
Subject: 2021 Corporate Asset Management Plan

Report to: Corporate Services Committee

Report date: Wednesday, June 15, 2022

Recommendations

1. That the 2021 Corporate Asset Management Plan attached to Report CSD 7-2022 as Appendix 1 **BE APPROVED**.

Key Facts

- The purpose of this report is to approve the 2021 Corporate Asset Management Plan that establishes compliance with Ontario Regulation 588/17, Asset Management Planning for Municipal Infrastructure (O. Reg. 588/17) prior to the deadline of July 1, 2022.
- The 2021 Corporate Asset Management Plan reflects changes since 2016 and presents the state of the Region's assets, service levels and risks, management strategies, and corresponding financial investment needs.
- From 2016 to 2021, improvements to asset management resulted in significant changes especially to investment needs. Compared to 2016, to eliminate the gap in the current annual investment, the financial changes in 2021 require an increase over a ten-year period to the annual Water and Wastewater rate from 3.15% to 7.22%, and the annual levy from 2.16% (exclusive of Agencies, Boards and Commissions) to 3.82% (exclusive of Agencies, Boards and Commissions).
- Future improvements to asset management planning will allow the Region to balance or adjust the investment needed with the level of service delivered and corresponding risk to service delivery.
- On an annual basis, staff will provide update reports on the plan's progress, which may require that Council adjust levels of service delivery to meet financial goals while addressing associated risk of service.

Financial considerations

An approved Asset Management Plan is a requirement to secure or maintain funding of the Federal Gas Tax, application based funds such as grants, and of the Ontario Development Charges Act.

The 2021 Corporate Asset Management Plan identifies a significant gap between available funding and investment to sustain the current level of service. This report does not recommend implementing changes to the previously approved rate increase or to the recommended levy increase at this time. Subsequent to asset management planning improvements for the asset management plan in 2025, staff will present alternatives to levels of service and investment to inform any change to rates and levy.

The 2021 Corporate Asset Management Plan identifies actions, staffing and financial resources to improve asset management planning prior to completing the asset management plan in 2025. Departments will identify any of these new resources through the annual budget process for approval by Council.

On approval by Council of this report, there is no direct financial impact to the 2022 operations of the Region.

However, without implementing changes to annual investments, the current level of service is not sustainable. Project deferral will continue leading to unplanned reduction in level of service, increase in risk and of asset failures, and increase in annual and long-term operational expenditures. This highlights the importance of continuing to improve asset management planning and rationalize levels of service with sustainable funding amounts.

Analysis

This report presents the 2021 Corporate Asset Management Plan for Council's approval, in accordance with Ontario Regulation 588/17: Asset Management Planning for Municipal Infrastructure (the "Regulation") and the Region's policy C-F-024 Asset Management Policy. Appendix 2 provides an overview of the Region's compliance related to the Ontario Regulatory 588/17.

The Asset Management Plan aligns with Corporate Asset Management Policy C-F-024 approved by Council in 2019. It incorporates key principles and strategic directions that enhance asset management practices and ensure that asset management activities are continuously improved and integrated across the organization.

Changes in asset management redefine investment backlog and future investment needs

This section summarizes the financial information of the 2021 Corporate Asset Management Plan. Other sections of this report provide additional details of the findings and results.

The backlog of deferred investment and forecast investment estimated in the 2021 Corporate Asset Management Plan is significantly greater than that in the 2016 Asset Management Plan.

The main reason for the increase is due to improvements in the asset management data. Although this data improvement highlights a greater financial need than in 2016, the information positions the Region to better address risk to level of service and of asset failure.

The result of the changes since 2016 is a need for a greater annual increase in rates and levy to reduce the backlog and achieve required funding levels. **Table 1** shows a comparison of various financial measures between 2016 and 2021 and the corresponding increase in those measures.

Table 1: Comparison of financial measures between 2016 and 2021

Financial item	2016 \$ millions	2021 \$ millions	Increase
Replacement value	\$7,430	\$9,817	32%
Backlog	\$546	\$2,480	354%
10-year average annual renewal investment including backlog (10-year AARI)	\$225	\$438	95%
Annual planning gap (difference between 10-year AARI versus the 10-year capital plan)	\$73	\$193	163%
Required Water and Wastewater Rate increase to fund gap	3.15%	7.22%	40%
Required Levy increase to fund gap	2.16% (exclusive of ABC's)	3.82% (inclusive of ABC's)	77%

ABC's stands for Agencies, Boards and Commissions of the Niagara Region.

The average annual renewal investment (AARI) is the total investment amount forecast in the period divided by the period. For example, the 10-year AARI is the total forecast investment cost for the next ten years divided by ten.

Both the identified levy and recommended rate increases are subject to annual budget approval. For various reasons due to financial constraints since the 2016 Asset Management Plan, Council did not fully follow the rate and levy increases approved or recommended.

Asset management employs risk to help determine an appropriate balance between the level of service delivered and the cost to deliver the service. Risk assessment provides the Region with the ability to make informed decisions when or under what circumstances it may be acceptable to defer investments.

Future improvements to asset management planning will allow the Region to use risk assessments to balance or adjust the investment needed with the level of service delivered and corresponding risk to service delivery.

The 2021 Corporate Asset Management Plan (2021 CAMP) builds on previous asset management planning

The approach in this Asset Management Plan builds on the successes of the previous 2016 plan and improvements to asset management practice since then. Although there are significant differences in the financial outcomes of this plan, this is a refinement rather than a significant departure from the previous plan. Many of the principles outlined in 2016 are still in place.

The recent improvements that have advanced the Region's asset management planning capabilities include the completion of the following key foundational components:

- An improvement plan for asset management developed as part of the 2016 Asset Management Plan that outlines specific business processes and practice improvements required to achieve asset management objectives.
- The Asset Management Governance Framework, which identifies the roles and responsibilities of Region staff within the Region's Asset Management System adopted by Council in January 2019.

- The Asset Management Policy, which outlines the Region's principles and commitments to asset management planning adopted by Council in May 2019.
- The Asset Management Focused Action Plan, an internal improvement plan update by staff in November 2021 that outlines specific business processes and practice improvements required to implement the policy and deliver sound asset management planning.

Progress since 2016:

- Practice improvements such as developing a risk model to assess asset failure and incorporating this as part of the annual capital budget process
- Refining lifecycle activities to accurately reflect practice including one major change to the lifecycle replacement cycle of roads from 66 years to 45 years
- Updating unit replacement costs to reflect current construction costs for the long-term care homes, transportation assets and for Regional facilities
- Introduced risk measurement as part of the investment forecast to facilitate future risk-based optimization decisions
- Incorporating asset rehabilitation and growth projects within the forecast of investment needs

There were two main obstacles in implementing the 2016 asset management plan and accompanying improvement plan.

The first obstacle, which is expected to be a continuing concern, is budget constraints to address annual capital requests and past capital deferrals. Deferral refers to projects not completed due to budget constraints. Budget constraints affect the ability to maintain level of service and increase risk of interruption in service delivery. In addition, capital deferrals require more investment in maintenance and increase operating budgets.

The second obstacle is the COVID-19 pandemic and strain on staffing and budgets. The result of the pandemic was to limit the improvements of the asset management system that the Region otherwise would have made.

The 2021 CAMP updates information on the state of infrastructure, including asset inventory, average asset life, and condition and replacement values for assets. It also provides information on demand, level of service, risk, lifecycle asset strategies, and financial information in the form of required capital investments. In addition, the 2021 CAMP includes 16 service areas. These areas are identified in Appendix 3.

Continuous improvement provides a framework to meet the future regulatory requirements

Continuously improving the asset management system enhances the data and information used for asset management decisions. These improvements increase the value from the assets and the service delivery of the Region.

The Region's annual capital planning process (Corporate Asset Management Resource Allocation or CAMRA) employs a risk model to help prioritize the annual capital budget across all service departments. This enables the Region to target the best return on investment of its limited funding.

A similar risk concept is applicable to apply for all of the Region's assets rather than just the current year's capital request.

The 2021 Corporate Asset Management Plan measures risk across the portfolio of the Region's assets although its use in optimizing the backlog is premature. Further work to calibrate the risk assessment process is necessary as part of the improvements to asset management planning before this level of risk optimization is possible. Risk assessment along with other asset management improvements up to 2025 will result in the ability to balance and optimize the level of service, the cost and risk to service delivery and risk of asset failure.

Although the Region conducts many of the current practices for asset management, the improvements require additional effort to develop, implement and continue to deliver as part of routine operations.

Approval for the resources to support the improvements will be through the annual capital and operating budget process.

Alternatives reviewed

The alternatives to approval of the 2021 Corporate Asset Management Plan and this report follow.

1. Do not approve the report. The Region will be non-compliant with a legislated requirement. Legislation requires completion and approval by Council of an asset management plan by July 1, 2022.

2. Approve the report, and using the capital financing strategy implement identified increases to rate and levy. This will help address the investment backlog for the next three years until the asset management plan in 2025. Using the planning improvements up to 2025, at that time Council may elect to further adjust rate and levy by balancing investment forecasts, level of service and risk.

Relationship to Council Strategic Priorities

The 2021 Corporate Asset Management Plan and this report support Council's Strategic Priorities as follows.

- Supporting Businesses and Economic Growth
- Healthy and Vibrant Community
- Responsible Growth and Infrastructure Planning
- Sustainable and Engaging Government

Visit the Region's website to view Councils' 2019-2022 Strategic Priorities:
<https://www.niagararegion.ca/priorities/default.aspx>

Other Pertinent Reports

CSD 21–2017 Asset Management Plan

CSD 51–2019 Capital Financing Policy

CSD 10-2019 Asset Management Governance Model

C-F-003 - Capital Asset Management Policy

C-F-024 – Asset Management Policy

Prepared by:
Dean Rurak, P.Eng.
Director
Asset Management Office

Recommended by:
Todd, Harrison, CPA, CMA
Commissioner / Treasurer
Corporate Services

Submitted by:

Ron Tripp, P.Eng.
Chief Administrative Officer

This report was prepared in consultation and with the support of senior management of the Region and many of their staff: Helen Chamberlain, Director, Financial Management & Planning, Deputy Treasurer; Richard Frayne, Superintendent, Operational Support, Niagara Regional Police Services; Dr. Mustafa Hirji, Commissioner, Public Health, Medical Officer of Health; Adrienne Jugley, Commissioner, Community Services; Siobhan Kearns, Director Environmental Health; Michelle Sergi, Commissioner, Planning and Development; Donna Woiceshyn, Director Housing Services; Bruce Zvaniga, Commissioner, Public Works.

Appendices

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2021 Corporate Asset Management Plan

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ES Executive Summary

The Regional Municipality of Niagara (the Region) is an upper tier municipality located in Southwestern Ontario, serving an estimated population of 498,660 people in 2022 over an area of approximately 1,800 square kilometers.

The Region is comprised of 12 local area municipalities including the Cities of Niagara Falls, St. Catharines, Thorold and Welland, the Towns of Fort Erie, Grimsby, Lincoln, Pelham and Niagara-on-the-Lake, and the Townships of Wainfleet and West Lincoln.

The 2021 Corporate Asset Management Plan (2021 CAMP) provides details of maintaining and managing the \$9.8 billion in assets that support the Region's services.

The 2021 CAMP reflects changes since 2016 and presents the state of the Region's assets, service levels and risks, management strategies, and corresponding financial investment needs. It presents the financial information and investments needed to support and sustain the Region's level of service.

The 2021 CAMP complies with the legislated requirements in Ontario Regulation 588/17, Asset Management Planning for Municipal Infrastructure (O. Reg. 588/17).

Asset management helps the Region care for the infrastructure that delivers valuable services to our communities. It helps inform Council so they may set direction in a way that:

- Considers service needs
- Uses resources wisely
- Manages risk and opportunity

The asset management plan documents the Region's services, assets, and practices and programs to manage them. Completion of the plan assures:

- Compliance with legislation and the Region's policies
- Continued eligibility for grants and funding
- Ultimately, alignment between desired levels of service, risk and cost through Rates, Levy and fees

ES. 1 Financial summary

The backlog of deferred investment and forecast investment estimated in the 2021 Corporate Asset Management Plan is significantly greater than that in the 2016 Asset Management Plan.

The main reason for the increase is due to improvements in the asset management data. Although this data improvement highlights a greater financial need than in 2016, the information positions the Region to better address risk to level of service and of asset failure.

The result of the changes since 2016 is a need for a greater annual increase in rates and levy to reduce the backlog and achieve required funding levels. Table 1 shows a comparison of various financial measures between 2016 and 2021 and the corresponding increase in those measures.

Table 1: Comparison of financial measures between 2016 and 2021

Financial item	2016 \$ millions	2021 \$ millions	Increase
Replacement value	\$7,430	\$9,817	32%
Backlog	\$546	\$2,480	354%
Annual investment including backlog in each of the next 10 years	\$225	\$438	95%
Annual funding gap over 10 years	\$73	\$193	163%
Required Water and Wastewater Rate increase to fund gap	3.15%	7.22%	129%
Required Levy increase to fund gap	2.16%	3.82%	77%

Both the identified levy and recommended rate increases are subject to annual budget approval. For various reasons due to financial constraints since the 2016 Asset Management Plan, Council did not follow the rate and levy increases approved or recommended.

Asset management employs risk to help determine an appropriate balance between the level of service delivered and the cost to deliver the service. Risk assessment provides the Region with the ability to make informed decisions when or under what circumstances it may be acceptable to defer investments.

Future improvements to asset management planning will allow the Region to use risk assessments to balance or adjust the investment needed with the level of service delivered and corresponding risk to service delivery.

ES. 2 Introduction

The 2021 CAMP structure is nine overview sections describing a summary of applicable details for all of the Region's services and assets. Subsequent sections provide detail for each of 16 service areas in the Region. The sections and descriptions are in Table 2.

Table 2: Sections of the Corporate Asset Management Plan

Number	Section	Description
1	Introduction	Defines asset management, the Region and services provided.
2	State of infrastructure	Characteristics of the asset inventory, and its value, condition, age, and risk.
3	Demand	Influencing factors on community needs and assets.
4	Level of service	Services we provide and indicators of performance.
5	Lifecycle asset strategy	How we deliver service and the actions we take to manage assets.
6	Finance strategy	What the costs of our service are and how we will fund them.
7	Data Management	The quality and completeness of asset data and information.
8	Climate change	How climate change affects assets and approach to address risk.
9	Continuous improvement	How we will improve asset management.

The 2021 CAMP includes 16 service areas within four of the Region's Departments and for the Niagara Regional Police Service as shown in Table 3.

Table 3: Region Departments and corresponding service areas in the asset management plan

Department	Service
Public Works	Water
	Wastewater
	Waste Management
	Transportation
	Transit
	Fleet
Community Services	Seniors Services
	Community Housing
	Children's Services
	Social Assistance and Employment Opportunities
Public Health and Emergency Services	Public Health
	Emergency Medical Services
Corporate Services	Information Technology
	Facilities
	Court Services
Niagara Regional Police Service	Police Services

All assets supporting the service area report under the service area regardless of the managing Department. For example, Police buildings, although managed by Corporate Services, report under the Police Services area. Two exceptions to the service area reporting structure is Information Technology (IT) and Fleet. All the Region's IT assets report under IT except for Police IT assets. The entire Region fleet reports under Fleet except for Police and EMS who report their fleet respectively.

Some Divisions are not included in the asset management plan because of the low value of the assets supporting the service. This includes Business Licensing and Enforcement, Economic Development and Planning among others. Assets these

Divisions utilize report under the respective service area such as Fleet or Information Technology.

ES. 3 Demand and level of service

Change in demand can occur because of a variety of factors such as population and demographics, changes in customer expectations, and external factors such as climate change. Demand forecasting helps analyze service needs to define future requirements and development of strategies to meet anticipated changes. Examples of service impacts include:

- Reduce, expand or remove the need for the service
- Maximize the capacity, life span and serviceability of existing assets
- Seek alternatives to investing in the assets, and/or alternative treatments,
- Explore ways to provide the services, e.g. own forces, contractors or agencies
- Explore funding options (government, non-government funding, and private sector investment).

The top drivers identified for the Region are population change, development trends and legislative changes.

The forecast for the Region's population is from 498,990 in 2022 to 694,000 in 2051. Development to accommodate population increase likely will be a combination of densification of existing areas and new development beyond current urban areas. These changes will have an impact on the Region's services, such as new dwellings requiring Water and Wastewater services, Transportation network requiring additional capacity, and community services demand in line with the population increase.

For municipal service providers, demand drivers closely link with level of service. A combination of demand drivers guide level of service development. These drivers include customer and other stakeholder expectations, regulatory and legislated requirements, and objectives including internal policies, strategies and procedures. In many cases, past performance and system design also inform level of service.

The cost associated with meeting the change in demand and service levels are included in the long-range financial forecast including cost of future maintenance, rehabilitation, refurbishment activities, and asset replacement.

ES. 4 State of infrastructure

Every time the Region produces an asset management plan, the plan reflects the best information at that point in time. This applies to asset inventory, condition, rehabilitation cost, and replacement cost. These changes affect the investment backlog and forecast of investment needs.

Understanding the useful life of an asset and its remaining life provides insight into the condition of assets and the potential risk of asset failure that affects levels of service and renewal need. Besides condition, age as a function of useful life is a primary determinant in asset management planning.

Condition corresponds to five grades from one to five (1 to 5), where one (1) represents very good, two (2) good, three (3) fair, four (4) poor, and five (5) represents very poor. Part grades are possible when averaging whole grades from multiple assets.

The distribution of assets by condition by percentage of value is in Table 4.

Table 4: Distribution of the Region's asset condition by value

Grade	Very good	Good	Fair	Poor	Very poor
Condition distribution %	27.2%	25.6%	15.6%	12.1%	19.4%
Replacement value \$ billions	\$2.67	\$2.52	\$1.53	\$1.19	\$1.91

The remaining useful life corresponds to the average age of all the assets divided by the average useful expected life of those assets.

The replacement value, average condition and average percentage of life consumed for the assets in the Region's services is in Table 5.

Table 5: Replacement value, average condition grade and average percentage of remaining useful life for assets of the Region's assets

Parameter	Replacement Value (\$ millions)	Condition grade	Remaining useful life
Total or average	\$9,816.9	2.7	39%

Although many Regional assets are in overall fair condition, significant investment is required to address poor and very poor assets to maintain service levels and manage risks.

An asset reaching useful expected life does not mean that the asset is in a failed state. An asset that is as old as or older than its useful expected life generally is in poorer condition than a newer or younger asset. However, some assets continue to perform beyond useful expected life but with an increased risk of failure or with lower performance.

The Region's annual budget process incorporates risk and other factors as part of the Corporate Asset Management Resource Allocation process (CAMRA). CAMRA works well to guide the Regions' annual funding decisions working with hundreds of projects. Expanding the process and applying it to the tens of thousands of assets within the Region requires more work before it is effective to help the Region balance level of service, risk and cost.

ES. 5 Lifecycle strategy

Asset management strategies are the planned lifecycle-based actions that the Region uses to manage its infrastructure to meet service levels.

The basic premise of a lifecycle asset strategy is to perform routine maintenance during the life of the asset with periodic rehabilitation or refurbishment. Replacement of the asset using its useful expected life guides when to replace and create a new asset. This starts the lifecycle over again.

The lifecycle asset strategy models the behavior, deterioration and risk of assets over time and the actions to restore performance. This forms the basis of the forecast of actions and costs, and the effect on levels of service, performance and risk.

ES. 6 Data management

The Region does not have a central registry for its asset management data although the continuous improvement plan includes developing one.

The Region manages its asset management data using a number of spreadsheets, computerized maintenance management systems (CMMS), and the geographic information system (GIS).

The 2021 CAMP uses ten key asset data attributes. These are:

1. Asset hierarchy – to allow reporting rollup through parent/child relationship of asset components
2. Asset identification – a unique number for each asset and each component to track inventory
3. Year installed – to determine age and inform timing of interventions
4. Units of asset measurement – to help determine replacement costs
5. Useful expected life – to guide asset replacement and help determine risk
6. Replacement cost – for each asset and component to inform investment needs
7. Condition – to help plan asset actions and inform risk
8. Consequence of failure – impact of failure to help determine risk
9. Probability of failure – to determine when failure might occur and help determine risk
10. Asset actions (maintenance and renewal) and corresponding timing and cost – to help generate investment needs

The quality of the Region's asset data reflects the confidence in determining the timing for asset actions and ultimately the investment needs and corresponding revenue requirements.

A data quality analysis defines the rating using a similar system as condition grades where one (1) represents very good, two (2) good, three (3) fair, four (4) poor, and five (5) represents very poor. Part grades are possible when averaging whole grades from multiple asset data criteria.

The overall data quality rating is fair with a numeric value of 2.9. Continuous improvement plans also include data improvement across many of the key attributes.

ES. 7 Continuous improvement of asset management

The asset management system is a management approach to direct, coordinate, and control activities for assets and the services the assets support. The asset management system is not software. It provides a structured and consistent approach to managing assets and service delivery.

Continuously improving the asset management system enhances the data and information used for asset management decisions. These improvements increase the value from the assets and the service delivery of the Region.

The most recognizable output of the asset management system the asset management plan. Improving the practices that support the asset management plan is the basis of the Region's six year focused action plan.

The focused action plan builds from changes identified in the previous 2016 asset management plan and a recent assessment of the state of practice of asset management in the Divisions, Departments and Boards of the Region.

There are five focus themes in the focused action plan. . Below are highlights of the themes and improvements.

1. Asset management planning
Development and implementation of corporate frameworks for core practices including level of service, asset performance data, risk assessment, lifecycle strategies and capital planning.
2. Capital project delivery
Improving project management for the annual delivery of capital investment projects with a focus on project performance monitoring and cost estimation.
3. Operations and maintenance
Improving the integration of maintenance with capital asset renewal planning and improving the software systems and data that support maintenance management.
4. Advanced asset management
Building from all other practice and data improvement, developing a central asset register and procuring software for advanced analysis and investment decision support.
5. Continuous improvement
In the final year of the plan, reassessing the state of practice and resetting any required improvements into a new focused action plan.

The improvements support these specific requirements of the asset management regulation that must be in the asset management plan by 2025:

- options for the proposed levels of service and the risks associated with those options
- capital and operating costs of undertaking the lifecycle activities and of the levels of service
- the ability of the Region to afford the preferred level of service

Resources to improve asset management

Although the Region conducts many of the current practices for asset management, the focused action plan is a series of 19 specific improvement initiatives. The improvements require additional effort to develop and implement improvements, and conduct as part of routine operations.

The several resources needed to improve and deliver asset management include:

1. Current staff complement
2. New asset management staff
3. Software for asset management
4. Budget increases for additional asset monitoring and assessment activities
5. Technical consultant support

Staffing from the corporate Asset Management Office (AMO) is sufficient to support and lead the development of practice frameworks and to support some Departments with implementing the improvements. In future years with a shift to asset management as part of routine Department operations, AMO staff will offset the need for additional new department staff.

Approval for additional resources will be through the annual capital and operating budget process.

1 Introduction

The Regional Municipality of Niagara (the Region) is an upper tier municipality located in Southwestern Ontario, serving an estimated population of 498,660 people in 2022 over an area of approximately 1,800 square kilometers. The Region is comprised of 12 local area municipalities including the Cities of Niagara Falls, St. Catharines, Thorold and Welland, the Towns of Fort Erie, Grimsby, Lincoln, Pelham and Niagara-on-the-Lake, and the Townships of Wainfleet and West Lincoln.

The Region's asset management vision is to achieve excellence and efficiency in service delivery through all capital assets (owned in whole or in part, leased or managed by the Region), at sustainable asset lifecycle costs, and acceptable levels of risk. The Region's 2021 Corporate Asset Management Plan (2021 CAMP, or the Plan) provides the framework for management of the Region's assets and presents consolidated information for all of the Region's assets. Legislative requirements, the Region's policies and objectives, and industry practice guided preparation of the Plan.

Niagara Regional Council's (Council) 2019-2022 Strategic Plan provides a guide for the work of the organization over the term of Council and focused on the services provided at the Regional level. Four [4] strategic priorities were identified in Council's 2019-2022 Strategic Plan:

1. Supporting business and economic growth
 - A coordinated approach to fostering economic growth in Niagara
2. Healthy and vibrant community
 - Foster a high quality of life through safe, healthy, and inclusive neighbourhoods through the delivery of quality, affordable and accessible human services
3. Responsible growth and infrastructure planning
 - Sustainable investments in transportation, transit and infrastructure, while aligning infrastructure planning with preservation of the natural environment
4. Sustainable and engaging government
 - A commitment to high quality, efficient, fiscally sustainable and coordinated core services through enhanced communication, partnerships and collaborations with the community

1.1 Overview of the Region's asset management journey

The Region began its asset management journey with the 2014 Asset Management Plan (2014 AMP) in response to the Ontario Ministry of Infrastructure's "Building Together: Guide for Municipal Asset Management Plans". The 2014 AMP included roads, bridges, water and wastewater systems and social housing assets required under the Ministry of Infrastructure's guide, as well as waste management assets.

In 2016, the Region published the 2016 Asset Management Plan (2016 AMP) which built on the 2014 AMP to include the majority of the Region's assets, and meet the requirements for Federal Gas Tax funding transfers with the Association of Municipalities of Ontario. The 2016 AMP covered Transportation, Water and Wastewater, Community Housing (previously known as Niagara Regional Housing), Waste Management, Public Health (including Emergency Medical Services), Community Services, Information Technology, Facilities and Police. The 2016 AMP was organized based on the Region's divisions, however assets managed under shared services were not aligned with the services being provided by the Region.

The Region then adopted C-F-024, "Asset Management Policy" (AM Policy), in May 2019, as per the requirements of Ontario Regulation 588/17, "Asset Management Planning for Municipal Infrastructure" (O. Reg. 588/17). The objective of the AM Policy is to provide a framework and guidance to enable provision of levels of service that are appropriate and affordable for the community.

To further support the corporate-wide development and implementation of asset management practices at the Region, in 2019 Council approved an asset management governance structure, which resulted in the creation of:

- Corporate Asset Management Steering Team (CAMST): Comprised of senior management from all Region commissions, boards and agencies providing governance and oversight of asset management within the Region.
- Corporate Asset Management Office (AMO): Centrally staffed to lead and support the development of a corporate-wide asset management system with implementation within departments.
- Asset Management Working Group (AMWG): Region wide body of department staff involved with development, delivery and support of asset management providing input and helping with asset management communications.

1.2 Summary of the Region's services

The 2021 CAMP includes 16 service areas within four of the Region's Departments and the Regional Niagara Police Service as shown in Table 6.

