure Solutions Actions or policies that can lower costs or extend asset life (e.g. better integrated infrastructure planning and land use planning, demand management, insurance, process optimization, managed failures, etc.).	· Detailed Building Condition Assessments (BCA's) completed on an 8 to 10-year cycle
	· Linking the asset management plan to other studies, master plans and strategies
	· Public consultation on levels of service
	· Conduct regular energy audits of facilities to identify opportunities for improved efficiency
	· Align facility expansion planning with population growth forecasting/growth studies and needs studies
	· On a case-by-case basis the City will explore options including alternatives to building new assets, for any major developments being considered
	· Leverage incentive programs offered through utilities that are for low carbon emissions or energy efficiency projects
Maintenance Activities Activities include regularly scheduled inspection	· Educate staff on climate change initiatives and energy efficiency opportunities with respect to building operations/ownership
	· Preventative and corrective maintenance programs for facilities

Strategy Type	Current Practice
and maintenance, or more significant repair and activities associated with unexpected events.	<ul style="list-style-type: none"> · Consider sustainability and environmental opportunities in operating and maintenance decisions · Service contracts for regulatory building elements requiring annual inspection/certification (ESA, TSSA, Fire suppression, etc.) · Asbestos management program for current condition and all abatement requirements as needed · Seasonal maintenance contracts such as snow clearing and cleaning
Renewals/Rehabilitation: Includes significant repairs designed to extend the life of the asset (e.g. the lining of iron watermain can defer the need for replacement).	<ul style="list-style-type: none"> · Building element renewal/rehabilitation needs are reviewed at on a case-by-case basis to determine the best option · Activities are coordinated with other building lifecycle activities to minimize costs
Replacement Activities that are expected to occur once an asset has reached the end of its useful life and renewal/rehabilitation is no longer an option.	<ul style="list-style-type: none"> · Facility components replaced when at end of useful life through capital planning/business case · Replace large assets based on condition or efficiency · Context of replacement is specific to the facility, i.e. Assets that are replaced should not have a longer useful life than the useful life of the facility. Facilities are continually maintained and assets inside are perpetually replaced · Updates to building codes drive programs for replacement needs
Disposals/Abandonment Policies Activities associated with disposing of an asset once it has reached the end of its useful life or is otherwise no longer needed by the municipality.	<ul style="list-style-type: none"> · Facilities that are no longer needed for the intended service are either sold, re-purposed or demolished

Strategy Type	Current Practice
<p>Expansion Programs Planned activities required to extend the services to previously un-serviced areas – or expand services to meet growth demands.</p>	<ul style="list-style-type: none"> · Demand for childcare services increases over time leading to the need for expansion/addition to existing facility when feasible (adding infant rooms, growth needs, etc)
	<ul style="list-style-type: none"> · Building code changes often drive expansion programs to meet new codes
	<ul style="list-style-type: none"> · Retrofitting buildings to automated systems to optimize asset functionality/operations where feasible
	<ul style="list-style-type: none"> · Implementation of interior and exterior LED lighting retrofit program
	<ul style="list-style-type: none"> · Upgrade insulation/building envelope while conducting other essential building work (where feasible)
	<ul style="list-style-type: none"> · Update building elements according to new building codes when asset needs renewals
	<ul style="list-style-type: none"> · Planning strategies are based on manufacturer and/or industry standards for recommended renewal/rehabilitation activities and timelines to extend life of building element in order to avoid premature replacement costs
	<ul style="list-style-type: none"> · Replace windows and doors with high efficiency according to replacement schedule/need
	<ul style="list-style-type: none"> · Replace mechanical equipment with high efficiency according to replacement schedule/need
<p>Future Strategies</p>	<ul style="list-style-type: none"> · Changes to accessibility requirements for public buildings drive expansion needs, use grants/incentives where possible
	<ul style="list-style-type: none"> · On a case-by-case basis, seek new partnership opportunity to relocate and/or increase childcare locations (i.e. partner with schoolboards to lease/rent space in existing or new build schools to open a new childcare location.

3.1 Asset Management Strategies and Associated Risks

Strategic Risks

Strategic level risks are events that may impact the ability of the City to deliver asset management strategies and minimize costs.

Potential strategic level risks associated with the City's ability to effectively deliver established Childcare Services are:

- Insufficient funding levels
- Insufficient staffing and resources to responsibly implement lifecycle strategies
- Asset deterioration assessments/models are underestimated/miscalculated
- External/environmental factors such as climate change effects (more severe weather instances, increased demands due to growth)

Risk Trade Offs

If lifecycle activities (operations, maintenance, renewal, and other capital projects) are not undertaken, they may sustain or create risk consequences. These risk consequences may include (but not limited to):

- Public health and safety – assets not adequate/available for emergency response
- Further/accelerated asset deterioration
- Increased backlog of work
- Increased treatment costs
- Level of treatment changes requiring increased resources/costs (maintenance now needing replacement)
- Planned budget/needs forecast not a reflection of actual asset needs
- Additional assets/expansion of services required
- Reputation/image negatively affected

Risks relating to asset failure are mitigated through condition assessment programs, maintenance programs (legislated and best practices) and scheduled renewal programs which ensure assets are in acceptable condition and are available to achieve the determined levels of services. Risks related to fleet asset failures are addressed through proactive fleet maintenance and adequate vehicle storage to ensure adequate service readiness.

All City services, including childcare services are reviewed and identified in the City's Business Continuity Plan (BCP) and prioritization process. The BCP identifies the key interruption impacts, recovery time objectives, dependencies, qualified resources available and a resource back-up strategy should services be interrupted. The BCP is reviewed and updated regularly to ensure that critical services are not interrupted, minimizing risks.

The choice of strategy for maintaining daycare facility assets considers the risk of failure of the assets, the risk to service delivery and the risk to other services dependant on this service area. Strategies implemented are at the lowest cost in order to reduce the burden on the tax base and user fees where possible and to maintain the current levels of service.

A full detailed, documented risk analysis in which the identification of credible risks, the likelihood of the risk event occurring, the consequences should the event occur, development of a risk rating, evaluation of the risk and the development of a risk treatment plan for non-acceptable risks is planned and will be included in future versions of the asset management plan when completed.

3.2 Lifecycle Models, Interventions, and Cost of Service:

Overview of Lifecycle Models

Service area lifecycle models have been developed³ in which asset intervention thresholds and associated costs for lifecycle activities (rehabilitation and replacement) are documented.

Lifecycle models are mathematical, statistical and logic models of planned actions and of asset deterioration over time. This helps the City to forecast required asset lifecycle activities and their impacts on levels of service, risk, and funding needs. In short, lifecycle models are mathematical representation of the City's *Lifecycle Activities*.

Overview of Interventions

Interventions represent the major lifecycle activities carried out for assets over their service life and are typically accounted for as part of the capital planning process. The term 'intervention threshold' or 'intervention trigger' are used interchangeably, and they describe a point in an asset's lifecycle when the intervention typically occurs.

When an asset degrades and an intervention threshold is reached, the asset will require treatment (i.e., repair or rehabilitation). After the treatment is applied, the performance (condition) of that asset will increase to a higher value, at which point it will continue to degrade. This will extend the overall estimated service life (ESL) of the asset.

The costs associated with interventions can be used to establish capital funding needs and determine the most cost-effective solution to maintain level of service targets. Costs for thresholds were derived from the City's historical financial information for actual or similar interventions where available and applicable. Where replacement activities are determined, asset replacement costs were used.

³ Request for Proposal RFP 22-22 Consulting Services to Support Asset Management Planning Updates

3.3 Lifecycle Options Analysis and Costs of Service

The options analysis of the lifecycle activities that could be undertaken were reviewed with the facility management subject matter experts. Lifecycle activity options were discussed and determined that the current planned activities are appropriate and the most cost-effective option(s). Details related to the childcare facility available funding, investments and shortfalls can be found in Section 5.0 – Financial Summary.

Table 7 and Figure 3 below shows the daycare facility projected 10-year lifecycle costs (asset renewal and replacement activities required for existing assets) and performance to maintain current levels of service. For details on current levels of service descriptions, measures and targets and current performance, refer to Table 5 in Section 2 – Levels of Service of this attachment.

Lifecycle costs shown below were calculated based on current asset conditions and forecasted out over the 10-yr period using the recommended deterioration model for that asset/asset class. Where asset condition data was not available, age-based condition ratings were applied.

Table 7: Daycare Facilities Lifecycle Associated Costs – Delivering Current Levels of Service, existing assets

Lifecycle Activity Costs - Childcare Facility Assets	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	Total 10-Yr
Childcare Assets	\$0	\$16,219	\$16,219	\$16,219	\$16,219	\$16,219	\$16,219	\$16,219	\$16,219	\$16,219	\$16,219	\$162,190
Annual Total	\$0	\$16,219	\$16,219	\$16,219	\$16,219	\$16,219	\$16,219	\$16,219	\$16,219	\$16,219	\$16,219	\$162,190
Average Annual Lifecycle Cost	\$16,219	\$16,219	\$16,219	\$16,219	\$16,219	\$16,219	\$16,219	\$16,219	\$16,219	\$16,219	\$16,219	

Based on the lifecycle assessment of the Daycare facility assets (for renewal and replacement), it is estimated that the City would need to spend an average of \$16.2 thousand per year to carry out the required lifecycle activities to maintain current levels of service.

Figure 3: 10-Year Forecasted Performance for Maintaining Levels of Service – Daycare Facility

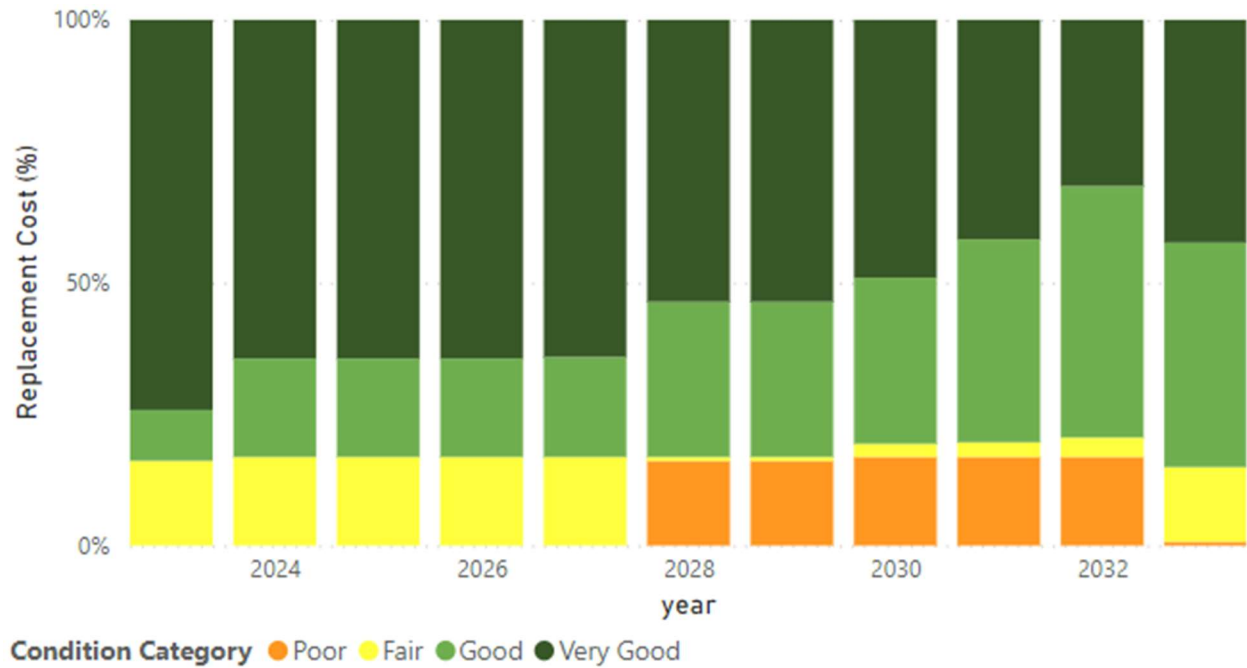



Figure 3 above illustrates the performance (condition) of the Daycare facility assets over the 10-year forecast. The estimated average combined annual expenditures to maintain these conditions is approximately \$16.2K.

Attachment #11: Arts, Culture & Heritage Service Area



Infrastructure Value	\$65M	
Annual Renewal Needs	\$1.3M	
Overall Condition	4.0	Good
High Risk Asset Value	\$3.2M	5%
Trend		

1.0 Summary of Arts, Culture & Heritage

Asset classes that fall under the Arts, Culture & Heritage (ACH) service area include the museum and City archives, libraries and collections, the art gallery, public art and the market hall and tower. Annual renewal needs are based on lifecycle management strategies and represent the estimated amount of capital the City needs to reinvest in its existing asset inventory on an annual basis over the next 10 years to sustain the current levels of service (based on 25-yr investment forecast). Condition rating trends remain neutral since the previous Plan with an overall condition rating of good.

Table 1 details the City's inventory for the ACH and related assets service area.

1.1 Inventory Details

Table 1: Arts, Culture & Heritage Service Area Inventory

Asset Inventory	2023 Quantity	Unit of Measure
Museum		
Peterborough Museum and Archives	3,300	Sq.m
Museum Curatorial Centre	3,000	Sq.m
Libraries		
Main Library	5,342	Sq.m
Library Equipment	Pooled	Pooled
Library Collections	361,131	Each
Art Gallery of Peterborough		
Art Gallery of Peterborough	1,193	Sq.m
Public Art		
Public Art Collections	29	Each
Heritage		

Asset Inventory	2023 Quantity	Unit of Measure
Market Hall/Clock Tower	1,068	Sq.m

1.2 Replacement Costs

The estimated year end 2023 replacement costs for the Arts, Culture & Heritage service area totalled \$64.6 million. Replacement costs were determined using different valuation methods such as condition assessments, risk insurance appraisals, or historical costs inflated to 2023 where recent assessments or costing information was not available.

Figure 1: Arts, Culture & Heritage Service Area –Replacement Cost by Asset Class

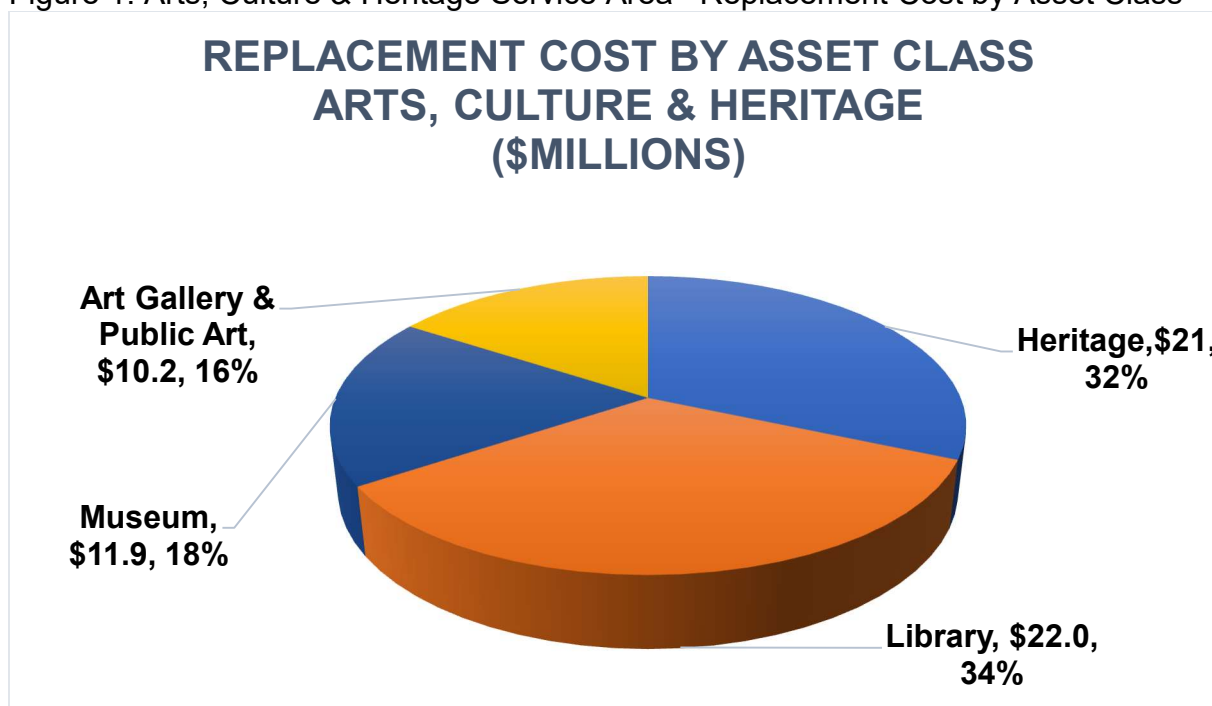


Table 2: Arts, Culture & Heritage - Replacement Costs by Asset

Asset Inventory	2023 Replacement Cost
Museum	
Peterborough Museum and Archives & Memorial Pavilion	\$7,112,670
Museum Curatorial Centre	\$4,618,699
Museum Lookout Structure ¹	\$173,386
Libraries	
Main Library	\$17,241,591
Library Equipment	\$613,642

¹ Lookout Structure is located within Ashburnham Park but accounted for under the Museum portfolio

Asset Inventory	2023 Replacement Cost
Library Collections	\$4,178,984
Art Gallery of Peterborough	
Art Gallery of Peterborough	\$4,806,805
Public Art	
Public Art Collections	\$5,361,299
Heritage	
Market Hall/Clock Tower ²	\$20,542,762
Arts, Culture & Heritage Total	\$64,649,834

1.3 Asset Condition and Remaining Useful Life

The ACH service area is currently rated in overall good condition. Condition ratings for facilities are based on the most recent building condition assessments (BCA's) completed in 2021-2022 with updates anticipated in 2028. Age based ratings have been used where assessments are not available. Based on replacement cost, 29% or \$18.6 million are rated very good, 32% or \$20.4 million rated good, 31% or \$20.1 million rated fair and 8% or \$5.5 million rated poor and very poor. Figure 2 and Table 3 provide condition details of ACH assets.

² Partially city owned. Replacement cost of the full facility is shown until further analysis is carried out to determine the City's share in terms of replacement cost.

Figure 2: Art, Culture & Heritage - Distributed Condition and Replacement Cost

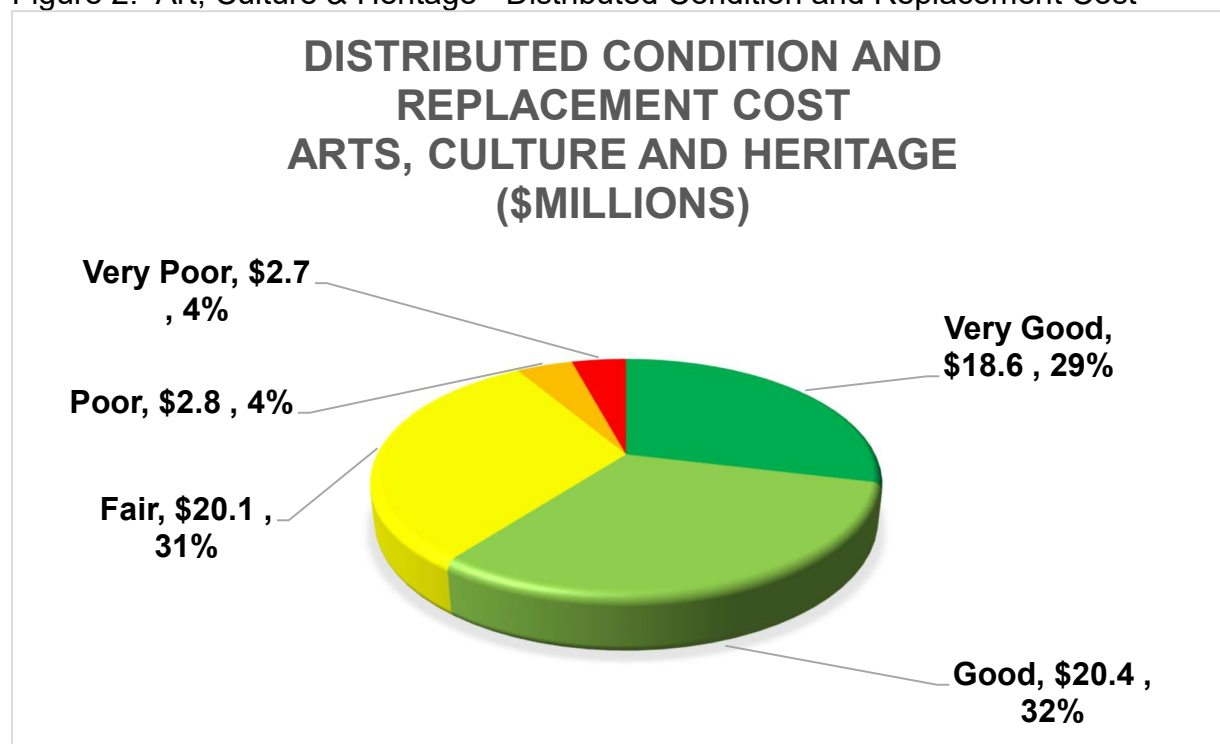


Table 3: Arts, Culture & Heritage - Asset Condition Ratings

Asset Inventory	2023 Condition Rating
Museum	
Peterborough Museum and Archives & Curatorial Centre	Good
Libraries	
Main Library, Equipment & Collections	Good
Art Gallery of Peterborough	
Art Gallery of Peterborough	Good
Heritage	
Market Hall/Clock Tower	Fair
Overall ACH Condition³	Good

Museum and Archives

The recent \$3.3 million Museum renewal project consisting of three phases was completed in 2017. Renewal and construction activities included renovations to 3,000 square feet of the existing facility along with exterior improvements, the construction of an additional 9,000 square foot dedicated storage building, new HVAC systems and the purchase and installation of custom collection storage systems.