Table 6: Region Departments and corresponding service areas in the asset management plan

Department	Service
Public Works	Water
	Wastewater
	Waste Management
	Transportation
	Transit
	Fleet
Community Services	Seniors Services
	Community Housing
	Children's Services
	Social Assistance and Employment Opportunities
Public Health and Emergency Services	Public Health
	Emergency Medical Services
Corporate Services	Information Technology
	Facilities
	Court Services
Niagara Regional Police Service	Police Services

All assets supporting the service area report under the service area regardless of the managing Department. For example, Police buildings, although managed by Corporate Services, report under the Police Services area. Two exceptions to the service area reporting structure is Information Technology (IT) and Fleet. All the Region's IT assets report under IT except for Police IT assets. The entire Region fleet reports under Fleet except for Police and EMS who report their fleet respectively.

Descriptions of the 16 services are below including a summary of the assets supporting the service.

Water services provide treated drinking water to 11 of the Region's 12 local area municipalities (LAMs), with the exception being the Township of Wainfleet. Water service delivery is two-tiered. Niagara Region draws and treats raw water, operates bulk water storage facilities, major booster pumping stations, and rechlorination stations, and transmits treated water to participating LAMs, who then convey the water through local area transmission mains to residents and businesses. Assets supporting Water services include water treatment plants, water storage, pumping stations, watermains, and fleet.

Wastewater services treat sewage from 11 of Niagara Region's 12 local area municipalities (LAMs), with the Township of Wainfleet as the exception. Wastewater collection and treatment is two tiered. The LAMs collect sewage from residents and businesses and convey it to the Region through local area collection mains. The LAM collection system connects to larger Region-owned sewage transmission mains, which convey the sewage to wastewater treatment plants. Assets supporting Wastewater services include wastewater treatment plants, lagoons, pumping stations, sanitary mains, and fleet.

Waste Management Services (WMS) collects and processes residential and commercial waste. This is provided through bi-weekly curbside collection of waste and weekly collection of recycling and organics. Assets supporting WMS include active landfill sites and cell capacity, material recycling facility, naturalization sites and closed landfill sites.

Transportation is responsible for the provision of transportation through the network of Regional arterial roads. Asset supporting Transportation Services include roads, bridges, culverts, storm-water, traffic signals and luminaires, as well as fleet and works yard facilities.

Transit services leads inter-municipal transit, Niagara Regional Transit, and Niagara Specialized Transit. Assets supporting Transit include fleet that the Region purchased. The new Niagara Transit Commission will encompass all transit assets in the Region. This data is not available at the time of completing the 2021 Corporate Asset Management Plan.

Fleet services provides a full range of vehicle and equipment services for internal Regional divisions including maintenance and repair, marketing and disposal, and acquisition. Fleet manages fleet assets for all service areas with the exceptions of EMS and NRPS. Assets supporting Fleet include vehicles, trailers, maintenance garages, fuel depots and equipment. This section of the asset management plan reports all Region Fleet assets except those of Emergency Medical Services and Niagara Region Police.

Seniors Services provides a variety of long-term healthcare services for residents in the Region's long-term care homes. They also provide services for clients with healthcare needs and/or functional limitations who still live in the community, as well as those who attend adult day programs. Assets supporting Seniors Services include long-term care homes, supportive housing facilities, and care equipment.

Community Housing administers the Region's Community Housing program. Community Housing owns and operates approximately 3,000 accommodation units and has legislative oversight of an additional 4,000 private sector or non-profit units. Community Housing promotes affordable housing opportunities in Niagara, is a community partner who works collaboratively with stakeholders, and ensures equitable and fair access to affordable housing. Assets supporting Community Housing include high rise, low rise, townhouse, and single/semi communities.

Children's Services is responsible for the overall planning and management of services to children from birth to 12 years of age and their families. Assets supporting Children's Services include 5 daycare facilities and associated equipment.

Social Assistance and Employment Opportunities (SAEO) provides management and oversight of Ontario Works, on behalf of the Province. SAEO provides service through the development of plans and strategies to address and alleviate poverty in the Region, coordination with other Region divisions and community organizations involved in the delivery of human services. Assets supporting SAEO include five public service office facilities.

Public Health is responsible for the overall coordination and delivery of the Region's service requirements as a Board of Health in Ontario. Service requirements include providing a medical division, chronic disease and injury prevention division, clinical services division, environmental health division, family health division and an

organizational and foundational standards division. Assets supporting Public Health include facilities and equipment.

Emergency Medical Services (EMS) is responsible for providing 24-hour evidence based emergency pre-hospital medical care and transportation to hospital for individuals experiencing injury or illness. EMS customers include all residents and visitors of the Niagara Region. Assets supporting EMS include divisional stations, fleet, equipment, and information technology.

Information Technology (IT) plans, builds, sustains and secures the enterprise architecture, software applications, computer equipment and telecommunications systems. IT assets include various hardware such as servers, computers, telephone systems and software applications. This section of the asset management plan reports all Region IT assets except those of Niagara Regional Police Services.

Facilities centrally manages the majority of facilities within the Region including energy management and reporting. However, reporting of facility information for the asset management plan is by service area. Buildings shared by multiple departments such as the Region's administrative headquarters reports within Facilities.

Court Services administrates the Provincial Offences Courts including the prosecution of certain provincial offence matters, and fine processing and collection services. Assets supporting Court Services is the courthouse facility, equipment and information technology.

Police Services (Niagara Regional Police Services or NRPS) provide police services including crime prevention, law enforcement, and assistance to victims of crime, public order maintenance, and emergency response. NRPS serves one of Ontario's largest geographic regions by patrolling an area of 1,863 square kilometers, covering 12 Municipalities. Assets supporting NRPS include facilities for headquarters and divisional stations, fleet, personal and protective equipment and tools, investigative equipment and information technology assets.

1.3 Assets not included in this asset management plan

- Office furnishing and equipment
- Some service specific equipment, such as:
 - NRPS forensics lab

- W/WW lab equipment
- Transit assets of the newly approved regional transit Commission
- Land
- Forestry
- Niagara Peninsula Conservation Authority

1.4 Legislated requirements for asset management plans

Asset management planning supports the long-term strategic investment planning practices, which are crucial to the sustainability of infrastructure in an asset-intensive organization such as the Region. While these activities are sound business decisions, there has also been a legislative and regulatory push for the development of formal asset management plans for public sector entities to formalize these practices.

1.4.1 O. Reg. 588/17

The Government of Ontario released Ontario Regulation 588/17, “Asset Management Planning for Municipal Infrastructure” (O. Reg. 588/17) under the Infrastructure for Jobs and Prosperity Act, 2015. O. Reg. 588/17 established the requirements for municipalities to improve asset management practices over a number of years. The timelines presented in O. Reg. 588/17 were amended by Ontario Regulation 193/21 as a result of the COVID-19 pandemic as follows:

- July 1, 2022 – an asset management plan in respect of its core municipal infrastructure assets
- July 1, 2024 – an asset management plan in respect of all of its other municipal infrastructure assets
- July 1, 2025 – proposed levels of service for all assets, and a financial strategy to sustain

1.4.2 Canada Community Building Fund (formerly “Federal Gas Tax”)

In April 2014, the Region entered into a 10-year municipal funding agreement with the Association of Municipalities of Ontario for the transfer of Canada Community Building Funds (formerly named Federal Gas Tax funds). The agreement required the Region to develop and implement an asset management plan by December 31, 2016, and include the information and analysis described in Ontario’s Building Together: Guide for Municipal Asset Management Plans.

1.4.3 Development Charges Act

Ontario’s Development Charges Act requires asset management plans that demonstrate that the assets included in the background study are financially feasible over their full lifecycle. The Act requires detailed asset management plans to support

Transit development charge (DC) By-laws and less detailed asset management plans for all other DC eligible services.

1.5 Asset management plan methodology

The Plan fulfills the Region's legislated requirements under O. Reg. 588/17 for the preparation of an asset management plan, and follows the Building Together: Guide for Asset Management Plans of the Province of Ontario.

Additionally, the Region's AM Policy describes the vision and objectives of asset management in the Region. The AM Policy outlines three [3] principles that have been implemented in the Plan:

1. Service focused: Assets support the service delivered. Plan and manage the performance of assets keeping in mind the service delivered. Set service levels expected by customers and other stakeholders respecting cost, value and risk.
2. Value-based and affordable: Whole of lifecycle evaluation considers both operational and capital costs. Identify the best combination of investments that deliver the greatest benefit while respecting funding, resource, and timing constraints including customers' willingness and ability to pay.
3. Risk-based principles: Make more informed and better asset management decisions to address existing or potential risks to Regional objectives while understanding the likely outcomes and results of the actions.

The Plan is a consolidated summary of the asset management plans of each of the services provided by the Region. Staff from across the Region with the Asset Management Office developed these service area AM plans participating in workshops, providing information and validating results.

2 Demand for service

The goal of service demand analysis is to identify the required new or augmented service and related assets. Anticipated future demand provides details or forecast of growth, changes in requirements and changes in asset utilization. The forecast is enabled by describing drivers of change in demand and how the demand changes may influence service and assets. Demand analysis leads to investment planning necessary to meet the demand forecast.

Service demand is often interpreted as growth or capacity. Demand is also defined by other attributes such as quality, accessibility, and condition. As such, demand analysis closely links with levels of service.

Demand for services can exceed current capacity and may result in the need to expand, augment or upgrade assets, procure additional contracted services, or implement programs to reduce demand such as with conservation programs. Conversely, demand for services may also decrease, such as a move to more online services instead of in-person as has been experienced during the pandemic.

Change in demand can occur because of a variety of factors such as population and demographics, changes in customer expectations, and external factors such as climate change. Demand forecasting helps analyze service needs to define future requirements and development of strategies to meet anticipated changes. Examples of service impacts include:

- Reduce, expand or remove the need for the service
- Maximize the capacity, life span and serviceability of existing assets
- Seek alternatives to investing in the assets, and/or alternative treatments,
- Explore ways to provide the services, e.g. own forces, contractors or agencies
- Explore funding options (government, non-government funding, and private sector investment).

The cost associated with meeting the change in demand can be included in the long-range financial forecast including cost of future operating, maintenance and asset renewal activities.

2.1 Change in demand

Demand drivers are the underlying factors that direct change in the demand for the service. Drivers and their influence help define and measure the changing requirements for services, and the activities and assets required to support those services.

2.2 Demand driver influence and effect

Service divisions across the Region identified a number of drivers that influence demand for the services they provide and rated them by significance of impact on demand as low, moderate or high. A summary of the significance of impact rankings is provided in Table 7. Most drivers identified result in changes to operational requirements rather than changes to the assets utilized in the provision of the service.

Table 7: Region demand driver rankings

Driver	Region rank
Population change	1
Development trends	2
Legislation and higher Government	2
Organizational goals and objectives	4
Social issues and trends	5
Customer expectations	5
Demographic changes	7
Economic factors	7
Pandemic	7
Climate change	10
Technology change	10
Operational efficiency	12
Other service provider changes	13
Asset management	14

In order to better understand the impact which these drivers have on corporate service delivery they were further grouped into the following five [5] generalized drivers, as summarized in Table 8.

Table 8: Demand driver definitions

Generalized driver	Definition
Population, demographics and development changes	Population, and any increase or decrease, change in the structure of the population through age, sex, race, marital status, number of children, occupation, annual income, education level and others. Development changes refer to planning and developments which occur to change the makeup of infrastructure across the region, for instance densification and/or sprawl.
Social and economic trends	Trends caused by social changes and economic conditions, such as accessible services, proactive policing, and environmental conscientiousness. Legislative requirements issued by higher levels of government are often driven by social or economic trends and is therefore included.
Corporate objectives and customer expectations	Regional goals and objectives, including optimization of services. Internal and external customer expectations of services delivery.
Technology and service delivery partners	External service delivery change which impacts the need for a Regional service. Technological innovation which creates a change in a required Regional service.
Significant global event	Significant global event which disrupts the lives of many Niagara residents such as war, pandemic or epidemic, and climate change (more intense storm events, colder winters, hotter summers, and longer droughts).

2.2.1 Population, demographic and development changes

Population is forecasted to grow from 498,990 in 2022 to 694,000 in 2051. If population increases as forecasted, significant development will occur. This development would likely be a combination of densification of existing areas and new development beyond current urban areas. These changes would have an impact on the Region's services, such as new dwellings requiring Water and Wastewater services, Transportation network requiring additional capacity, and social services demand increase in line with the population increase.

2.2.2 Social and economic trends

Social and economic trends encompass a wide range of impacts and are based on a large number of factors and events. An example of this can be found in Community

Housing services which provides affordable housing to those in need. Some scholars predict a growing economic polarization in the coming years, which will likely cause an increase in demand for social services such as those provided by Community Housing. Social trends may dictate how or what services are delivered, and the changes may even be dictated by legislation to implement. For example, the trend over the last several years to invest in Transit is driven by the need to improve social conditions and economic opportunity through enhanced mobility in addition to climate change considerations.

2.2.3 Corporate objectives and customer expectations

Corporate objectives refer to customer expectations, operational efficiency and organizational goals and objectives. For example, EMS has a system transformation initiative to find internal efficiencies to ensure the service is operating efficiently and cost effectively.

2.2.4 Technology and service delivery partners

New technology and its use in service delivery may result in changes to asset useful lives, quality of services delivered, or efficiencies in service delivery. For example, Waste Management can use GPS technology to identify compaction levels within a landfill, which may lead to actions resulting in a reduced need for additional cell capacity.

2.2.5 Significant global event

Significant global events, such as climate change or the COVID-19 pandemic, has a direct impact on Regional services. For example, climate change impacts Wastewater with an increase in frequency and severity of storms that the network must be designed to endure. Whereas COVID-19 pandemic impacts to Facilities may reduce the amount of space maintained if remote work arrangement extend beyond the near term.

2.3 Development

The forecast population increase is a significant driver of new assets. Planning for growth is part of master plans such as for Transportation, Water and Wastewater, and Community Housing. Funding for new assets required to support growth may come from development charges.

Development charges (DCs) are fees collected from developers at the time of building permit approval to assist the municipality with covering the initial capital costs of new infrastructure to accommodate the proposed development.

A Development Charge By-law is legislated to be in effect for no more than five years. Although the last completed study for the entire Region is from 2017, an update in 2022 is ongoing and part of Council reporting in the same period as this asset management plan. As a result, the 2021 Corporate Asset Management Plan includes a draft of new assets from the 2022 Development Charges study; expect those of Water and Wastewater. Growth assets in this plan for Water and Wastewater are those from the 2017 Development Charges study.

3 Levels of service

Levels of service (LOS) are key business drivers that influence decisions about managing assets. LOS statements describe the quality of service the Region is striving to provide to customers and other stakeholders, and commonly relate to service attributes such as availability, reliability, suitability, health and safety, affordability, environmental sustainability, responsiveness and timeliness. Performance indicators and targets are used to describe, quantify and communicate the services that customers and other stakeholders expect to receive and to determine whether the Region is delivering as expected.

For municipal service providers, LOS are guided by a combination of customer and other stakeholder expectations, regulatory and legislated requirements, and internal policies, strategies and procedures. In many cases, LOS are also implied based on past performance and system design. Effective asset management requires that LOS be formalized and supported through a framework of performance measures, targets, and timeframes to achieve targets, and that the costs to deliver the documented LOS be understood.

Niagara has organized its LOS framework under the following categories:

- Corporate LOS: Corporate statements that describe what services the Region intends to deliver, and how it will align with customer expectations, operation efficiencies, and organizational goals and objectives.
- Customer LOS: Understanding the Region's customers and other stakeholders and their expectations is a key input into LOS. Customer LOS are typically balanced against legislative requirements and the customer's ability/willingness to pay.
- Technical LOS: The Region must translate customer expectations and legislative requirements into technical objectives, performance measures, and targets. Technical levels of service define what the Region must do to deliver services that meet customer and legislated LOS.

In addition, legislation plays a great part in defining level of service and may be applicable at either the corporate, customer or technical level.

- Legislated LOS: Legislated requirements define the standards by which the Region is obligated to provide services. Legislative requirements are a significant business driver for most municipal services.

The individual service sections describe the level of service and requirements. This section provides more detail on the corporate level of service, and an overview with examples of legislated, customer and technical level of service.

3.1 Corporate LOS

Corporate LOS are statements that describe what the Region intends to focus on for the term of the Council Strategic Plan. Council engaged in a number of public consultations on what residents expected from the Region and current trends and drivers amongst other relevant issues, and used the results to develop Councils' Strategic Plan for 2019-2022. Councils Strategic Plan identified four [4] key areas of focus for the term of Council:

1. Supporting business and economic growth
 - A coordinated approach to fostering economic growth in Niagara
2. Healthy and vibrant community
 - Foster a high quality of life through safe, healthy, and inclusive neighbourhoods through the delivery of quality, affordable and accessible human services
3. Responsible growth and infrastructure planning
 - Sustainable investments in transportation, transit and infrastructure, while aligning infrastructure planning with preservation of the natural environment
4. Sustainable and engaging government
 - A commitment to high quality, efficient, fiscally sustainable and coordinated core services through enhanced communication, partnerships and collaborations with the community

Within each of the four focus themes, the Region has identified specific actionable objectives. Examples of these are investment in Transit, Community Housing, Social Equity, and in asset management.

3.2 Legislated LOS

Legislated requirements define the standards according to which the Region is obligated to provide services to the community. These standards typically relate to service and asset safety and reliability. The Region delivers services in adherence to applicable legislative requirements, including required compliance monitoring and reporting.

Ontario Regulation 588/17, “Asset Management Planning for Municipal Infrastructure” (O. Reg. 588/17) includes legislated customer levels of services for ‘core municipal infrastructure assets’ (O. Reg. 588/17 refers to them as ‘Community LOS’ which the Plan utilizes when referencing the O. Reg. 588/17 requirements) and requires qualitative descriptions that describe the scope, quality of reliability of the services provided. O. Reg. 588/17 also specifies Technical LOS for municipal infrastructure assets.

3.3 Customer LOS

Customer level of service are generally qualitative and written to describe the service delivered.

Examples in this category are:

- Wastewater: Provide adequate wastewater collection and treatment capacity to prevent sewage backups and overflows
- Waste Management: Waste is disposed of economically
- Information Technology: Public access municipal information and services when, where and how it is convenient to them

3.4 Technical LOS

The Region must translate customer expectations and legislative requirements into technical objectives, performance measures, and targets. Technical LOS define what the Region must do to deliver services that meet customer and legislated LOS.

Compliance with legislated requirements has always been a primary driver for the Region, with changes to legislation driving continuous update of associated technical LOS over time. Technical LOS to support customer and other stakeholder requirements are more dynamic than those defined to support legislative requirements – they must be adapted to changes in the local, regional and global business environments.

Examples in this category are:

- Water: Number of boil water advisories issues
- Roads: Overall average pavement condition grade
- Various: Percentage compliance with regulatory obligations

4 State of infrastructure

The state of infrastructure (SOI) provides the current state of the Region's assets to facilitate informed infrastructure investment decisions, in particular for asset rehabilitation and renewal. SOI provides the basis for determining the amount of funding required to sustain the levels of service at an acceptable level to Niagara Region residents and the community at large and informs the decision making process to keep assets in an acceptable state of repair.

SOI addresses four traditional asset management questions:

1. What assets does the Region own (quantity)?
2. What are they worth (replacement value)?
3. What is the asset performance level (condition in this asset management plan with some risk information)?
4. What is the expected and remaining useful life?

Furthermore, this section highlights the Region's intention to shift the approach to asset management decision-making from condition to risk based. The shift will incorporate a greater emphasis on risk-based economic decision making to enable the explicit trade-off between level of service, cost and risk. As such, risk information is included as part of the assessment for the assets:

5. What is the risk level associated with the assets?

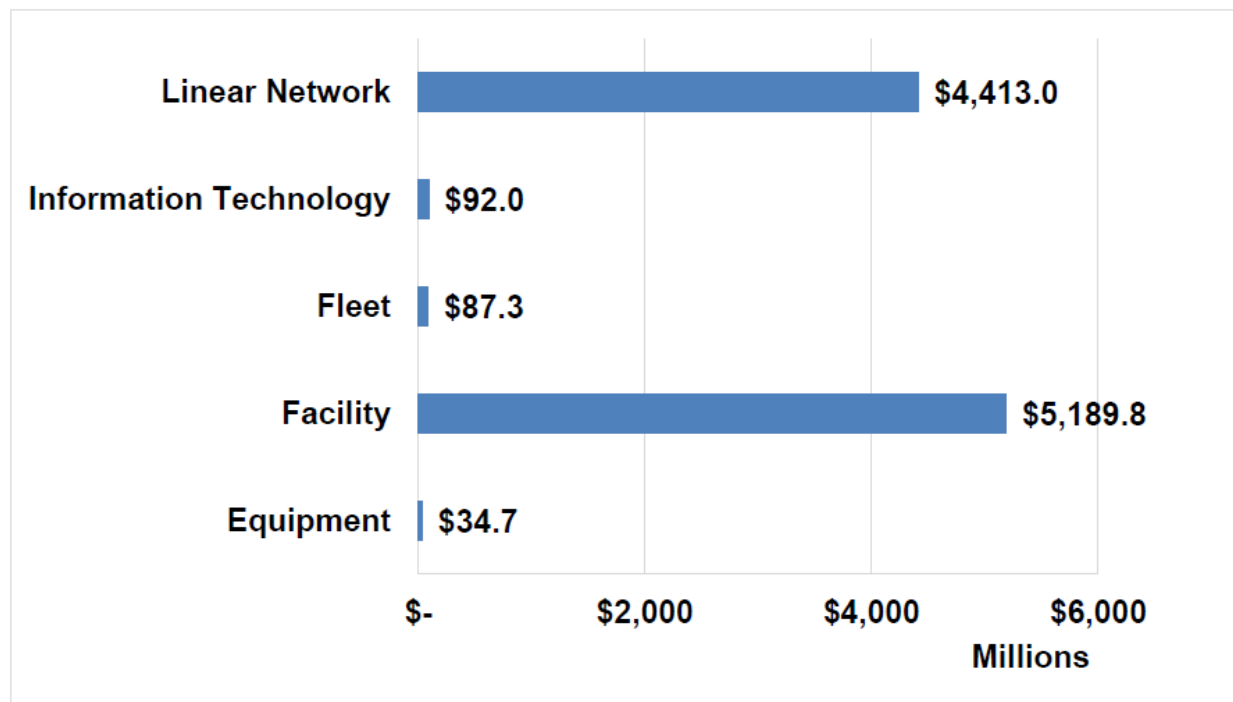
This section includes summary information for all asset owned and operated by the Region on:

- Asset classes or types and quantity
- Replacement cost
- Asset age distribution and asset age as a proportion of useful expected life (UEL)
- Asset condition
- Risk including probability and consequence of failure

4.1 Asset inventory and replacement cost

The assets required to support the services provided by the Region are estimated to cost \$9.82 billion to replace, as summarized by asset category in Figure 1.

Figure 1: Asset replacement cost (\$ millions)



Some of the Regions assets include:

- 41 facilities, such as corporate headquarters, Public Health, day care centres, ambulance and police stations
- Six [6] water treatment plants, 31 pumping stations & reservoirs, and 314 km of water transmission mains for drinking water
- 10 wastewater treatment plants, 126 sewage pumping stations, and 306 km of force and gravity mains for sewage conveyance
- 1,733 km of road network and 89,085 square meters of bridges

From an asset management perspective, current replacement cost valuations are useful for long-term decision-making since it provides a key decision making parameter for understanding the future commitments for replacing assets at their end of useful life or upon asset failure. The current replacement cost was derived from a variety of source data and methods depending on the asset type.

Index from previous cost estimate

Indexing is a forecast of the current replacement value uses an appropriate index starting from a recent asset valuation (replacement cost estimate). The most common index in a municipal setting is Canada's Construction Price Index for Non Residential

Buildings (NRBCI). NRBCI is applicable for facilities, infrastructure and major equipment.

Market price

Market price is the recent purchase price of the same or similar asset that is commercially available. Market price is applicable for commonly purchased and relatively short-lived assets including vehicles, computers, and equipment.

Cost models

Cost models rely on units of measure and a unit cost derived from modelling and combining different sources and methods for the unit cost. The Region has some informal cost models and very few formal cost models.

4.2 Asset age distribution

Traditionally, the age of an asset indicates its remaining life based on its useful expected life (UEL). In absence of condition or risk assessments, the age distribution of assets relative to their respective UEL provides a broad and high-level assessment of remaining useful life. This ratio of age to UEL informs the development of a planning horizon for future asset replacements. This is especially the case when an organization has limited condition or failure data. The average age and average UEL, based on weighted average cost, are summarized by service in Figure 2 and Table 9.

Figure 2: Average age and UEL in years

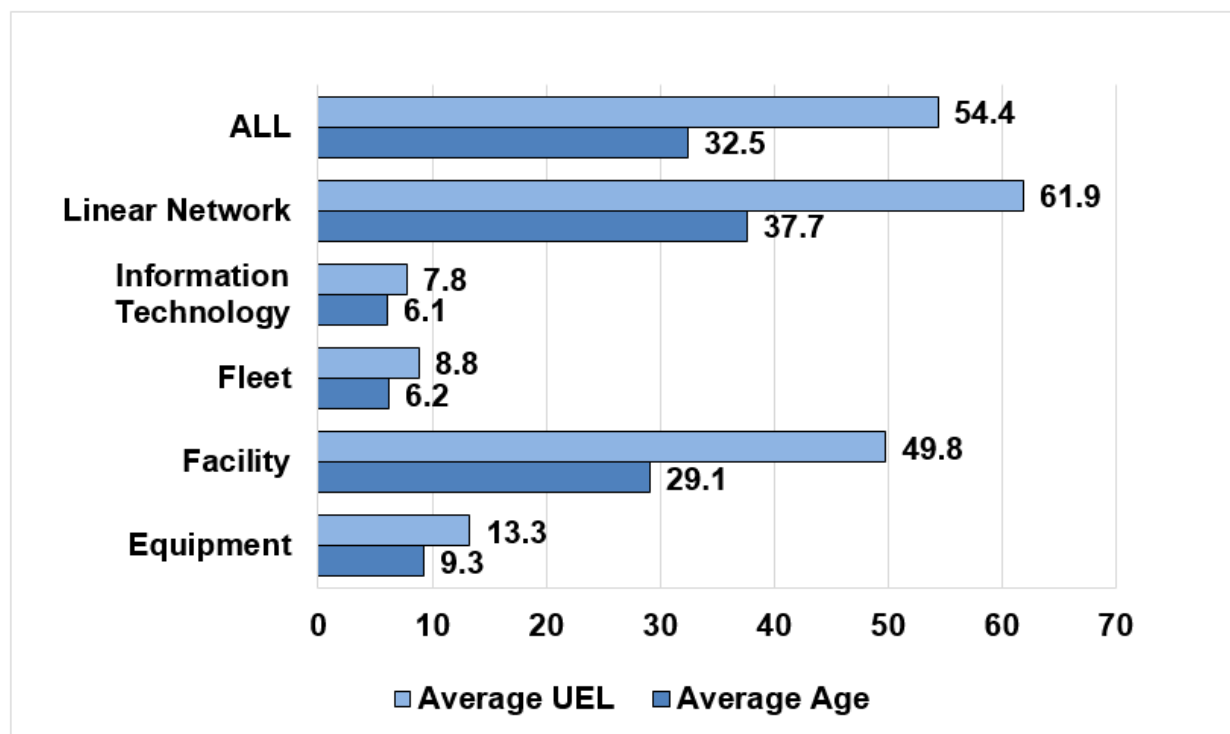


Table 9: Average age and UEL in years

Asset Category	Average Age	Average UEL	Average Remaining Life
Equipment	9.3	13.3	4.0
Facility	29.1	49.8	20.7
Fleet	6.2	8.8	2.6
Information Technology	6.1	7.8	1.8
Linear Network	37.7	61.9	24.3
Total	32.5	54.4	21.9

An asset reaching useful expected life does not mean that the asset is in a failed state. An asset that is as old as or older than its useful expected life generally is in poorer condition than a newer or younger asset. However, some assets continue to perform beyond useful expected life but with an increased risk of failure or with lower performance.