³ Weighted by replacement value

Library Main Branch

Recent renovations in 2018 to the Main Branch included include slab repairs, hazardous materials abatement, HVAC replacements, roofing replacement and internal reorganization, a new entrance, two new elevators, improved accessibility both inside and outside, and cold weather heated walkways. Expansion and renovations improved core library services and result in a net gain of 9,000 square feet of public space.

Art Gallery of Peterborough

In 2011 a functional analysis⁴ of the Art Gallery was completed, followed by a feasibility study in 2014⁵ and an update to the feasibility study in 2019. These studies indicate that the current facility has been maximized well beyond its use and a purpose-built facility is required to better meet the demand of the community, current standards for a public institution and maximizes the use of a public art gallery. In 2015 there was scheduled replacement of the failing HVAC system to maintain the climate control as required for a collecting institution by the Department of Canadian Heritage. At that time, the collection was temporarily relocated offsite to a fine art storage facility and improvements were made to the permanent collection and art storage vault. Other improvements for safety and efficiency have been made in recent years, including asbestos remediation, replacement of the front entrance doors, new internal doors at the entrance to the gallery space and new LED lighting throughout the exhibition spaces including a replacement of the failing original (1979) track lighting system in the main gallery. These improvements have enabled the gallery to continue to provide good service and maintain Category A status. The facility use has been maximized to the point that outside rental is required for storage. As indicated in previous studies mentioned, the facility no longer meets growth demand and has reached beyond functional capacity to provide appropriate service. Previous plans for new facility development need to be revitalized for discussion.

Public Art Collections

The Public Art Collection is one branch of the civic collection, representative of significant public artworks/projects, funded in whole or in part by the City, that have been undergone the City's public art selection process, as defined in the public art policy and related procedures. The collection includes original works of art, in any media that have been planned and executed with the specific intention of being installed or presented in a public space, accessible to all citizens either temporarily or permanently. The City is responsible for maintaining the Public Art Collection to reasonable and safe standards. A Public Art Collection Management Plan provides a coherent program of maintenance, conservation and preservation, and a management strategy that details the location, condition, and maintenance requirements/procedures of each work. Permanent artworks are made of durable materials and have been fabricated and acquired by the City with the intention that they be maintained and preserved over the long-term or in perpetuity. Temporary or transient works are intended to activate a space and engage the public over a short period of time; it is understood that these pieces have a shorter lifespan and long-term conservation efforts are not applicable.

⁴ Lundholm Associates in association with Ginder Consulting and Lett Architects Inc., Art Gallery of Peterborough Functional Analysis Plan, City of Peterborough (2011).

⁵ Lundholm Associates in association with Lett Architects Inc., Feasibility Plan, Art Gallery of Peterborough Feasibility Study, City of Peterborough (2014).

These Artworks are maintained as part of the Public Art Collection for the timeframe identified at the time of acquisition and/or for agreed upon increments thereafter.

Market Hall and Clock Tower

The Market Hall and Clock tower, a designated heritage building, is a small to mid-size, multi-functional space that hosts a variety of performing arts, fundraising events, and educational programmes. The facility underwent interior LED lighting upgrades and exterior façade repairs in 2018. The facility is partially owned by the City, which includes the clock tower, the second floor of the market hall and the east, south and west facades of the exterior. The recent upgrades to the interior lighting and exterior faces improved the overall condition to fair.

Remaining Useful Life

The following summarizes the ACH service area remaining useful life. The useful life of an asset is the estimated period over which the City expects to use the asset. Estimates are based on the calculated age or observed age (where condition assessments have been completed) and do not take into consideration any betterments that extend the useful life of the asset(s). Ideally, as condition assessments are completed the 'observed' age will be used in calculating remaining useful life. The ages of the assets are variable and with efforts to extend the life by application of lifecycle treatments, there isn't necessarily a linear relationship between age and condition.

Table 4 shows the Arts, Culture & Heritage service area remaining useful life details.

Table 4: Arts, Culture & Heritage Remaining Useful Life⁶

Asset Inventory	Ave. Expected Useful Life (Yrs.)	Ave. Remaining Useful Life (Yrs.)	Percent of Useful Life Remaining
Museum			
Peterborough Museum and Archives & Curatorial Centre	35	19	54%
Libraries			
Main Library, Equipment & Collections	13	1	6%
Art Gallery of Peterborough			
Art Gallery of Peterborough Facility	40	0	0%
Heritage			
Market Hall/Clock Tower	26	0	0%
ACH Remaining Useful Life	27	3	11%

⁶ ESL, RUL, and percent of useful life remaining are based on calculated average of asset classes

1.4 Asset Risk Assessment

Currently, the consequences of failure for facilities have been determined manually by City staff based on a standardized chart for consequence (found in Appendix B). The risk evaluation considers environmental, economical, social, life safety, legislation and corporate reputation as factors when scoring consequence. Building elements considered high risk are those that pose a high consequence of failure and typically are associated with the safety, health, and well being of the facility users/tenants. These elements include (but are not limited to): building structure, shell, fire and life safety systems, heat generating systems and elevating devices.

Using the product of the scores for likelihood of failure (likelihood is higher as asset condition worsens) and the consequence of failure, the asset is assigned a risk rating using the ranges shown in the chart below:

Category	Range
High Risk	< 5
Medium Risk	5 – 20
Low Risk	> 20

The estimated replacement value of Arts, Culture & Heritage high risk assets is \$3.2 million.

The City continues to prioritize the operational, maintenance and renewal needs of both the critical assets and high-risk assets to minimize health and safety risks and impacts to service delivery.

2.0 Levels of Service

This section will present levels of service as they are currently being provided by the City. Service area objective statements were developed by taking into consideration the goals, strategies and objectives defined in other overarching Council approved City plans, studies and policies such as the 2016 Vision 2025, A 10-Year Strategic Plan for Recreation⁷, Parks, Arenas and Culture and the 2012 Municipal Cultural Plan.

Stakeholder and technical levels of service, performance measures and current targets for the ACH assets service area are outlined in Table 5 below. Further development of the City's levels of service is underway in which the proposed levels of service and the affordability of the service will be analyzed and presented. Future versions of the Asset Management Plan will also include other proposed levels of service reporting requirements set forth in the Asset Management Planning for Municipal Infrastructure Regulation (O.Reg. 588/17).

⁷ The RETHINK GROUP in association with C.Talbot & Assoc. Vision 2025, A 10-Year Strategic Plan for Recreation, Parks, Arenas and Culture, City of Peterborough (2016)

Table 5: Levels of Service – Arts, Culture & Heritage

Asset Class: ACH - Art Gallery of Peterborough								
Service Objective Statement: Strives to present a variety of visual art experiences and explorations to stimulate and expand public perception of art as part of our life and community.								
Stakeholder Value/Service Attribute	Stakeholder LoS and Measures		Stakeholder Performance		Technical Measure		Technical Performance	
			Year of Measure				Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
Scope	Showcase Permanent Collections, curate and exhibit local artists, and engage the community through contemporary art	An available facility to facilitate programming, exhibitions and external engagement	Provision of an Art Gallery, 11,000 sq. ft of space	Provision of an Art Gallery, 11,000 sq. ft of space	Ratio of galleries to current population	1 facility:45,000 of pop	1 facility: 83,651 of pop.	1 facility: 83,651 of pop.
					Meet environmental and care standards necessary to preserve works long-term	Meet 'Category A' Collecting Institution designation by the Department of Canadian Heritage	Designated Category A Collecting Institution	Designated Category A Collecting Institution
Reliability/Quality	Providing a reliable and high-quality Art Gallery that meets the needs of the community	Art Gallery is maintained in a state of good repair	Facility is proactively maintained and reliable for intended use	Facility is proactively maintained and reliable for intended use	Average facility condition rating	Minimum facility condition rating of 'Fair'	Fair	Fair
					Average Facility Condition Index (FCI) value for all facilities	Minimum Fair (5% - 10%)	n/a – not reported	10% (Fair)

Asset Class: ACH - Art Gallery of Peterborough								
Service Objective Statement: Strives to present a variety of visual art experiences and explorations to stimulate and expand public perception of art as part of our life and community.								
Stakeholder Value/Service Attribute	Stakeholder LoS and Measures		Stakeholder Performance		Technical Measure		Technical Performance	
			Year of Measure				Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
Climate Leadership	Facilities are energy efficient and demonstrate leadership on climate action	Facilities meet our environmental objective	Facilities strive to lower energy usage by installing energy conservation measures that improve energy efficiency to reduce GHG emissions	Facilities strive to lower energy usage by installing energy conservation measures that improve energy efficiency to reduce GHG emissions	Annual energy consumption per Sq.m	Energy Use Intensity (EUI) of 0.41 GJ/m2 or less	n/a - not reported	1.34 GJ/m2

Asset Class: ACH - Libraries								
Service Objective Statement: The Library will inspire our community to become more literate and engaged. We are an agent for positive community transformation through interaction, discovery and learning.								
Stakeholder Value/Service Attribute	Stakeholder LoS and Measures		Stakeholder Performance		Technical Measure		Technical Performance	
			Year of Measure				Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
Scope	Access to sufficient and suitably located branch libraries.	Maintain an adequate level of library space and service	Provision of 2 library branches: Main and DelaFosse, opening of a self-serve Library Kiosk at the Peterborough Sport & Wellness Centre (PSWC)	Provision of 1 library branch (Main) with a new construction planned to open in fall of 2024 (replacing DelaFosse). There are now 3 x self-serve kiosks in the City - one each of the following: PSWC, PRHC and Trent.	Ratio of library space to current population	0.8-1.25 gross sq. ft/capita	67,500 gross sq.ft. (0.8 gross sq. ft/capita)	Main Branch - 28,792 sq.ft Kiosk - 20 sq.ft each x 3 = 60 sq.ft (0.3 gross sq.ft/capita)

Asset Class: ACH - Libraries								
Service Objective Statement: The Library will inspire our community to become more literate and engaged. We are an agent for positive community transformation through interaction, discovery and learning.								
Stakeholder Value/Service Attribute	Stakeholder LoS and Measures		Stakeholder Performance		Technical Measure		Technical Performance	
	Stakeholder LoS Statement	Stakeholder Performance Measure	Year of Measure		Technical PM	Target	Year of Measure	
			2021	2023			2021	2023
Reliability/Quality	Providing reliable and high-quality Libraries that meet the needs of the community	Libraries are maintained in a state of good repair	n/a – not reported	Facilities are proactively maintained and reliable for intended use	Average facility condition rating	Minimum facility condition rating of 'Fair'	Fair	Good
					Average Facility Condition Index (FCI) value for all facilities	Minimum Fair (5% - 10%)	n/a – not reported	1% (Good)
Climate Leadership	Facilities are energy efficient and demonstrate leadership on climate action	Facilities meet our environmental objective	Facilities strive to lower energy usage by installing energy conservation measures that improve energy efficiency to reduce GHG emissions	Facilities strive to lower energy usage by installing energy conservation measures that improve energy efficiency to reduce GHG emissions	Annual energy consumption per Sq.m	Energy Use Intensity (EUI) of 1.03 GJ/m2 or less	n/a - not reported	0.97 GJ/m2

Asset Class: ACH – Museum and Archives								
Service Objective Statement: The City strives to provide adequate, safe, welcoming and accessible environments serving the entire community.								
Stakeholder Value/Service Attribute	Stakeholder LoS and Measures		Stakeholder Performance		Technical Measure		Technical Performance	
			Year of Measure				Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
Scope	Access to sufficient and suitably located museum and archives	Maintain an adequate level of museum and archives space	Provision of one Community Museum & Archives location	Provision of one Community Museum & Archives location	Ratio of museum facilities to current population	1 facility: community	1 facility: 85,000 pop.	1 facility: 83,651 pop.
Reliability/Quality	Providing reliable and high-quality Museum and Archives Facility that meets the needs of the community	Museum and Archives Facilities are maintained in a state of good repair	Facilities are proactively maintained and reliable for intended use	Facilities are proactively maintained and reliable for intended use	Average facility condition rating	Minimum facility condition rating of 'Fair'	n/a – not reported	Museum – Good
					Average Facility Condition Index (FCI) value for all facilities	Minimum Fair (5% - 10%)	n/a – not reported	Museum - Good (3%)
					Number of facilities with FCI or 10% or better	4 Facilities	n/a – not reported	Museum - 4/4 facilities

Asset Class: ACH – Museum and Archives								
Service Objective Statement: The City strives to provide adequate, safe, welcoming and accessible environments serving the entire community.								
Stakeholder Value/Service Attribute	Stakeholder LoS and Measures		Stakeholder Performance		Technical Measure		Technical Performance	
	Stakeholder LoS Statement	Stakeholder Performance Measure	Year of Measure		Technical PM	Target	Year of Measure	
			2021	2023			2021	2023
Climate Leadership	Facilities are energy efficient and demonstrate leadership on climate action	Facilities meet our environmental objective	Facilities strive to lower energy usage by installing energy conservation measures that improve energy efficiency to reduce GHG emissions	Facilities strive to lower energy usage by installing energy conservation measures that improve energy efficiency to reduce GHG emissions	Annual energy consumption per Sq.m	Energy Use Intensity (EUI) of 0.41 GJ/m2 or less	n/a - not reported	0.83 GJ/m2

3.0 Asset Management Strategies – Arts, Culture & Heritage

The following table describes the current strategies and activities for the ACH service area to maintain the current levels of service, while minimizing risk at the lowest lifecycle costs. Options for which lifecycle activities that could potentially be undertaken have been explored in various needs studies and reports such as the Art Gallery of Peterborough Strategic Plan (2016) and Feasibility Study (2014) and Feasibility Study Update (2019), the Library Strategic Plan (2018) and the Vision 2025, A Ten-Year Strategic Plan for Recreation, Parks, Arenas and Culture (2016). The City plans the necessary lifecycle activities at the required time and does not need to alter the *type* of activity undertaken. However, with limited funding available, the interval and timing of the necessary lifecycle activities are affected, which can have an overall impact on the performance of the asset(s) over its useful life.

Table 6: Arts, Culture & Heritage– Asset Management Lifecycle Strategies

Strategy Type	Current Practice
Non-infrastructure Solutions Actions or policies that can lower costs or extend asset life (e.g. better integrated infrastructure planning and land use planning, demand management, insurance, process optimization, managed failures, etc.).	· Building condition assessment program
	· Needs studies to assess community needs and how services are being delivered to the community
	· Linking the asset management plan to other studies, master plans and strategies
	· Integrating infrastructure and land use planning
	· Public consultation on levels of service
	· Leverage incentive programs offered through utilities that are for low carbon emissions or energy efficiency projects
	· Educate staff on climate change initiatives and energy efficiency opportunities with respect to building operations/ownership
	· Partnership Policy to extend and enhance services is a sustainable way and coordinate and reduce overlap in efforts between agencies serving the same area.
Maintenance Activities Activities include regularly scheduled inspection and maintenance, or more significant repair and activities associated with unexpected events.	· Service contracts for building life-safety and security alarm systems, elevating systems, and code/regulated building elements
	· Basic custodial services

Strategy Type	Current Practice
	<ul style="list-style-type: none"> General routine maintenance activities performed throughout the interior and exterior of each facility
Renewals/Rehabilitation: Includes significant repairs designed to extend the life of the asset (e.g. the lining of iron watermain can defer the need for replacement).	<ul style="list-style-type: none"> Renewal of facility elements or sub-systems such as structures, roofs, building exteriors, building services (HVAC, plumbing, electrical), interior finishes and sitework that are at the end of their useful life and renewal does not improve/expand the intended service initially provided Upgrading projects focus on removing asset exposure to elements
Replacement Activities that are expected to occur once an asset has reached the end of its useful life and renewal/rehabilitation is no longer an option.	<ul style="list-style-type: none"> Facility components replaced when at end of useful life through capital planning/business case Replacement due to obsolescence or does not meet minimum design standards/intent Replacements considered within the context of the facility Combine projects to include the investigations, renewals and replacements Replace large assets based on condition or efficiency Heritage facility replacements that are intended to preserve the heritage value of the property/facility – roof, exterior facades, windows, doors, trim/accents Replacement of library collections are carried out according to the same selection criteria that apply to new materials
Disposals/Abandonment Policies Activities associated with disposing of an asset once it has reached the end of its useful life or is otherwise no longer needed by the municipality.	<ul style="list-style-type: none"> Facilities that are no longer needed for the intended service are either sold, re-purposed or demolished Library collection items that are damaged by patrons are repaired when possible or disposed of

Strategy Type	Current Practice
	<ul style="list-style-type: none"> · For library collections, materials are withdrawn from the collection when: · No longer used by the community · Worn out, damaged or cannot be repaired · Outdated, unreliable or misleading · More current materials on a subject become available · Public demand no longer requires multiple copies · Space is required for new materials
Expansion Programs Planned activities required to extend the services to previously un-serviced areas – or expand services to meet growth demands.	<ul style="list-style-type: none"> · When facility has reached its functional capacity and expansion is necessary for continued delivery of service · Changes to accessibility requirements for public buildings drive expansions. Grants are used, where possible to meet these requirements · Expansion of renewable energy programs and systems to reduce energy costs for operation · Update to new building codes when asset needs renewals · Ensure existing facility use is maximized before additional facilities are provided
Future Strategies	<ul style="list-style-type: none"> · Seek opportunities to co-locate ACH facilities with other compatible community facilities · Seek opportunities to collaborate with others to provide arts, culture and heritage facilities; and associated programming and events. · Seek opportunities to increase the integration of services among major providers (school boards, Peterborough County, community groups, commercial sector, neighboring townships, etc.) · Align culture opportunities and services to the interests and perspectives of older adult community to meet future expected service level demands

3.1 Asset Management Strategies and Associated Risks

Strategic Risks

Strategic level risks are events that may impact the ability of the City to deliver asset management strategies and minimize costs.

Potential strategic level risks associated with the City's ability to effectively deliver established Recreation Services are:

- Insufficient funding levels
- Insufficient staffing and resources to responsibly implement lifecycle strategies
- Asset deterioration assessments/models are underestimated/miscalculated
- External/environmental factors such as climate change effects (more severe weather instances, increased demands due to growth)

Risk Trade Offs

If lifecycle activities (operations, maintenance, renewal, and other capital projects) are not undertaken, they may sustain or create risk consequences. These risk consequences may include (but not limited to):

- Public health and safety – assets not adequate/available for emergency response
- Further/accelerated asset deterioration
- Increased backlog of work
- Increased treatment costs
- Level of treatment changes requiring increased resources/costs (maintenance now needing replacement)
- Planned budget/needs forecast not a reflection of actual asset needs
- Additional assets/expansion of services required
- Reputation/image negatively affected

Risks relating to ACH building elements and infrastructure failures are mitigated through condition assessment programs and maintenance programs (legislated and best practices) which provide the data necessary to plan the actions at the right time to achieve the determined levels of services. Primarily, risks are financial in nature and without planned, adequate levels of funding, strategies are potentially at risk for limited implementation (or no implementation at all), resulting in the delivery of lower levels of service to stakeholders.

Currently, the limited art gallery space has been identified as an inherent risk associated with the ability to meet the demands of the visitors and artists, as well as with the ability to fulfill the Art Gallery mandate.

There is a risk associated with the increase in demand from population growth, primarily in the age 55 and older age group by the year 2041. The increase within this age group

implies that activities of interest will significantly increase, and the service level of supporting facilities will have to be increased as well. Activities related to the Arts, Culture & Heritage service area include performing arts, attending community events, visiting museums and historic sites and appreciating cultural heritage. Replacements, Expansion and Future Strategies will need to take aging demographics into consideration when being implemented.

All City services, including ACH services are reviewed and identified in the City's Business Continuity Plan (BCP) and prioritization process. The BCP identifies the key interruption impacts, recovery time objectives, dependencies, qualified resources available and a resource back-up strategy should services be interrupted. The BCP is reviewed and updated regularly to ensure that critical services are not interrupted, minimizing risks.

The choice of strategy for maintaining ACH assets considers the risk of failure of the assets, the risk to service delivery and the risk to other services dependant on this service area. ACH projects seek to work with external stakeholders to align projects to minimize disruption of the use of the existing facilities/programs and reduce costs. Strategies implemented are at the lowest cost in order to reduce the burden on the tax base and user fees where possible and to maintain the current levels of service.

3.2 Lifecycle Models, Interventions, and Cost of Service:

Overview of Lifecycle Models

Service area lifecycle models have been developed⁸ in which asset intervention thresholds and associated costs for lifecycle activities (rehabilitation and replacement) are documented.

Lifecycle models are mathematical, statistical and logic models of planned actions and of asset deterioration over time. This helps the City to forecast required asset lifecycle activities and their impacts on levels of service, risk, and funding needs. In short, lifecycle models are mathematical representation of the City's *Lifecycle Activities*.

Overview of Interventions

Interventions represent the major lifecycle activities carried out for assets over their service life and are typically accounted for as part of the capital planning process. The term 'intervention threshold' or 'intervention trigger' are used interchangeably, and they describe a point in an asset's lifecycle when the intervention typically occurs.

When an asset degrades and an intervention threshold is reached, the asset will require treatment (i.e., repair or rehabilitation). After the treatment is applied, the performance

⁸ Request for Proposal RFP 22-22 Consulting Services to Support Asset Management Planning Updates

(condition) of that asset will increase to a higher value, at which point it will continue to degrade. This will extend the overall estimated service life (ESL) of the asset.

The costs associated with interventions can be used to establish capital funding needs and determine the most cost-effective solution to maintain level of service targets. Costs for thresholds were derived from the City's historical financial information for actual or similar interventions where available and applicable. Where replacement activities are determined, asset replacement costs were used.

3.3 Lifecycle Options Analysis and Costs of Service

The options analysis of the lifecycle activities that could be undertaken were reviewed with the ACH services subject matter experts. Lifecycle activity options were discussed and determined that the current planned activities are appropriate and the most cost-effective option(s). Details related to the Recreation services available funding, investments and shortfalls can be found in Section 5.0 – Financial Summary.

Table 7 and Figure 3 below shows the ACH services area projected 10-year lifecycle costs (asset renewal and replacement activities required for existing assets) and performance to maintain current levels of service. For details on current levels of service descriptions, measures and targets and current performance, refer to Table 5 in Section 2 – Levels of Service of this attachment.

Lifecycle costs shown below were calculated based on current asset conditions and forecasted out over the 10-yr period using the recommended deterioration model for that asset/asset class. Where asset condition data was not available, age-based condition ratings were applied.

Table 7: Arts, Culture & Services Lifecycle Associated Costs – Delivering Current Levels of Service, existing assets

Lifecycle Activity Costs - ACH Assets	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	otal 10-Yr
Heritage	\$0	\$244,904	\$244,904	\$244,904	\$244,904	\$244,904	\$244,904	\$244,904	\$244,904	\$244,904	\$244,904	\$2,449,040
Library	\$0	\$833,288	\$833,288	\$833,288	\$833,288	\$833,288	\$833,288	\$833,288	\$833,288	\$833,288	\$833,288	\$8,332,884
Museum and Arts	\$0	\$241,018	\$241,018	\$241,018	\$241,018	\$241,018	\$241,018	\$241,018	\$241,018	\$241,018	\$241,018	\$2,410,178
Annual Total	\$0	\$1,319,210	\$1,319,210	\$1,319,210	\$1,319,210	\$1,319,210	\$1,319,210	\$1,319,210	\$1,319,210	\$1,319,210	\$1,319,210	\$13,192,102
Average Annual Lifecycle Cost	\$1,319,210	\$1,319,210	\$1,319,210	\$1,319,210	\$1,319,210	\$1,319,210	\$1,319,210	\$1,319,210	\$1,319,210	\$1,319,210	\$1,319,210	

Based on the lifecycle assessment of the Arts, Culture & Heritage assets (for renewal and replacement), it is estimated that the City would need to spend an average of \$1.3 million per year to carry out the required lifecycle activities to maintain current levels of service.

Figure 3: 10-Year Forecasted Performance for Maintaining Levels of Service – Arts, Culture & Heritage

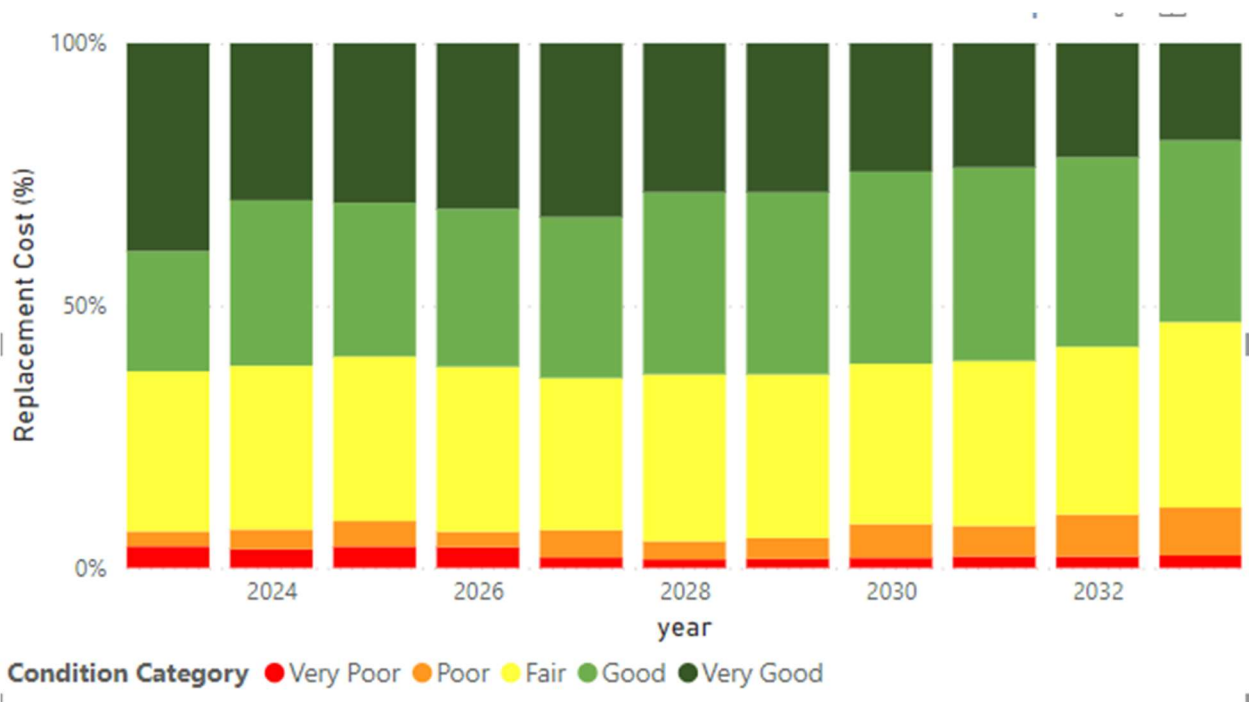


Figure 3 above illustrates the performance (condition) of Arts, Culture & Heritage assets over the 10-year forecast. The estimated average combined annual expenditures to maintain these conditions is approximately \$1.3 million.

Attachment #12: Information Technology Services



Infrastructure Value	\$9.8M	
Annual Renewal Needs	\$0.9M	
Overall Condition	4.0	Good
High Risk Asset Value	\$9M	96%
Trend	N/A	

1.0 Summary of Information Technology Services

Asset classes that fall under the Information Technology Services (ITS) service area include audio-visual equipment, network appliances and servers, printers and scanners, security systems¹, telephone, and voicemail equipment, back up power supply and workstations. Annual renewal needs shown are based on lifecycle management strategies and represent the estimated amount of capital the City needs to reinvest in its existing asset inventory on an annual basis over the next 10 years to sustain the current levels of service (based on the 25-yr investment forecast).

This is the first iteration of the Asset Management Plan that includes Information Technology Services.

Table 1 details the ITS service area inventory.

1.1 Inventory Details

Table 1: ITS Service Area Inventory

Asset Category & Class	2023 Quantity	Unit of Measure
Equipment		
Audio-Visual	pooled	n/a
Network Appliances and Servers	68	Each
Printers and Scanners	pooled	n/a

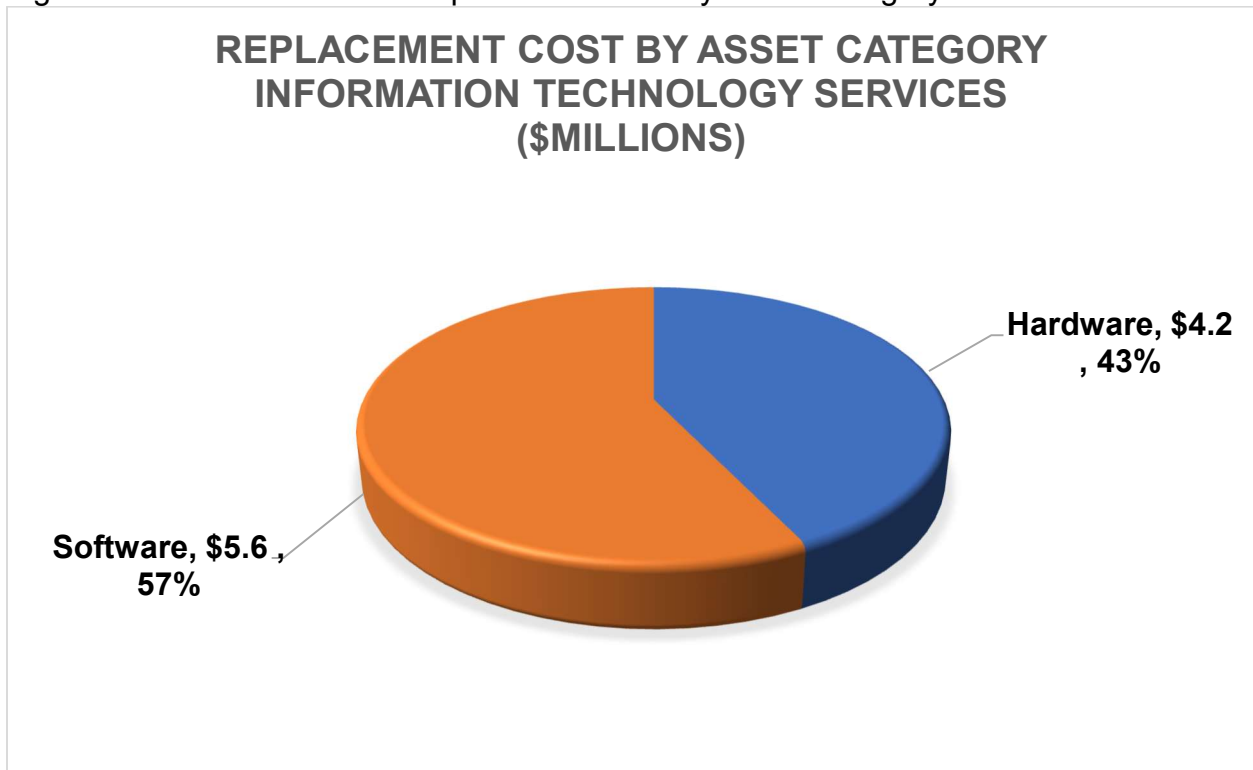
¹ Security Systems and related components for various corporate facilities. Reported as part of ITS assets in this Plan to align with TCA financial reporting structure.

Asset Category & Class	2023 Quantity	Unit of Measure
Security Systems ²	pooled	n/a
Telephones and Voicemail	pooled	n/a
Uninterrupted Power Supply Systems	pooled	n/a
Workstations	pooled	n/a
Software	pooled	n/a

1.2 Replacement Costs

The estimated year end 2023 replacement costs for the ITS service area totalled \$9.8 million. Replacement costs were determined using recent acquisition costs of like assets or historical inflated to 2023 dollars where recent costing information was not available.

Figure 1: ITS Service Area –Replacement Cost by Asset Category



² Security Systems and related components for various corporate facilities. Reported as part of ITS assets in this Plan to align with TCA financial reporting structure.

Table 2: ITS Assets - Replacement Costs by Asset Class

Asset Class & Sub-Class	2023 Replacement Cost
Hardware	
Audio-Visual	\$358,033
Network Appliances and Servers	\$1,914,249
Printers and Scanners	\$133,190
Security Systems – Emergency System ³	\$50,053
Telephones and Voicemail	\$260,131
Uninterrupted Power Supply Systems	\$83,924
Workstations	\$1,407,140
Software	
Software	\$5,572,834
ITS Assets Total	\$9,779,555

1.3 Asset Condition and Remaining Useful Life

For the City's IT assets reported in this Plan, condition ratings are presented using recommendations based on professional judgment/expertise by IT subject matter experts. This alternate method takes into consideration not just age/ESL as a proxy, but the asset failure rates, overall performance, reliability, and the cost impacts of extending asset useful life vs. acquiring new. This provides a better reflection of actual IT asset conditions vs. applying age-based ratings. City staff are working towards developing a more robust 5-point rating scale for IT assets that incorporates varying factors affecting asset condition as part of the assessment criteria and will align with methods used in other service areas in this Plan. The overall condition of ITS assets is rated 'good'.

For various software systems and applications, hardware equipment, etc., the City strives to extend the useful life through regular inspections, maintenance, upgrades, and updates. The City ensures that, pending available budget, equipment refresh schedules are followed to mitigate against technological obsolescence, operational/functional inefficiencies and risks related to security and data integrity.

Using the alternate condition rating methodology and based on replacement cost, 1% or \$50k is rated very good and 99% or \$9.7 million are rated good. Figure 2 and Table 3 provide condition details of the ITS service area.

³ Facility Asset but reported as part of ITS assets in this Plan to align with TCA financial reporting structure.

Figure 2: ITS Assets - Distributed Condition and Replacement Cost

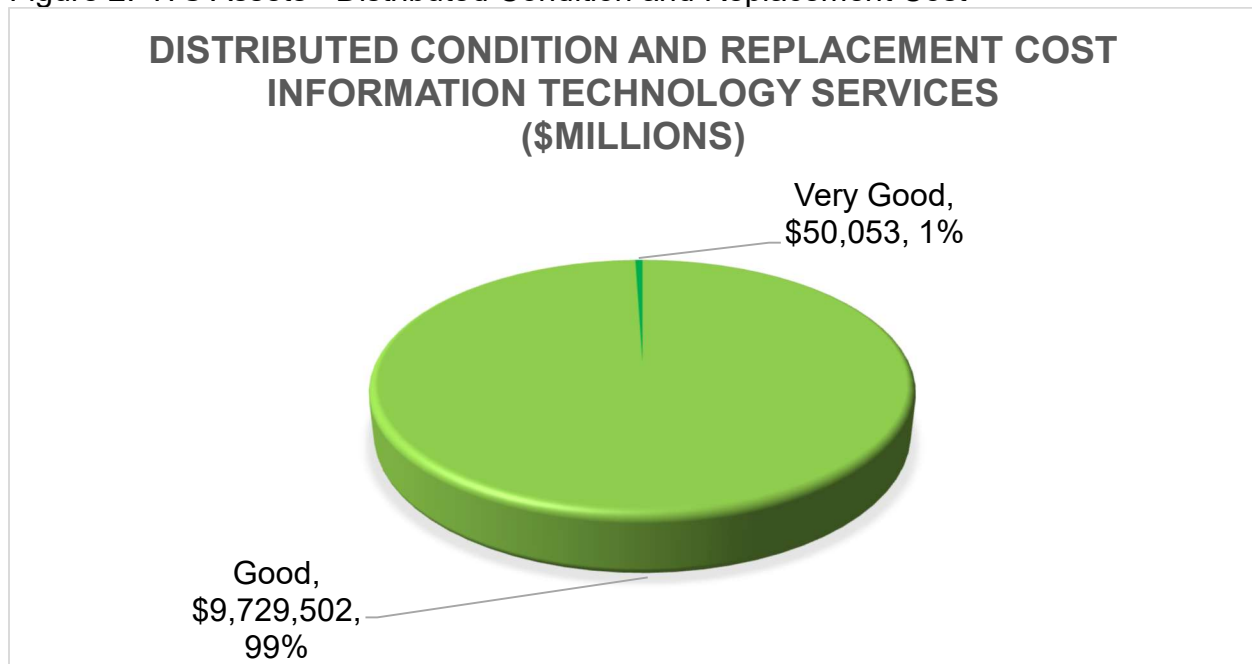


Table 3: ITS Assets - Asset Condition Ratings

Asset Class & Sub-Class	2023 Condition Rating
Hardware	
Audio-Visual	Good
Network Appliances and Servers	Good
Printers and Scanners	Good
Security Systems – Emergency System ⁴	Very Good
Telephones and Voicemail	Good
Uninterrupted Power Supply Systems	Good
Workstations	Good
Software	
Software	Good
ITS Overall Condition	Good

Remaining Useful Life

The following summarizes the Information Technology Services assets' remaining useful life. The useful life of the assets shown represent the estimated period over which the City expects to use the asset. Estimates of ages are based on the calculated

⁴ Security Systems for various facility access. Reported as part of ITS assets in this Plan to align with TCA financial reporting structure

age only and do not take into consideration any betterments that extend the useful life of the asset(s). The City is working towards improving asset data that will inform the useful life of the assets, and will consider software updates, equipment upgrades and system enhancements, etc.

Table 4 shows ITS assets remaining useful life details.

Table 4: ITS Assets Remaining Useful Life⁵

Asset Inventory	Expected Useful Life (Yrs.)	Ave. Remaining Useful Life (Yrs.)	Percent of Useful Life Remaining
Hardware	8	0	0%
Software	12	0	0%
ITS Assets Remaining Useful Life	9	0	0%

1.4 Asset Risk Assessment

The consequences of failure for ITS assets have been determined manually by City staff based on a standardized chart for consequence (found in Appendix B). The assessment considers environmental, economical, social, life safety, legislation and corporate reputation as factors when scoring consequence.

Using the product of the scores for likelihood of failure (likelihood is higher as asset condition worsens) and the consequence of failure, the asset is assigned a risk rating using the ranges shown in the chart below:

Category	Range
High Risk	< 5
Medium Risk	5 – 20
Low Risk	> 20

The estimated replacement value of ITS high-risk assets is \$9.4 million.

The City continues to prioritize the operational, maintenance and renewal needs of both the critical assets and high-risk assets to minimize health and safety risks and impacts to service delivery.