This performance concept is important to understand when addressing asset backlog. For example, keeping a vehicle on the road past the useful expected life is possible. This subjects the vehicle to higher maintenance costs to keep it running and higher risk of failure of a major component including breaking down at unexpected times. Both these outcomes affect level and cost of service.

The shorter the useful expected life, the higher the capital investment for asset replacement. Ideally, the useful expected life correlates with the expected performance and level of service of an asset. However, the risk of assets at any age should inform decisions about asset replacement to enable balance of cost and level of service with risk.

Overall, the Region has a healthy age distribution of its assets. On average, Facilities and Networks – the largest category of aggregated assets – have significant remaining life left to continue delivery of services for at least two decades. The specific age distribution within these broad categories provides a more granular view on imminent investment needs in the near future. From the perspective of planning asset replacement programs, the Region uses asset age distributions relative to their UEL for ranking high priority assets for further consideration.

Figure 2 represents the asset categories as averages, and therefore may represent new assets as well as assets beyond their useful life. There are in fact assets beyond their useful expected life meaning they are overdue for replacement and represent an investment backlog or deferred investment.

4.3 Asset condition

The assessment of asset condition provides a more refined approach to estimating an assets remaining UEL when condition is directly measured. The Region uses a number of techniques for assessing asset conditions, namely structured visual inspections, model-based condition deterioration assessments and condition assessments correlated with asset age distributions.

To enable comparison of condition and condition trends over time between different asset types, a generic condition grading scale translates detailed engineering data about assets into information that the public and council can compare across asset groups. For this purpose, an industry standard general condition grading system was used based on the International Infrastructure Management Manual (IIMM), summarized in Table 10.

Table 10: General condition rating scale (from IIMM)

Colour	Condition rating	Description
	Very good (VG)	Asset is physically sound and is performing its function as originally intended. Required maintenance costs are well within standards and norms. Typically, asset is new or recently rehabilitated.
	Good (G)	Asset is physically sound and is performing its function as originally intended. Required maintenance costs are within acceptable standards and norms but are increasing. Typically, asset has been used for some time but is still within early to mid-stage of its expected life.
	Fair (F)	Asset is showing signs of deterioration and is performing at a lower level than originally intended. Some components of the asset are becoming physically deficient and component replacement may be necessary. Maintenance requirements and costs are continuing to increase. Typically, asset has been used for a long time and is within the mid- to later stage of its expected life.
	Poor (P)	Asset is showing significant signs of deterioration and may be performing to a much lower level than originally intended. A major portion of the asset is physically deficient. Required maintenance costs exceed acceptable standards and norms. Typically, asset is approaching the end of its expected life.
	Very poor (VP)	Asset is physically unsound and/or not performing as originally intended. The asset is still operational but has higher probability of failure or failure is imminent. Maintenance costs are unacceptable and rehabilitation is not cost effective. Replacement / major refurbishment are required.

Asset condition, based on weighted average cost, is summarized by asset category in Figure 3 and Table 11.

Figure 3: Asset condition as % of value by asset category

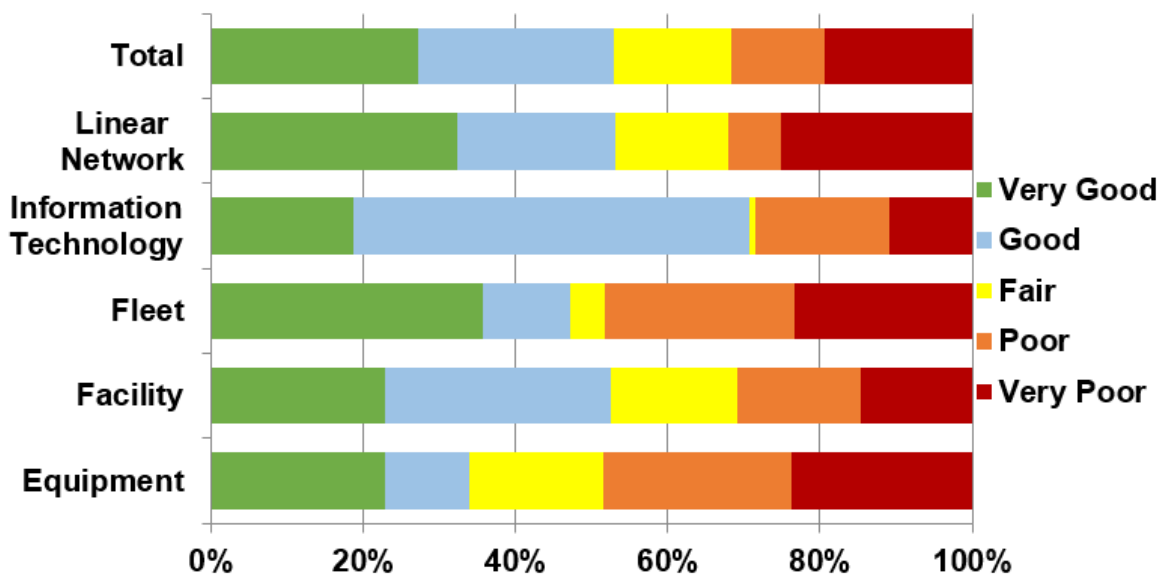


Table 11: Region's asset condition as % of value by asset category

Colour	Condition rating	Total	Linear Network	Information Technology	Fleet	Facility	Equipment
	Very good	27.2%	32.4%	18.7%	35.7%	22.9%	23.0%
	Good	25.6%	20.7%	51.9%	11.5%	29.6%	11.0%
	Fair	15.6%	14.9%	0.9%	4.5%	16.6%	17.6%
	Poor	12.1%	6.8%	17.5%	24.9%	16.2%	24.6%
	Very poor	19.4%	25.2%	10.9%	23.3%	14.7%	23.8%

The Region's portfolio of assets is overwhelmingly rated in fair to very good condition, with nearly 70% of assets rated as fair or better condition. Although some of these assets deteriorate at a faster pace (e.g., IT equipment, vehicles, etc.) relative to long-lived infrastructure assets, it can generally be assumed that the Region has a healthy mix of assets in various condition states.

Nonetheless, the converse of good performance is the 25.2% of assets in very poor condition. Assets in this group are high risk and candidates for immediate replacement.

The specific condition distribution within these categories provides a more granular view on imminent investment needs in the near future as shown in Figure 4 and Table 12.

Figure 4: Asset condition as % of value by service

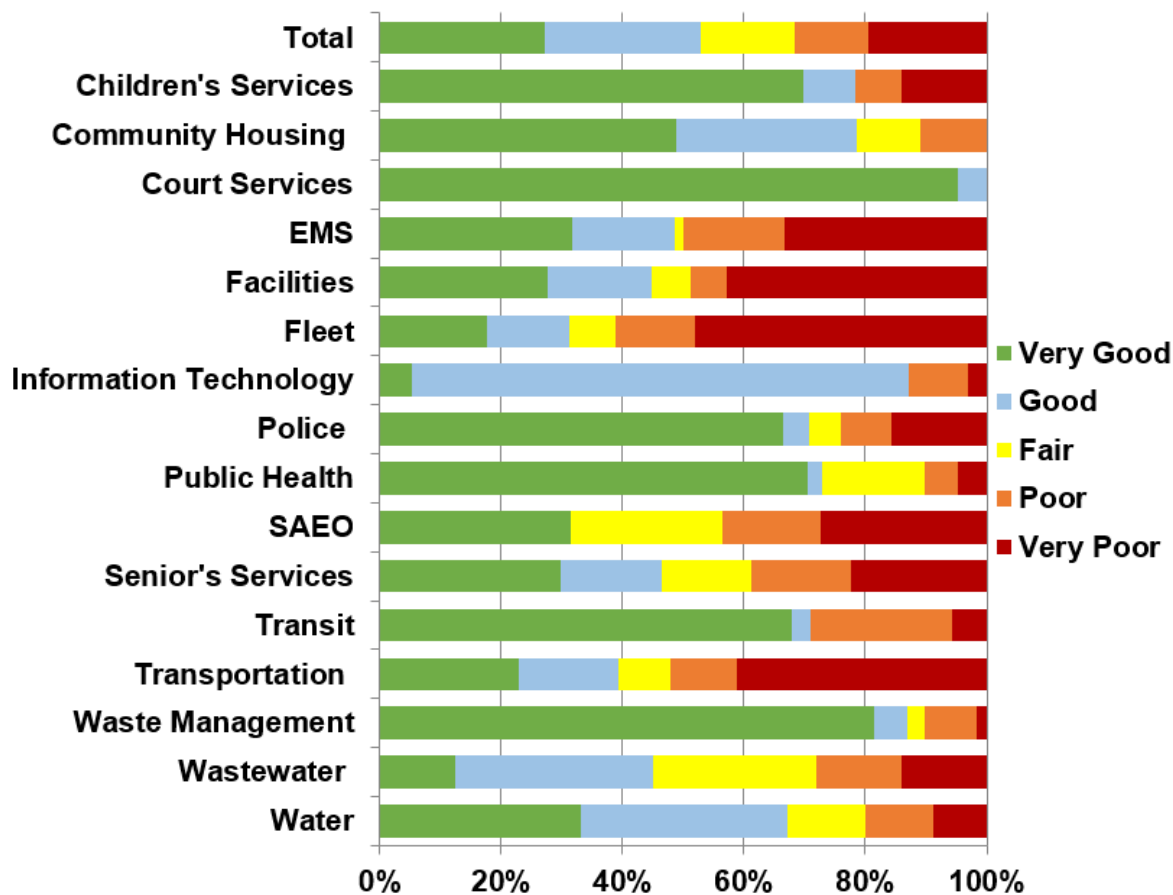


Table 12: Region's asset condition as % of value by service

Service	Very good	Good	Fair	Poor	Very poor
Children's Services	69.7%	8.6%	0.2%	7.5%	14.0%
Community Housing	48.7%	29.9%	10.5%	10.9%	0.0%
Court Services	95.4%	4.6%	0.0%	0.0%	0.0%
EMS	31.6%	17.1%	1.4%	16.5%	33.4%
Facilities	27.7%	17.1%	6.4%	5.9%	42.9%
Fleet	17.6%	13.6%	7.6%	13.1%	48.1%
Information Technology	5.3%	81.8%	0.0%	9.8%	3.1%
Police	66.4%	4.3%	5.1%	8.5%	15.7%
Public Health	70.4%	2.5%	16.9%	5.5%	4.6%
SAEO	31.4%	0.0%	25.0%	16.3%	27.4%
Senior's Services	29.9%	16.6%	14.8%	16.2%	22.5%
Transit	68.0%	2.9%	0.0%	23.3%	5.8%
Transportation	23.0%	16.3%	8.5%	11.1%	41.2%
Waste Management	81.5%	5.4%	2.8%	8.6%	1.7%
Wastewater	12.3%	32.7%	27.0%	14.0%	14.0%
Water	33.0%	34.1%	12.8%	11.3%	8.7%
Total	27.2%	25.6%	15.6%	12.1%	19.4%

Where available, actual data on condition and performance assess current state and forecast infrastructure needs. When gaps in data exist, an action plan establishes the steps necessary for more comprehensive data and information. The action plan improves the level of confidence in the use of the information, which is to forecast infrastructure investment requirements.

4.4 Risk

Table 13 (Risk Matrix) is a standardized risk matrix to represent assets with their current replacement cost and percentage of total asset replacement cost, respectively, according to their probability of failure (POF) and consequence of failure (COF). For each asset, POF is determined using a Weibull probability function to indicate its current cumulative asset failure likelihood. The cumulative distribution function is asset-specific in terms of the UEL and increasing POF over the lifetime for each asset.

COF represents an assets' criticality to provide service to society, and is defined by social, environmental and financial impact in the event that an asset fails.

- Environmental impact is a measure for the consequential impact of an asset failure on the environment, and includes pollution to air, water bodies and soil contamination.
- Social impact of asset failure evaluates Health & Safety, Well-being, Compliance and Reputational impact on the residents and employees of the Region.
- Financial impact considers the direct cost to the Region as well as compensation to affected residents. The impact of asset failure is represented as a monetary cost.

From an asset management planning perspective, the risk matrix facilitates the review and targeted action of high risk assets and lays the foundation for risk-based asset management planning, e.g. in prioritizing asset replacements or rehabilitation of assets using cost benefit analysis, where risk reduction is considered a benefit.

Risks relating to asset failure may be further mitigated through more detailed condition and risk assessments, preventative and corrective maintenance planning and capital renewal programs. The activities are intended to ensure that the appropriate work is completed to sustain the desired LOS delivered. Asset service risk distribution is summarized in Table 13.

A note on the colour scheme in the matrix is that it is similar to that of the condition grade colour scheme but is not precisely the same. The main difference is assets that have a very high consequence of failure always require a higher degree of treatment regardless of the probability of failure.

Table 13: Distribution of the Region's asset risk (in \$ millions)

COF	Very low	Low	Moderate	High	Very high
POF					
Very high	\$4	\$21	\$46	\$-	\$-
High	\$139	\$187	\$32	\$3,481	\$721
Moderate	\$146	\$1,114	\$132	\$1,026	\$420
Low	\$278	\$379	\$484	\$773	\$-
Very low	\$3	\$110	\$29	\$-	\$291

POF = Probability of failure

COF = Consequence of failure

Table 14 represents the percentage of total asset replacement cost according to the risk of asset failure. Considering that 7.3% of assets (weighted by asset value) fall into the category of very high risk, these assets should be further validated and prioritized for subsequent asset management activities, including capital asset replacement and auditing emergency response planning.

Table 14: Region risk exposure summary

Colour	Risk	Asset value (\$ million)	% of assets
VL	Very low (VL)	\$391.7	4.0%
L	Low (L)	\$554.5	5.6%
M	Moderate (M)	\$2,991.8	30.5%
H	High (H)	\$5,157.8	52.5%
VH	Very high (VH)	\$721.0	7.3%
	Total	\$9,816.8	100.0%

Risks can indicate required action, standardized responses to existing risks by risk category are as follows:

- Very low (VL)
 - A very low risk has a low probability of risk occurring, and low impact to service delivery. This risk can be responded to by maintaining routine procedures, and planning renewals in the longer term.
- Low (L)
 - A low risk has a low-moderate probability of occurring, and low-moderate impact to service delivery. This risk can be responded to by establishing a monitoring program and planning renewals in the intermediate to long term.
- Moderate (M)
 - A moderate risk has a moderate probability of occurring, and a moderate impact to service delivery. This risk can be responded to by establishing a monitoring program, and planning renewals in the intermediate term.
- High (H)

- A high risk has a moderate-high probability of occurring, and moderate-high impact to service delivery. This risk can be responded to by establishing a monitoring program with frequent risk assessments, and planning renewals in the intermediate to near term. Consideration should also be made for additional preventative or correction actions.
- Very high (VH)
 - A very high risk has a high probability of occurring, and high impact to service delivery. This risk can be responded to by establishing a monitoring program with frequent risk assessments, and planning renewals in the near term. Consideration should also be made for additional preventative or correction actions.

5 Lifecycle strategies

Lifecycle delivery is the asset management element to manage assets from the time it is acquired to its disposal. Lifecycle delivery includes a strategy or approach for actions to maintain, rehabilitate and replace assets. In its simplest form, these actions, referenced as infrastructure solutions, are the lifecycle asset strategy (LAS). In the asset management plan these actions, their costs, and timing inform the level of service and the cost of service.

In addition to infrastructure solutions, the LAS includes non-infrastructure solutions and associated costs. There are five [5] categories of LAS as summarized in Table 15.

Table 15: The five categories of lifecycle asset strategies

No.	Solution	Description
1	Service	Service delivery solutions may or may not involve the asset portfolio. Service decisions focus on the extent of service provided and on service delivery. Service based lifecycle management includes contracted service as a non-asset solution.
2	Maintenance	Operations and maintenance of the asset portfolio according to maintenance or operations strategies. This includes regularly scheduled inspection, condition assessments, routine maintenance, and more significant repairs including those due to unexpected events. Maintenance helps assets achieve expected life whereas incorrect maintenance leads to not achieving expected life.
3	Renewal	Renewal is enhancement of the assets or services, and rehabilitation or replacement of existing assets. Generally, rehabilitation is different from maintenance because of the higher cost, that it is a capital expense and that it enhances the asset in some way such as extending the asset life. Replacement occurs when rehabilitation is no longer a viable option and the asset has reached the end of its useful life.
4	Expansion	Expansion is planned activities to extend services to previously un-serviced areas or expand services to meet growth demands. For assets, it is the addition of new assets or new asset capacity.
5	Non-asset	Non-asset solutions are those that do not involve the acquisition, maintenance or renewal of assets. They are actions or policies that can lower costs or extend asset life, e.g., better integrated infrastructure planning and land use planning, demand management such as conservation or business process optimization. Master or service planning and management are the main processes identifying non-asset solutions.

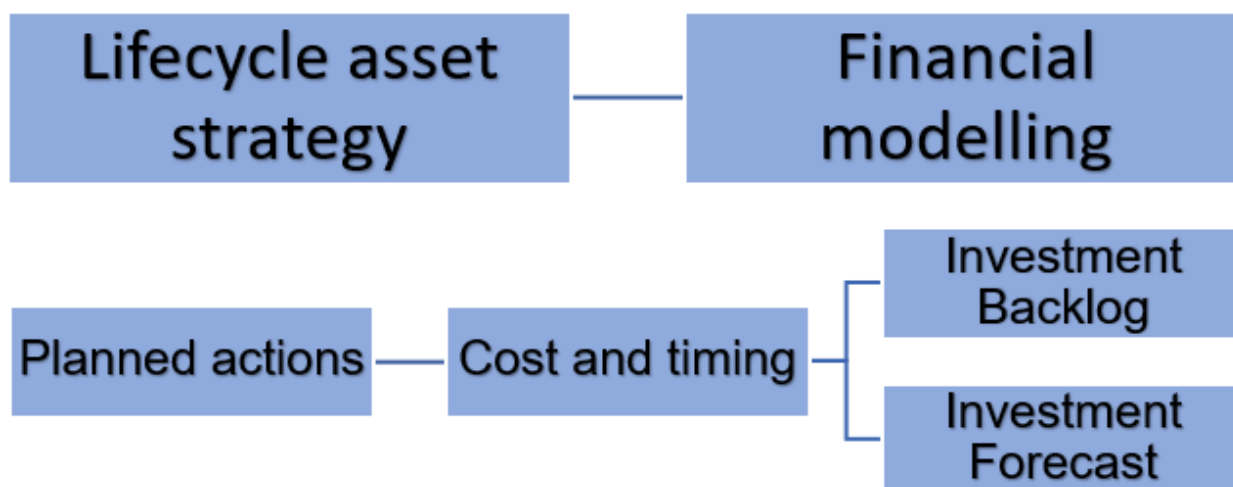
The LAS is the planned actions that enable assets to provide the desired level of service in an efficient and sustainable way.

Efficient means providing service at the lowest lifecycle cost. To achieve the lowest lifecycle cost includes delaying investment as long as possible. Delaying investment means managing risk of failure or interruption of service delivery within tolerable limits. Risk is an important measure to help make decisions on when it is best to maintain, rehabilitate or to replace an asset.

Sustainable means fully funding the service needs and actions. The basis of determining funding needs or investment is the lifecycle asset strategy.

Figure 5 shows the relationship between the lifecycle asset strategy and financial modelling.

Figure 5: Lifecycle asset strategy and financial modelling



5.1 Lifecycle asset strategies for the Region's assets

The Region uses three [3] basic lifecycle asset strategies in the financial model for all existing assets. These are maintenance, rehabilitation, and replacement.

The financial model uses the expansion strategy for all assets to support growth that the Region's Development Charges Bylaw identifies. After acquiring the asset, the financial model employs one of the three strategies for existing assets as applicable as described in Table 15 previously.

The Region uses five [5] categories for all its assets and further subdivides the category for different classes of assets. An example is Buildings and Plant within the Facility

category. In addition to maintenance, which is a strategy for virtually every asset in the Region, there is a general strategy for each asset category in Table 16.

Table 16: Lifecycle asset strategy for the Region's assets

Asset category	Class	Lifecycle asset strategy
Facility	Buildings	Rehabilitation and replacement
Facility	Plant	Rehabilitation and replacement
Facility	Landfill	Rehabilitation and replacement
Equipment	Equipment	Replacement
Linear network	Roads	Rehabilitation and replacement
Linear network	Bridges	Rehabilitation and replacement
Linear network	Other Transportation	Replacement
Linear network	Pipelines	Replacement
Fleet	Fleet	Replacement
Information Technology	Hardware	Replacement
Information Technology	Software	Replacement

5.2 Performance modelling

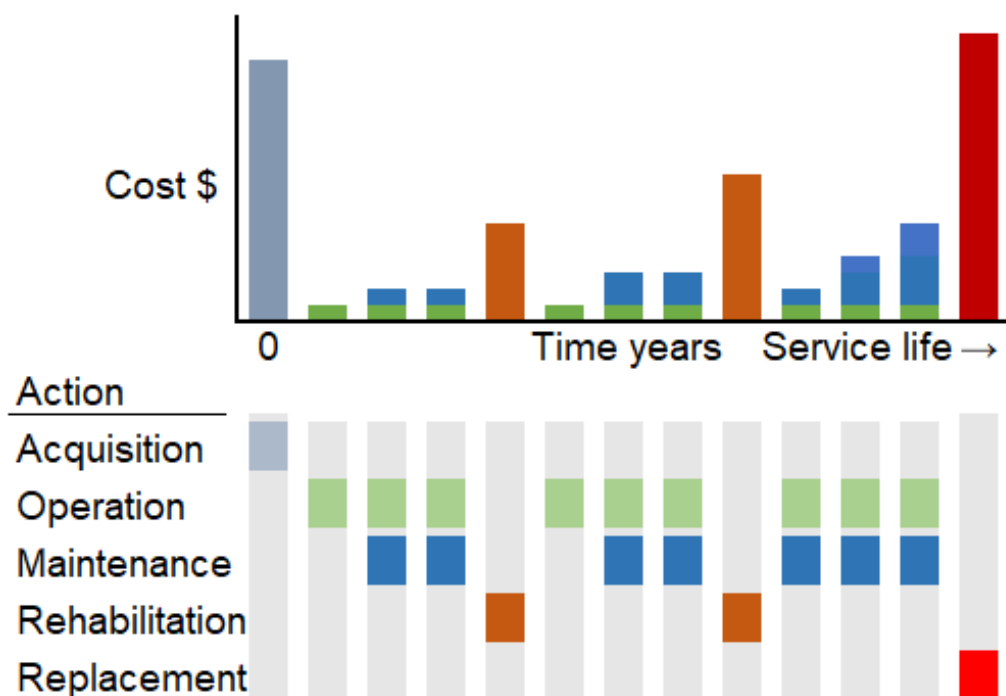
Performance modelling is the basis of lifecycle analysis. Analysis requires a model of change in asset performance over time and change because of lifecycle actions. An example of performance change is the improvement of condition and lowering of risk after rehabilitation.

All assets degrade over time and this degradation may have linear or non-linear degradation curves. Deterioration profiles for an asset can be determined from a variety of sources, including historical performance, local knowledge, and best practice. Some organizations have developed bespoke deterioration profiles using failure and performance data. More typically, organizations adopt typical performance curves approximating an industry standard. Provided an organization collects performance data, it is possible to customize these standard deterioration curves over time.

Based on empirical data and experience, specific points along the degradation curve can be set as thresholds for actions of maintenance, rehabilitation or replacement.

The lifecycle depicted in Figure 6 illustrates the relationship between cost and lifecycle actions through the asset life. This is a simple example in that the actions correspond to time during the life of the asset rather than risk. A risk-based strategy employs risk principles for rehabilitation and replacement timing.

Figure 6: Example of a simple lifecycle asset strategy



5.3 Risk of not following the lifecycle asset strategy

The selected strategies reflect the best information and practice at this time. The Region has designed the strategies to be appropriate, cost-effective and ensure service sustainability.

Deviating from the defined strategies increase the risk of service delivery risks and risk from asset failures. It is worth noting the Region may choose to vary from the strategies and resulting forecast investment rate for a time due to various economic or political factors. However, eventually funding must follow the strategy and the forecast investment amounts to avoid increasing the backlog, and realizing asset risks.

The timing of a lifecycle strategy action, one of the three [3] used in the financial model, relies on timely and accurate asset management activities such as inspections,

assessments, analysis and forecasts. If the Region does not complete the actions and activities in the right way, at the right time, or for the right reason, it exposes the Region to risk. The outcomes of the risk are general and typical for most assets. A general description is in Table 17.

Table 17: Risks of not following the lifecycle asset strategy

Risk	Strategy	Potential outcomes
Work timed too late Incorrect assessment: lower performance than actual	Maintenance, Rehabilitation, Replacement	Reduced level of service, fail to avoid failure and consequences, more expensive maintenance or repair, missing an opportunity for minor works
Work timed too early Incorrect assessment: higher performance than actual	All	Ineffective use of funding and resources
Work timed too late	Expansion	Stalled growth and revenue, overcapacity pressure on existing assets
Incorrect lifecycle model timing	Maintenance, Rehabilitation, Replacement	Incorrect forecast of investment and either under or over funded
Incorrect risk assessment	Maintenance, Rehabilitation, Replacement	Suboptimal prioritization and performance
Incorrect work performance or strategy	All	Suboptimal performance, ineffective use of funding and resources

5.4 Measuring risk

The risk model in this asset management plan is the risk model from the annual capital budget process, the Corporate Asset Management Resource Allocation Model or CAMRA.