⁵ ESL, RUL, and percent of useful life remaining are based on calculated average of asset classes

2.0 Levels of Service

This section will present levels of service as they are currently being provided by the City. Service area objective statements were developed by taking into consideration the goals, strategies and objectives defined in other overarching Council approved City plans, studies and policies.

Stakeholder and technical levels of service, performance measures and current performance for the ITS service area are outlined in Table 5. Further development of the City's levels of service is underway in which the proposed levels of service and the affordability of the service will be analyzed and presented. Future versions of the Asset Management Plan will also include other proposed levels of service reporting requirements set forth in the Asset Management Planning for Municipal Infrastructure Regulation (O.Reg. 588/17).

Table 5: Levels of Service – Information Technology Services

Asset Class: Information Technology Services								
Service Objective Statement: Efficiently providing secure information technology at an appropriate quality and quantity to support the delivery of services.								
Stakeholder Value/Service Attribute	Stakeholder LoS and Measures		Stakeholder Performance		Technical Measure		Technical Performance	
			Year of Measure				Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
Reliability/Quality	Providing reliable and high-quality IT Assets that meet the needs of the community and stakeholders	IT Assets are maintained in a state of good repair	n/a	IT Assets are proactively maintained and reliable for intended use	Unplanned downtime average that is high impact and has broad scope for key technology that the City relies on for critical functions.	Unplanned downtime less than 1 hour during production hours with less than four single incidences/device within 8 hours	n/a	Target met.
					Distribution of hours allocated to Enterprise Application Support	Enterprise applications no more than 70% of hours dedicated to keep the lights on (run the business). Minimum 10% dedicated to major capital projects (transforming the organization).	n/a	Target met.
					Consistent performance for external Security Audit/Assessment.	80% of audit scores are equal to or better than previous year	n/a	Target met

Asset Class: Information Technology Services								
Service Objective Statement: Efficiently providing secure information technology at an appropriate quality and quantity to support the delivery of services.								
Stakeholder Value/Service Attribute	Stakeholder LoS and Measures		Stakeholder Performance		Technical Measure		Technical Performance	
			Year of Measure				Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
					Metric for service desk issues regarding end-user assets.	70% of requests addressed within 1 business day and 90% within three business days	n/a	Target met

3.0 Asset Management Strategies – Information Technology Services

The following table describes the current strategies and activities for the Information Technology Services area to maintain the current levels of service. Options for which lifecycle activities that could potentially be undertaken have been explored on based on industry best practices, past trends, business requirements. The following table below documents the set of planned actions or ‘activities’ that the City undertakes to sustain current levels of service, while managing risk at the lowest lifecycle cost. The City plans the necessary lifecycle activities at the required time and does not need to alter the *type* of activity undertaken. However, with limited funding available, the interval and timing of the necessary lifecycle activities are affected, which can have an overall impact on the performance of the asset(s) over its useful life.

Table 6: Information Technology Services – Asset Management Lifecycle Strategies

Strategy Type	Current Practice
Non-infrastructure Solutions Actions or policies that can lower costs or extend asset life (e.g. better integrated infrastructure planning and land use planning, demand management, insurance, process optimization, managed failures, etc.).	· Regular equipment monitoring and inspection
	· Linking the asset management plan to other studies, master plans and strategies
	· Public consultation on levels of service
	· Regular support provided by IT department
	· High priority in procurement for purchasing critical equipment
Maintenance Activities Activities include regularly scheduled inspection and maintenance, or more significant repair and activities associated with unexpected events.	· Equipment maintained by IT department as needed
	· Reactive maintenance as required
	- Patch installations and upgrades where required
Renewals/Rehabilitation: Includes significant repairs designed to extend the life of the asset (e.g. the lining of iron watermain can defer the need for replacement).	· Not applicable - IT equipment undergoes regular maintenance program until replacement
Replacement Activities that are expected to occur once an asset has reached the end of its useful life and renewal/rehabilitation is no longer an option.	· Replace equipment when no longer functioning as intended
	· Replace equipment when obsolete
Disposals/Abandonment Policies Activities associated with disposing of an asset once it has reached the end of its useful life or is otherwise no longer needed by the municipality.	· Repurpose used equipment whenever possible
	· Retain retired critical equipment as required to maintain spare ratios
Expansion Programs Planned activities required to extend the services to previously un-serviced areas – or expand services to meet growth demands.	· Upgrade equipment as required to meet user needs
	· Right-size equipment as needed to accommodate expansion of service and planned growth
Future Strategies	n/a

3.1 Asset Management Strategies and Associated Risks

Strategic Risks

Strategic level risks are events that may impact the ability of the City to deliver asset management strategies and minimize costs.

Potential strategic level risks associated with the City's ability to effectively deliver established IT Services are:

- Insufficient funding levels
- Increased Cyber Security risks
- Insufficient staffing and resources to responsibly implement lifecycle strategies
- IT asset replacement plans/schedules are underestimated/miscalculated
- External/environmental factors such as climate change effects (more severe weather instances, flooding) that could cause physical damage to equipment and/or power outages
- Supply chain issues
- Technology disruptors that render a current technology obsolete

Risk Trade Offs

If the identified lifecycle activities (operations, maintenance, renewal, and other capital projects) are not undertaken, they may sustain or create risk consequences. These risk consequences may include (but not limited to):

- Reduced/interrupted emergency service support due to failed or obsolete 911 emergency dispatch equipment and software
- Threats to IT security - sensitive data/systems are more vulnerable to hackers, viruses, etc. if monitoring and detection tools are not in place
- Hardware and software become obsolete causing operational/functional delays
- Increased backlog of work for those business units requesting IT resources
- Planned budget/needs forecast not a reflection of actual asset needs
- Additional assets/expansion of services required
- Reputation/image negatively affected

Risks associated with IT security and the loss of confidential data are mitigated through a number of measures including advanced monitoring and detection tools, security awareness training, strong access control measures and detailed incident response plans. Risks associated with not replacing IT assets at the end of useful life are mitigated by the implementation of the City Capital Expenditure Project in which the lifecycle management, new initiatives and enhancements of existing IT assets are funded.

All City services, including IT dependencies are reviewed and identified in the City's Business Continuity Plan (BCP) and prioritization process. The BCP identifies the key interruption impacts, recovery time objectives, dependencies, available qualified resources, and a resource back up strategy should there be disruption to services. The BCP is reviewed and updated regularly to ensure that back up IT infrastructure is available where required and critical services are not interrupted, minimizing risks.

The choice of strategy for operating and maintaining IT assets considers the risk of failure of the assets, the risk to service delivery and the risk to other services dependant on this service area. Strategies implemented attempt to balance cost, security and performance at the lowest cost (where applicable) in order to reduce the burden on the tax base and user fees where possible and to maintain the current levels of service.

A full detailed, documented risk analysis in which the identification of credible risks, the likelihood of the risk event occurring, the consequences should the event occur, development of a risk rating, evaluation of the risk and the development of a risk treatment plan for non-acceptable risks is being reviewed and will be included in future versions of the asset management plan when completed.

3.2 Lifecycle Models, Interventions, and Cost of Service:

Overview of Lifecycle Models

Service area lifecycle models have been developed⁶ in which asset intervention thresholds and associated costs for lifecycle activities (rehabilitation and replacement) are documented.

Lifecycle models are mathematical, statistical and logic models of planned actions and of asset deterioration over time. This helps the City to forecast required asset lifecycle activities and their impacts on levels of service, risk, and funding needs. In short, lifecycle models are mathematical representation of the City's *Lifecycle Activities*.

Overview of Interventions

Interventions represent the major lifecycle activities carried out for assets over their service life and are typically accounted for as part of the capital planning process. The term 'intervention threshold' or 'intervention trigger' are used interchangeably, and they describe a point in an asset's lifecycle when the intervention typically occurs.

When an asset degrades and an intervention threshold is reached, the asset will require treatment (i.e., repair or rehabilitation). After the treatment is applied, the performance (condition) of that asset will increase to a higher value, at which point it will continue to degrade. This will extend the overall estimated service life (ESL) of the asset.

The costs associated with interventions can be used to establish capital funding needs and determine the most cost-effective solution to maintain level of service targets. Costs for thresholds were derived from the City's historical financial information for actual or similar interventions where available and applicable. Where replacement activities are determined, asset replacement costs were used.

3.3 Lifecycle Options Analysis and Costs of Service

The options analysis of the lifecycle activities that could be undertaken were reviewed with ITS subject matter experts. Lifecycle activity options were discussed and determined that the current planned activities are appropriate and the most cost-effective option(s). Details related to the ITS available funding, investments and shortfalls can be found in Section 5.0 – Financial Summary.

Table 7 and Figure 3 below shows the ITS service area projected 10-year lifecycle costs (asset renewal and replacement activities required for existing assets) and performance to maintain current levels of service. For details on current levels of service descriptions, measures and targets and current performance, refer to Table 5 in Section 2 – Levels of Service of this attachment.

Lifecycle costs shown below were calculated based on current asset conditions and forecasted out over the 10-yr period using the recommended deterioration model for that asset/asset class.

⁶ Request for Proposal RFP 22-22 Consulting Services to Support Asset Management Planning Updates

Table 7: ITS Lifecycle Associated Costs – Delivering Current Levels of Service, existing assets

Lifecycle Activity Costs - Information Technology Services	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	Total 10-Yr
ITS assets	\$0	\$911,201	\$911,201	\$911,201	\$911,201	\$911,201	\$911,201	\$911,201	\$911,201	\$911,201	\$911,201	\$9,112,010
Annual Total	\$0	\$911,201	\$911,201	\$911,201	\$911,201	\$911,201	\$911,201	\$911,201	\$911,201	\$911,201	\$911,201	\$9,112,010
Average Annual Lifecycle Cost	\$911,201	\$911,201	\$911,201	\$911,201	\$911,201	\$911,201	\$911,201	\$911,201	\$911,201	\$911,201	\$911,201	

Based on the lifecycle assessment for ITS assets (for renewal and replacement), it is estimated that the City would need to spend an average of \$0.9 million per year to carry out the required lifecycle activities to maintain current levels of service.

Attachment #13: Emergency Services



Infrastructure Value	\$66.3M	
Annual Renewal Needs	\$1.9M	
Overall Condition	3.0	Fair
High Risk Asset Value	\$27M	41%
Trend	N/A	

1.0 Summary of Emergency Services

The Emergency Services area includes Police and Fire Services. Asset classes that fall under both areas include facilities, fleet, and equipment. Annual renewal needs shown are based on lifecycle management strategies and represent the estimated amount of capital the City needs to reinvest in its existing asset inventory on an annual basis over the next 10 years to sustain the current levels of service (based on the 25-yr investment forecast).

This is the first iteration of the Asset Management Plan that includes Emergency Services.

Table 1 details the City's inventory for Emergency Services.

1.1 Inventory Details

Table 1: Emergency Services Inventory

Asset Class & Sub-class	Asset	2023 Quantity	Unit of Measure
Fire Services			
Fleet	Vehicles	39	Each
Facilities	Fire Station #1	27,208	Sq. Ft
	Fire Station #2	3,500	Sq. Ft
	Fire Station #3	16,603	Sq. Ft
	Annex/Emergency Operations Centre	2,670	Sq. Ft

Asset Class & Sub-class	Asset	2023 Quantity	Unit of Measure
Miscellaneous Equipment	Various Equipment	Pooled	Pooled
Police Services			
Fleet	Vehicles	62	Each
Facilities	Peterborough Police & Parking Garage	55,590	Sq. Ft
Miscellaneous Equipment	Various Equipment	Pooled	Pooled

1.2 Replacement Costs

The estimated year end 2023 replacement costs for the Emergency Services area totalled \$66.3 million. Replacement costs were determined using different valuation methods, such as unit cost multipliers based on recent construction projects or replacements, condition assessments or historical costs inflated to 2023 where recent assessments or costing information was not available.

Figure 1: Emergency Services –Replacement Cost by Asset Category

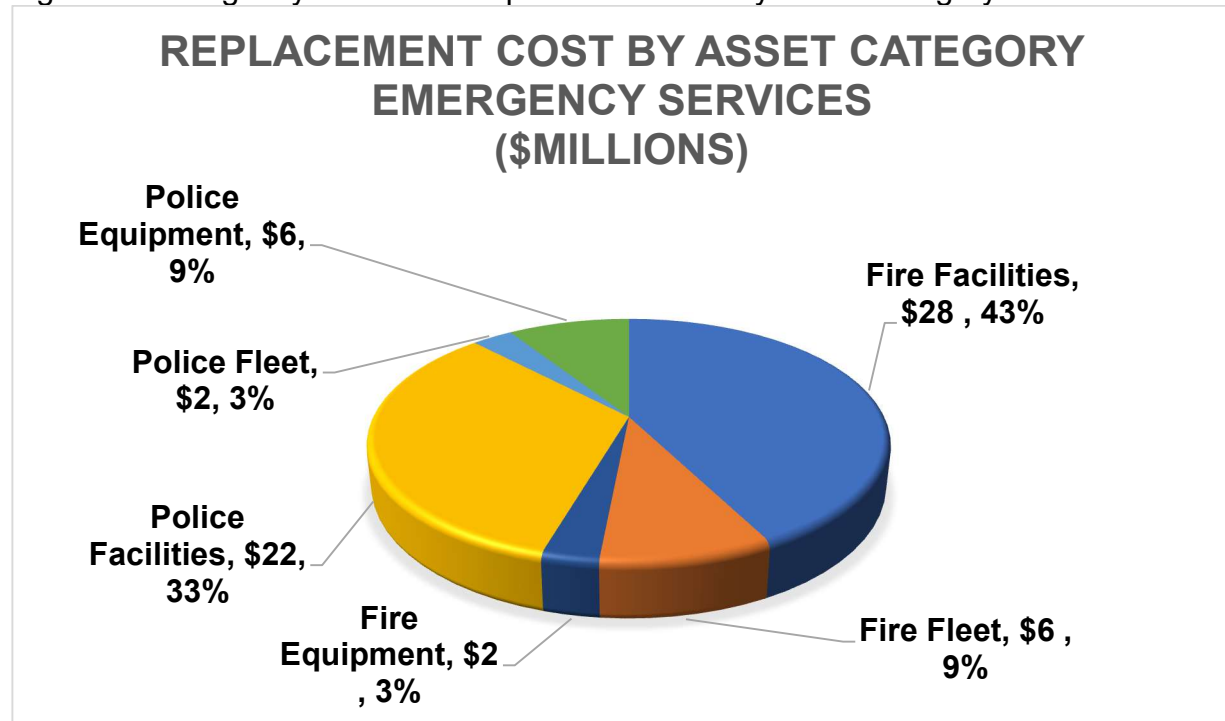


Table 2: Emergency Services - Replacement Costs by Asset

Asset Category & Class	Asset	2023 Replacement Cost
Fire Services		
Fleet	Vehicles	\$6,325,186
Facilities	Fire Station #1	\$15,165,490
	Fire Station #2	\$1,546,793
	Fire Station #3	\$10,316,259
	Annex/Emergency Operations Centre	\$1,234,054
Equipment	Emergency and Non-Emergency Response equipment	\$2,186,994
Police Services		
Fleet	Vehicles	\$2,297,585
Facilities	Peterborough Police & Parking Garage	\$21,516,414
Equipment	Emergency Response Equipment	\$5,671,691
Emergency Services Total		\$66,260,466

1.3 Asset Condition and Remaining Useful Life

The City's Emergency Services assets are currently rated in overall fair condition. Where condition inspections have not been completed, high-level ratings using professional judgement, or age-based ratings were used. Based on replacement cost, 11% or \$7.0 million are rated very good, 19% or \$12 million rated good, 42% or \$27 million rated fair and 29% or \$19 million are rated poor and very poor. Figure 2 and Table 3 provide condition details of Emergency Services.

Figure 2: Emergency Services - Distributed Condition and Replacement Cost

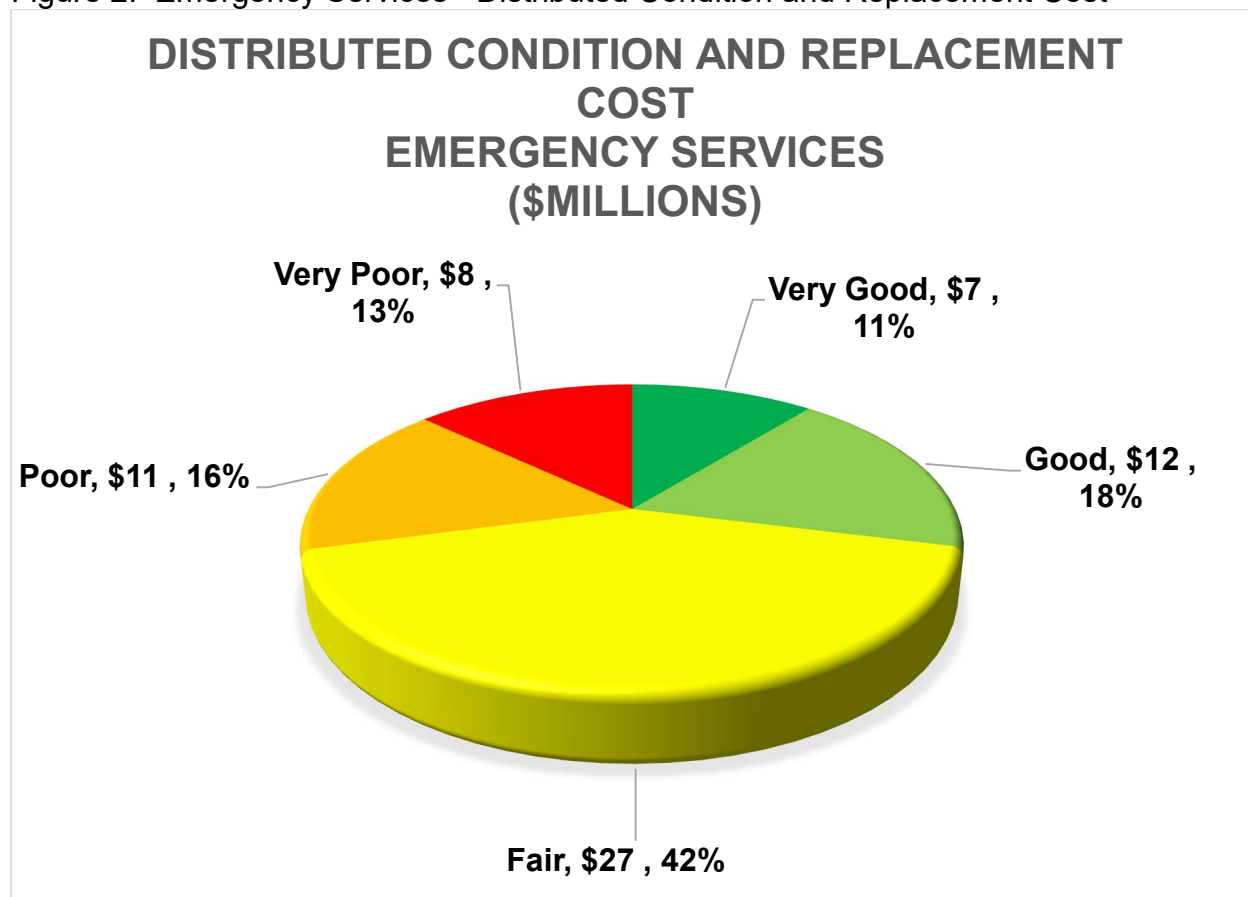


Table 3: Emergency Services - Asset Condition Ratings

Asset Category & Class	Asset	2023 Condition Rating
Fire Services		
Fleet	Vehicles	Fair
Facilities	Fire Station #1	Fair
	Fire Station #2	Poor
	Fire Station #3	Good
	Annex/Emergency Operations Centre	Good

Asset Category & Class	Asset	2023 Condition Rating
Equipment	Emergency and Non-Emergency Response equipment	Fair
Police Services		
Fleet	Vehicles	Good
Facilities	Peterborough Police & Parking Garage	Fair
Miscellaneous Equipment	Emergency Response Equipment	Poor
Emergency Services Overall Condition¹		Fair

Fire and Police Services Facilities

Fire and Police facility ratings shown are based on the most recent building condition assessments completed in 2021-2022 and use observed age of facility elements at the time of assessment. Other assets use an age-based rating methodology and have been reviewed by staff to ensure that it reflects the current conditions until detailed assessments are completed. The City plans to complete BCA's on a seven-year cycle with the next round of assessments anticipated to be completed in 2028.

A new Fire Station #2 is currently being constructed in to replace the outdated facility currently located on Carnegie Avenue (built in 1967). The design and location of the current facility has made service delivery challenging, requiring a new location to accommodate current needs as well as growth demands. Construction of the new Fire Station #2 is underway with an anticipated completion date in fall of 2024.

Fleet

Condition ratings for fleet are based on both inspected conditions and age-based ratings. For Fire Services, useful life of specialized heavy-duty vehicles (e.g., pumper trucks, aerial lift trucks) are based on Fire Underwriters Insurance Rating Chart for the age, vehicle and its use. Light-duty support vehicles are typically replaced every 15 years. Police light duty vehicles (e.g., police cruisers, pick-up trucks, etc.) and miscellaneous fleet (e.g., motorcycles) are estimated to reach end of useful life and replaced every 9 to 10 years.

The City's fleet maintenance plan incorporates ministry requirements and industry best practices which aims to maintain a high level of vehicle health. Predictive processes are utilized when scheduling major repairs such as engine, transmission, and axle repairs. This ensures that the right maintenance activities are being carried out at the correct time throughout the vehicle's life cycle and minimizing the total cost of ownership.

¹ Weighted by replacement cost

Police and Fire Services Equipment

Fire fighting equipment, personal protective equipment (PPE) and police protective equipment have an average operational life of 5-10 years and are part of a scheduled inspection and replacement program to ensure the fire and police staff are suitably equipped and to adhere to Ministry of Labour standards. Condition ratings shown are age-based and reviewed by service area subject matter experts.

Remaining Useful Life

The following summarizes the Emergency Services assets' remaining useful life. The useful life of an asset is the estimated period over which the City expects to use the asset. Estimates are based on the calculated age or observed age (where condition assessments have been completed) and do not take into consideration any betterments that extend the useful life of the asset(s). Ideally, as condition assessments are completed the 'observed' age will be used in calculating remaining useful life. The ages of the assets are variable and with efforts to extend the life by application of lifecycle treatments, there isn't necessarily a linear relationship between age and condition.

Table 4 shows the Emergency Services remaining useful life details.

Table 4: Emergency Services Assets Remaining Useful Life²

Asset Inventory	Expected Useful Life (Yrs.)	Remaining Useful Life (Yrs.)	Percent of Useful Life Remaining
Facilities			
Fire Stations	34	12	34%
Peterborough Police Station & Parking Garage	34	14	41%
Fleet			
Emergency Response Fleet	12	2	0%
Non-Emergency Response Fleet	23	21	44%
Equipment			
Emergency Response Equipment	10	0	0%
Non-Emergency Response Equipment	10	0	0%
Emergency Services Assets Remaining Useful Life	30	10	34%

² ESL, RUL, and percent of useful life remaining are based on calculated average of asset classes.

1.4 Asset Risk Assessment

The consequences of failure for Emergency Services assets have been determined manually by City staff based on a standardized chart for consequence (found in Appendix B). The assessment considers environmental, economical, social, life safety, legislation and corporate reputation as factors when scoring consequence.

Using the product of the scores for likelihood of failure (likelihood is higher as asset condition worsens) and the consequence of failure, the asset is assigned a risk rating using the ranges shown in the chart below:

Category	Range
High Risk	< 5
Medium Risk	5 – 20
Low Risk	> 20

The estimated replacement value of Emergency Services high risk assets is \$26.1 million.

The City continues to prioritize the operational, maintenance and renewal needs of both the critical assets and high-risk assets to minimize health and safety risks and impacts to service delivery.

2.0 Levels of Service

This section will present levels of service as they are currently being provided by the City. Service area objective statements were developed by taking into consideration the goals, strategies and objectives defined in other overarching Council approved City plans, studies and policies such as the Official Plan (April 2023).

Stakeholder and technical levels of service, performance measures and current performance for Emergency Services are outlined in Table 5 and 6 below. Further development of the City's levels of service is underway in which the proposed levels of service and the affordability of the service will be analyzed and presented. Future versions of the Asset Management Plan will also include other proposed levels of service reporting requirements set forth in the Asset Management Planning for Municipal Infrastructure Regulation (O.Reg. 588/17).

Table 5: Levels of Service – Fire Services

Asset Class: Fire Services - Facilities								
Service Objective Statement: Providing effective and reliable emergency services that keep the community safe.								
Stakeholder Value/Service Attribute	Stakeholder LoS and Measures		Stakeholder Performance		Technical Measure		Technical Performance	
			Year of Measure				Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
Reliability/Quality	Providing reliable and high-quality Fire Services Facilities that meet the needs of the community	Fire Services Facilities are maintained in a state of good repair	n/a - not reported	Facilities are proactively maintained and reliable for intended use	Percent of fire suppression incidents within NFPA response travel time.	90% of fire suppression incidents are within NFPA standards	n/a - not reported	Station 1: 86% Station 2: 71% Station 3: 95%
					Average Facility Condition Index (FCI) value for all facilities	Good (Between 0% and 5%)	n/a - not reported	5% (Good)
					Number of facilities assets in overall fair or better condition	4 Facilities	n/a - not reported	3 Facilities

Asset Class: Fire Services - Facilities								
Service Objective Statement: Providing effective and reliable emergency services that keep the community safe.								
Stakeholder Value/Service Attribute	Stakeholder LoS and Measures		Stakeholder Performance		Technical Measure		Technical Performance	
			Year of Measure				Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
Climate Leadership	Facilities are energy efficient and demonstrate leadership on climate action	Facilities meet our environmental objectives	n/a - not reported	Facilities strive to lower energy usage by installing energy conservation measures that improve energy efficiency to reduce GHG emissions	Annual energy consumption per facility per square meter	Energy Use Intensity (EUI) of 0.66 GJ/m2 or less	n/a - not reported	1.10 GJ/m2

Asset Class: Fire Services - Fleet and Equipment								
Service Objective Statement: Efficiently providing safe, reliable, and fuel efficient vehicles at a cost affordable to the client.								
Stakeholder Value/Service Attribute	Stakeholder LoS and Measures		Stakeholder Performance		Technical Measure		Technical Performance	
			Year of Measure				Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
Reliability/Quality	Providing reliable and high-quality Fire Fleet and Equipment that meets the needs of the community and stakeholders	Fire Fleet and Equipment is maintained in a state of good repair	n/a	Fleet and Equipment is proactively maintained and reliable for intended use	Percentage of support vehicles that are past their useful life	Less than 5%	n/a - not reported	19%
					Percentage of vehicles that past their useful life (fire apparatus and first response vehicles)	Less than 5%	n/a - not reported	25%
					Unassigned/spare ratio of vehicles	Max 20%	n/a - not reported	20%
					Percentage of fire equipment past their estimated service life	0%	n/a - not reported	21%
					Unassigned/spare ratio of fire equipment	Max 20%	n/a - not reported	20%
Climate Leadership	Providing vehicles and equipment with minimal greenhouse gas emissions	Fleet that meets our environmental objectives	n/a	60% of all new light duty fleet acquisition s are low carbon by 2030	Percentage of support vehicles that are electrified	5%	n/a - not reported	TBD

Table 6: Levels of Service – Police Services

Asset Class: Police Services - Facilities								
Service Objective Statement: Providing effective and reliable emergency services that keep the community safe.								
Stakeholder Value/Service Attribute	Stakeholder LoS and Measures		Stakeholder Performance Year of Measure		Technical Measure		Technical Performance Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
Reliability	Providing reliable and high-quality Police Facilities that meet the needs of the community	Police Facilities are maintained in a state of good repair	n/a - not reported	Facilities are proactively maintained and reliable for intended use	Percentage of police stations that are able to meet response times	100%	n/a	100%
					Average Facility Condition Index (FCI) value for all facilities	Good (Between 0% and 5%)	n/a	2% (Good)
					Number of facilities assets in overall fair or better condition	2 Facilities	n/a	2 Facilities
Accessibility	Providing facilities that are accessible and available to stakeholders to support service delivery	Description of facilities and level of accessibility	n/a - not reported	Facilities are accessible for intended use	Facility meets parking needs for staff and service vehicles.	Yes	n/a	No

Asset Class: Police Services - Facilities								
Service Objective Statement: Providing effective and reliable emergency services that keep the community safe.								
Stakeholder Value/Service Attribute	Stakeholder LoS and Measures		Stakeholder Performance Year of Measure		Technical Measure		Technical Performance Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
Climate Leadership	Facilities are energy efficient and demonstrate leadership on climate action	Facilities meet our environmental objectives	n/a - not reported	Facilities strive to lower energy usage by installing energy conservation measures that improve energy efficiency to reduce GHG emissions	Annual energy consumption per facility per square meter	Energy Use Intensity (EUI) of 0.66 GJ/m2 or less	n/a - not reported	1.05 GJ/m2

Asset Class: Police Services - Fleet								
Service Objective Statement: Efficiently providing safe, reliable, and fuel efficient vehicles at a cost affordable to the client.								
Stakeholder Value/Service Attribute	Stakeholder LoS and Measures		Stakeholder Performance		Technical Measure		Technical Performance	
			Year of Measure				Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
Reliability/Quality	Providing reliable and high-quality Police Fleet that meets the needs of the community and stakeholders	Police Fleet is maintained in a state of good repair	n/a	Fleet is proactively maintained and reliable for intended use	Percentage of vehicles that past their useful life	Less than 5%	n/a	2%
					Unassigned/spare ratio of vehicles	Max 10%	n/a	10%
Climate Leadership	Providing vehicles & equipment with minimal greenhouse gas emissions	Fleet that meets our environmental objectives	n/a	60% of all new light duty fleet acquisitions are low carbon by 2030	Percentage of vehicles that are electrified	5%	n/a	TBD

Asset Class: Police Services - Equipment								
Service Objective Statement: Efficiently providing police equipment at an appropriate quality and quantity to support the delivery of services.								
Stakeholder Value/Service Attribute	Stakeholder LoS and Measures		Stakeholder Performance		Technical Measure		Technical Performance	
			Year of Measure				Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
Reliability/Quality	Providing reliable and high-quality Police Equipment that meets the needs of the community and stakeholders	Police Equipment is maintained in a state of good repair	n/a	Equipment is proactively maintained and reliable for intended use	Percentage of police equipment past their estimated service life	0%	n/a	50%

3.0 Asset Management Strategies – Emergency Services

Emergency Services assets include both Fire and Police services assets. Options for which lifecycle activities that could potentially be undertaken have been explored in various needs studies and reports such as the Fire Station #2 Relocation Study and the Peterborough Police Services Board Strategic Plan. The following table below documents the set of planned actions or ‘activities’ that the City undertakes to sustain current levels of service, while managing risk at the lowest lifecycle cost. The City plans the necessary lifecycle activities at the required time and does not need to alter the *type* of activity undertaken. However, where limited funding is available, the interval and timing of the necessary lifecycle activities are affected, which can have an overall impact on the performance of the asset(s) over its useful life.

Table 7: Emergency Services – Asset Management Lifecycle Strategies

Strategy Type - Facilities	Current Practice
Non-infrastructure Solutions Actions or policies that can lower costs or extend asset life (e.g. better integrated infrastructure planning and land use planning, demand management, insurance, process optimization, managed failures, etc.).	· Building condition assessment program
	· Linking the asset management plan to other studies, master plans and strategies
	· Public consultation on levels of service
	· Needs studies to assess community needs and how services are being delivered to the community
	· Integrating asset management planning to drive lifecycle activities
	· Integrating infrastructure and land use planning
	· Educate staff on climate change initiatives and energy efficiency opportunities with respect to building operations/ownership
Maintenance Activities Activities include regularly scheduled inspection and maintenance, or more significant repair and activities associated with unexpected events.	· Preventative and corrective maintenance programs for facilities
	· Service contracts for building life-safety and security alarm systems, elevating systems, and code/regulated building elements
	· Basic custodial services
	· Seasonal maintenance contracts such as snow clearing and cleaning
	· Service contracts for pest control and landscaping maintenance
Renewals/Rehabilitation: Includes significant repairs designed to extend the life of the asset (e.g. the lining of iron watermains can defer the need for replacement).	· Renewal of facility elements or sub-systems such as structures, roofs, building exteriors, building services (HVAC, plumbing, electrical), interior finishes and sitework that are at the end of their useful life and renewal does not improve/expand the intended service initially provided
	· Upgrading projects focus on removing asset exposure to elements
Replacement Activities that are expected to occur once an asset has reached the end of its useful life and renewal/rehabilitation is no longer an option.	· Facility components replaced when at end of useful life through capital planning/business case (as identified through BCAs)
	· Replacement due to obsolescence or does not meet minimum design standards/intent
	· Replacements considered within the context of the facility

Strategy Type - Facilities	Current Practice
	· Asset replacement is coordinated with planned expansion wherever possible
	· Asset replacement is bundled with other dependent assets wherever possible
	· Operating vs. Replacement cost comparison
Disposals/Abandonment Policies Activities associated with disposing of an asset once it has reached the end of its useful life or is otherwise no longer needed by the municipality.	· Facilities that are no longer needed for the intended service are either sold, re-purposed or demolished
Expansion Programs Planned activities required to extend the services to previously un-serviced areas – or expand services to meet growth demands.	· Expansion when facility has reached its functional capacity and expansion is necessary for continued delivery of service
	· Changes to accessibility requirements for public buildings where identified and there is an opportunity to do so.
	· Changes to building components to increase energy efficiency (ex. LED lighting, etc.) where possible
	· Expansion of renewable energy programs and systems to reduce energy costs for operation where possible
Future Strategies	- n/a

Strategy Type – Fleet and Equipment	Current Practice
Non-infrastructure Solutions Actions or policies that can lower costs or extend asset life (e.g. better integrated infrastructure planning and land use planning, demand management, insurance, process optimization, managed failures, etc.).	· Training programs for mechanics and operators to optimally maintain and operate vehicles
	· Linking the asset management plan to other studies, master plans and strategies
	· Public consultation on levels of service
	· Regular vehicle inspection coordinated with planned maintenance
	· Redundancy of parts and fleet for the system
	· Redundancy of critical equipment
	· Annual government inspections legislated for Fire Services
	· High priority in procurement for purchasing fleet compatible with current fleet to improve parts and maintenance costs
Maintenance Activities Activities include regularly scheduled inspection and maintenance, or more significant repair and activities associated with unexpected events.	· High standard for preventative maintenance that exceeds the Original Equipment Manufacturer (OEM) schedule

Strategy Type – Fleet and Equipment	Current Practice
	· Reactive maintenance as required
	· Annual HVAC, Undercoating, Mirror Replacement programs
	· Fluid monitoring with lab analysis performed every other service to gain insight of future failures
	· Third party tire checks 2x a year
	· Monitor OEM bulletins/recalls and be ready to replace and repair
Renewals/Rehabilitation: Includes significant repairs designed to extend the life of the asset (e.g. the lining of iron watermain can defer the need for replacement).	· Not applicable for most assets. Fleet and equipment undergo regular maintenance program until replacement
	· Heavy duty vehicles (ex. emergency vehicles) have an engine overhaul at mid-life (approximately 5 years of age).
Replacement Activities that are expected to occur once an asset has reached the end of its useful life and renewal/rehabilitation is no longer an option.	· Replace vehicles at end of service life
	· Replace equipment at end of service life
Disposals/Abandonment Policies Activities associated with disposing of an asset once it has reached the end of its useful life or is otherwise no longer needed by the municipality.	· Sell problematic fleet (very rare)
	· Auction retired fleet
	· Retain retired fleet as required to maintain spare ratios
	· Retain retired equipment as required to maintain spare ratios
Expansion Programs Planned activities required to extend the services to previously un-served areas – or expand services to meet growth demands.	· Right-size fleet as needed to accommodate expansion of service and planned growth
	· Right-size equipment as needed to accommodate expansion of service and planned growth
Future Strategies	· Review alternate fuels periodically for potential use
	· Consider electric vehicles and equipment where possible and practical

3.1 Asset Management Strategies and Associated Risks

Strategic Risks

Strategic level risks are events that may impact the ability of the City to deliver asset management strategies and minimize costs.

Potential strategic level risks associated with the City's ability to effectively deliver established Emergency Services are:

- Insufficient funding levels
- Insufficient staffing and resources to responsibly implement lifecycle strategies
- Asset deterioration assessments/models are underestimated/miscalculated
- External/environmental factors such as climate change effects (more severe weather instances, increased demands due to growth)

Risk Trade Offs

If lifecycle activities (operations, maintenance, renewal, and other capital projects) are not undertaken, they may sustain or create risk consequences. These risk consequences may include (but not limited to):

- Public health and safety – assets not adequate/available for emergency response
- Further/accelerated asset deterioration
- Increased backlog of work
- Increased treatment costs
- Level of treatment changes requiring increased resources/costs (maintenance now needing replacement)
- Planned budget/needs forecast not a reflection of actual asset needs
- Additional assets/expansion of services required
- Reputation/image negatively affected

Risks relating to asset failure are mitigated through condition assessment programs, maintenance programs (legislated and best practices) and scheduled renewal programs which ensure assets are in acceptable condition and are available to achieve the determined levels of services. Risks related to fleet asset failures are addressed through proactive fleet maintenance and adequate vehicle storage to ensure adequate service readiness.

All City services, including emergency services are reviewed and identified in the City's Business Continuity Plan (BCP) and prioritization process. The BCP identifies the key interruption impacts, recovery time objectives, dependencies, qualified resources available and a resource back-up strategy should services be interrupted. The BCP is reviewed and updated regularly to ensure that critical services are not interrupted, minimizing risks.

The choice of strategy for maintaining Emergency Services assets considers the risk of failure of the assets, the risk to service delivery and the risk to other services dependant on this service area. Strategies implemented are at the lowest cost in order to reduce the burden on the tax base and user fees where possible and to maintain the current levels of service.

A full detailed, documented risk analysis in which the identification of credible risks, the likelihood of the risk event occurring, the consequences should the event occur, development of a risk rating, evaluation of the risk and the development of a risk treatment plan for non-acceptable risks is planned and will be included in future versions of the asset management plan when completed.

3.2 Lifecycle Models, Interventions, and Cost of Service:

Overview of Lifecycle Models

Service area lifecycle models have been developed³ in which asset intervention thresholds and associated costs for lifecycle activities (e.g., rehabilitation and replacement) are documented.

Lifecycle models are mathematical, statistical and logic models of planned actions and of asset deterioration over time. This helps the City to forecast required asset lifecycle activities and their impacts on levels of service, risk, and funding needs. In short, lifecycle models are mathematical representation of the City's *Lifecycle Activities*.

Overview of Interventions

Interventions represent the major lifecycle activities carried out for assets over their service life and are typically accounted for as part of the capital planning process. The term 'intervention threshold' or 'intervention trigger' are used interchangeably, and they describe a point in an asset's lifecycle when the intervention typically occurs.

When an asset degrades and an intervention threshold is reached, the asset will require treatment (e.g., repair or rehabilitation). After the treatment is applied, the performance (condition) of that asset will increase to a higher value, at which point it will continue to degrade. This will extend the overall estimated service life (ESL) of the asset.

The costs associated with interventions can be used to establish capital funding needs and determine the most cost-effective solution to maintain level of service targets. Costs for thresholds were derived from the City's historical construction costs and financial information for actual or similar interventions where available and applicable. Where replacement activities are determined, asset replacement costs were used.

3.3 Lifecycle Options Analysis and Costs of Service

The options analysis of the lifecycle activities that could be undertaken were reviewed with the Emergency services subject matter experts. Lifecycle activity options were discussed and determined that the current planned activities are appropriate and the most cost-effective option(s). Details related to the Emergency services available funding, investments and shortfalls can be found in Section 5.0 – Financial Summary.