The CAMRA model is a methodology that assesses the Region's exposure to operational risks in the context of its corporate priorities. It uses a customized risk

assessment methodology within the triple bottom line consequences of Environment, Social and Financial consequence.

The risk model in CAMRA uses a standard formula of probability multiplied by consequence of a risk event with the following criteria for consequence:

- Health and safety
- Well being
- Compliance
- Reputational risk
- Environmental
- Consequential costs

This provides a framework for consistent, defensible and replicable risk assessments that are sufficiently generic to be comparative across all the Region's services.

In the annual budget, for individual projects staff select probability of failure (POF) from six pre-set values using a corresponding description for each. The pre-set values range from 2% to 100%. Staff assign a rating for each individual project and for each of the five consequence factors using a standard scale. This approach works well when there is a limited number of individual projects to assess such as the several hundred in the annual budget. However, for the asset management plan there are tens of thousands of assets to assess so a modelled approach is better.

The model for probability uses a two-parameter Weibull equation that returns a POF for any asset age. The parameters change the relationship between POF and age. Setting the parameter values requires a professionally judged qualitative understanding of asset behaviour correlating to asset type. The results from several years of using CAMRA also is a source of data for the qualitative assessment. In this way the set of standard Weibull models built are applicable to any asset in the Region.

To use the Weibull risk model the parameters necessary are:

- Asset type: to enable Weibull model selection
- Useful expected life: to set the model performance boundary condition
- Age: to generate probability using the Weibull model
- Condition: when available, to generate a working age if different from actual age

The model risk assessment for consequence of failure uses a similar approach to assess assets at the class level.

With the modelled approach, it is possible to measure risk for every asset in the Region. However, the model and its use needs further improvement before using it to optimize the timing of forecast lifecycle actions and resulting investments. For now, the Region has a foundation from which to work towards the legislative requirements of the 2025 asset management plan.

6 Financial strategy

This section presents a financial projection of asset investment needs based asset inventory data and lifecycle activities discussed in Section 5, which outlines the lifecycle asset strategy.

The basic premise of a lifecycle asset strategy is to perform routine maintenance during the life of the asset with periodic rehabilitation or refurbishment. Replacement of the asset using its useful expected life guides when to replace and create a new asset. Asset replacement starts the lifecycle over again.

The lifecycle asset strategy models the behavior, deterioration and risk of assets over time and the actions to restore performance. This model forms the basis of the forecast of actions and costs, and the effect on levels of service, performance and risk

The financial strategy projects investment requirements from asset management planning and combines this with financial and budget planning practices. This enables the Region to determine a long-range financial plan to sustain the level of service delivered by the Region.

6.1 Changes to investment backlog and future investment needs

This subsection summarizes the financial information from this section. Additional details are in subsequent subsections.

The backlog of deferred investment and forecast investment estimated in the 2021 Corporate Asset Management Plan is significantly greater than that in the 2016 Asset Management Plan.

The main reason for the increase is due to improvements in the asset management data. Although this data improvement highlights a greater financial need than in 2016, the information positions the Region to better address risk to level of service and of asset failure.

The result of the changes since 2016 is a need for a greater annual increase in rates and levy to reduce the backlog and achieve required funding levels. Table 15 shows a comparison of various financial measures between 2016 and 2021 and the corresponding increase in those measures.

Table 18: Comparison of financial measures between 2016 and 2021

Financial item	2016 \$ millions	2021 \$ millions	Increase
Replacement value	\$7,430	\$9,817	32%
Backlog	\$546	\$2,480	354%
Annual investment including backlog in each of the next 10 years	\$225	\$438	95%
Annual funding gap over 10 years	\$73	\$193	163%
Required Water and Wastewater Rate increase to fund gap	3.15%	7.22%	129%
Required Levy increase to fund gap	2.16%	3.82%	77%

For various reasons due to financial constraints since the 2016 Asset Management Plan, Council did not follow the rate and levy increases approved or recommended from this plan.

There is ongoing pressure to maintain current rate and levy increases as low as possible. While understandable, there is a clear need to rationalize the investment needed with the level of service delivered. Appropriate rate and levy amounts require a decision on a revenue increase, or a reduction in level of service, or both.

Asset management employs risk to help determine an appropriate balance between the level of service delivered and the cost to deliver the service. Risk assessment provides the Region with the ability to make informed decisions when or under what circumstances it may be acceptable to defer investments.

To inform the rate and levy decision, the Region will work on improving asset management for the Asset Management Plan in 2025. This includes identifying alternative levels of service, costs of the alternative levels of service, the associated risk to service delivery and the corresponding change to rates and levy.

6.2 Future renewal investment needs

The 2021 CAMP forecasts average annual renewal investment (AARI) for each service that is necessary to sustain the Region's existing assets, valued at \$9.8 billion, and for

the future investment needed to sustain growth assets that are initially funded through development charges. For application in funding strategies, AARIs are presented for the 10, 50 and 100-year terms to provide a fulsome view of the longer-term needs of the Region, which will inform the development of a sustainable financial strategy.

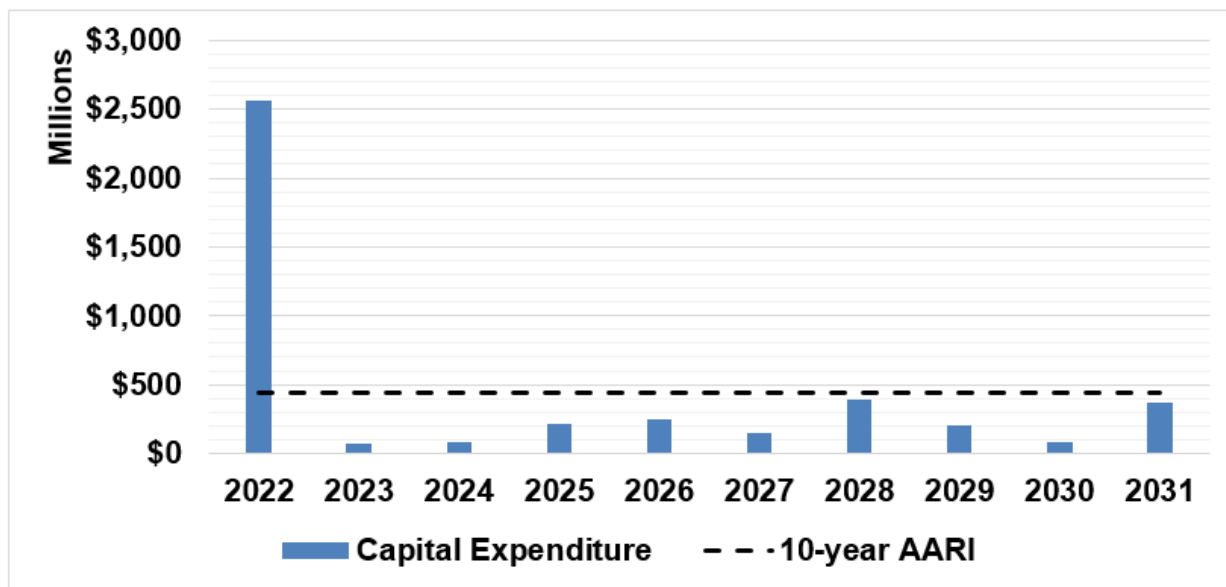
The AARI forecast in the 2021 CAMP includes the replacement of the assets at the end of the useful expected life (UEL), as well as expenditures for lifecycle strategies to sustain assets and lower overall cost of ownership. For assets that are paid for through development charges, the cost of acquisition is assumed to be \$nil for the Region. Following acquisition, the future renewal and replacement costs have been included in the AARI forecast.

The 10-year AARI includes the average annual spending necessary to eliminate the current backlog of \$2,479.7 million over the 10-year period. This is in addition to the level of average investment required annually based on the Region's lifecycle asset strategies.

When the 10-year AARI is compared to the average renewal budget from the 2022 Capital Budget and 9-year Forecast (2022 Capital Budget) of \$245.4 million annually, there is a difference of \$192.8 million.

This difference in average annual investment is the funding gap. Figure 7 and presents the annual and 10-year average capital program from the 2022 Capital Budget and the 10-year AARI. The high bar indicated in 2022 indicates that there is a backlog of capital work of approximately \$2,479.7 million based on analysis of the renewal strategies.

Figure 7: Region's total future renewal investment needs



Future renewal investments, backlog, and projected infrastructure funding gap vary between services. Table 19 provides a summary of the 10-year Capital Budget renewal investment, 10-year AARI, infrastructure funding gap, and backlog by service.

Note: Facilities 10-year average capital budget in Table 19 includes budgets for facilities managed by the corporate Facilities service. At this time, there is insufficient detail in the capital budget requests to allocate costs to specific services. Table 19 also excludes asset acquisition costs that are funded through development charges as it is a net \$nil cost to the Region. The lifecycle costs after acquisition are included in the 10-year AARI forecast.

Table 19: Service renewal investments (\$ million)

Service	10-year average capital renewal budget	10-year AARI forecast	Infrastructure gap (surplus if positive)	Backlog
Water	\$36.2	\$50.0	(\$13.8)	\$242.2
Wastewater	\$51.3	\$113.7	(\$62.4)	\$589.6
Waste Management	\$3.4	\$5.0	(\$1.6)	\$8.6
Transportation	\$96.4	\$189.0	(\$92.6)	\$1,422.4
Transit	\$2.4	\$2.6	(\$0.2)	\$1.5
Fleet	\$3.0	\$4.5	(\$1.5)	\$20.3
Seniors Services	\$1.9	\$15.1	(\$13.2)	\$40.8
Community Housing	\$8.7	\$25.2	(\$16.5)	\$39.6
Children's Services	\$0.0	\$0.5	(\$0.5)	\$2.7
SAEO	\$0.0	\$1.0	(\$1.0)	\$5.9
Public Health	\$0.0	\$0.3	(\$0.3)	\$1.3
Emergency Medical Services	\$5.1	\$4.6	\$0.5	\$13.2
Information Technology	\$4.5	\$6.8	(\$2.3)	\$1.7
Facilities	\$23.0	\$6.1	\$16.9	\$48.3
Courts	\$0.0	\$0.2	(\$0.2)	\$0.0
Police Services	\$9.5	\$13.6	(\$4.1)	\$41.5
Total	\$245.4	\$438.2	(\$192.8)	\$2,479.6

Service-specific information is presented in the individual service sections of the 2021 CAMP.

6.3 Capital budget

As part of the annual capital budget process, each of the Region's services develops a 1-year capital budget and 9-year forecast. The Region prioritizes capital project requests from all divisions using a corporate prioritization model that measures a projects risk and its level of alignment with corporate priorities. The risk model uses a triple bottom line (social, environment and economic) approach with a consistent set of criteria to determine the consequence of an asset failure, then incorporates the project cost and probability of failure (before and after project completion) to generate a risk-

based return on investment (R-ROI). The corporate priority model determines the level of alignment with corporate priorities, including Council's four strategic priorities.

Results from the models allow the Region to rank proposed projects and provide a consistent basis to compare and evaluate projects from different divisions with objective, evidence based information. Project prioritization is informed by the model outputs in the following order:

1. R-ROI value
2. Risk (consequence of failure * probability of failure)
3. Corporate priority alignment
4. Factors identified by staff professional judgement in addition to those incorporated in the model

As the Region is currently experiencing a funding shortfall in its capital program, the prioritized list generated through the models assists with determining which projects should be recommended for funding allocation first. The final prioritization list is reviewed and approved by the Region's Corporate Asset Management Steering Team for recommendation to Council.

To assess the financial sustainability of these capital investments, the 2021 AMP includes long-term outlooks over 50 and 100 years for each service (see Section 6.3). This long-term analysis ensures that major expenditures beyond the next 10-year period are considered in sustaining assets and developing appropriate reserves for peak investment requirements.

In 2019 Council approved C-F-027 Capital Financing Policy (CF Policy), which establishes guiding principles for the basis of the capital financing request in the operating budget. A description of the primary funding sources and the CF Policy principles for applying funding based on project type are summarized in Table 20.

Table 20: Funding sources and CF Policy principles for use

Funding source	Description	CF Policy principles for use
Reserves	Pay-as-you-go funding provided from the tax levy or user rates	State of good repair
Debt	Long-term borrowing, generally to be repaid over the useful life of the underlying assets, funding for repayment from the tax levy of rates	Strategic investments
Development charges	Funding collected from developers under the Region's DC Bylaw to fund infrastructure requirements that are growth-related	Growth-driven projects
Other	Government grants, cost-sharing contributions or other external sources, generally linked to a specific project	Specific project being funded or those eligible under the terms of the funding agreement

Funding sources identified in the 2022 Capital Budget and 9-year Forecast are summarized in Figure 8.

Figure 8: 2022-2031 Capital budget funding sources

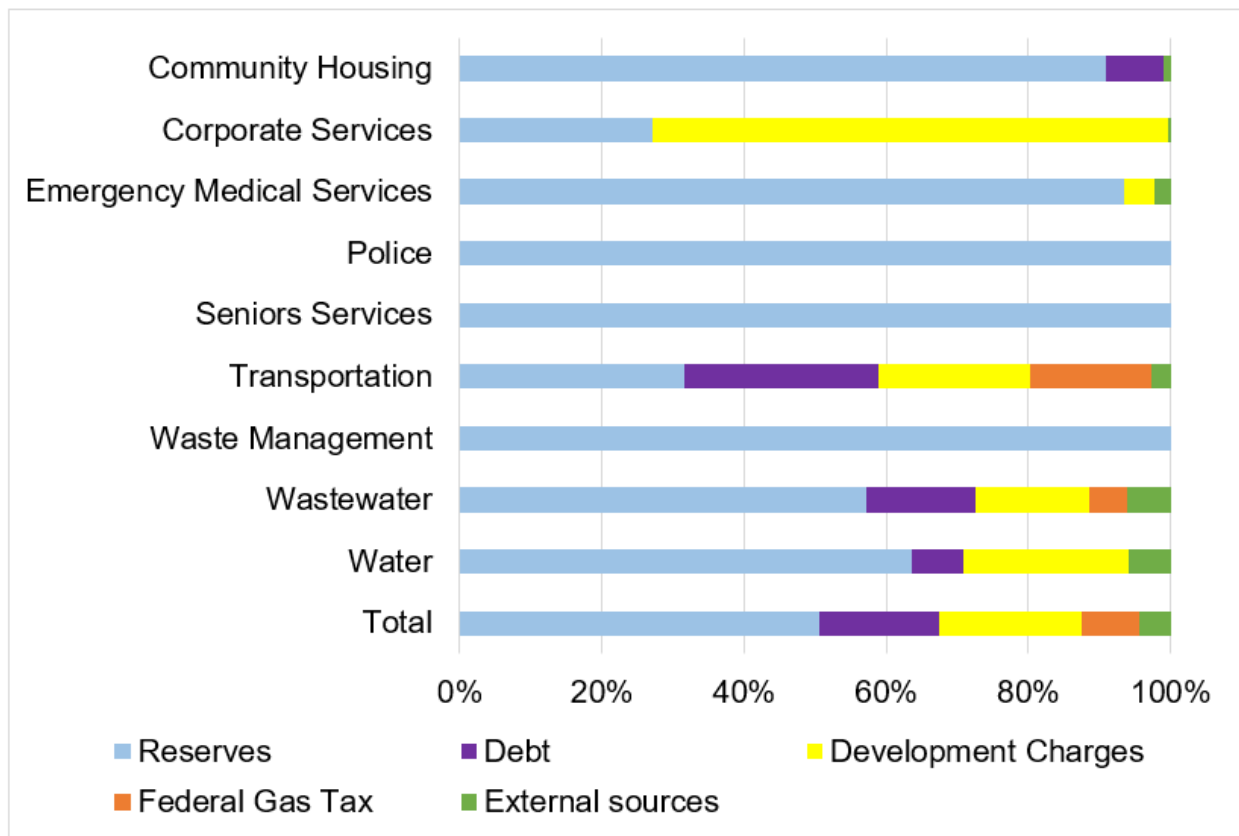


Table 21: Funding sources and CF Policy principles for use

Service	Reserves	Debt	Development charges	Federal gas tax	External sources
Community Housing	91.0%	7.9%	0.0%	0.0%	1.1%
Corporate Services	27.2%	0.0%	72.5%	0.0%	0.3%
Emergency Medical Services	93.4%	0.0%	4.2%	0.0%	2.4%
Police	100.0%	0.0%	0.0%	0.0%	0.0%
Seniors Services	100.0%	0.0%	0.0%	0.0%	0.0%
Transportation	31.5%	27.3%	21.4%	16.9%	2.8%
Waste Management	100.0%	0.0%	0.0%	0.0%	0.0%
Wastewater	57.2%	15.4%	16.0%	5.3%	6.1%
Water	63.6%	7.2%	23.3%	0.0%	5.9%
Total	50.5%	17.0%	20.1%	8.1%	4.4%

Included in the funding source summary is approximately \$89.2 million of funding from grants, local area municipalities (cost-sharing) or other external sources. As these sources are generally application based or one-time funding, such as specific stimulus announcements, it is not practical to forecast these funds as a sustainable source into the future. As such, these sources will need to be replaced in the future with a sustainable funding source to meet capital expenditure requirements.

Examples of other financial policies and Council reports that directly impact capital budget information or processed include:

- C-F-013 Reserve and Reserve Funds Policy establishes target reserve balances and outlines any restrictions on use of funds with a reserve or reserve fund
- C-F-003 Capital Asset Management Policy address how tangible capital assets are recorded in the financial statements of the Region including eligible costs, depreciation and disposal practices
- Capital pay-as-you-go/reserve funding increases:

- CSD 70 2016: 1% of total levy in 2017 (referred to as the Infrastructure Deficit Reduction)
- CSD 51-2021: 1% of the Regional departmental levy dedicated to infrastructure funding in 2021 \$2M
- CSD 58-2022: 1% of total levy in 2022

6.4 Operating budget

Annually, each of the Region's services develops a current year operating budget and a 2-year forecast (referred to as the multi-year operating budget), which outline the financial requirements to support service delivery. To maintain the current levels of service, the Region includes planned maintenance and operations works in its annual operating budget. Table 22 outlines the approved 2022 operating budget by service, summarized at object of expenditure level, which includes operating and maintenance related expenditures.

Table 22: 2022 operating budget summary (in \$ millions)

Service	Staffing	Utilities	Operating & maintenance	Program specific	Operating subtotal
Water	\$7.8	\$3.3	\$2.9	\$30.7	\$44.7
Wastewater	\$10.8	\$7.8	\$5.5	\$43.7	\$67.8
Waste Management	\$4.0	\$0.7	\$4.9	\$58.0	\$67.6
Transportation	\$15.0	\$0.7	\$7.2	\$20.1	\$43.0
Transit	\$0.4	\$0.0	\$0.8	\$21.7	\$22.9
Fleet	\$1.9	\$0.0	\$2.3	\$2.8	\$7.0
Seniors Services	\$89.8	\$2.0	\$3.5	\$13.7	\$109.0
Community Housing	\$5.8	\$5.1	\$6.3	\$43.6	\$60.8
Children's Services	\$8.5	\$0.1	\$0.1	\$49.6	\$58.3
SAEO	\$17.2	\$0.2	\$6.3	\$103.6	\$127.3
Public Health	\$55.4	\$0.1	\$1.9	\$7.1	\$64.5
Emergency Medical Services	\$52.7	\$0.2	\$4.0	\$8.5	\$65.4
Information Technology	\$5.7	\$0.0	\$0.9	\$4.0	\$10.6
Facilities	\$3.9	\$0.6	\$1.2	\$0.7	\$6.4
Courts	\$2.8	\$0.0	\$0.2	\$8.9	\$11.9
Police Services	\$171.0	\$1.1	\$7.2	\$13.7	\$193.0
Total	\$452.7	\$21.9	\$55.2	\$430.4	\$960.2

In addition to operating costs, each of the Region's services' budget for capital financing related expenditures that are funded through transfer from the operating budget. Table 23 outlines the capital financing costs by service, which includes capital reserve transfers and debt charges (payments on previously approved and outstanding debt).

Table 23: 2022 capital financing budget summary (in \$ millions)

Service	Capital reserves transfers	Debt charges	Capital financing total
Water	\$22.2	\$2.1	\$24.3
Wastewater	\$18.6	\$14.2	\$32.8
Waste Management	\$4.4	\$0.1	\$4.5
Transportation	\$11.8	\$19.2	\$31.0
Transit	\$0.7	\$1.3	\$2.0
Fleet	\$2.6	\$0.0	\$2.6
Seniors Services	\$2.4	\$7.8	\$10.2
Community Housing	\$3.9	\$6.9	\$10.8
Children's Services	\$0.4	\$0.1	\$0.5
SAEO	\$0.8	\$0.0	\$0.8
Public Health	\$1.3	\$1.2	\$2.5
Emergency Medical Services	\$4.3	\$1.0	\$5.3
Information Technology	\$0.0	\$0.0	\$0.0
Facilities	\$0.0	\$0.2	\$0.2
Courts	\$0.3	\$0.5	\$0.8
Police Services	\$4.1	\$9.3	\$13.4
Total	\$77.5	\$63.9	\$141.4

6.5 Actual capital expenditures

Table 24 provides actual historical capital expenditures for the Region's infrastructure. Capital funds for initial construction of assets, funded by Development Charges, are included. Therefore, a direct comparison to the future forecasts in Section 4 is not appropriate. Also, expenditures for centrally managed facilities such as child care centres and public health offices, are recorded in this table under Facilities.

Table 24: Actual capital expenditures (in \$ millions)

Service	2017	2018	2019	2020	2021
Water	\$12.0	\$21.0	\$16.4	\$36.9	\$24.1
Wastewater	\$21.0	\$15.1	\$26.7	\$28.5	\$32.6
Waste Management	\$2.0	\$2.3	\$9.5	\$6.0	\$2.4
Roads Network	\$44.9	\$34.8	\$57.8	\$53.2	\$29.6
Transit	\$4.6	\$0.5	\$0.8	\$3.5	\$0.9
Fleet	\$2.9	\$0.8	\$0.7	\$0.2	\$0.1
Seniors Services	\$1.5	\$1.4	\$1.5	\$1.7	\$1.0
Community Housing	\$9.7	\$17.0	\$16.2	\$13.4	\$36.1
Children's Services	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
SAEO	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Public Health	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Emergency Medical Services	\$0.1	\$3.9	\$0.8	\$4.5	\$3.1
Information Technology	\$2.9	\$2.9	\$2.8	\$2.5	\$2.4
Facilities	\$16.7	\$5.0	\$10.2	\$18.8	\$23.5
Courts	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Police Services	\$6.1	\$3.7	\$2.8	\$4.9	\$5.5
Total	\$124.7	\$108.4	\$146.2	\$174.1	\$161.3

7 Data management

7.1 Introduction

Data management is the practice of collecting, keeping, and using data securely, efficiently, and cost-effectively. The goal of data management is to help people, organizations, and connected things optimize the use of data within the bounds of policy and regulation so that they can make decisions and take actions that maximize the benefit to the organization.

In asset management, data management practices are often categorized in two [2] parts:

1. Asset hierarchy; the definition of an asset, its relationship to other assets and systems, and the components that make up the asset.
2. Asset information; the inventory and performance attributes that describe the asset.

7.2 Asset hierarchy

An asset hierarchy allows an organization to effectively and efficiently manage the assets utilized in service delivery, and ensure the necessary asset information is complete across all services. The Region does not currently have a consistent corporate-wide asset hierarchy in place, however each service maintains an asset inventory organized to suit individual service management purposes.

To complete this 2021 CAMP, asset information was compiled from the services inventories and transformed, as required, to consistently report by the asset categories noted in Section 4, State of infrastructure. As part of the Region's ongoing asset management system improvements, a corporate-wide asset hierarchy will be developed.

7.3 Asset information

Data is maintained using a variety of spreadsheets, computerized maintenance management systems (CMMS), and the geographic information system (GIS). The Region does not have a central registry. An action plan had been developed to create a central asset registry which can be used to maintain asset information. For the development of the 2021 CAMP, there were nine [9] asset data attributes required:

1. Asset hierarchy – parent/child
2. Asset ID - unique

3. Year installed
4. Units of measure
5. Useful life
6. Replacement Cost
7. Condition
8. Consequence of failure (COF)
9. Probability of failure (POF)

As the quality and completeness of asset data attribute information varies across the Region's services, five [5] parameters were used to assess the quality of the asset information:

1. Completeness
2. Consistency
3. Currency
4. Accuracy
5. Surrogate Information

A data quality analysis was undertaken to evaluate the quality of data sources with respect to these data attributes against the quality parameters. In the case of some categories these attributes are available, however in many instances there is missing data or the quality parameters are insufficient. In these situations surrogate data was used, such as data that was estimated through transformations. Where existing data is not available or of sufficient quality, an action plan should be established to reach a desired data quality.

The analysis was completed by asset category at the service level by grading the quality on a one to five scale, where one is the highest quality and five is the lowest. The consolidated results, weighted by asset replacement value, can be found in Table 25.

Table 25: Data quality assessment results

Quality parameters	Rating
Completeness	3.12
Consistency	2.71
Currency	2.21
Accuracy	2.81
Total	2.93

8 Climate change

The Region has committed to considering climate change as part of the risk management approach and embedding it in local asset management planning methods. Climate change is identified as a driver for demand, and requires special consideration throughout asset management, including demand, level of service, state of infrastructure, and lifecycle asset strategies. Changes to environmental weather factors from climate change include wind speed and direction, temperature changes, storm intensity, and sunlight intensity.

This asset management plan considers climate change in terms of how it affects assets which support service delivery and describes, in general terms, the affects climate change has on asset management planning. Some examples of how climate change interact with aspects of asset management are described below.

8.1 Demand

Changes to engineering, environmental and planning requirements to address climate change could result in the need for accelerated rehabilitation or replacement programs and related increases in capital and operational cost.

Each of the Region's services' identified drivers that impact demand for services, and many indicated climate change as a primary driver. The increased demand is often for more robust assets, such as facilities with more insulation, or storm water systems with increased capacity to withstand a 100-year storm event. These asset upgrades would both mitigate, and adapt to the effects of climate change.