Table 8 and Figure 3a and 3b below shows the Emergency services area projected 10-year lifecycle costs (asset renewal and replacement activities required for existing assets) and performance to maintain current levels of service. For details on current levels of service descriptions, measures and targets and current performance, refer to Table 5 in Section 2 – Levels of Service of this attachment.

Lifecycle costs shown below were calculated based on current asset conditions and forecasted out over the 10-yr period using the recommended deterioration model for that asset/asset class. Where asset condition data was not available, age-based condition ratings were applied.

³ Request for Proposal RFP 22-22 Consulting Services to Support Asset Management Planning Updates

Table 8: Emergency Services Lifecycle Associated Costs – Delivering Current Levels of Service, existing assets

Lifecycle Activity Costs - Emergency Services Assets	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	Total 10-Yr
Fire Services	\$0	\$829,440	\$829,440	\$829,440	\$829,440	\$829,440	\$829,440	\$829,440	\$829,440	\$829,440	\$829,440	\$8,294,402
Police Services	\$0	\$1,043,086	\$1,043,086	\$1,043,086	\$1,043,086	\$1,043,086	\$1,043,086	\$1,043,086	\$1,043,086	\$1,043,086	\$1,043,086	\$10,430,865
Annual Total	\$0	\$1,872,527	\$1,872,527	\$1,872,527	\$1,872,527	\$1,872,527	\$1,872,527	\$1,872,527	\$1,872,527	\$1,872,527	\$1,872,527	\$18,725,266
Average Annual Lifecycle Cost	\$1,872,527	\$1,872,527	\$1,872,527	\$1,872,527	\$1,872,527	\$1,872,527	\$1,872,527	\$1,872,527	\$1,872,527	\$1,872,527	\$1,872,527	

Based on the lifecycle assessment for Emergency services assets (for renewal and replacement), it is estimated that the City would need to spend an average of \$1.9 million per year to carry out the required lifecycle activities to maintain current levels of service.

Figure 3a: 10-Year Forecasted Performance for Maintaining Levels of Service – Fire Services

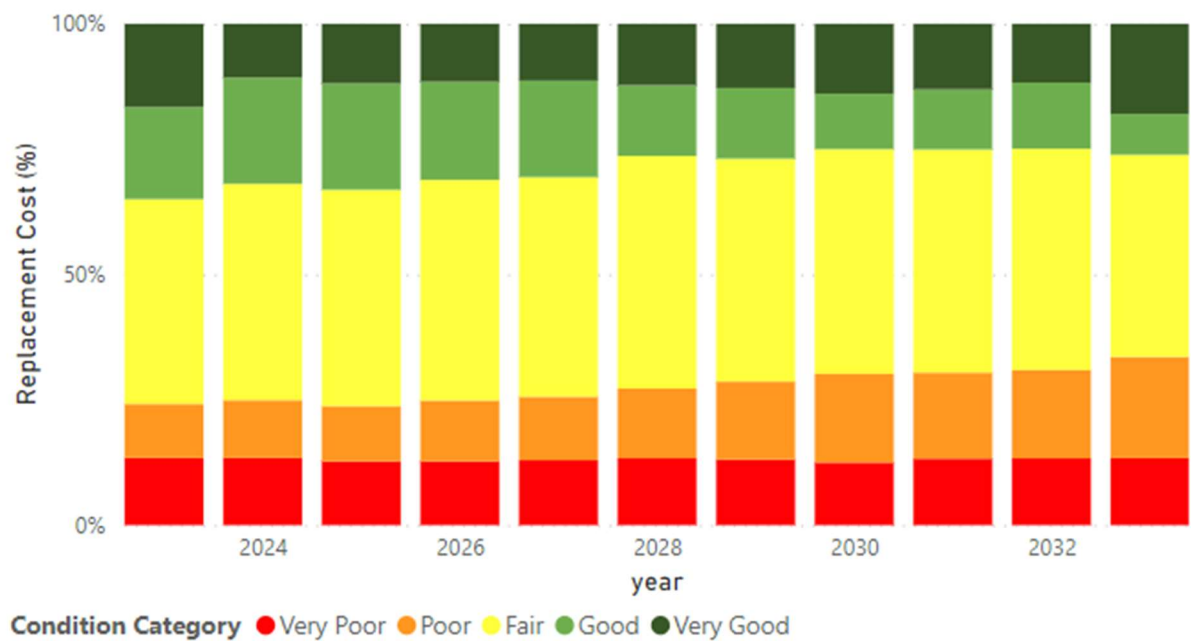


Figure 3b: 10 Year Forecasted Performance for Maintaining Levels of Service – Police Services

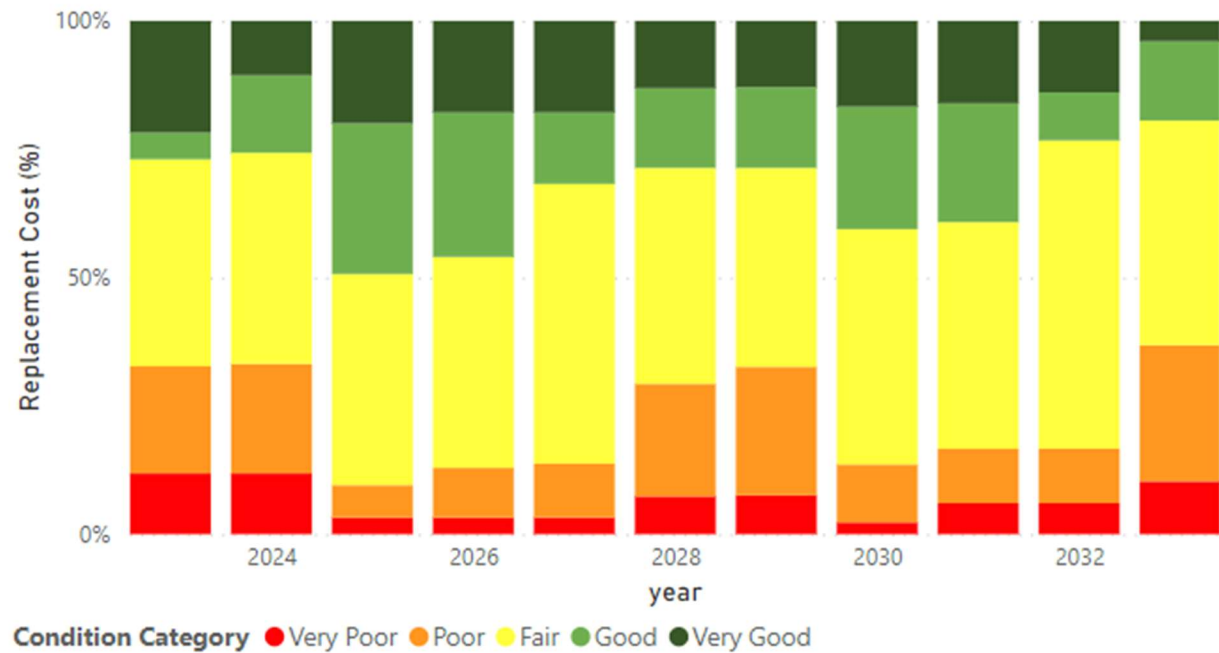


Figure 3a and 3b above illustrates the performance (condition) of Fire and Police assets over the 10-year forecast. The estimated average combined annual expenditures to maintain these conditions is approximately \$1.9M.

Attachment #14: Public Works



Infrastructure Value	\$44.9M	
Annual Renewal Needs	\$1.8M	
Overall Condition	4.0	Good
High Risk Asset Value	\$2M	4%
Trend	N/A	

1.0 Summary of Public Works Service Area

Asset classes that fall under the Public Works service area include the Municipal Operations Centre and Office Facility, Operations Storage Garage, the salt and sand storage facility, fleet, and equipment. Annual renewal needs shown are based on lifecycle management strategies and represent the estimated amount of capital the City needs to reinvest in its existing asset inventory on an annual basis over the next 10 years to sustain the current levels of service (based on the 25-yr investment forecast).

This is the first iteration of the Asset Management Plan that includes the Public Works Service Area.

Table 1 details the City's inventory for the Public Works service area.

1.1 Inventory Details

Table 1: Public Works Inventory

Asset Class & Sub-class	2023 Quantity	Unit of Measure
Facilities		
Municipal Operations Centre Office	16,100	Sq. Ft
Municipal Operations Centre and Storage Garage	53,916	Sq. Ft
Salt and Sand Storage Facility	21,720	Sq. Ft
Fleet		
Equipment and Vehicles	72	Each

1.2 Replacement Costs

The estimated year end 2023 replacement costs for the Public Works service area totalled \$44.9 million. Replacement costs were determined using recent acquisition costs of like assets or historical costs inflated to 2023 dollars where recent costing information was not available.

Figure 1: Public Works Service Area –Replacement Cost by Asset Sub-Class

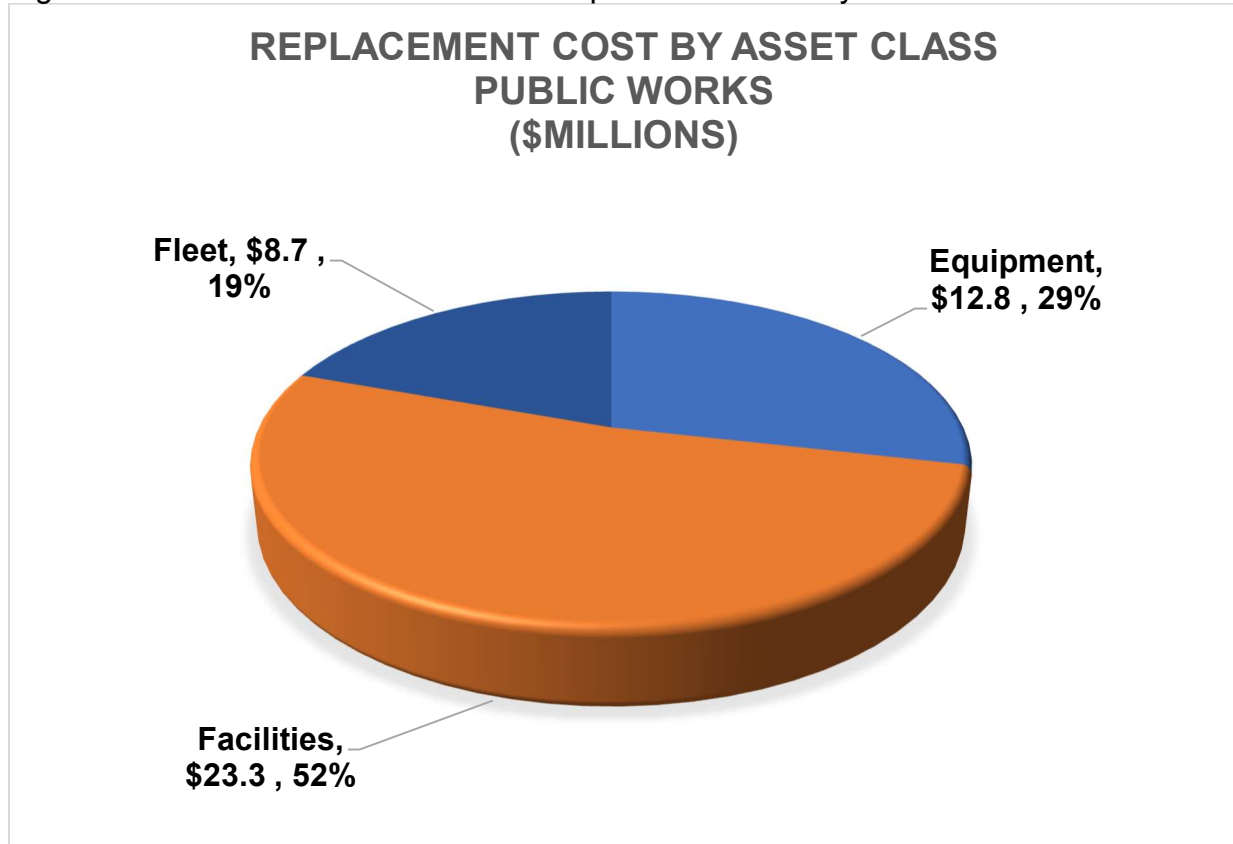


Table 2: Public Works Assets - Replacement Costs by Asset Class

Asset Category & Class	2023 Replacement Cost
Facilities	
Municipal Operations Centre Office	\$4,363,020
Municipal Operations Centre and Storage Garage	\$18,135,109
Salt and Sand Storage Facility	\$831,795
Fleet & Equipment	
Fleet	\$8,725,557
Equipment	\$12,833,497
Public Works Total	\$44,888,977

1.3 Asset Condition and Remaining Useful Life

Facilities

Public Works facility condition ratings shown are based on the most recent building condition assessment (BCA) completed in 2021-2022 and use observed age of facility elements at the time of assessment. The City plans to complete BCA's on a seven year cycle with the next round of assessments anticipated to be completed in 2028.

In 2019, the Public Works yard and operations office relocated from the overcrowded Townsend Street location into a newly purchased facility at 791 Webber Avenue, now called the Municipal Operations Centre. Other services operating from this location include Fleet Services and Traffic Operations. With significant renovations being completed, the new Municipal Operations Centre now provides more space to better suit staff, fleet, traffic, and public works operational needs, including a larger salt and sand dome storage facility.

Fleet and Equipment

Condition ratings for fleet are based on both inspected conditions and age-based ratings. The City's fleet maintenance plan incorporates ministry requirements and industry best practices which aims to maintain a high level of vehicle health. Predictive processes are utilized when scheduling major repairs such as engine, transmission, and axle repairs. This ensures that the right maintenance activities are being carried out at the correct time throughout the vehicle's life cycle.

Based on replacement cost, 42% or \$19 million are rated very good, 13% or \$5.6 million rated good, 20% or \$9 million rated fair and 25% or \$11.4 million rated poor and very poor. Figure 2 and Table 3 provide condition details of the Public Works service area.

Figure 2: Public Works Assets - Distributed Condition and Replacement Cost

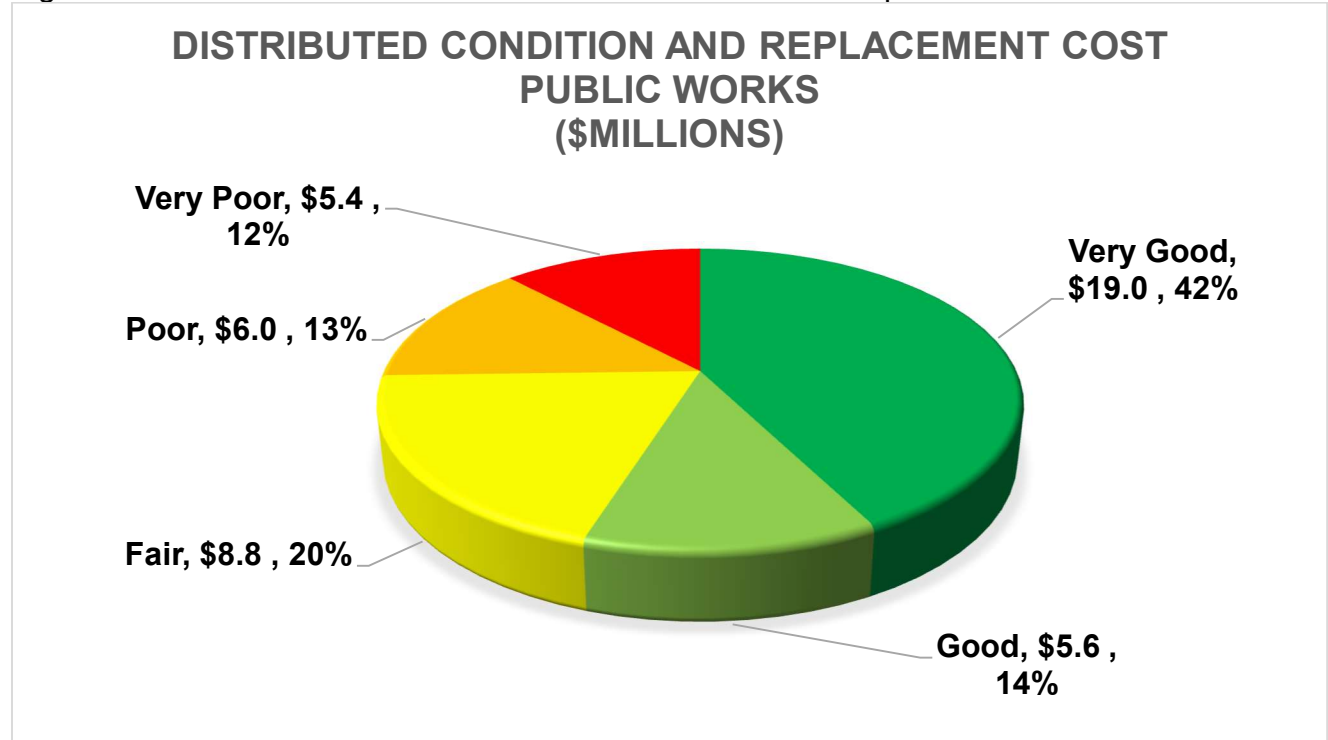


Table 3: Public Works Assets - Asset Condition Ratings

Asset Class & Sub-Class	2023 Condition Rating
Facilities	
Municipal Operations Centre Office	Good
Municipal Operations Centre Storage and Garage	Very Good
Salt and Sand Storage Facility	Very Good
Fleet & Equipment	
Fleet	Poor
Equipment	Poor
Public Works Overall Condition¹	Good

Remaining Useful Life

The following summarizes the Public Works assets' remaining useful life. The useful life of an asset is the estimated period over which the City expects to use the asset.

Estimates of ages are based on the calculated age or observed age (where condition assessments have been completed) and do not take into consideration any betterments that extend the useful life of the asset(s). Ideally, as condition assessments are

¹ Weighted by replacement cost

completed the 'observed' age will be used in calculating remaining useful life. The ages of the assets are variable and with efforts to extend the life by application of lifecycle treatments. It shouldn't be assumed that there is a linear relationship between age and condition for both the calculated and observed age method.

Table 4 shows Public Works assets remaining useful life details.

Table 4: Public Works Assets Remaining Useful Life²

Asset Class and Sub-Class Inventory	Ave. Expected Useful Life (Yrs.)	Ave. Remaining Useful Life (Yrs.)	Percent of Useful Life Remaining
Equipment	15	4	26%
Facilities	34	26	77%
Fleet	10	0	0%
Public Works Assets Remaining Useful Life	28	20	70%

1.4 Asset Risk Assessment

The consequences of failure for Public Works assets have been determined manually by City staff based on a standardized chart for consequence (found in Appendix B). The assessment considers environmental, economical, social, life safety, legislation and corporate reputation as factors when scoring consequence.

Using the product of the scores for likelihood of failure (likelihood is higher as asset condition worsens) and the consequence of failure, the asset is assigned a risk rating using the ranges shown in the chart below:

Category	Range
High Risk	< 5
Medium Risk	5 – 20
Low Risk	> 20

The estimated replacement value of Public Works high-risk assets is \$1.9 million.

The City continues to prioritize the operational, maintenance and renewal needs of both the critical assets and high-risk assets to minimize health and safety risks and impacts to service delivery.

² ESL, RUL, and percent of useful life remaining are based on calculated average of asset classes

2.0 Levels of Service

This section will present levels of service as they are currently being provided by the City. Service area objective statements were developed by taking into consideration the goals, strategies and objectives defined in other overarching Council approved City plans, studies, and policies.

Stakeholder and technical levels of service, performance measures and current performance for the Public Works service area are outlined in Table 5 below. Further development of the City's levels of service is underway in which the proposed levels of service and the affordability of the service will be analyzed and presented. Future versions of the Asset Management Plan will also include other proposed levels of service reporting requirements set forth in the Asset Management Planning for Municipal Infrastructure Regulation (O.Reg. 588/17).

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Table 5: Levels of Service – Public Works

Asset Class: Public Works – Fleet								
Service Objective Statement: Efficiently providing safe, reliable, and fuel efficient vehicles at a cost affordable to the client.								
Stakeholder Value/Service Attribute	Stakeholder LoS and Measures		Stakeholder Performance Year of Measure		Technical Measure		Technical Performance Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
Reliability/Quality	Providing reliable and high-quality Public Works Fleet and Equipment that meet the needs of the community and stakeholders	Public Works Fleet and Equipment are maintained in a state of good repair	n/a	Vehicles and equipment are proactively maintained and reliable for intended use	Percentage of vehicles that past their useful life	Max 10%	n/a	36%
					Percentage of machinery and equipment assets past their useful life	Max 10%	n/a	20%
					Unassigned ratio of vehicles	Max 10%	n/a	5%
					Unassigned ratio of equipment	Max 10%	n/a	5%
Climate Leadership	Providing vehicles & equipment with minimal greenhouse gas emissions	Fleet that meets our environmental objectives	n/a	60% of all new light duty fleet acquisitions are low carbon by 2030	Percentage of vehicles that are electrified	5%	n/a	TBD

Asset Class: Public Works – Facilities								
Service Objective Statement: Providing high quality, accessible, and energy efficient facilities that are available and meet the needs of the community.								
Stakeholder Value/Service Attribute	Stakeholder LoS and Measures		Stakeholder Performance Year of Measure		Technical Measure		Technical Performance Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
Reliability/Quality	Providing reliable and high-quality Public Works Facilities that meet the needs of the community and stakeholders	Public Works Facilities are maintained in a state of good repair	n/a	Facilities are proactively maintained and reliable for intended use	Average Facility Condition Index (FCI) value for all facilities	Fair (Between 5% and 10%)	n/a	0.33% (Good)
					Number of facilities with FCI or 10% or better	5 Facilities	n/a	5 Facilities
Climate Leadership	Facilities are energy efficient and demonstrate leadership on climate action	Facilities meet our environmental objectives	n/a	Facilities strive to lower energy usage by installing energy conservation measures that improve energy efficiency to reduce GHG emissions	Annual energy consumption per facility per square meter	Energy Use Intensity (EUI) of 0.86 GJ/m2 or less	n/a	2.39 GJ/m2

3.0 Asset Management Strategies – Public Works

The following table describes the current strategies and activities for the Public Works service area to maintain the current levels of service. Options for which lifecycle activities that could potentially be undertaken are based on industry best practices. The following table below documents the set of planned actions or ‘activities’ that the City undertakes to sustain current levels of service, while managing risk at the lowest lifecycle cost. The City plans the necessary lifecycle activities at the required time and does not need to alter the *type* of activity undertaken. However, with limited funding available, the interval and timing of the necessary lifecycle activities are affected, which can have an overall impact on the performance of the asset(s) over its useful life.

Table 6: Public Works– Asset Management Lifecycle Strategies

Strategy Type - Facilities	Current Practice
Non-infrastructure Solutions Actions or policies that can lower costs or extend asset life (e.g. better integrated infrastructure planning and land use planning, demand management, insurance, process optimization, managed failures, etc.).	· Building condition assessment program (7-year cycle)
	· Linking the asset management plan to other studies, master plans and strategies
	· Public consultation on levels of service
	· Needs studies to assess community needs and how services are being delivered to the community
	· Integrating asset management planning to drive lifecycle activities
	· Integrating infrastructure and land use planning
	· Educate staff on climate change initiatives and energy efficiency opportunities with respect to building operations/ownership
Maintenance Activities Activities include regularly scheduled inspection and maintenance, or more significant repair and activities associated with unexpected events.	· Preventative and corrective maintenance programs for facilities
	· Service contracts for building life-safety and security alarm systems, elevating systems, and code/regulated building elements
	· Basic custodial services
	· Seasonal maintenance contracts such as snow clearing and cleaning
	· Secondary roofing program to re-inspect all facility roofs annually.

Strategy Type - Facilities	Current Practice
	<ul style="list-style-type: none">· Service contracts for pest control and landscaping maintenance
Renewals/Rehabilitation: Includes significant repairs designed to extend the life of the asset (e.g. the lining of iron watermain can defer the need for replacement).	<ul style="list-style-type: none">· Renewal of facility elements or sub-systems such as structures, roofs, building exteriors, building services (HVAC, plumbing, electrical), interior finishes and sitework that are at the end of their useful life and renewal does not improve/expand the intended service initially provided
	<ul style="list-style-type: none">· Upgrading projects focus on removing asset exposure to elements
Replacement Activities that are expected to occur once an asset has reached the end of its useful life and renewal/rehabilitation is no longer an option.	<ul style="list-style-type: none">· Facility components replaced when at end of useful life through capital planning/business case (as identified through BCAs)
	<ul style="list-style-type: none">· Major renovations occur to update building spaces as required
	<ul style="list-style-type: none">· Replacement due to obsolescence or does not meet minimum design standards/intent
	<ul style="list-style-type: none">· Replacements considered within the context of the facility
	<ul style="list-style-type: none">· In the event of a required service expansion, entire facilities are replaced if an improvement or financial analysis justifies the need for a new building as opposed to upgrading the existing one
	<ul style="list-style-type: none">· Asset replacement is coordinated with planned expansion wherever possible
	<ul style="list-style-type: none">· Asset replacement is bundled with other dependent assets wherever possible
Disposals/Abandonment Policies Activities associated with disposing of an asset once it has reached the end of its useful life or is otherwise no longer needed by the municipality.	<ul style="list-style-type: none">· Operating vs. Replacement cost comparison
	<ul style="list-style-type: none">· Facilities that are no longer needed for the intended service are either sold, re-purposed or demolished

Strategy Type - Facilities	Current Practice
Expansion Programs Planned activities required to extend the services to previously un-serviced areas – or expand services to meet growth demands.	· Expansion when facility has reached its functional capacity and expansion is necessary for continued delivery of service
	· Changes to accessibility requirements for public buildings where identified and there is an opportunity to do so.
	· Changes to building components to increase energy efficiency (ex. LED lighting, etc.) where possible
	· Expansion of renewable energy programs and systems to reduce energy costs for operation where possible
Future Strategies	- n/a

Strategy Type – Fleet and Equipment	Current Practice
Non-infrastructure Solutions Actions or policies that can lower costs or extend asset life (e.g. better integrated infrastructure planning and land use planning, demand management, insurance, process optimization, managed failures, etc.).	· Training programs for mechanics and operators to optimally maintain and operate vehicles
	· Regular vehicle inspection coordinated with planned maintenance
	· Linking the asset management plan to other studies, master plans and strategies
	· Public consultation on levels of service
	· Redundancy of parts and fleet for critical items in the system
	· Redundancy of critical equipment

Strategy Type – Fleet and Equipment	Current Practice
	· Annual government inspections legislated for Fire services (all emergency vehicles and apparatus, heavy duty equipment for winter control)
	· High priority in procurement for purchasing fleet compatible with current fleet to improve parts and maintenance costs
Maintenance Activities Activities include regularly scheduled inspection and maintenance, or more significant repair and activities associated with unexpected events.	· High standard for preventative maintenance that exceeds the Original Equipment Manufacturer (OEM) schedule
	· Reactive maintenance as required
	· Annual HVAC, Undercoating, Mirror Replacement programs
	· Fluid monitoring with lab analysis performed every other service to gain insight of future failures (for emergency fleet)
	· Third party tire checks 2x a year
	· Monitor OEM bulletins/recalls and be ready to replace and repair
Renewals/Rehabilitation: Includes significant repairs designed to extend the life of the asset (e.g. the lining of iron watermain can defer the need for replacement).	· Not applicable for most assets. Fleet and equipment undergo regular maintenance program until replacement
	· Heavy duty vehicles (ex. plow trucks) have an engine overhaul at mid-life (approximately 5 years of age).
Replacement Activities that are expected to occur once an asset has reached the end of its useful life and renewal/rehabilitation is no longer an option.	· Replace vehicles at end of service life
	· Replace equipment at end of service life
Disposals/Abandonment Policies Activities associated with disposing of an asset once it has reached the end of its useful life or is otherwise no longer needed by the municipality.	· Sell problematic fleet (very rare)
	· Auction retired fleet
	· Retain some retired fleet to maintain spare ratios (emergency vehicles, sanitation, plows, i.e. all heavy-duty).

Strategy Type – Fleet and Equipment	Current Practice
	<ul style="list-style-type: none">· Retain some retired equipment as required to maintain spare ratios
Expansion Programs Planned activities required to extend the services to previously un-serviced areas – or expand services to meet growth demands.	<ul style="list-style-type: none">· Right-size fleet as needed to accommodate expansion of service and planned growth
	<ul style="list-style-type: none">· Right-size equipment as needed to accommodate expansion of service and planned growth
Future Strategies	<ul style="list-style-type: none">· Review alternate fuels periodically for potential use
	<ul style="list-style-type: none">· Consider electric vehicles (non-heavy-duty fleet) and equipment
	<ul style="list-style-type: none">· Consider electric vehicles for sanitation trucks
	<ul style="list-style-type: none">· Consider electric or hybrid vehicles (vactor truck)

3.1 Asset Management Strategies and Associated Risks

Strategic Risks

Strategic level risks are events that may impact the ability of the City to deliver asset management strategies and minimize costs.

Potential strategic level risks associated with the City's ability to effectively deliver established Emergency Services are:

- Insufficient funding levels
- Insufficient staffing and resources to responsibly implement lifecycle strategies
- Growth and development not considered when establishing PW operational needs
- External/environmental factors such as climate change effects (more severe and more frequent weather instances, flooding) that could cause physical damage to Public Works facilities

Risk Trade Offs:

If the identified lifecycle activities (operations, maintenance, renewal, and other capital projects) are not undertaken, they may sustain or create risk consequences. These risk consequences may include (but not limited to):

Fleet:

- Lack of/limited snow clearing activities (health and safety, legislated impacts)
- Lack of/limited resources to carry out repairs or rehabilitation activities (e.g. roads and related assets, bridges, underground infrastructure, etc.)
- Regulatory non-compliance (plows required for snow clearing)
- Delays to major or time sensitive construction works that depend on or rely on public works fleet to be completed
- Interrupted service/support to various other City departments that require PW fleet for service delivery.

Facilities:

- Major delays/service interruptions to operations
- Backlog of fleet service work impacting various other City services (including emergency services such as fire and police)
- Delays/interruptions to other core services that rely on Public Works Operations such as roads, sanitary sewer, stormwater, transit, etc.

General Consequences:

- Additional assets/expansion of services required to meet demand
- Reputation/image negatively affected
- Staff morale affected

Risks relating to asset failure are mitigated through condition assessment programs, maintenance programs (legislated and best practices) and scheduled renewal programs which ensure assets are in acceptable condition and are available to achieve the determined levels of services. Risks related to fleet asset failures are addressed through proactive fleet maintenance and adequate vehicle storage to ensure adequate service readiness.

All City services, including Public Works services are reviewed and identified in the City's Business Continuity Plan (BCP) and prioritization process. The BCP identifies the key interruption impacts, recovery time objectives, dependencies, qualified resources available and a resource back-up strategy should services be interrupted. The BCP is reviewed and updated regularly to ensure that critical services are not interrupted, minimizing risks.

The choice of strategy for maintaining Public Works assets considers the risk of failure of the assets, the risk to service delivery and the risk to other services dependant on this service area. Strategies implemented are at the lowest cost in order to reduce the burden on the tax base and user fees where possible and to maintain the current levels of service.

A full detailed, documented risk analysis in which the identification of credible risks, the likelihood of the risk event occurring, the consequences should the event occur, development of a risk rating, evaluation of the risk and the development of a risk treatment plan for non-acceptable risks is planned and will be included in future versions of the asset management plan when completed.

3.2 Lifecycle Models, Interventions, and Cost of Service

Overview of Lifecycle Models

Service area lifecycle models have been developed³ in which asset intervention thresholds and associated costs for lifecycle activities (rehabilitation and replacement) are documented.

Lifecycle models are mathematical, statistical and logic models of planned actions and of asset deterioration over time. This helps the City to forecast required asset lifecycle activities and their impacts on levels of service, risk, and funding needs. In short, lifecycle models are mathematical representation of the City's *Lifecycle Activities*.

Overview of Interventions

Interventions represent the major lifecycle activities carried out for assets over their service life and are typically accounted for as part of the capital planning process. The term 'intervention threshold' or 'intervention trigger' are used interchangeably, and they describe a point in an asset's lifecycle when the intervention typically occurs.

When an asset degrades and an intervention threshold is reached, the asset will require treatment (i.e., repair or rehabilitation). After the treatment is applied, the performance (condition) of that asset will increase to a higher value, at which point it will continue to degrade. This will extend the overall estimated service life (ESL) of the asset.

The costs associated with interventions can be used to establish capital funding needs and determine the most cost-effective solution to maintain level of service targets. Costs for thresholds were derived from the City's historical financial information for actual or similar interventions where available and applicable. Where replacement activities are determined, asset replacement costs were used.

3.3 Lifecycle Options Analysis and Costs of Service

The options analysis of the lifecycle activities that could be undertaken were reviewed with the Public Works subject matter experts. Lifecycle activity options were discussed and determined that the current planned activities are appropriate and the most cost-effective option(s). Details related to the Public Works available funding, investments and shortfalls can be found in Section 5.0 – Financial Summary.

Table 7 and Figure 3 below shows the Public Works area projected 10-year lifecycle costs (asset renewal and replacement activities required for existing assets) and performance to maintain current levels of service. For details on current levels of

³ Request for Proposal RFP 22-22 Consulting Services to Support Asset Management Planning Updates

service descriptions, measures and targets and current performance, refer to Table 5 in Section 2 – Levels of Service of this attachment.

Lifecycle costs shown below were calculated based on current asset conditions and forecasted out over the 10-yr period using the recommended deterioration model for that asset/asset class. Where asset condition data was not available, age-based condition ratings were applied.

Table 7: Public Works Lifecycle Associated Costs – Delivering Current Levels of Service, existing assets

Lifecycle Activity Costs - Public Works Assets	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	Total 10-Yr
Public Works	\$0	\$1,792,755	\$1,792,755	\$1,792,755	\$1,792,755	\$1,792,755	\$1,792,755	\$1,792,755	\$1,792,755	\$1,792,755	\$1,792,755	\$17,927,552
Annual Total	\$0	\$1,792,755	\$1,792,755	\$1,792,755	\$1,792,755	\$1,792,755	\$1,792,755	\$1,792,755	\$1,792,755	\$1,792,755	\$1,792,755	\$17,927,552
Average Annual Lifecycle Cost	\$0	\$1,792,755	\$1,792,755	\$1,792,755	\$1,792,755	\$1,792,755	\$1,792,755	\$1,792,755	\$1,792,755	\$1,792,755	\$1,792,755	

Based on the lifecycle assessment for Emergency services assets (for renewal and replacement), it is estimated that the City would need to spend an average of \$1.8 million per year to carry out the required lifecycle activities to maintain current levels of service.

Figure 3: 10-Year Forecasted Performance for Maintaining Levels of Service – Public Works



Figure 3 above illustrates the performance (condition) of Public Works assets over the 10-year forecast. The estimated average combined annual expenditures to maintain these conditions is approximately \$1.8 million.

Attachment #15: Administration Facilities



Infrastructure Value	\$56.2M	
Annual Renewal Needs	\$1.0M	
Overall Condition	3.0	Fair
High Risk Asset Value	\$13M	23%
Trend	N/A	

1.0 Summary of Administration Facilities Service Area

Asset classes that fall under the Administration facilities service area include City Hall, Community Services (210 Wolfe St.), and the Provincial Court House. Annual renewal needs shown are based on lifecycle management strategies and represent the estimated amount of capital the City needs to reinvest in its existing asset inventory on an annual basis over the next 10 years to sustain the current levels of service.

This is the first iteration of the Asset Management Plan that includes the Administration facilities service area.

Table 1 details the City's inventory for the Administration facilities service area.

1.1 Inventory Details

Table 1: Administration Facilities Inventory

Asset Category & Class	2023 Quantity	Unit of Measure
Facilities		
City Hall & Carnegie Wing	64,100	Sq. Ft
Community Services – 210 Wolfe St.	15,110	Sq. Ft
Provincial Court House	19,675	Sq. Ft

1.2 Replacement Costs

The estimated year end 2023 replacement costs for the Administration facility service area totalled \$56.2 million. Replacement costs are based on the most building condition assessments completed in 2021-2022 or historical costs inflated to 2023 where condition assessments were not available.

Figure 1: Administration Service Area –Replacement Cost by Asset Class

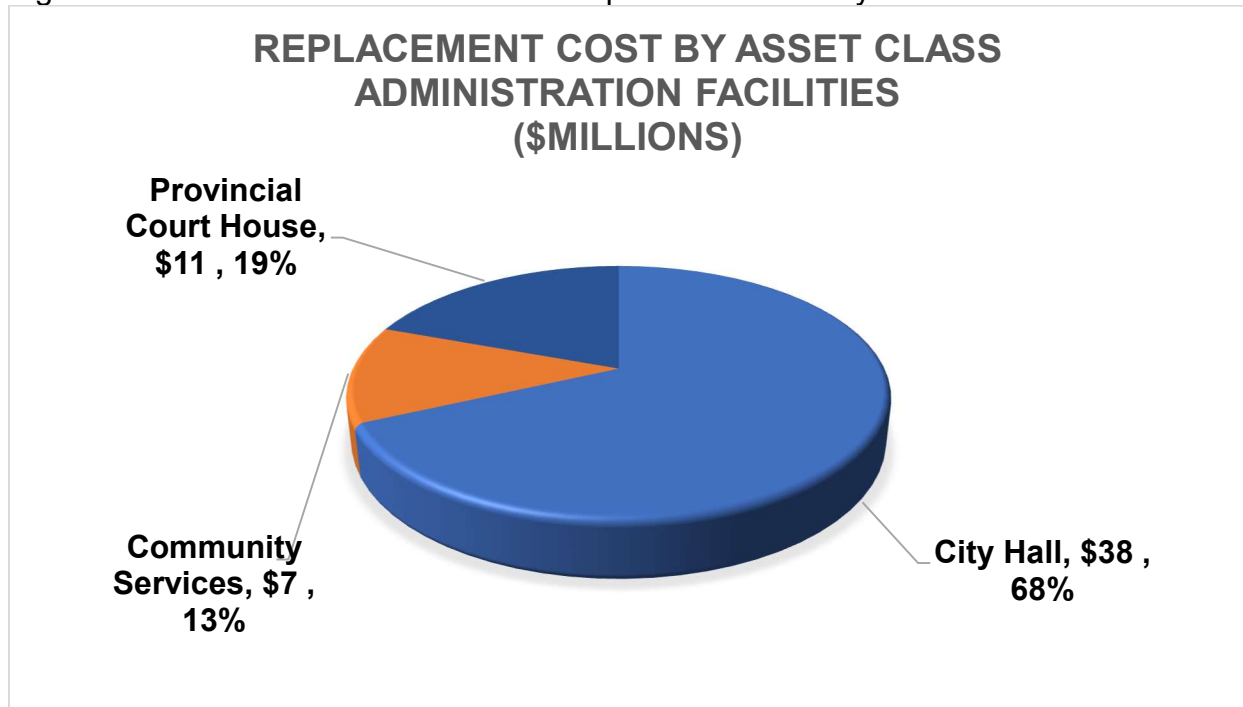


Table 2: Administration Service Area - Replacement Costs by Asset Class

Asset Category & Class	2023 Replacement Cost
Facilities	
City Hall & Carnegie Wing	\$38,324,670
Community Services – Recreation Division at 210 Wolfe St.	\$6,982,592
Provincial Court House	\$10,895,572
Administration Total	\$56,202,833

1.3 Asset Condition and Remaining Useful Life

Facilities

Condition ratings are based on the most recent building condition assessments (BCA'S) completed in 2021 and 2022 and use observed age of facility elements at the time of assessment. The City plans to complete BCA's on a seven year cycle with the next round of assessments anticipated to be completed in 2028.

Based on replacement cost of building elements, 22% or \$12.4 million are rated very good and good, 56% or \$31.2 million are rated fair, and 22% or \$12.5 million are rated poor and very poor. Figure 2 and Table 3 provide condition details of the Administration facilities service area.