In other cases, climate change may have an indirect impact on a demand driver. For example, social issues and trends or demographic changes may be driven by other issues like climate change. These drivers may result in need more assets or more robust assets.

8.2 Levels of service

Levels of service (LOS) can be sustained by considering the implications of climate change when designing assets. An example can be seen in a storm water system, by designing infrastructure capacity to manage events with greater intensity that are expected to occur more frequently. The resulting system is more resilient and better designed to continue delivering the desired LOS.

8.3 State of infrastructure

Risk is considered across assets which support service. Risk is comprised of a probability of failure (POF) and consequence of failure (COF). As both POF and COF can be impacted by climate change, the Region's risk profile will be impacted by climate change.

For example, climate change may result in environmental conditions which accelerate the rate at which materials degrade, which increases the POF. In other cases climate change may increase the COF, such as flooding impacts when the storm water system capacity is exceeded with increased frequency and severity of storms.

8.4 Lifecycle strategies

It is evident that climate change may increase the probability of risks being realized and in some cases may also increase the consequence of risks being realized. These additional risks can be managed by developing appropriate lifecycle strategies.

These strategies should consider the impacts of climate change and consider opportunities to develop services which are more resilient to the impacts of climate change. These lifecycle strategies may include non-asset, service, maintenance, renewal, or expansion. Increased renewal is a likely solution given the expected increased rate of degradation due to environmental conditions described earlier.

9 Continuous improvement

9.1 Introduction

The asset management system is a management approach to direct, coordinate, and control activities for assets and the services the assets support. The asset management system is not software. It provides a structured and consistent approach to managing assets and service delivery. The output from the asset management system is achieving the greatest value from the assets the Region owns. The assets, and their careful management, helps the Region achieve its service delivery goals.

The asset management plan is the most recognizable output of the asset management system. A primary output of the asset management plan is long-range investment needs and financial planning to ensure sustainability. Financial sustainability requires a careful balance and decisions between competing forces. These forces are:

- the demand and level of service customers require,
- the state of assets including risk, and
- the available funding through taxes, rates, grants and other sources.

Higher levels of service cost more while lower levels increase risk of service interruptions and of customer satisfaction. Asset management helps achieve the right balance of risk, cost and level of service.

Continuously improving the asset management system enhances the data and information used for asset management decisions. These improvements increase the value from the assets and the service delivery of the Region.

9.2 Improvements to the asset management system

A focused action plan captures planned improvements to the asset management system over the next six years. The focused action plan builds from changes identified in the previous 2016 asset management plan and a recent assessment of the state of practice of asset management in the Divisions, Departments and Boards of the Region.

The focused action plan is a series of initiatives leading to compliance with the requirements of Ontario's asset management regulation, O. Reg. 588/17, and specifically requirements for the year 2025 municipal asset management plans. It also leads to comparative levels of practice across all of the different services of the Region leading to better investment decisions.

The improvement initiatives are within five focus themes spread over a six-year period. Below are highlights of the themes and improvements.

1. Asset management planning

Development and implementation of corporate frameworks for core practices including level of service, asset performance data, risk assessment, lifecycle strategies and capital planning.

2. Capital project delivery

Improving project management for the annual delivery of capital investment projects with a focus on project performance monitoring and cost estimation.

3. Operations and maintenance

Improving the integration of maintenance with capital asset renewal planning and improving the software systems and data that support maintenance management.

4. Advanced asset management

Building from all other practice and data improvement, developing a central asset register and procuring software for advanced analysis and investment decision support.

5. Continuous improvement

In the final year of the plan, reassessing the state of practice and resetting any required improvements into a new focused action plan.

The improvements support these specific requirements of the asset management regulation that must be in the 2025 asset management plans:

- options for the proposed levels of service and the risks associated with those options
- capital and operating costs of undertaking the lifecycle activities and of the levels of service
- the ability of the Region to afford the preferred level of service

9.3 Resources to implement the improvement plan

The focused action plan is a series of 19 specific improvement initiatives. Although the Region conducts many of the current practices for asset management, the improvements require additional effort to develop, implement and continue to deliver as part of routine operations.

There are several resources needed to improve and deliver asset management.

1. Current staff complement
2. New asset management staff
3. Software for asset management
4. Budget increases for additional monitoring and assessment activities
5. Technical consultant support

Staffing from the corporate Asset Management Office (AMO) is sufficient to support and lead the development of practice frameworks and to support some Departments with implementing the improvements. In future years with a shift to asset management as part of routine Department operations, AMO staff will offset the need for additional new department staff.

The Region completed a resource analysis that confidently confirms the need for new asset management staff in many of the service divisions such as Fleet, Transportation and Facilities. The approach to staffing phases new resources over a three period and is subject to continued monitoring and assessment of staffing needs:

- 2023 – 4 new positions
- 2024 – 4 additional positions with gap supplemented with 2 AMO positions
- 2025 – 4 additional positions with gap supported from 2 or more AMO positions

Estimated costs for software are for cost estimation, maintenance management and decision support. Some software may be subscription based and therefore be an operating expense. The full cost and details of the software may change during the evaluation stage of the applicable improvement initiative.

Increase in operating budgets reflect additional and enhanced activity such as condition assessments and for additional and new assets. While the requirements are clear, the specific costs require further analysis.

Some asset management activities and improvements require technical consultant support. The most notable is for master planning and for implementing new software.

Approval for the resources will be through the annual capital and operating budget process.

9.4 Monitoring and Review Procedures

By regulation, the Region must conduct an annual review of its asset management progress and the progress in implementing the asset management plan.

The annual review includes identifying any obstacles to implementing the asset management plan and addressing how to overcome the obstacles.

Measures for the progress of asset management are the extent or degree of the following:

- Adherence to the plan and schedule of improvements in the Focused Action Plan
- Adherence to outcomes from the Focused Action Plan such as conducting condition assessments
- Ratio of actual annual budget to the forecast expenditure
- Revenue adjustments made to meet the long-term financial requirements
- Alignment between projects in the annual capital plans and the forecast of investment needs in the same period
- Attainment of funding goals for levels of service and asset renewal

9.5 Progress measurement of the 2016 Asset Management Plan

The progress made on the 2016 Asset Management Plan includes:

- Adopting the governance model for asset management including forming a corporate asset management office
- Added management positions for asset management in the Transportation division and in the Water and Wastewater division
- Various practice improvements notably developing a risk model to assess asset failure and incorporating this as part of the annual capital budget process
- Refining lifecycle activities to more accurately reflect actual practice including one major change to the lifecycle replacement cycle of roads from 66 years to 45 years
- Updating unit replacement costs to reflect current construction costs for the Long-Term Care homes and for some Transportation assets

- Introduced risk and residual risk measurement as part of the investment forecast to allow for future risk-based optimization decisions
- Where the 2016 forecast included only asset replacement, incorporating asset rehabilitation and growth projects within the forecast of investment needs

There were two main obstacles in implementing the 2016 asset management plan and accompanying improvement plan.

The first obstacle, which the Region expects to be a continuing concern, is budget constraints to address annual capital requests and past capital deferrals. Deferral refers to projects not completed due to budget constraints. Budget constraints affect the ability to maintain level of service and increase risk of interruption in service delivery. In addition, capital deferrals require more investment in maintenance and thus increase operating budgets.

The second obstacle is the COVID-19 pandemic and resulting strain on staffing as well as on budgets. The result of the COVID-19 pandemic was to limit the improvements of the asset management system that the Region otherwise would have made.

10 Water

10.1 Introduction

Water services include providing treated drinking water to 11 of Niagara Region's 12 local area municipalities (LAMs). The Region does not provide water services to the Township of Wainfleet. Water service delivery is two-tiered whereby Niagara Region draws and treats raw water, operates outstations, and transmits treated water to participating LAMs, who then convey the water through local area transmission mains to residents and businesses.

Through the above delivery model, Water Services provides services to over 425,000 users across the Niagara Region. Assets used to provide the services include:

- 6 water treatment plants and associated facility assets.
- 31 outstations, including pump stations, treated water storage facilities, rechlorination facilities, sampling stations, and other facilities, and associated assets.
- Approximately 313 kilometers of trunk watermain.
- Two "Water Wagons" for the provision of potable water at community events.
- Divisional-specific software applications – shared with Wastewater Services.
- Vehicles – managed by Fleet Services.

This Asset Management Plan (AMP) assists Water in developing a summary of current capital and operating spending requirements and a forecast of future needs. It includes consideration of objectives and priorities established within Water Services as well as those established at the corporate level. The AMP simultaneously references and influences many Corporate and business unit processes that guide the delivery, maintenance, and expansion of services.

To complement corporate objectives and priorities, Water maintains its own strategic plan and asset management documents and records, such as the Water-Wastewater Master Servicing Plan (WWWMSPP – "How We Flow". Additionally, Water is legislatively required to implement and maintain a quality management system conformant to Ontario's Drinking Water Quality Management Standard (Ministry of the Environment and Climate Change, 2017). The Standard includes specific elements that focus on infrastructure provision, maintenance, rehabilitation, and renewal; risk management; emergency management; and continual improvement.

10.2 Water demand drivers

Demand drivers are the underlying factors that direct change in the demand for the service. Drivers and their influence help define and measure the changing requirements for services and the activities and assets required to support those services. Some of the drivers identified in this AMP can be used to inform specific, measurable changes to service delivery; others are more qualitative in nature. Drivers and the estimated significance of impact on service are summarized in Table 26.

Table 26: Water demand drivers

Demand driver	Divisional significance
Legislation and higher government	High
Asset management	High
Climate change	Moderate-high
Population change	High
Planning trends	High

10.2.1 Planned asset portfolio growth and enhancements

The expected growth in the population of Niagara will place significant pressure on the capacity of existing assets and create demand for new assets. The Region has updated various master plans that outline current service levels and associated existing assets, recommend future service levels and associated assets, and identify the actions required to move from the current to future state including requirements for new, expanded and enhanced assets.

Table 27 highlights large-investment capital projects for Water Services that are forecasted to address growth or enhancement needs. For additional information on growth related projects, please see Section 25.7.

Table 27: Water forecast asset portfolio growth and enhancement projects

Asset class	Growth or enhancement forecasted
Water Treatment Plants (WTPs)	- Grimsby WTP expansion (additional 15ML capacity) - CT volume increases at all treatment plant reservoirs

Asset class	Growth or enhancement forecasted
Treated Water Storage	• New South Niagara Falls Elevated Tank, with capacity increase • New Bemis Elevated Tank (Welland), with capacity increase
Water Distribution Systems	• New trunk main from Grimsby WTP to new Grimsby Reservoir • New trunk watermain from new Grimsby Reservoir to Hixon Reservoir (Lincoln) • New Niagara Falls South trunk watermain to provide additional supply to new growth areas

10.3 Water levels of service

Table 28 summarizes Water Services' performance against customer and technical levels of service (LOS).

Table 28: Water LOS summary

Customer LOS	Technical LOS	Performance
Provide safe drinking water to LAMs, including raw water uptake, treatment, bulk water storage, and transmission to LAMs for subsequent distribution to end-users. *	Scope: percentage of properties connected to the municipal water system. **	97%
Provide adequate volumes of water at adequate pressures to meet fire flow requirements in serviced areas. *	Scope: percentage of properties where fire flow is available. **	Unknown

Customer LOS	Technical LOS	Performance
Provide safe drinking water to participating LAMs, including raw water uptake, treatment, bulk water storage, and transmission to LAMs for subsequent distribution to end-users. *	Reliability: number of connection-days per year where a boil water advisory is in place compared to the total number of properties connected to the municipal water system. **	Zero boil-water advisories
Provide safe drinking water to participating LAMs, including raw water uptake, treatment, bulk water storage, and transmission to LAMs for subsequent distribution to end-users. *	Reliability: number of connection-days per year due to water main breaks compared to the total number of properties connected to the municipal water system. **	8 connection-days per 160,897 connected properties
Assets are maintained in good condition and enable reliable/ continuous provision of service.	Physical condition state = % of assets in fair condition or better, by current replacement value	80%

* Refer to detailed description of customer LOS in Section 10.3.1

** LOS measures required by O. Reg. 588/17

10.3.1 Customer levels of service (CLOSs)

Scope: user groups/areas connected to the regional water system

Niagara Region owns and operates five drinking-water systems that treat and transmit drinking water to 11 of the 12 LAMs, namely, the Cities of St. Catharines, Thorold, Niagara Falls, Welland, and Port Colborne, the Towns of Grimsby, Lincoln, Niagara-on-the-Lake, Pelham, and Fort Erie, and the Township of West Lincoln, but not the Township of Wainfleet.

Scope: user groups/areas with fire flow

Niagara Region's 2021 WWWWSP identifies fire flow criteria for Regional transmission mains (250L/s at 30psi residual pressure). In practice, the Region strives to maintain system pressures within an operating range of 50-80psi (40psi min, 100psi max). Treated water is discharged from the plants at adequate pressures to feed the transmission systems, with system storage and booster pumping stations installed in

strategic locations to ensure adequacy of water flow and pressure at points of transfer to LAM distribution systems. The LAMs manage service delivery to end-users, and thus are ultimately responsible to ensure that distribution system pressures meet regulated local fire flow requirements; however, where issues are identified, Water works with LAMs to adjust system pressures through booster pumping, pressure relief valves, and bulk water storage management.

Reliability: boil water advisories

A boil water advisory may be issued where a condition or concern is identified in the drinking water system that may negatively impact the safety of the water supply. The boil water advisory serves to protect the community from potentially harmful pathogens that may cause illness or adverse health effects.

Conditions necessitating a boil water advisory can occur within LAM operations as well as Regional operations. The Region (Water Services and Public Health) works in partnership with LAMs to ensure that public safety is protected and appropriate reparative and restorative measures are put in place.

Boil water advisories are exceedingly rare occurrences for both the Region and our municipal partners.

Reliability: service interruptions

Service interruptions could be caused by watermain breaks. Considering the two-tier system and the Region's responsibility for high-flow transmission of drinking water to LAMs, Water maintains a highly reliable transmission system that is looped and/or has redundancy of supply in many locations; as such, transmission main isolations do not put properties out of water at the same frequency that a LAM watermain isolation would. When a transmission main breaks, continuity of service to end-users can typically be maintained by operating valves to reroute flow through other mains or by relying on system storage to maintain service while repairs are made.

10.3.2 Technical levels of service

The water industry is highly regulated, with relevant legislation enacted at the federal, provincial, and regional/municipal levels. With this in mind, it is reasonable to say that selected compliance requirements offer "built-in" technical LOSs for Water, these can be found in section 10.3.3. Table 28 describes the technical levels of service as required by O. Reg. 588/17.

10.3.3 Regulatory

Water Services strives to maintain compliance with all legislative and regulatory requirements. Major legislation relevant to Water Services includes but is not limited to:

- Source water protection: Clean Water Act, 2006, and associated regulations
- Water-taking: O. Reg. 387/04, “Water Taking and Transfer”
- Water treatment and distribution: Safe Drinking Water Act, 2002, and associated regulations, particularly:
 - O. Reg. 188/07, “Licensing of Municipal Drinking Water Systems”
 - O. Reg. 169/03, “Ontario Drinking Water Quality Standards”
 - O. Reg. 170/03, “Drinking Water Systems”
 - O. Reg. 128/04, “Certification of Drinking Water System Operators and Water Quality Analysts”
- System-specific instruments: Permits to Take Water, Municipal Drinking Water Licenses

The fundamental purpose of the Safe Drinking Water Act is to “provide for the protection of human health and the prevention of drinking water health hazards through the control and regulation of drinking water systems and drinking water testing”. This purpose is supported by that of the Clear Water Act, which is to “protect existing and future sources of drinking water”.

10.3.4 Backup capacity and/or equipment redundancy

Within the scope of its Water and Wastewater Quality Management Systems, the Division undertakes routine risk assessments for each of its water systems; capacity and redundancy concerns are explicitly considered, and the condition and performance reviews of assets are prioritized in areas where no redundancy ensures continued service delivery in the event of an asset’s failure.

10.3.5 Physical condition of assets

The Division assesses the condition of its vertical assets through a “capital validation” process where Operations and Maintenance teams provide information about asset condition and performance. Through this process, the Division examines processes at each facility and assigns a condition rating for each process. A standard condition scale of 1-5 is used to assign these ratings, where 1 indicates that the asset is in a “new or like-new condition” and 5 indicates that “full rehabilitation or replacement is required”. Outside of the Division’s capital validation process, the Region’s corporate Asset Management Office uses Weibull functions to generate estimated remaining service lives for vertical Water-Wastewater assets.

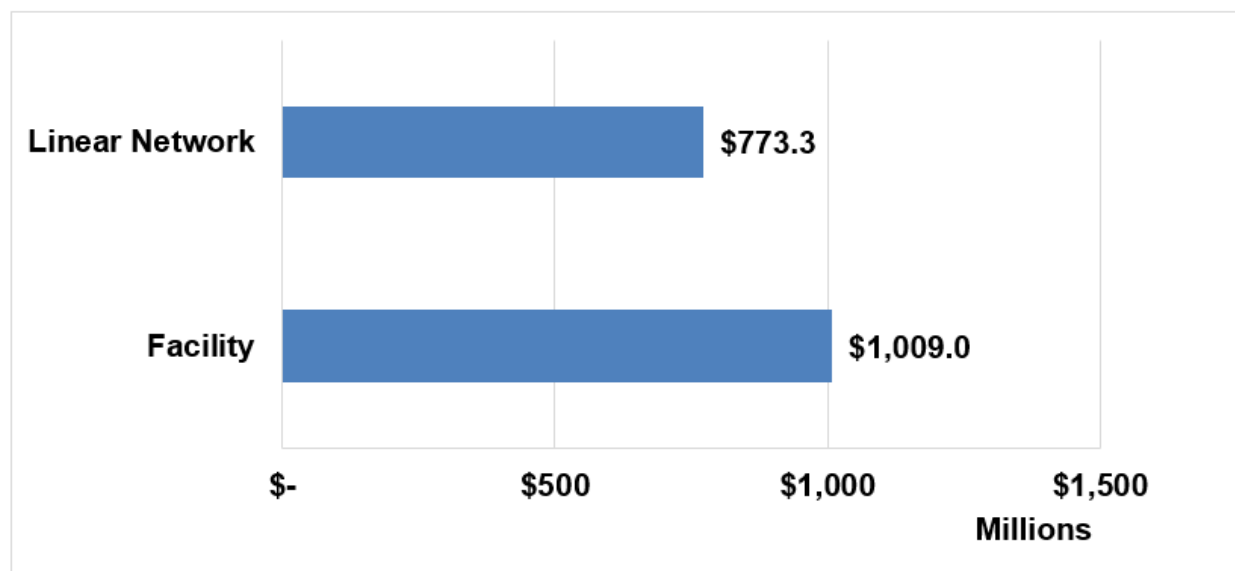
Water services assesses the condition of its below ground assets through several means. Weibull functions are applied in the Water-Wastewater GIS to provide an indication of remaining service life for pipe segments and other linear assets, and the remaining service life is then coupled with pipe break history to generate a condition score using the same 1-5 rating system as described above. Water has not established a “target” score for condition ratings; rather, the goal is simply maintain its assets in a serviceable condition.

10.4 Water state of infrastructure

10.4.1 Water asset inventory and replacement cost

The assets required to support the services provided by water include facility and linear network assets. Replacement costs for water assets were estimated by indexing current replacement values, identifying market pricing, and/or preparing cost models. The assets required to support the services provided by Water are estimated to cost \$1,782.3 M to replace, as summarized in Figure 9.

Figure 9: Water inventory and replacement cost



10.4.2 Water asset age distribution

Water assets, on average, are halfway through their useful expected life (UEL); these averages reflect a wide range of in-service dates. Water has undertaken several significant treatment plant and treated water storage facility upgrades in recent years, and several more are forecasted within the ten-year horizon. With significant growth projected in the Region over the planning horizon (to 2051), upcoming capital projects

will address growth needs as well as rehabilitation work that is required. The average age and estimated service life of Water assets, weighted by replacement value, is summarized by asset category in Figure 10 and Table 29.

Figure 10: Water average age by asset category

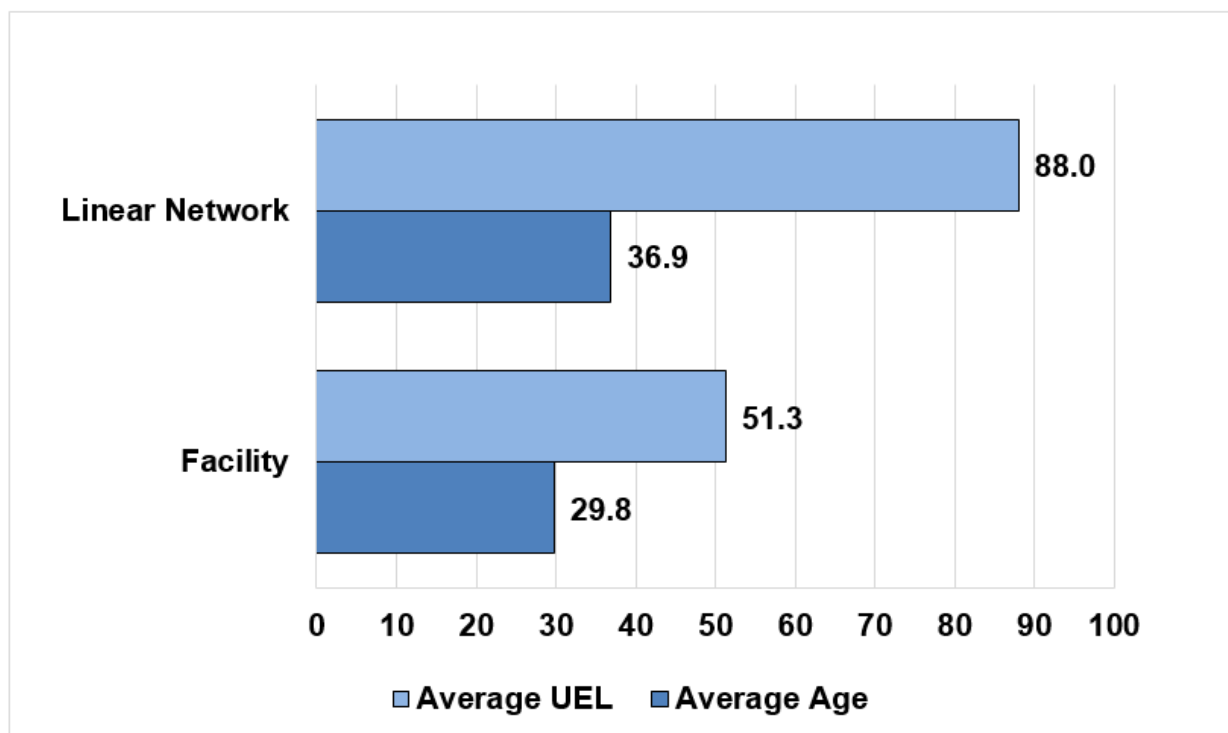


Table 29: Water average age by asset category

Asset Category	Average Age	Average UEL	Average Remaining Life
Facility	29.8	51.3	21.4
Linear Network	36.9	88.0	51.1
Total	32.9	67.2	34.3

10.4.3 Water asset condition

At present, much of the condition data for discrete water assets is collected through informal visual assessment of asset condition, observed changes in asset or process performance, or other subjective means. Formal condition assessments are occasionally completed, but these are typically reserved for situations where there are known gaps in asset condition or performance, with the outputs being used to scope

capital work. A tiered condition assessment approach is being developed so that cost-effective technologies are used on assets where condition data is the most relevant. As linear water assets are more difficult to inspect, condition ratings for these assets are typically based on age and break history.

Water assets are rated as good, with 67% of assets rated as good or better. The average condition of Water assets, weighted by replacement value, is summarized by asset category in Figure 11 and Table 30.

Figure 11: Water asset condition as % of value

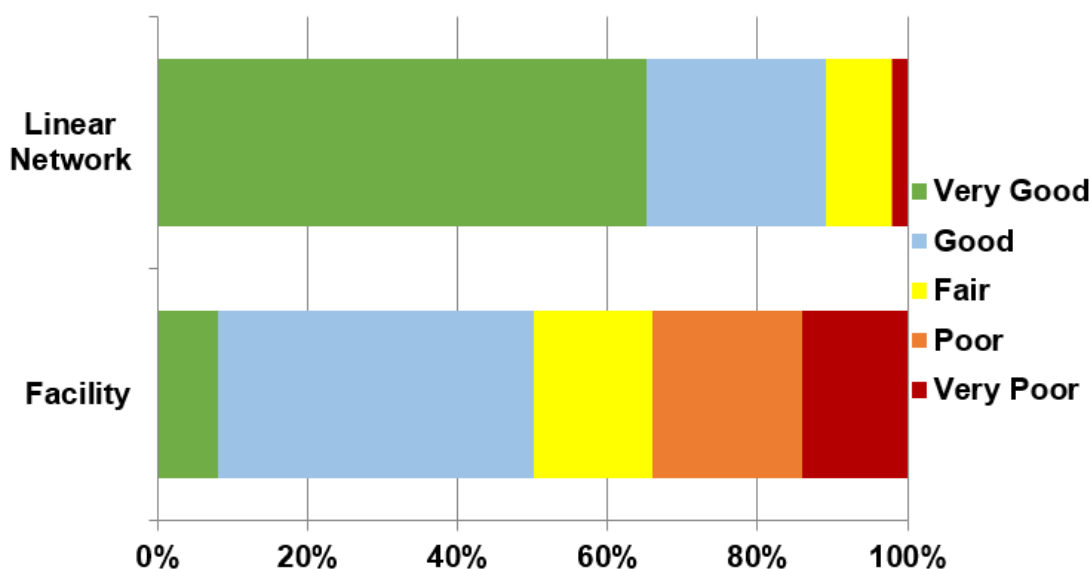


Table 30: Water asset condition as % of value

Colour	Condition rating	Facility	Linear Network	Total
	Very good	8.1%	65.1%	33.0%
	Good	42.0%	23.9%	34.1%
	Fair	15.9%	8.9%	12.9%
	Poor	20.0%	0.2%	11.3%
	Very poor	14.0%	1.9%	8.7%

10.4.4 Water risk

Water conducts annual risk assessments for all six of its drinking water systems under the scope of its Drinking Water Quality Management System (Drinking Water QMS). These assessments include examination of both asset-based and process-based risks, and equipment reliability and redundancy are explicitly considered. Outputs of the risk assessments are fed into the capital planning process via the initiation of capital needs requests for each high-scoring asset risk. Water continues to work on strengthening linkages between QMS risk assessment outputs, condition assessment information, and capital planning.

Table 31 is a standardized risk matrix that represents assets with their current replacement cost according to the risk of asset failure.