Figure 2: Administration Facilities- Distributed Condition and Replacement Cost

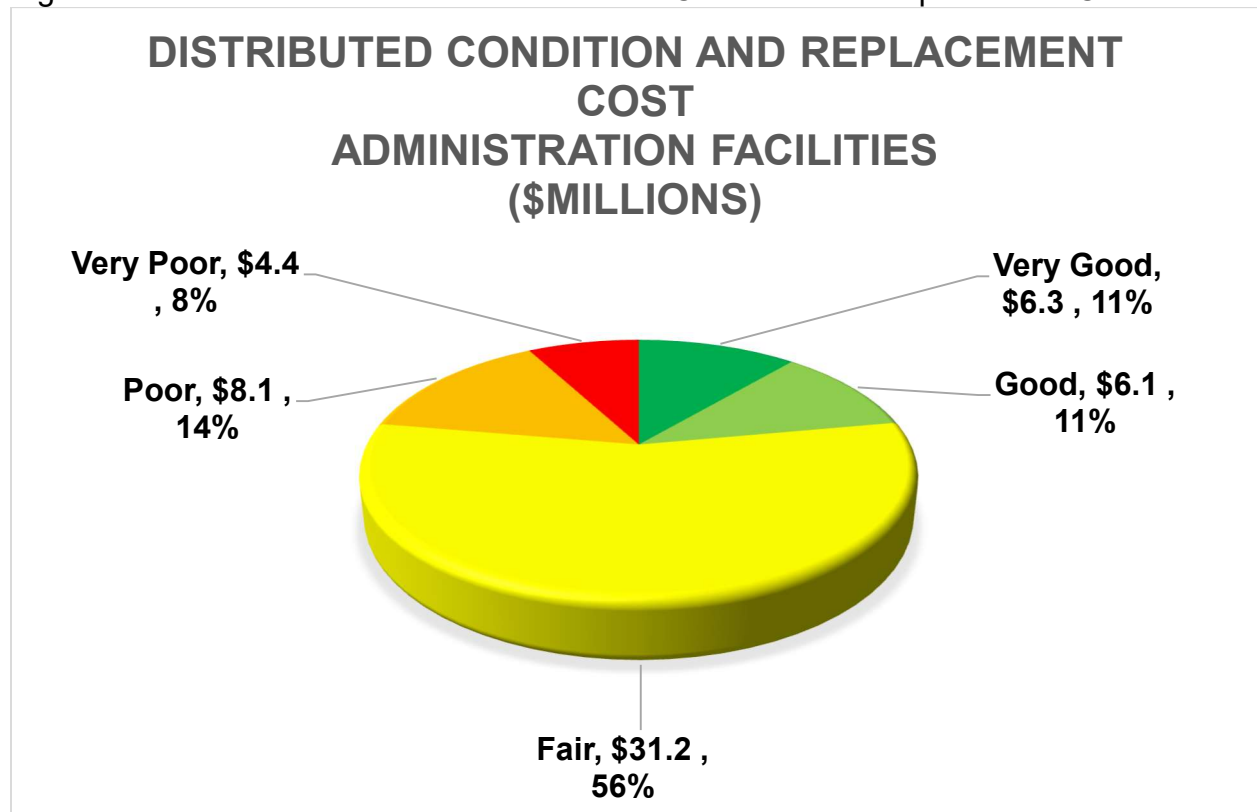


Table 3: Administration Facilities - Condition Ratings

Asset Category & Class	2023 Condition Rating
Facilities	
City Hall & Carnegie Wing	Fair
Community Services – Recreation Division at 210 Wolfe St.	Poor
Provincial Court House	Fair
Administration Overall Condition¹	Fair

Remaining Useful Life

The following summarizes the Administration facilities' remaining useful lives. The expected useful life of an asset is the estimated period over which the City expects to use the asset. Estimates of ages are based on the calculated age or observed age (where condition assessments have been completed) and do not take into consideration any betterments that extend the useful life of the asset(s). Ideally, as condition assessments are completed the 'observed' age will be used in calculating remaining useful life. The ages of the assets are variable and with efforts to extend the life by application of lifecycle treatments.

Table 4 shows Administration Facilities remaining useful life details.

Table 4: Administration Facilities - Remaining Useful Life²

Asset Category & Class Inventory	Ave. Expected Useful Life (Yrs.)	Ave. Remaining Useful Life (Yrs.)	Percent of Useful Life Remaining
Facilities			
City Hall & Carnegie Wing	33	17	51%
Community Services – Recreation Division at 210 Wolfe St.	32	15	46%
Provincial Court House	32	12	38%
Administration Facilities Remaining Useful Life	32	15	47%

1.4 Asset Risk Assessment

The consequences of failure for Administration facility assets have been determined manually by City staff based on a standardized chart for consequence (found in

¹ Weighted by replacement cost

² ESL, RUL, and percent of useful life remaining are based on calculated average of asset classes

Appendix B). The assessment considers environmental, economical, social, life safety, legislation and corporate reputation as factors when scoring consequence.

Using the product of the scores for likelihood of failure (likelihood is higher as asset condition worsens) and the consequence of failure, the asset is assigned a risk rating using the ranges shown in the chart below:

Category	Range
High Risk	< 5
Medium Risk	5 – 20
Low Risk	> 20

The estimated replacement value of Administration high-risk assets is \$13 million.

The City continues to prioritize the operational, maintenance and renewal needs of both the critical assets and high-risk assets to minimize health and safety risks and impacts to service delivery.

2.0 Levels of Service

This section will present levels of service as they are currently being provided by the City. Service area objective statements were developed by taking into consideration the goals, strategies and objectives defined in other overarching Council approved City plans, studies, and policies.

Stakeholder and technical levels of service, performance measures and current performance for Administration facilities are outlined in Table 5 below. Further development of the City's levels of service is underway in which the proposed levels of service and the affordability of the service will be analyzed and presented. Future versions of the Asset Management Plan will also include other proposed levels of service reporting requirements set forth in the Asset Management Planning for Municipal Infrastructure Regulation (O.Reg. 588/17).

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Table 5: Levels of Service – Administration Facilities

Asset Class: Administration – Facilities								
Service Objective Statement: Providing high quality, accessible, and energy efficient facilities that are available and meet the needs of staff and community.								
Stakeholder Value/Service Attribute	Stakeholder LoS and Measures		Stakeholder Performance Year of Measure		Technical Measure		Technical Performance Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
Reliability/Quality	Providing reliable and high-quality Administration Facilities that meet the needs of the community/stakeholders	Administration Facilities are maintained in a state of good repair	n/a - not reported	Facilities are proactively maintained and reliable for intended use	Average Facility Condition Index (FCI) value for all facilities	Fair (between 5% and 10%)	n/a - not reported	8% (Fair)

Asset Class: Administration – Facilities								
Service Objective Statement: Providing high quality, accessible, and energy efficient facilities that are available and meet the needs of staff and community.								
Stakeholder Value/Service Attribute	Stakeholder LoS and Measures		Stakeholder Performance Year of Measure		Technical Measure		Technical Performance Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
Accessibility	Facilities are accessible for intended use	Description of facilities and level of accessibility	n/a - not reported	<p>Administration Facilities include:</p> <p>City Hall - Public Administration. Accessible to Staff and Public. Public services hours of operation: Monday to Friday 8:30am to 4:30 pm</p> <p>Provincial Court House - Public Administration. Accessible to Staff and Public. Public services hours of operation: Monday to Friday 8:30am to</p>	Facility meets parking needs of staff	Yes	n/a - not reported	City Hall and Provincial Courthouse - No 210 Wolfe St.- Yes

Asset Class: Administration – Facilities								
Service Objective Statement: Providing high quality, accessible, and energy efficient facilities that are available and meet the needs of staff and community.								
Stakeholder Value/Service Attribute	Stakeholder LoS and Measures		Stakeholder Performance Year of Measure		Technical Measure		Technical Performance Year of Measure	
	Stakeholder LoS Statement	Stakeholder Performance Measure	2021	2023	Technical PM	Target	2021	2023
				4:30 pm 210 Wolfe St. - Social Services - Overflow Shelter. Accessible to Staff and Public. Public service hours of operation: 7-days a week, 10:00 pm to 8:00am.				
Climate Leadership	Facilities are energy efficient and demonstrate leadership on climate action	Facilities that meet our environmental objectives	n/a - not reported	Facilities strive to lower energy usage by installing energy conservation measures that improve energy efficiency to reduce GHG emissions	Annual energy consumption per facility per square meter	Courthouse: 0.87 GJ/m2 City Hall: 0.86 GJ/m2 Wolfe St.: 0.87 GJ/m2	n/a - not reported	Courthouse: 0.76 GJ/m2 City Hall: 0.78 GJ/m2 210 Wolfe St.: 1.23 GJ/m2

3.0 Asset Management Strategies – Administration Facilities

The following table describes the current strategies and activities for Administration facilities. Options for which lifecycle activities that could potentially be undertaken are based on recommendations from the most recent building condition assessments and facility management best practices. The following table below documents the set of planned actions or ‘activities’ that the City undertakes to sustain current levels of service, while managing risk at the lowest lifecycle cost. The City plans the necessary lifecycle activities at the required time and does not need to alter the *type* of activity undertaken. However, with limited funding available, the interval and timing of the necessary lifecycle activities are affected, which can have an overall impact on the performance of the asset(s) over its useful life.

Table 6: Administration Facilities– Asset Management Lifecycle Strategies

Strategy Type	Current Practice
Non-infrastructure Solutions Actions or policies that can lower costs or extend asset life (e.g. better integrated infrastructure planning and land use planning, demand management, insurance, process optimization, managed failures, etc.).	· Building condition assessment program
	· Linking the asset management plan to other studies, master plans and strategies
	· Public consultation on levels of service
	· Needs studies to assess community needs and how services are being delivered to the community
	· Integrating asset management planning to drive lifecycle activities
	· Integrating infrastructure and land use planning
	· Educate staff on climate change initiatives and energy efficiency opportunities with respect to building operations/ownership
Maintenance Activities Activities include regularly scheduled inspection and maintenance, or more significant repair and activities associated with unexpected events.	· Preventative and corrective maintenance programs for facilities
	· Service contracts for building life-safety and security alarm systems, elevating systems, and code/regulated building elements
	· Basic custodial services
	· Seasonal maintenance contracts such as snow clearing and cleaning
Renewals/Rehabilitation: Includes significant repairs designed to extend the life of the asset (e.g. the lining of iron	· Service contracts for pest control and landscaping maintenance
	· Renewal of facility elements or sub-systems such as structures, roofs, building exteriors, building services (HVAC, plumbing, electrical), interior finishes and sitework that are at the end of their useful life and renewal does not

Strategy Type	Current Practice
watermains can defer the need for replacement).	<p>improve/expand the intended service initially provided</p> <ul style="list-style-type: none"> · Upgrading projects focus on removing asset exposure to elements
<p>Replacement Activities that are expected to occur once an asset has reached the end of its useful life and renewal/rehabilitation is no longer an option.</p>	<ul style="list-style-type: none"> · Facility components replaced when at end of useful life through capital planning/business case (as identified through BCAs) · Replacement due to obsolescence or does not meet minimum design standards/intent · Replacements considered within the context of the facility · Asset replacement is coordinated with planned expansion wherever possible · Asset replacement is bundled with other dependent assets wherever possible · Operating vs. Replacement cost comparison
<p>Disposals/Abandonment Policies Activities associated with disposing of an asset once it has reached the end of its useful life or is otherwise no longer needed by the municipality.</p>	<ul style="list-style-type: none"> · Facilities that are no longer needed for the intended service are either sold, re-purposed or demolished
<p>Expansion Programs Planned activities required to extend the services to previously un-serviced areas – or expand services to meet growth demands.</p>	<ul style="list-style-type: none"> · Expansion when facility has reached its functional capacity and expansion is necessary for continued delivery of service · Changes to accessibility requirements for public buildings where identified and there is an opportunity to do so. · Changes to building components to increase energy efficiency (ex. LED lighting, etc.) where possible · Expansion of renewable energy programs and systems to reduce energy costs for operation where possible
Future Strategies	-n/a

3.1 Asset Management Strategies and Associated Risks

Strategic Risks

Strategic level risks are events or scenarios that may impact the ability of the City to deliver asset management strategies and minimize costs.

Potential strategic level risks associated with the City's ability to effectively deliver Administration facility levels of service are (but not limited to):

- Insufficient funding levels
- Insufficient staffing and resources to responsibly implement facility lifecycle strategies
- Growth not considered when establishing facility needs
- External/environmental factors such as climate change effects (more severe and more frequent weather instances, flooding) that could cause physical damage to facilities

Risk Trade Offs

If the identified lifecycle activities (operations, maintenance, renewal, and other capital projects) are not undertaken, they may sustain or create risk consequences. These risk consequences may include (but not limited to):

- Major delays/service interruptions to public services delivered from City Hall, Provincial Court House
- Lack of public communications internally and externally
- Non-compliance with legislation (e.g. election related services)
- Backlog of court case/ court support services
- Delays/interruptions to other services that depend on the administrative work of the Recreation Division located at 210 Wolfe Street
- Reputation/image negatively affected
- Lack of public confidence
- Reduced staff morale

All City services, including services delivered from Administrative facilities are reviewed and identified in the City's Business Continuity Plan (BCP) and prioritization process. The BCP identifies the key business interruption impacts, recovery time objectives, dependencies, available qualified resources, and a resource back up strategy should there be disruption to services. The BCP is reviewed and updated regularly to ensure that alternate locations are available where required and critical services are not interrupted, minimizing risks.

The choice of strategy for operating and maintaining Administration facilities considers the risk of failure of the assets, the risk to service delivery and the risk to other services dependant on this service area. Strategies implemented are at the lowest cost in order to reduce the burden on the tax base and user fees where possible and to maintain the current levels of service.

A full detailed, documented risk analysis in which the identification of credible risks, the likelihood of the risk event occurring, the consequences should the event occur, development of a risk rating, evaluation of the risk and the development of a risk treatment plan for non-acceptable risks is planned and will be included in future versions of the asset management plan when completed.

3.2 Lifecycle Models, Interventions, and Cost of Service:

Overview of Lifecycle Models

Service area lifecycle models have been developed³ in which asset intervention thresholds and associated costs for lifecycle activities (rehabilitation and replacement) are documented.

Lifecycle models are mathematical, statistical and logic models of planned actions and of asset deterioration over time. This helps the City to forecast required asset lifecycle activities and their impacts on levels of service, risk, and funding needs. In short, lifecycle models are mathematical representation of the City's *Lifecycle Activities*.

Overview of Interventions

Interventions represent the major lifecycle activities carried out for assets over their service life and are typically accounted for as part of the capital planning process. The term 'intervention threshold' or 'intervention trigger' are used interchangeably, and they describe a point in an asset's lifecycle when the intervention typically occurs.

When an asset degrades and an intervention threshold is reached, the asset will require treatment (i.e., repair or rehabilitation). After the treatment is applied, the performance (condition) of that asset will increase to a higher value, at which point it will continue to degrade. This will extend the overall estimated service life (ESL) of the asset.

The costs associated with interventions can be used to establish capital funding needs and determine the most cost-effective solution to maintain level of service targets. Costs for thresholds were derived from the City's historical financial information for actual or similar interventions where available and applicable. Where replacement activities are determined, asset replacement costs were used.

3.3 Lifecycle Options Analysis and Costs of Service

The options analysis of the lifecycle activities that could be undertaken were reviewed with the Facilities subject matter experts. Lifecycle activity options were discussed and determined that the current planned activities are appropriate and the most cost-effective option(s). Details related to the Administration Facilities available funding, investments and shortfalls can be found in Section 5.0 – Financial Summary.

Table 7 and Figure 3 below shows the Administration Facilities service area projected 10-year lifecycle costs (asset renewal and replacement activities required for existing assets) and performance to maintain current levels of service. For details on current levels of service descriptions, measures and targets and current performance, refer to Table 5 in Section 2 – Levels of Service of this attachment.

Lifecycle costs shown below were calculated based on current asset conditions and forecasted out over the 10-yr period using the recommended deterioration model for that asset/asset class. Where asset condition data was not available, age-based condition ratings were applied.

³ Request for Proposal RFP 22-22 Consulting Services to Support Asset Management Planning Updates

Table 7: Administration Facilities Lifecycle Associated Costs – Delivering Current Levels of Service, existing assets

Lifecycle Activity Costs - Administration Facilities	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	Total 10-Yr
Administration Facilities	\$0	\$979,477	\$979,477	\$979,477	\$979,477	\$979,477	\$979,477	\$979,477	\$979,477	\$979,477	\$979,477	\$9,794,771
Annual Total	\$0	\$979,477	\$979,477	\$979,477	\$979,477	\$979,477	\$979,477	\$979,477	\$979,477	\$979,477	\$979,477	\$9,794,771
Average Annual Lifecycle Cost	\$0	\$979,477	\$979,477	\$979,477	\$979,477	\$979,477	\$979,477	\$979,477	\$979,477	\$979,477	\$979,477	

Based on the lifecycle assessment for Administration Facility assets (for renewal and replacement), it is estimated that the City would need to spend an average of \$1.0 million per year to carry out the required lifecycle activities to maintain current levels of service.

Figure 3: 10-Year Forecasted Performance for Maintaining Levels of Service – Administration Facilities

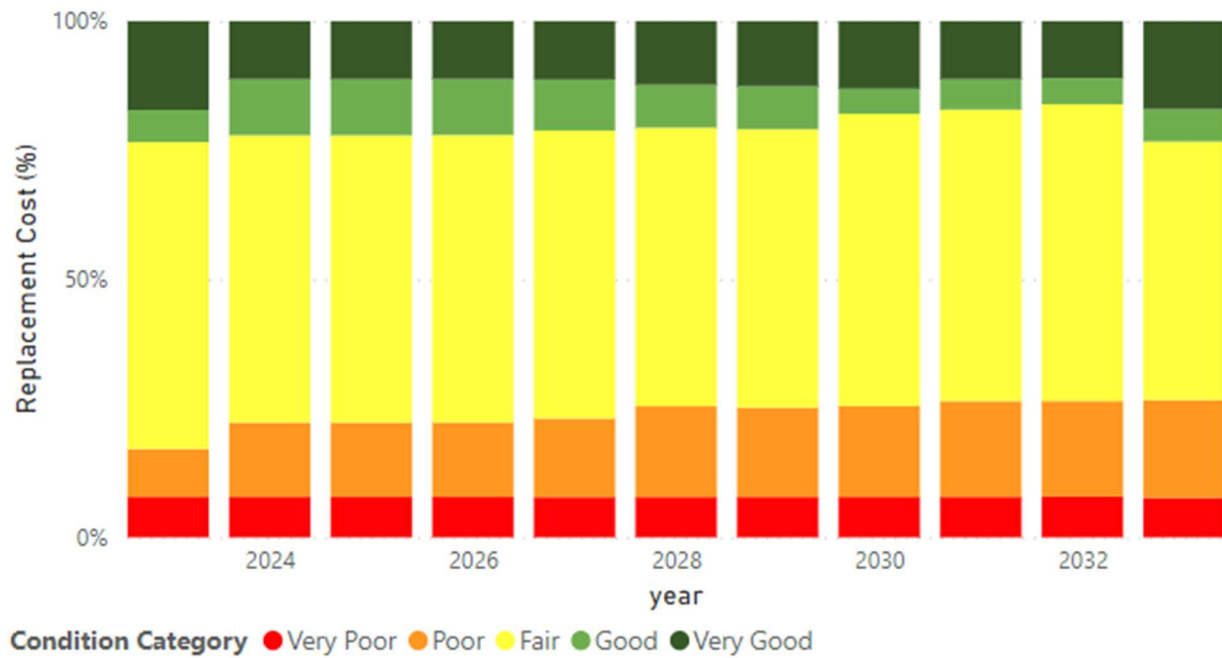


Figure 3 above illustrates the performance (condition) of Administration Facility assets over the 10-year forecast. The estimated average combined annual expenditures to maintain these conditions is approximately \$1.0 million.