Table 31: Water risk distribution

COF	Very low	Low	Moderate	High	Very high
POF					
Very high	\$-	\$-	\$-	\$-	\$-
High	\$-	\$-	\$-	\$-	\$669
Moderate	\$-	\$-	\$-	\$-	\$340
Low	\$-	\$-	\$-	\$773	\$-
Very low	\$-	\$-	\$-	\$-	\$-

POF = Probability of failure

COF = Consequence of failure

Table 32 represents the percentage of total asset replacement cost according to the risk of asset failure.

Table 32: Water risk exposure summary

Colour	Risk category	Asset value (\$ million)	% of assets
VL	Very low (VL)	\$	0.0%
L	Low (L)	\$0.0	0.0%
M	Moderate (M)	\$773.3	43.4%
H	High (H)	\$339.7	19.1%
VH	Very high (VH)	\$669.3	37.5%
	Total	\$1,782.3	100.0%

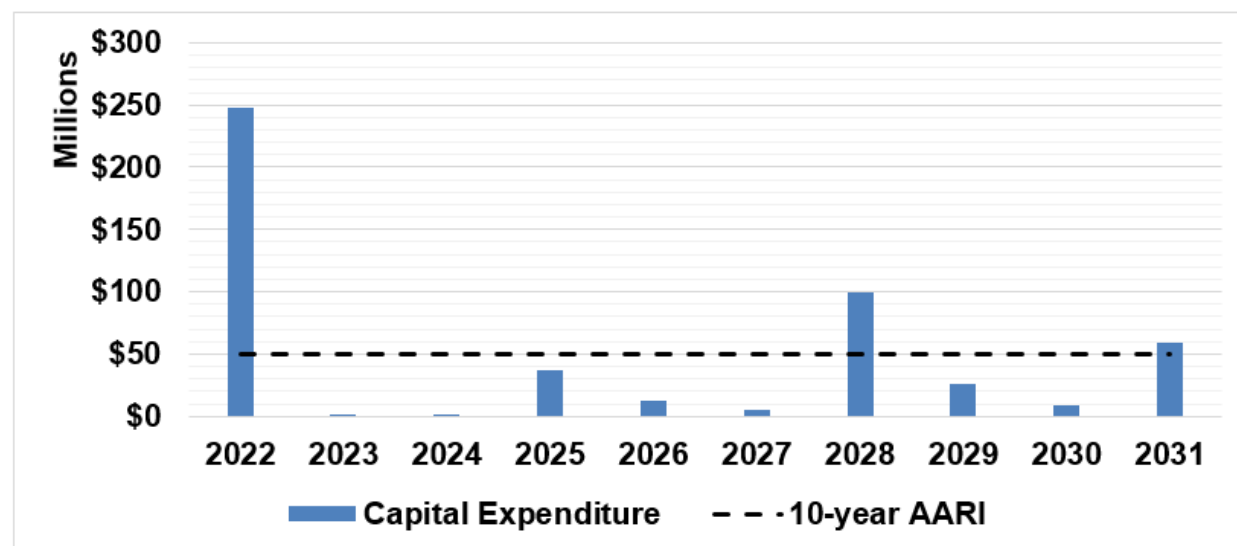
10.5 Lifecycle strategies

Water preserves assets through maintenance and renewal (i.e. rehabilitation and replacement) activities and investments. Maintenance and renewal activities are timed to reduce the risk of service failure from deterioration in asset condition and to minimize the total cost of ownership. Sufficient investment, doing the right thing to the right asset at the right time for the right reason, is crucial.

10.6 Financial strategy

Figure 12 presents the AARI necessary to support existing assets and current levels of service for Water of \$50.0 M in the 10-year forecast. This includes both annual requirements for the 10-year period, as well as addressing the identified capital spending backlog of \$242.2 M during the same period. For comparison, the 50-year AARI is forecast at \$42.2 million as the backlog is spread over a longer period.

Figure 12: Water AARI and capital expenditure



10.6.1 Water financial indicators

The cost of service delivery for Water includes operating expenses, capital expenditures and revenues. A summary of the 2022 operating budget for Water is presented in Table 33.

Table 33: Water summary of costs to deliver services

Area of expenditure	2022 budget (in millions)
Staffing	\$7.8
Utilities	\$3.3
Operating & maintenance	\$2.9
Program specific	\$30.7
Capital reserve transfers	\$22.2
Debt charges	\$2.1

10.7 Water 2017 Development Charge Background Study projects

The following Table 34 is an extraction of the growth projects identified in the 2017 Development Charge Background Study (2017 DCBS).

Table 34: Water infrastructure costs in the DC calculation

Increased service needs attributable to anticipated development	Timing	Gross capital cost estimate (\$ million)	Net cost funded by Region (\$ million)	Other funding sources (\$ million)	Potential DC cost recovery (\$ million)
Pumping	2017-2021	\$10,944.0	\$1,094.4	\$0.0	\$9,849.6
Pumping	2032-2041	\$989.0	\$98.9	\$0.0	\$890.1
Storage	2017-2021	\$46,313.0	\$14,162.7	\$0.0	\$32,150.3
Storage	2022-2031	\$15,750.0	\$9,163.6	\$0.0	\$6,586.4
Storage	2032-2041	\$14,521.0	\$8,238.9	\$0.0	\$6,282.1
Treatment	2017-2021	\$22,969.0	\$0.0	\$18,500.0	\$4,469.0
Treatment	2022-2031	\$51,496.0	\$10,299.2	\$0.0	\$41,196.8
Watermain	2017-2021	\$33,522.0	\$16,761.0	\$0.0	\$55,500.4
Watermain	2022-2031	\$65,880.0	\$10,545.5	\$0.0	\$33,719.5

Increased service needs attributable to anticipated development	Timing	Gross capital cost estimate (\$ million)	Net cost funded by Region (\$ million)	Other funding sources (\$ million)	Potential DC cost recovery (\$ million)
Watermain	2032-2041	\$44,265.0	\$0.0	\$33,719.5	2032-2041

11 Wastewater

11.1 Introduction

Wastewater Services (Wastewater) treats sewage received from 11 of Niagara Region's 12 local area municipalities (LAMs). The Region does not provide wastewater services to the Township of Wainfleet. Wastewater service delivery is two-tiered whereby the LAMs collect sewage from residents and businesses and convey it to Niagara Region through local area collection mains. The LAM collection systems connect to larger Region-owned sewage transmission mains that convey the sewage to wastewater treatment plants.

Through the above delivery model, Wastewater provides service to over 370,000 users across the Niagara Region. Assets used to provide the services include:

- 10 wastewater treatment plants and associated facility assets.
- 5 wastewater treatment lagoons and associated facility assets (1 lagoon is operational, 4 are out of service).
- 1 biosolids treatment facility and associated facility assets.
- 126 outstations and associated facility assets; outstations include sewage pumping stations, odour control facilities, combined sewer overflow tanks, and a storm water pumping station.
- Approximately 145 kilometres of sanitary gravity collection mains.
- Approximately 161 kilometres of sanitary forcemains.
- Niagara Region Environmental Laboratory equipment.
- Divisional-specific software applications – shared with Water Services.
- Vehicles – managed by Fleet Services.

This Asset Management Plan (AMP) assists Wastewater in developing a summary of current capital and operating spending requirements and a forecast of future needs. It includes consideration of objectives and priorities established within the Wastewater division, as well as those established at the corporate level. The AMP simultaneously references and influences many Corporate and business unit processes that guide the delivery, maintenance, and expansion of services.

To complement corporate objectives and priorities, Wastewater maintains its own strategic plan and asset management documents and records. Legislation and documents that guide service delivery include the following:

- Water-Wastewater Master Servicing Plan (WWWMSP – “How We Flow”).

11.2 Wastewater demand drivers

Demand drivers are the underlying factors that direct change in the demand for a service. Drivers and their influence help define and measure the changing requirements for services and the activities and assets required to support those services. Some of the drivers identified in this AMP can be used to inform specific, measurable changes to service delivery; others are more qualitative in nature. Drivers and the estimated significance of impact on service are summarized in Table 35.

Table 35: Wastewater demand drivers

Demand driver	Divisional significance
Legislation and higher government	High
Asset management	High
Climate change	High
Population change	High
Planning trends	High

11.2.1 Planned asset portfolio growth and enhancements

The expected growth in the population of Niagara will place significant pressure on the capacity of existing assets and create demand for new assets. The Region has updated various master plans that outline current service levels and associated existing assets, recommend future service levels and associated assets, and identify the actions required to move from the current to future state, including requirements for new, expanded and enhanced assets.

Table 36 highlights large-investment capital projects for Wastewater that are forecasted to address these growth or enhancement needs. For additional information on growth related projects, please see Section 11.7.

Table 36: Wastewater Services forecast asset portfolio growth and enhancement projects

Asset class	Growth or enhancement forecasted
Wastewater Treatment Plants (WWTPs)	▪ New South Niagara Falls WWTP ▪ Baker Road WWTP Upgrade (Grimsby) ▪ Region-wide WWTP process upgrades to re-establish Environmental Compliance Approval capacity

Asset class	Growth or enhancement forecasted
Pumping Stations, Combined Sewer Overflows	▪ Region-wide WWTP process upgrades to improve odour control
Wastewater Collection Systems	▪ New trunk sewers supporting South Niagara Falls Wastewater Treatment Plant ▪ South Side Low Lift SPS to WWTP ▪ South Side High Lift SPS to WWTP ▪ Smithville trunk sewer upgrade ▪ Smithville forcemain twinning ▪ Wet weather reduction projects in selected catchment areas

11.3 Wastewater levels of service

Table 37 summarizes Wastewater Services' performance against customer and technical levels of service (LOS).

Table 37: Wastewater LOS summary

Customer LOS	Technical LOS	Performance
Provide efficient and environmentally-sound wastewater services to LAMs, including wastewater collection and pumping, treatment, and effluent discharge to the environment. *	Scope: percentage of properties connected to the municipal wastewater system **	95%
Provide adequate wastewater collection and treatment capacity to prevent sewage backups and overflows. *	Reliability: number of events per year where combined sewer flow in the municipal wastewater system exceeds system capacity compared to the total number of properties connected to the municipal wastewater system **	114 events per year per 158,883 connected properties

Customer LOS	Technical LOS	Performance
Provide adequate wastewater collection and treatment capacity to prevent sewage backups and overflows. *	Reliability: number of connection-days per year due to wastewater backups compared to the total number of properties connected to the municipal wastewater system **	Zero connection-days
Provide efficient and environmentally-sound wastewater services to LAMs, including wastewater collection and pumping, effective treatment, and effluent discharge to the environment. *	Reliability: number of effluent violations per year due to wastewater discharge compared to the total number of properties connected to the municipal wastewater system **	Two exceedances per year per 158,883 connected properties
Assets are maintained in good condition to enable reliable/ continuous provision of service. *	Physical condition state = % of assets in fair condition or better, by current replacement value	72%
Assets are provided in a way that fairly distributes costs for both current and future customers. *	Renewal reinvestment rate (%) = annual capital renewal expenditure / current replacement value	1.55%

* Refer to detailed description of customer LOS in Section 11.3.1

** LOS measures required by O. Reg. 588/17

11.3.1 Customer levels of services

Scope: user groups/areas connected to the regional wastewater system

Niagara Region owns and operates eleven wastewater systems that collect and treat wastewater from 11 of the 12 LAMs, namely, the Cities of St. Catharines, Thorold, Niagara Falls, Welland, and Port Colborne, the Towns of Grimsby, Lincoln, Niagara-on-the-Lake, Pelham, and Fort Erie, and the Township of West Lincoln, but not including the Township of Wainfleet. In these 11 municipalities receiving wastewater services, it is typical that only urban areas are serviced; rural properties may or may not be connected

to municipal servicing depending on their proximity to Regional trunk sewer mains. The Region also routinely accepts hauled sewage at 7 of 11 wastewater treatment facilities. Wastewater is required to maintain reserve capacity for this sewage and must ensure that hauled sewage volumes are considered in master servicing plans.

Reliability: frequency and volume of combined sewer overflows in habitable areas or beaches

Sanitary sewers in the Region's collection systems are designed to accommodate peak wet weather flows. The vast majority of sewage pumping stations are equipped with redundant pumps and emergency backup power in order to mitigate the potential risk of backups and/or overflows; selected stations are also equipped with combined sewer overflow tanks for this purpose at both the Regional and LAM tiers.

The Cities of Niagara Falls, Welland, and St. Catharines are the only LAMs who transmit combined sewer flows to Niagara Region. Within the Niagara Falls wastewater system (servicing the City of Niagara Falls), overflows in habitable areas include those discharging to the Niagara River:

- Bender Hill Sewage Pumping Station;
- Central Sewage Pumping Station;
- Muddy Run Sewage Pumping Station;
- Seneca St. Sewage Pumping Station.

Table 38 provides a 5-year overview of reportable overflow events per year at these four specified sites within the Niagara Falls wastewater system.

Table 38: Annual overflows in habitable areas – Wastewater systems servicing the City of Niagara Falls

Year	Facility	# Incidents	Volume (ML)
2016	Niagara Falls WWTP – selected overflows	6	0.250
2017	Niagara Falls WWTP – selected overflows	21	1.969
2018	Niagara Falls WWTP – selected overflows	13	8.516
2019	Niagara Falls WWTP – selected overflows	35	67.470
2020	Niagara Falls WWTP – selected overflows	21	27.168

Table 39 provides a 5-year overview of reportable overflow events per year in the Port Dalhousie and Port Weller wastewater systems (servicing the City of St. Catharines and

portions of the City of Thorold). In these two wastewater systems, all overflows are considered to be installed in habitable areas.

Table 39: Annual overflows in habitable areas – Wastewater systems servicing the City of St. Catharines

Year	Facility	# Incidents	Yearly volume (ML)
2016	Port Dalhousie WWTP	16	94.67
2016	Port Weller WWTP	14	68.68
2017	Port Dalhousie WWTP	36	572.45
2017	Port Weller WWTP	39	723.29
2018	Port Dalhousie WWTP	28	422.94
2018	Port Weller WWTP	33	371.55
2019	Port Dalhousie WWTP	34	222.09
2019	Port Weller WWTP	39	311.80
2020	Port Dalhousie WWTP	14	91.21
2020	Port Weller WWTP	17	140.59

There are no combined sewer overflows in habitable areas within the Welland wastewater system (servicing the City of Welland and the Town of Pelham).

Reliability: inflow and infiltration of stormwater into sanitary sewers

Inflow and infiltration (I/I) both introduce unwanted wastewater flows into a sanitary sewer system, increasing the risk of overflows to the environment, treatment plant process upsets, treatment bypasses, and/or basement flooding.

The Region collaborates with LAMs to identify and address areas with I/I. Flow monitoring activities and sewer CCTV inspections help to identify areas of the collection systems that are experiencing I/I issues so that rehabilitation and repair work can be planned at these sites.

Reliability: treated wastewater effluent discharge

Effluent objectives and compliance limits are established at both federal and provincial levels to support protection of recipient waters. All of the Region's wastewater treatment plants provide secondary wastewater treatment (or equivalent). Effluent is disinfected on a seasonal basis at all treatment plants, with the exception of the

Stevensville/Douglastown Lagoon (whose effluent is not disinfected) and the Seaway WWTP (whose effluent is disinfected year-round). The Region monitors the quality of effluent at each treatment plant to ensure that it meets all quality and compliance limits as prescribed in applicable regulations or in system-specific Environmental Compliance Approvals.

11.3.2 Technical levels of service

The wastewater industry is highly regulated, with relevant legislation enacted at the federal, provincial, and regional/municipal levels. With this in mind, it is reasonable to say that selected compliance requirements offer “built-in” technical LOSs for Wastewater. Table 37 describes the technical levels of service as required by O. Reg. 588/17.

11.3.3 Regulatory

Wastewater strives to maintain compliance with all legislative and regulatory requirements. Major legislation relevant to Wastewater includes but is not limited to:

- Sewage works:
 - Ontario Water Resources Act, R.S.O. 1990, and associated regulations, particularly O. Reg. 129/04, “Licensing of Sewage Works Operators”
 - Environmental Protection Act, R.S.O. 1990, and associated regulations, particularly O. Reg. 675/98, “Classification and Exemption of Spills and Reporting of Discharges”
- Wastewater effluent discharge:
 - Fisheries Act, R.S.C., 1985, and associated regulations, particularly the Wastewater Systems Effluent Regulations (SOR/2012-139)
- Biosolids management:
 - Nutrient Management Act, 2002
- Pollution control:
 - Canadian Environmental Protection Act, 1999, specifically, requirements around pollution control plans and National Pollutant Release Inventory reporting
- System-specific instruments:
 - Environmental Compliance Approvals

The fundamental purpose of the Ontario Water Resources Act is to “provide for the conservation, protection and management of Ontario’s waters and for their efficient and sustainable use, in order to promote Ontario’s long-term environmental, social and economic well-being”. This purpose is supported by the Fisheries Act, whose purpose is

to “provide a framework for the conservation and protection of fish and fish habitat, including by preventing pollution”.

11.3.4 Backup capacity and/or equipment redundancy

Asset performance is also considered under the lenses of redundancy and capacity. The condition and performance of an asset are often examined more closely in situations where there is no redundancy built into the system to allow for continued service delivery in the event of that asset’s failure. Installing redundant assets (e.g., twinning a watermain or sewer main) provides additional capacity that can be relied upon to ensure continued provision of service. Within the scope of its Water and Wastewater Quality Management Systems, Wastewater is required to complete routine risk assessments for each of its wastewater systems; capacity and redundancy concerns are explicitly considered in these assessments.

11.3.5 Physical condition of assets

Wastewater assesses the condition of its vertical assets through a “capital validation” process where Operations and Maintenance teams provide information about asset condition and performance. Through this process, Wastewater examines processes at each facility and assigns a condition rating for each process. A standard condition scale of 1-5 is used to assign these ratings, where 1 indicates that the asset is in a “new or like-new condition” and 5 indicates that “full rehabilitation or replacement is required”. Outside of Wastewater’s capital validation process, the Region’s corporate Asset Management Office uses Weibull functions to generate estimated remaining service lives for vertical Wastewater assets.

Wastewater assesses the condition of its linear assets through several means. Weibull functions are applied in the Wastewater GIS to provide an indication of remaining service life for pipe segments and other linear assets, and the remaining service life is then coupled with pipe break history to generate a condition score using the same 1-5 rating system as described above. Specific to wastewater, conventional sanitary gravity sewers are inspected on a three-year cycle, and the outputs from this inspection program are used to inform linear infrastructure rehabilitation and replacement programs. Wastewater has not established a “target” score for condition ratings; rather, Wastewater’s goal at this time is simply to maintain its assets in a serviceable condition.

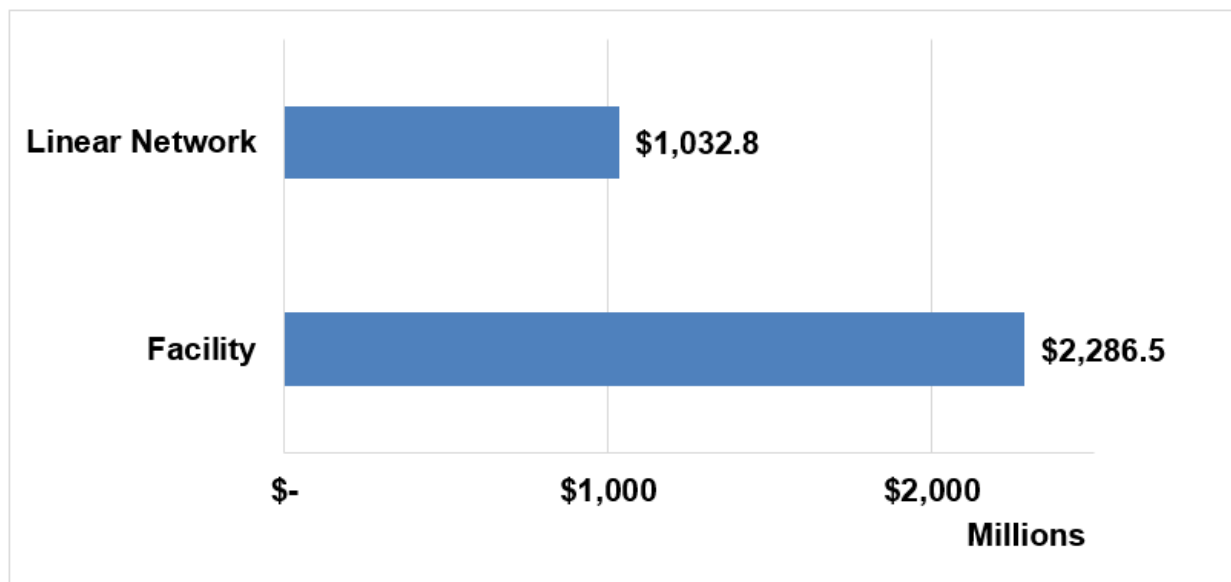
11.4 Wastewater state of infrastructure

11.4.1 Wastewater asset inventory and replacement cost

The assets required to support the services provided by wastewater include facility and linear network assets. Replacement costs for wastewater assets were estimated by

indexing current replacement values, identifying market pricing, and/or preparing cost models. The assets required to support the services provided by Wastewater are estimated to cost \$3,319.3 million to replace, as summarized in Figure 13.

Figure 13: Wastewater inventory and replacement cost



11.4.2 Wastewater asset age distribution

Wastewater assets, on average, are half way through their UEL; these averages reflect a wide range of in-service dates. Wastewater has made significant capital investments in recent years, and numerous upgrades to treatment plants, pumping stations, and linear assets are either in progress or completed. Significant future investments are also forecasted within the ten-year horizon. The average age and estimated service life of Wastewater assets, weighted by replacement value, is summarized by asset category in Figure 14 and Table 40.

Figure 14: Wastewater average age by asset category

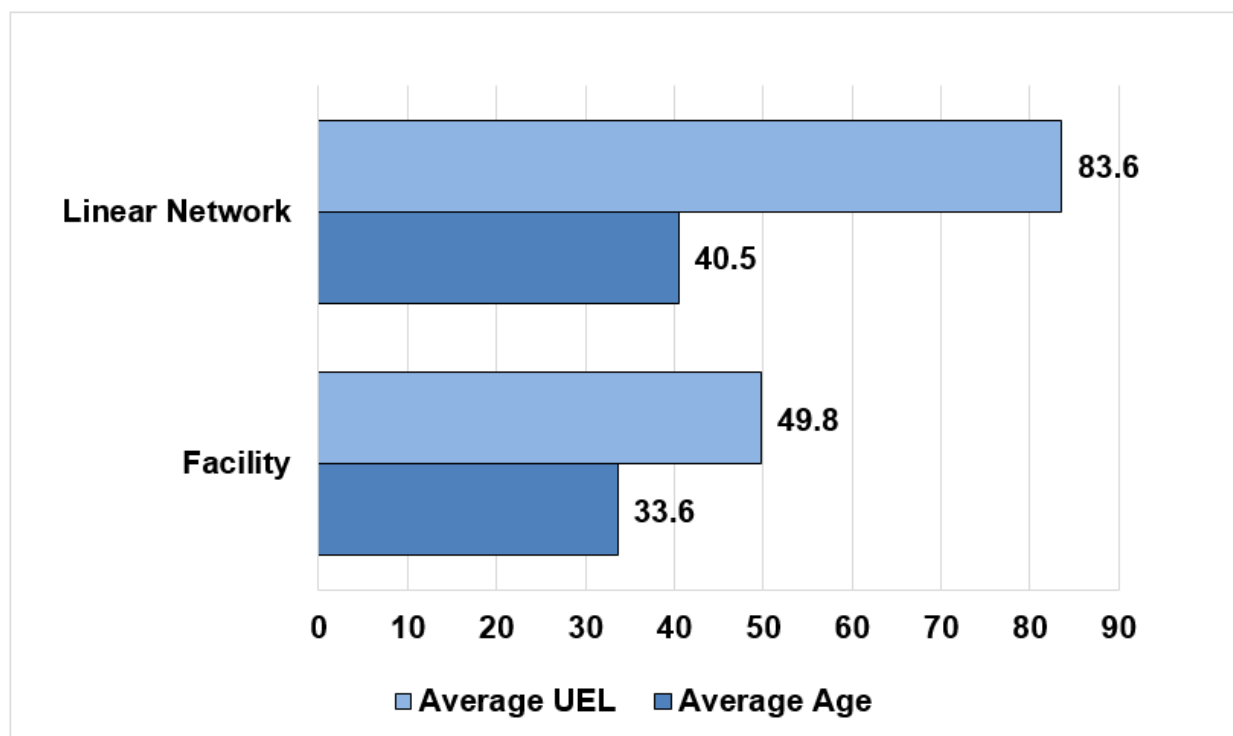


Table 40: Wastewater average age by asset category

Asset Category	Average Age	Average UEL	Average Remaining Life
Facility	33.6	49.8	16.2
Linear Network	40.5	83.6	43.1
Total	35.7	60.3	24.6

11.4.3 Wastewater asset condition

At present, much of the condition data for discrete Wastewater assets is collected through informal visual assessment of asset condition, observed changes in asset or process performance, or other subjective means. Formal condition assessments are occasionally completed, but these are typically reserved for situations where there are known gaps in asset condition or performance, with the outputs being used to scope capital work. A tiered condition assessment approach is being developed so that cost-effective technologies are used on assets where condition data is the most relevant. Condition ratings for sanitary forcemains are typically based on age and break history. The condition of sanitary gravity mains is assessed through the Region's CCTV

inspection program; the structural grade is rated on a scale from 1-5, which translates directly to a 'probability of failure' score for the asset.

Wastewater assets are rated as fair, with 72% of assets rated as fair or better. The average condition of Wastewater assets, weighted by replacement value, is summarized by asset category in Figure 15 and Table 41.

Figure 15: Wastewater asset condition as % of value

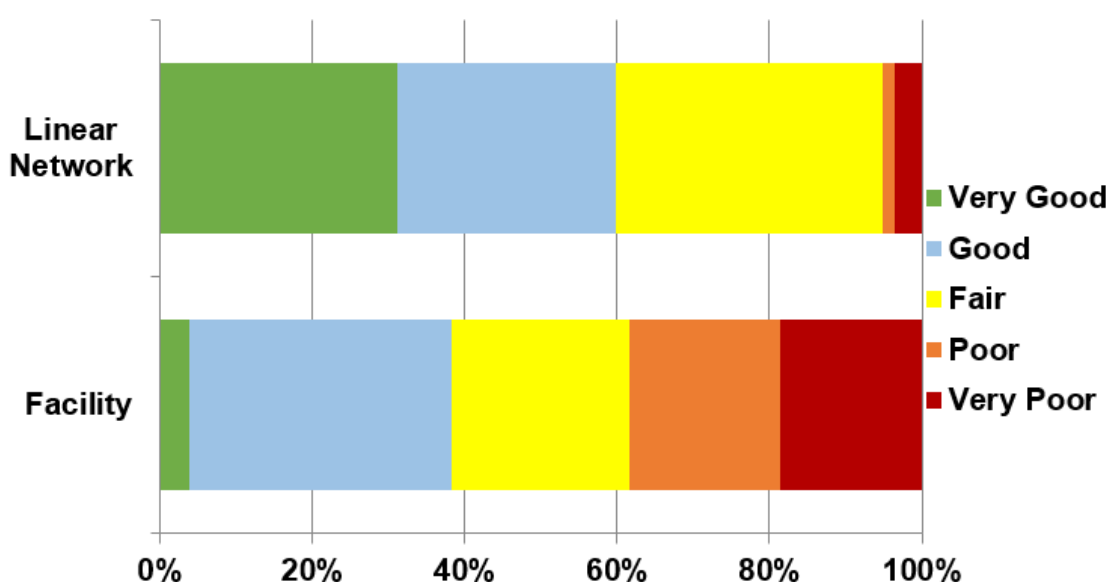


Table 41: Wastewater asset condition as % of value

Colour	Condition rating	Facility	Linear Network	Total
	Very good	3.8%	31.1%	12.3%
	Good	34.5%	28.7%	32.7%
	Fair	23.3%	35.1%	27.0%
	Poor	19.7%	1.5%	14.0%
	Very poor	18.7%	3.6%	14.0%

11.4.4 Wastewater risk

Wastewater conducts annual risk assessments for all 11 of its wastewater systems under the scope of its Quality Management System (QMS). These assessments include

examination of both asset-based and process-based risks, and equipment reliability and redundancy are explicitly considered. Outputs of the risk assessments are fed into the capital planning process via the initiation of capital needs requests for each high-scoring asset risk. Wastewater continues to work on strengthening linkages between QMS risk assessment outputs, condition assessment information, and capital planning.

Table 42 is a standardized risk matrix that represents assets with their current replacement cost according to the risk of asset failure.

Table 42: Wastewater risk distribution

COF	Very low	Low	Moderate	High	Very high
POF					
Very high	\$-	\$-	\$-	\$-	\$-
High	\$-	\$-	\$-	\$1,405	\$-
Moderate	\$-	\$771	\$-	\$882	\$-
Low	\$-	\$262	\$-	\$-	\$-
Very low	\$-	\$-	\$-	\$-	\$-

POF = Probability of failure

COF = Consequence of failure

Table 43 represents the percentage of total asset replacement cost according to the risk of asset failure.

Table 43: Wastewater risk exposure summary

Colour	Risk category	Asset value (\$ million)	% of assets
VL	Very low (VL)	\$0.0	0.0%
L	Low (L)	\$262.0	7.9%
M	Moderate (M)	\$770.8	23.2%
H	High (H)	\$2,286.5	68.9%
VH	Very high (VH)	\$0.0	0.0%
	Total	\$3,319.3	100.0%

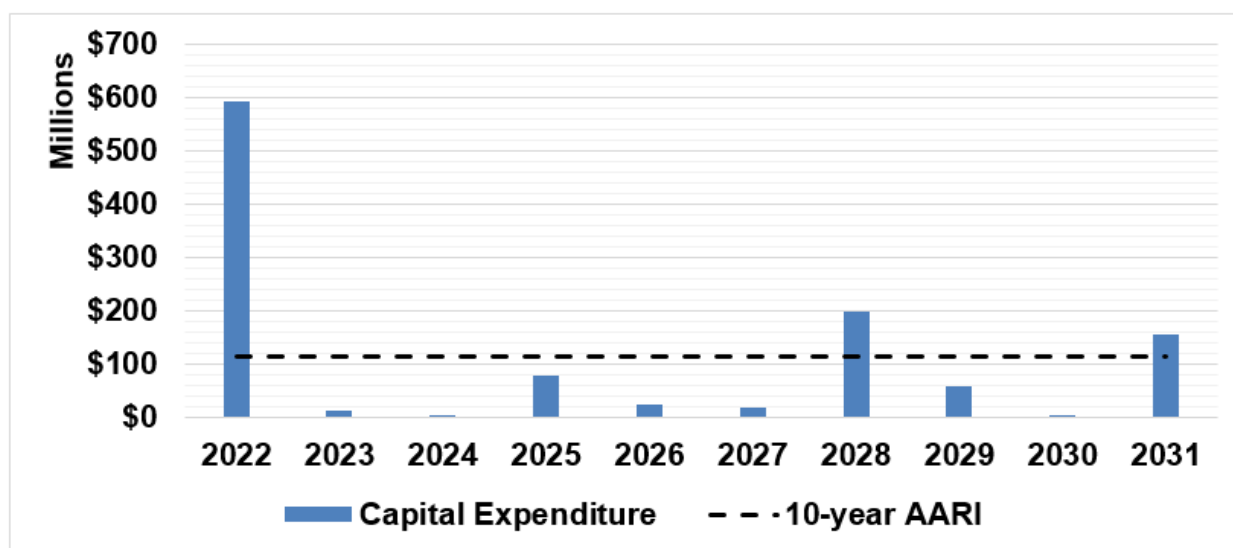
11.5 Lifecycle strategies

Wastewater preserves assets through maintenance and renewal (i.e. rehabilitation and replacement) activities and investments. Maintenance and renewal activities are timed to reduce the risk of service failure from deterioration in asset condition and to minimize the total cost of ownership. Sufficient investment, doing the right thing to the right asset at the right time for the right reason, is crucial.

11.6 Financial strategy

Figure 16 presents the AARI necessary to support existing assets and current levels of service for Wastewater of \$113.7 M in the 10-year forecast. This includes both annual requirements for the 10-year period, as well as addressing the identified capital spending backlog of \$589.6 M during the same period. For comparison, the 50-year AARI is forecast at \$96.8 million as the backlog is spread over a longer period.

Figure 16: Wastewater AARI and capital expenditure



11.6.1 Wastewater financial indicators

The cost of service delivery for Water includes operating expenses, capital expenditures and revenues. A summary of the 2022 operating budget for Wastewater is presented in Table 44.

Table 44: Wastewater summary of costs to deliver services

Area of expenditure	2022 budget (in millions)
Staffing	\$10.8
Utilities	\$7.8
Operating & maintenance	\$5.5
Program specific	\$43.7
Capital reserve transfers	\$18.6
Debt charges	\$14.2

11.7 Wastewater 2017 Development Charge Background Study projects

Table 45 is an extraction of the growth projects identified in the 2017 Development Charge Background Study (2017 DCBS).

Table 45: Wastewater infrastructure costs in the DC calculation

Increased service needs attributable to anticipated development	Timing	Gross capital cost estimate (\$ million)	Net cost funded by Region (\$ million)	Other funding sources (\$ million)	Potential DC cost recovery (\$ million)
Forcemain	2017-2021	\$2,981.0	\$298.1	\$0.0	\$2,682.9
Forcemain	2022-2031	\$52,703.0	\$14,295.4	\$0.0	\$38,407.6
Forcemain	2032-2041	\$467.0	\$93.4	\$0.0	\$373.6
Pumping	2017-2021	\$16,172.0	\$4,423.1	\$0.0	\$11,748.9
Pumping	2022-2031	\$36,747.0	\$9,537.5	\$0.0	\$27,209.5
Pumping	2032-2041	\$15,663.0	\$3,912.5	\$0.0	\$11,750.5
Sewer	2017-2021	\$1,450.0	\$0.0	\$0.0	\$1,450.0
Sewer	2022-2031	\$48,640.0	\$7,607.8	\$0.0	\$41,032.2
Treatment	2022-2301	\$171,895.0	\$99,461.5	\$0.0	\$72,433.5

12 Waste Management

12.1 Introduction

Waste Management services include providing the planning, management and operations of residential and commercial curbside waste, recycling and organics collection programs. WMS's mission is to deliver services to protect the environment and contribute to the economic prosperity of Niagara. The Region processes 75,000 tonnes of garbage, 39,000 tonnes of recyclables and 35,000 tons of organics annually.

Assets utilized to provide the services include:

- 2 landfills.
- 1 cell capacity.
- 1 recycling centre.
- 3 household hazardous / residential drop-off depots.
- 14 vehicles.
- 126 equipment.

Provincial objectives for other services, and related legislation, are primary drivers that guide and direct delivery of WMS services in Niagara Region. Council, through reporting updates and the Region's Corporate Strategy and Priorities, also provide direction for the delivery of service. Other legislation and documents that guide service delivery include the following:

- Waste Management Masterplan
- Niagara Region's 2016-2021 Blue Box Program Plan
- Bio-solids Management Master Plan Study
- Niagara Source Protection Plan

12.2 WMS demand drivers

Demand drivers are the underlying factors that direct change in the demand for the service. Drivers and their influence help define and measure the changing requirements for services, and the activities and assets required to support those services. Most of the drivers for WMS result in changes to operational requirements rather than changes to the assets utilized, with the estimated significance of impact on service summarized in Table 46.

Table 46: WMS demand drivers

Demand driver	Divisional significance
Population change	Moderate
Development trends	Moderate
Legislation and higher government	Moderate-high
Social issues and trends	Low
Pandemic	Low
Technology changes	Low
Other service provider changes	Moderate
Asset management	High

The new WMS Long-term Strategic Plan (LTSP), currently in process, will provide a long-term (25-year) projection of the demand and production requirements, as well as the infrastructure necessary to support the requirements.

Municipalities with population in excess of 5,000 people must have a blue box recycling program per Bill 101-94. There is an expected transition that will transfer the responsibility for recycling packaging materials from the consumer back to producers. The impact on this change and the services being delivered by WMS are currently being evaluated.

12.2.1 Planned asset portfolio growth and enhancements

The expected growth in the population of Niagara will place significant pressure on the capacity of existing assets and create demand for new assets. The Region has updated various master plans that outline current service levels and associated existing assets, recommend future service levels and associated assets, and identify the actions required to move from the current to future state including requirements for new, expanded and enhanced assets.

Table 47 lists forecasted capital projects for WMS that are required to address these growth or enhancement needs. For additional information on growth related projects, please see section 12.7.

Table 47: WMS forecast asset portfolio growth and enhancement projects

Asset class	Growth or enhancement forecasted
Facility – Bridge St., NR-12 and Humberstone	Improvements to active drop off depots
Facility – Walker	Expansion to organics processing facility
Facility	Provision for additional facilities
Vehicles	Additional vehicles and associated equipment to support operations
Equipment	Additional equipment and containers to support operations

12.3 WMS levels of service

Table 48 summarizes information on customer and technical measure for levels of service (LOS) that relate to the operation, maintenance and renewal of assets for the sustainment of Fleet's current LOS.

Table 48: WMS LOS summary

Customer LOS	Technical LOS	Performance (2019)
Waste is recycled when possible	Percentage of residential solid waste diverted	55.7%
Waste is disposed of economically	Solid waste average operating cost per tonne	\$159.50

12.3.1 Legislated levels of service

Regulations govern many aspects of service delivery at the program level, and much of it is very technical in nature. Some examples of regulations and their impact on WMS are as follows:

- Waste Diversion Transition Act 2016
 - Waste Diversion Transition Act is a provincial legislation. The purposes of this act are to promote the reduction, reuse and recycling of waste; providing for the operation of waste diversion programs; and promote the orderly winding up of waste diversion programs and industry funding organizations in order to allow responsibility for waste to be governed under the Resource Recovery and Circular Economy Act, 2016 or otherwise.

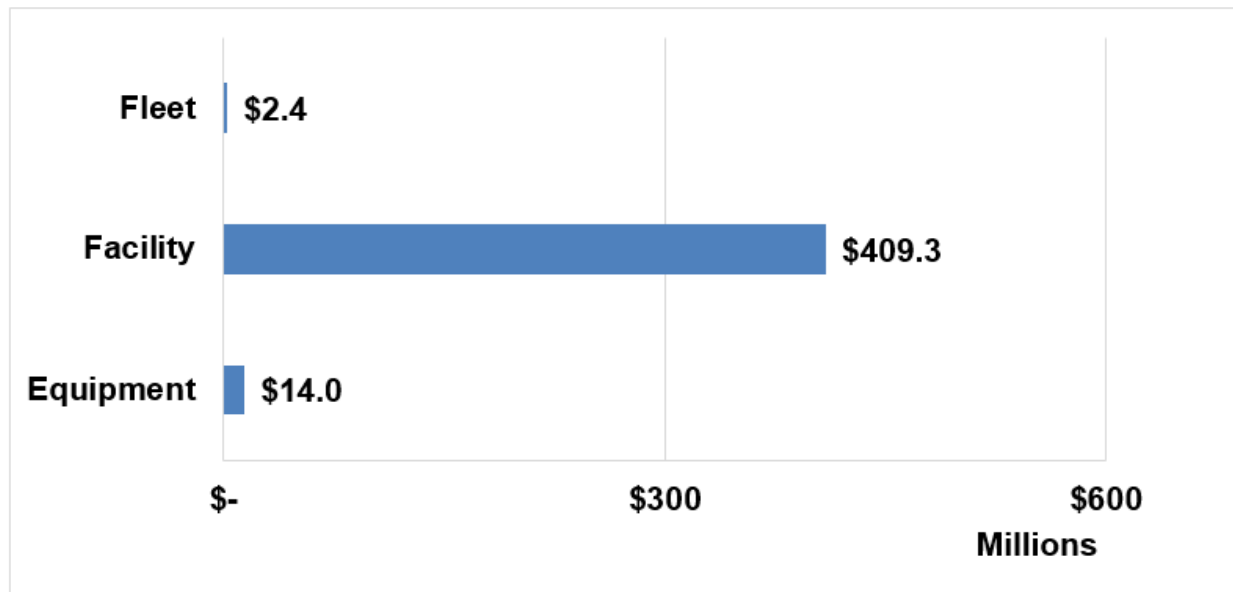
- **Resource Recovery and Circular Economy Act 2016**
 - Resource Recovery and Circular Economy Act is a provincial legislation. The purpose of this Act is to identify the provincial interest in resource recovery and waste reduction to provide overarching government direction. The act establishes full producer responsibility by making producers environmentally accountable and financially responsible for recovering resources and reducing waste associated with their products and packaging. The act also establishes the resource productivity and recovery authority to operate the resource productivity and recovery registry (i.e. data clearinghouse) and oversee producer performance by conducting compliance and enforcement activities. In implementing this Act, end-of-life materials are considered as resources rather than waste. This approach results in fewer raw materials being used and the production of long-lasting and reusable goods, thus bringing more opportunities to businesses and providing an incentive for future investment.
- **Waste-Free Ontario Act 2016**
 - Waste-Free Ontario Act is a provincial legislation. This Act has been created to enact the details within the Resource Recovery & Circular Economy Act and the Waste Diversion Transition Act. These acts are fundamentally connected and target similar goals in order to protect the natural environment by reducing the quantity of waste generated. The Waste Free Ontario act provides further detail into the responsibility of businesses that design, produce and market products or packaging for sale in Ontario, including that of convenience packaging and waste generated from the transportation of goods.

12.4 WMS state of infrastructure

12.4.1 WMS asset inventory and replacement cost

The assets required to support the services provided by WMS include equipment, facility, and fleet assets. Facility assets include the material recycling centre, active landfills and closed landfills, as well as material drop-off depots. A notable component which contributes to the valuation is the cell capacity. The cell capacity is captured as a facility asset and is valued at \$291 million. The estimated cost to replace the assets is \$425.7 million, as summarized in Figure 17.

Figure 17: WMS inventory and replacement cost



12.4.2 WMS asset age distribution

WMS assets are approximately half way through their useful expected life (UEL). The average age and estimated service life of WMS assets, weighted by replacement value, is summarized by asset category in Figure 18 and Table 49.

Figure 18: WMS average age by asset category

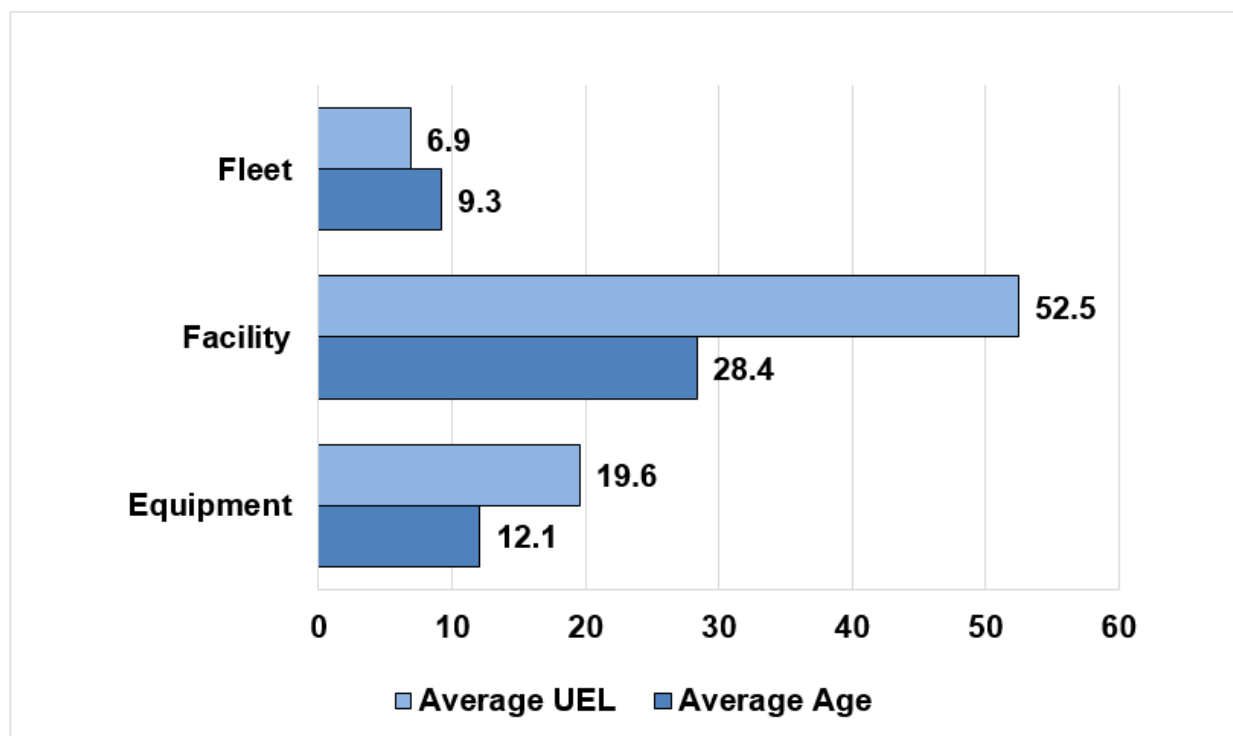


Table 49: WMS average age by asset category

Asset Category	Average Age	Average UEL	Average Remaining Life
Equipment	12.1	19.6	7.5
Facility	28.4	52.5	24.1
Fleet	9.3	6.9	(2.4)
All	26.3	48.3	21.9

12.4.3 WMS asset condition

Condition for WMS assets is based on an aged-based model to provide an estimate of current condition in the absence of condition information. WMS assets are rated as very good, with 82% of assets rated as very good or better. The cell capacity which is rated as very good is a significant driver to this overall score. Removing it would result in a lower score. Condition of WMS assets, weighted by replacement value, is summarized by asset category in Figure 19 and Table 50.

Figure 19: WMS asset condition as % of value

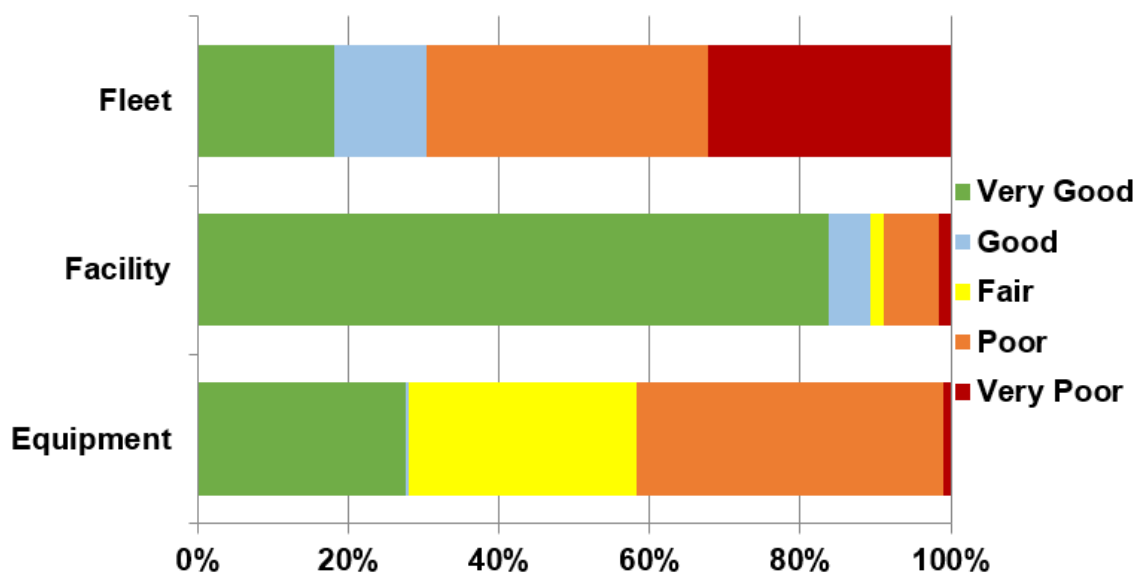


Table 50: WMS asset condition as % of value

Colour	Condition rating	Facility	Fleet	Equipment	Total
	Very good	83.7%	18.0%	27.7%	81.5%
	Good	5.5%	12.3%	0.4%	5.5%
	Fair	1.9%	0.0%	30.2%	2.8%
	Poor	7.3%	37.4%	40.6%	8.6%
	Very poor	1.6%	32.3%	1.1%	1.6%

12.4.4 WMS risk

Table 51 is a standardized risk matrix that represents assets with their current replacement cost according to the risk of asset failure.

Table 51: WMS risk distribution

COF	Very low	Low	Moderate	High	Very high
POF					
Very high	\$-	\$-	\$-	\$-	\$-
High	\$2	\$-	\$-	\$-	\$52
Moderate	\$-	\$-	\$-	\$-	\$81
Low	\$-	\$-	\$-	\$-	\$-
Very low	\$-	\$-	\$-	\$-	\$291

POF = Probability of failure

COF = Consequence of failure

Table 52 represents the percentage of total asset replacement cost according to the risk of asset failure.

Table 52: WMS risk exposure summary

Colour	Risk category	Asset value (\$ million)	% of assets
VL	Very low (VL)	\$0.0	0.0%
L	Low (L)	\$0.0	0.0%
M	Moderate (M)	\$2.4	0.6%
H	High (H)	\$409.3	96.1%
VH	Very high (VH)	\$14.0	3.3%
	Total	\$425.7	100.0%

12.5 Lifecycle strategies

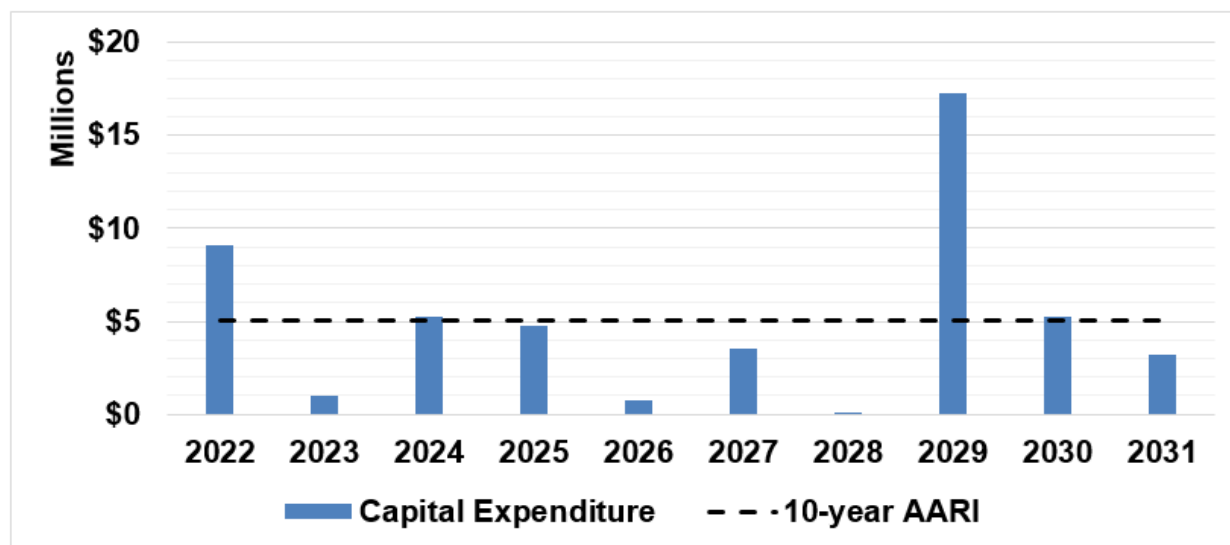
The LAS for WMS is to replace at the end of UEL, which is informed by industry practice and when available. Master planning considers the replacement of cell capacity.

12.6 Financial strategy

Figure 20 presents the AARI necessary to support existing assets and current levels of service for WMS of \$5.0 M in the 10-year forecast. This includes both annual requirements for the 10-year period, as well as addressing the identified capital spending backlog of \$8.6 M during the same period. For comparison, the 50-year AARI

is forecast at \$10.6 million as a result of the construction of a new landfill site is forecast in the 50-year period.

Figure 20: WMS AARI and capital expenditure



12.6.1 WMS cost to deliver service

The cost of service delivery for WMS includes operating expenses, capital expenditures and revenues. A summary of the 2022 operating budget for WMS is presented in Table 53.

Table 53: WMS summary of costs to deliver services

Area of expenditure	2022 budget (in millions)
Staffing	\$4.0
Utilities	\$0.7
Operating & maintenance	\$4.9
Program specific	\$58.0
Capital reserve transfers	\$4.4
Debt charges	\$0.1

12.7 WMS 2022 Development Charge Background Study projects

Table 54 is an extraction of the growth projects identified in the 2022 Development Charge Background Study (2022 DCBS).

Table 54: WMS infrastructure costs in the DC calculation

Increased service needs attributable to anticipated development	Timing	Gross capital cost estimate (\$ million)	Net cost funded by Region (\$ million)	Other funding sources (\$ million)	Potential DC cost recovery (\$ million)
Bridge Street Public Drop Off Depot Improvement	2023-2026	\$1.6	\$0.5	\$0.0	\$1.1
NR-12 - Drop-Off Depot Improvements (dump pad, access improvements and one rehab of one bunker currently out of service)	2023-2026	\$0.4	\$0.3	\$0.0	\$0.1
Humberstone - Drop-Off Depot Improvements (incl. grading and functional improvements to the Depot)	2023	\$0.4	\$0.0	\$0.0	\$0.4
Waste Management Long-term Strategic Plan	2023-2025	\$1.5	\$1.1	\$0.0	\$0.4
Walker Organics Facility Expansion	2022-2029	\$3.5	\$0.0	\$0.0	\$3.5
Provision for Additional Facilities	2022-2031	\$7.0	\$0.0	\$0.0	\$7.0

Increased service needs attributable to anticipated development	Timing	Gross capital cost estimate (\$ million)	Net cost funded by Region (\$ million)	Other funding sources (\$ million)	Potential DC cost recovery (\$ million)
Provision for Vehicles and Equipment	2022-2031	\$2.0	\$0.0	\$0.0	\$2.0
Provision for Additional Equipment	2022-2031	\$2.0	\$0.0	\$0.0	\$2.0
Provision for Additional Containers	2022-2031	\$1.0	\$0.0	\$0.0	\$1.0

13 Transportation

13.1 Introduction

Transportation services include responsibility for the stewardship of all related assets within the road right-of-way (ROW), including roads, bridges, culverts, storm-water, traffic signals and luminaires.

Assets utilized to provide the services include:

- 1,733 lane kilometers of arterial roads.
- 89,085 square meters of bridges.
- 1,785 cross culverts and 6,720 driveway culverts.
- 1,276 guiderails.
- 713 retaining walls.
- 13 barriers.
- 110 kilometers of storm-water sewers.
- 288 traffic signals
- 18,655 signs, including regulatory and non-regulatory signs.
- 6,295 luminaires.
- 20,146 trees.

The AMP enables Transportation to develop a forecast of spending requirements, which must be integrated with both current and future needs. The AMP needs to include the direction established by Transportation strategies, plans and objectives, as well as those established for the entire Region. The AMP will both utilize and influence many of the Corporate and business unit processes and documents that outline the direction for the enhancement or expansion of services.

Provincial objectives for other services, and related legislation, are primary drivers that guide and direct delivery of Transportation services in Niagara Region. Council, through reporting updates and the Region's Corporate Strategy and Priorities, also provide direction for the delivery of service. Other legislation and documents that guide service delivery include the following:

- Transportation Master Plan (TMP)
- Niagara Region Complete Streets Design Guidelines June 2017
- Niagara Region Guidelines for Transportation Impact Studies 2012
- Strategic Cycling Network Development Technical Paper 2017

13.2 Transportation demand drivers

Demand drivers are the underlying factors that direct change in the demand for the service. Drivers and their influence help define and measure the changing requirements for services, and the activities and assets required to support those services. Most of the drivers for Transportation result in changes to operational requirements rather than changes to the assets utilized, with the estimated significance of impact on service summarized in Table 55.

Table 55: Transportation demand drivers

Demand driver	Divisional significance
Population change	Moderate
Development trends	Moderate
Legislation and higher government	Moderate-high
Customer expectations	Moderate
Climate change	Moderate
Operational efficiency	Moderate
Asset management	High

The forthcoming release of the Transportation Master Plan (TMP) will strive to link with components of the Region's Official Plan (update in progress) and strategic financial investments, in order to address new transportation requirements and maintain levels of service. The forecasts included in the TMP are incorporated in the 2022 Development Charge Background Study, which is expected to be presented to Council for approval in mid-2022.

13.2.1 Planned asset portfolio growth and enhancements

The expected growth in the population of Niagara will place significant pressure on the capacity of existing assets and create demand for new assets. The Region has updated various master plans that outline current service levels and associated existing assets, recommend future service levels and associated assets, and identify the actions required to move from the current to future state including requirements for new, expanded and enhanced assets.

Table 56 lists forecast capital projects in excess of \$20 million for Transportation that are required to address these growth or enhancement needs. For additional information on growth related projects, please see section 13.7.

Table 56: Transportation forecast asset portfolio growth and enhancement projects

Asset class	Growth or enhancement forecasted
Bridges	Carlton St. extension and new bridge
Roads	Casablanca Blvd. capacity improvements
Roads	Creek Rd. capacity improvements
Roads	Garrison Rd. capacity improvements
Roads	Hwy 406 and Third St. Louth interchange
Roads	Lundy's Lane capacity improvements
Roads	Merritt Rd. capacity improvements
Roads	Montrose Rd. capacity improvements
Roads	Netherby Rd. capacity improvements
Roads	New West St. Catharines grade separation
Roads	Niagara Escarpment Crossing – new road construction
Roads	Niagara Stone Rd. capacity improvements
Roads	Ontario St. capacity improvements
Roads	Rice Rd. capacity improvements
Roads	Sodom Rd. capacity improvements
Roads	South Niagara East West arterial – new road construction
Roads	Stanley Ave. capacity improvements
Roads	Twenty Mile Rd. capacity improvements
Luminaires	Annual enhancement program
Signals	Annual enhancement program
Intersections	Annual enhancement program

13.3 Transportation levels of service

Table 57 summarizes information on customer and technical measure for levels of service (LOS) that relate to the operation, maintenance and renewal of assets for the sustainment of Transportation's current LOS.

Table 57: Transportation LOS summary

Customer LOS	Technical LOS	Performance
Description of road network. *	Number of lane-kilometers of each of arterial roads, collector roads and local roads as a proportion of square kilometers of land area of the municipality. **	Total lane km = 1,733 km of arterial roads. Roads occupy 20.9 km ² for a total portion of 1.12%
Description or images that illustrate the different levels of road class pavement condition. *	- For paved roads in the municipality, the average pavement condition index (PCI) value. - For unpaved roads in the municipality, the average surface condition (e.g. excellent, good, fair or poor). **	- Average PCI = 68 - N/A – no unpaved roads
Description of the traffic that is supported by municipal bridges (e.g., heavy transport vehicles, motor vehicles, emergency vehicles, pedestrians, cyclists). *	Percentage of bridges in the municipality with loading or dimensional restrictions. **	2% of bridges have loading restrictions.
- Description or images of the condition of bridges and how this would affect use of the bridges. * - Description or images of the condition of culverts and how this would affect use of the culverts. *	- For bridges in the municipality, the average bridge condition index (BCI) value. ** - For structural culverts in the municipality, the average bridge condition index value. **	- Average Bridge BCI = 69 - Average Culvert BCI=70

Customer LOS	Technical LOS	Performance
Description, which may include maps, of the user groups or areas of the municipality that are protected from flooding, including the extent of the protection provided by the municipal stormwater management system. *	1. Percentage of properties in municipality resilient to a 100-year storm. ** 2. Percentage of the municipal stormwater management system resilient to a 5-year storm. **	1. Zero (0)% for 100-year storm event 2. 100% 5-year storm event

* Refer to detailed description of customer LOS in Section 13.3.1

** LOS measures required by O. Reg. 588/17

13.3.1 Customer level of service

Roads - scope: Description of road network and connectivity

The Region manages a series of roads that, in combination with provincial and local roads, creates a transportation network for the safe and efficient movement of people and goods into and within the Region and neighbouring municipalities.

There are eight [8] provincial highways within the Region, including the Queen Elizabeth Way, Highway 405, Highway 406, Highway 420, Highway 3, Highway 58 and 58A and Highway 140. Provincial highways are regulated by MTO, and development and access in close proximity to these highways are subject to provincial permitting and approval. At the local municipal level, each of the 12 area municipalities operates and maintains its own network of roads with some connecting to the Region's roads.

Roads - quality: Description of pavement condition

Pavement condition is maintained through regular maintenance and renewals. Condition is assessed regularly during routine patrols and a fulsome assessment through radar technology every three years. Data collected includes the condition of the road surface such as type, extent and severity of distresses (e.g. cracking and rutting) and smoothness or ride comfort of the road. An overall Pavement Condition Index (PCI) is calculated on an annual basis and used as input into annual road renewal and rehabilitation programs.

Bridges and culverts - scope: Description of traffic supported by bridges

All traffic is supported by regional bridges and culverts, in some cases load restrictions are enacted. Where bridge load restrictions are in place, an application process exists to manage any proposed instance of overweight travel. Where a load restriction would be exceeded, the travel is re-routed to ensure integrity of the structure.

Bridges and culverts - quality: Description of bridges and culverts condition

In accordance with O. Reg. 104/97 Standards for Bridges, the Region conducts detailed inspections of all of its bridges every two years. All inspections are supervised by a trained, professional engineer following the guidelines in Ontario's Structure Inspection Manual (OSIM) which sets standards for the visual inspection and condition rating of bridges and their elements. The inspector assesses each bridge element and records the amount of the element in each of four condition states: Excellent, Good, Fair, and Poor. The inspector also records suspected performance deficiencies and recommends maintenance and renewal activities, with costs. Where structures are identified for follow up, a strength evaluation of the structure is conducted to determine the load carrying capacity remains in accordance with the requirements as stated in the Canadian Highway Bridge Design Code.

Stormwater - scope: Description of flooding protection

The Region's stormwater system is designed to protect regional Right of Way (RoW), stormwater infrastructure is modelled to protect against the 5-year storm event. Climate change has and will increase the intensity and frequency of storms and subsequently the demand for flood protection. The Region is evaluating the network to understand implications of a 100-year storm event.

13.3.2 Legislated levels of service

Regulations govern many aspects of service delivery at the program level, and much of it is very technical in nature. Some examples of regulations and their impact on Transportation are as follows:

- Highway Traffic Act
 - This is an Ontario regulation describing the rules of operating vehicles on public roads including types of operators, drivers and loads.
- Drainage Act R.S.O 1990
 - The Drainage Act is a provincial legislation assigning the municipality with responsibility for maintaining the drainage works after construction.

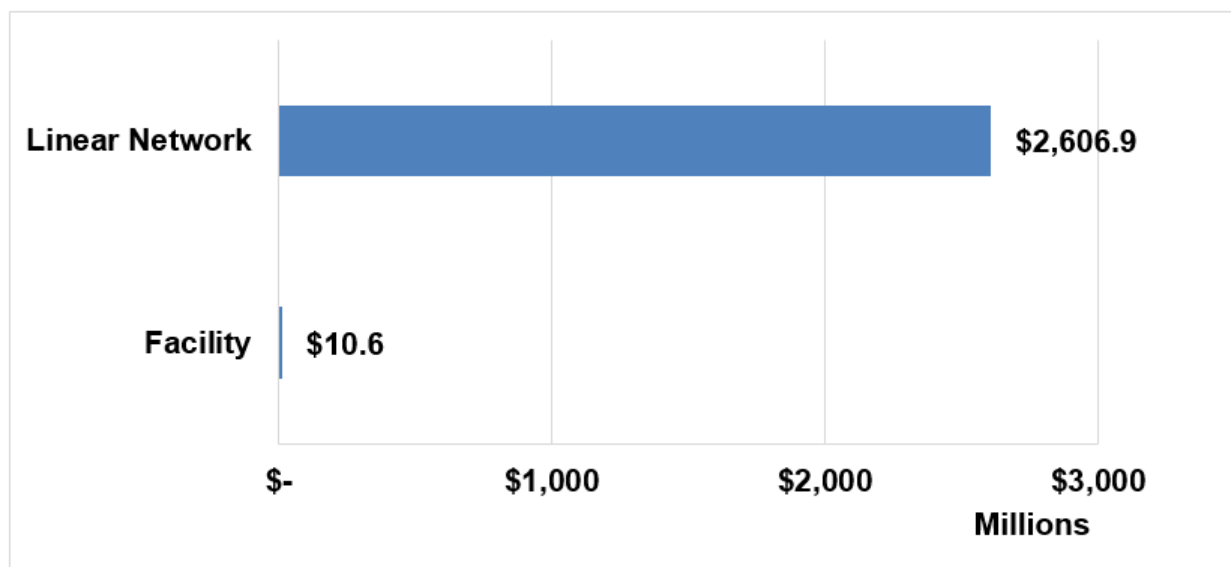
- Minimum Maintenance Standards for Municipal Highways – O. Reg. 239/02 (previous O. Reg. 366/18)
 - This Act establishes the minimum maintenance standards including inspection frequency and repair of municipal highways and the assets that support them.
- Standards For Bridges O. Reg. 104/97 (previous O. Reg. 472/10)
 - The Act requires that all provincial and municipal bridges be inspected every two years under the direction of a professional engineer using the Ministry's Ontario Structure Inspection Manual (Inspection Manual).

13.4 Transportation state of infrastructure

13.4.1 Transportation asset inventory and replacement cost

The assets required to support the services provided by Transportation include linear network and facility assets. Linear network includes significant pavement assets, as well as bridges, culverts, traffic signals, guiderails, rationing walls, storm water assets, luminaires and signs. The estimated cost to replace the assets is \$2,617.5 million, as summarized in Figure 21.

Figure 21: Transportation inventory and replacement cost



13.4.2 Transportation asset age distribution

Transportation assets are generally in the last quarter of their useful expected life (UEL). Since linear network assets are such a large value of the service their age is a significant driver. The average age and estimated service life of Transportation assets,

weighted by replacement value, is summarized by asset category in Figure 22 and Table 58.

Figure 22: Transportation average age by asset category

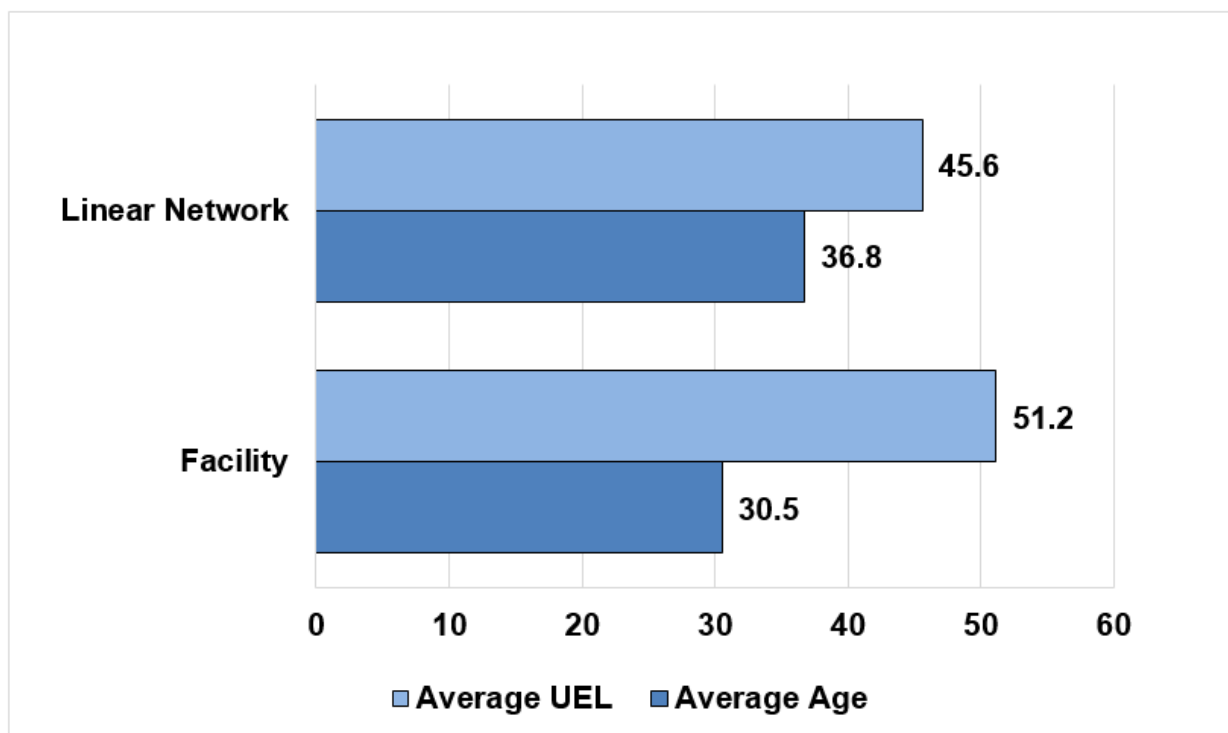


Table 58: Transportation average age by asset category

Asset Category	Average Age	Average UEL	Average Remaining Life
Facility	30.5	51.2	20.6
Linear Network	36.8	45.6	8.8
All	36.7	45.6	8.9

13.4.3 Transportation asset condition

Condition for Transportation assets is based on an aged-based model to provide an estimate of current condition in the absence of condition information. Transportation assets are rated as poor, with 52% of assets rated as poor or better. Condition of Transportation assets, weighted by replacement value, is summarized by asset category in Figure 23 and Table 59.

Figure 23: Transportation asset condition as % of value

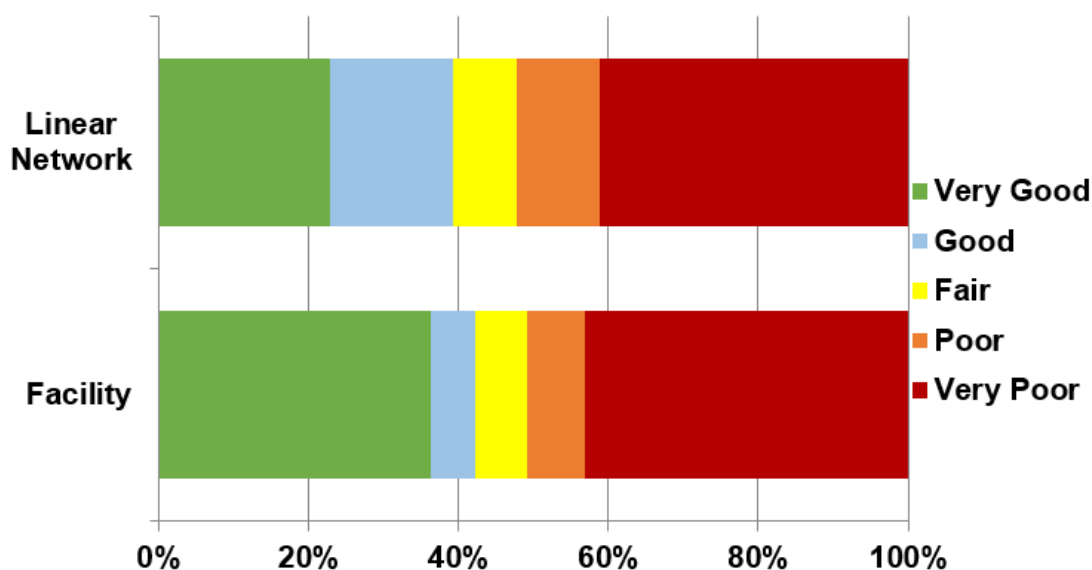


Table 59: Transportation asset condition as % of value

Colour	Condition rating	Facility	Linear Network	Total
	Very good	36.4%	22.9%	23.0%
	Good	5.8%	16.4%	16.3%
	Fair	6.9%	8.5%	8.5%
	Poor	7.7%	11.1%	11.1%
	Very poor	43.2%	41.1%	41.2%

13.4.4 Transportation risk

Table 60 is a standardized risk matrix that represents assets with their current replacement cost according to the risk of asset failure.

Table 60: Transportation risk distribution

COF	Very low	Low	Moderate	High	Very high
POF					
Very high	\$1	\$4	\$-	\$-	\$-
High	\$-	\$2	\$-	\$2,076	\$-
Moderate	\$103	\$-	\$46	\$144	\$-
Low	\$76	\$117	\$19	\$-	\$-
Very low	\$-	\$30	\$-	\$-	\$-

POF = Probability of failure

COF = Consequence of failure

Table 61 represents the percentage of total asset replacement cost according to the risk of asset failure.

Table 61: Transportation risk exposure summary

Colour	Risk category	Asset value (\$ million)	% of assets
VL	Very low (VL)	\$106.1	4.1%
L	Low (L)	\$219.9	8.4%
M	Moderate (M)	\$21.8	0.8%
H	High (H)	\$2,269.7	86.7%
VH	Very high (VH)	\$0.0	0.0%
	Total	\$2,617.5	100.0%

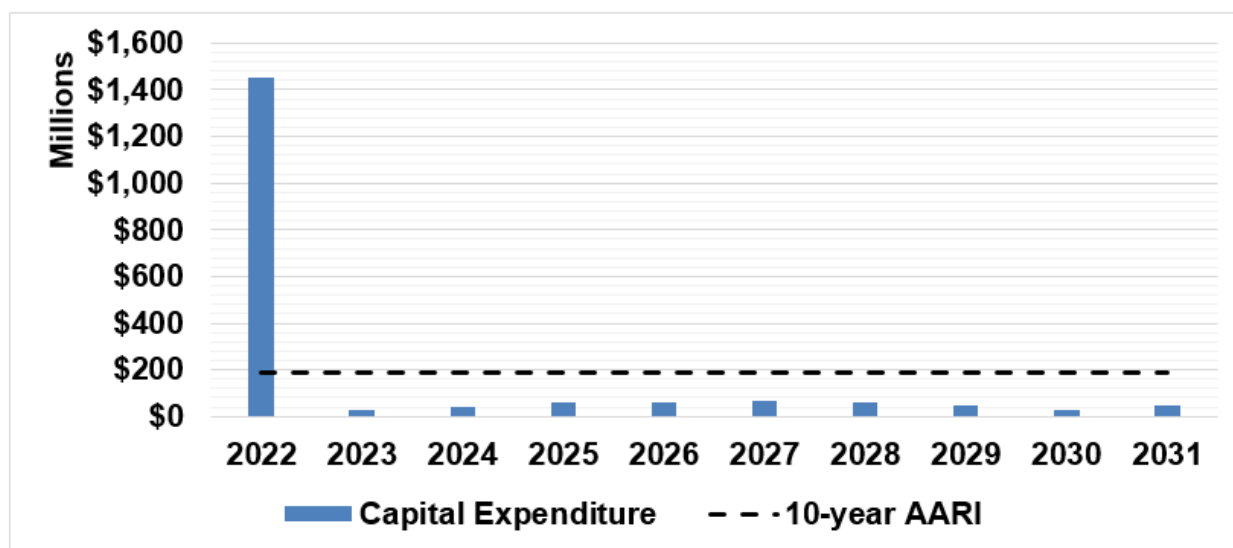
13.5 Lifecycle strategies

Transportation's LAS for roads, bridges and culverts, and some signal components is to apply a % of replacement value for repairs and rehabilitation at a specified point in time. For example, a section of paved urban arterial road, which has a useful expected life (UEL) of 45 years, Transportation anticipates spending approximately 18% of the replacement cost resurfacing the road at 15 and 30 years. For other assets such as fleet, guiderails and illumination, Transportation's LAS is to replace at the end of UEL.

13.6 Financial strategy

Figure 24 presents the AARI necessary to support existing assets and current levels of service for Transportation of \$189.0 M in the 10-year forecast. This includes both annual requirements for the 10-year period, as well as addressing the identified capital spending backlog of \$1,422.4 M during the same period. For comparison, the 50-year AARI is forecast at \$109.6 million as the backlog is spread over a longer period.

Figure 24: Transportation AARI and capital expenditure



13.6.1 Transportation cost to deliver service

The cost of service delivery for Transportation includes operating expenses, capital expenditures and revenues. A summary of the 2022 operating budget for Transportation is presented in Table 62.

Table 62: Transportation summary of costs to deliver services

Area of expenditure	2022 budget (in millions)
Staffing	\$15.0
Utilities	\$0.7
Operating & maintenance	\$7.2
Program specific	\$20.1
Capital reserve transfers	\$11.8
Debt charges	\$19.2

13.7 Transportation 2022 Development Charge Background Study projects

Table 63 is a summary of the growth projects identified in the 2022 Development Charge Background Study (2022 DCBS) based on the underlying assets and expected timing of the projects.

Table 63: Transportation infrastructure costs in the DC calculation

Increased service needs attributable to anticipated development	Timing	Gross capital cost estimate (\$ million)	Net cost funded by Region (\$ million)	Other funding sources (\$ million)	Potential DC cost recovery (\$ million)
Active transport	2022-2026	\$12.2	\$9.1	\$0.0	\$3.1
Active transport	2022-2031	\$11.7	\$8.8	\$0.0	\$2.9
Active transport	2027-2036	\$12.2	\$9.1	\$0.0	\$3.1
Annual programs	2022-2041	\$459.5	\$392.3	\$0.0	\$67.2
New bridge	2032-2041	\$112.5	\$11.2	\$0.0	\$101.3
Bridge reconstruction	2022-2031	\$91.4	\$74.4	\$0.5	\$16.5
Culvert reconstruction	2022-2031	\$3.7	\$2.9	\$0.0	\$0.8
Intersection improvement	2022-2026	\$44.0	\$2.5	\$0.0	\$41.5
Intersection improvement	2027-2041	\$31.5	\$15.7	\$0.0	\$15.8
Capacity Improvements	2022-2031	\$970.0	\$405.3	\$3.3	\$561.4
Capacity Improvements	2031-2035	\$22.5	\$8.0	\$0.0	\$14.5
Capacity Improvements	2036-2041	\$43.4	\$28.2	\$0.0	\$15.2
Studies	2022-2031	\$4.2	\$0.2	\$0.0	\$4.0
Studies	2022-2041	\$13.1	\$1.3	\$0.0	\$11.8

14 Transit

14.1 Introduction

Transit services includes leading various transit related initiatives in partnership with local municipal partners. Some of these initiatives include Inter-municipal transit, Niagara Regional Transit, Niagara Specialized Transit, and the GO implementation office.

This AMP reports assets originally purchased by the Region under the current service structure for Transit.

Assets utilized to provide the services include:

- 32 buses.

The new Niagara Transit Commission will include additional transit assets of the local area municipalities. However, this data is not available at the time of writing this report.

Provincial objectives for other services, and related legislation, are primary drivers that guide and direct delivery of Transit services in Niagara Region. Council, through reporting updates and the Region's Corporate Strategy and Priorities, also provide direction for the delivery of service. Other legislation and documents that guide service delivery include the following:

- Niagara Region Transit Governance Study
- Niagara Region Transportation Master Plan
- Niagara Region Transportation Master Plan – Transit strategy technical paper
- Niagara Transit Service Delivery and Governance Strategy
- Niagara Specialized Transit Study 2020
- Inter-Municipal Transit Service Implementation Strategy

14.2 Transit demand drivers

Demand drivers are the underlying factors that direct change in the demand for the service. Drivers and their influence help define and measure the changing requirements for services, and the activities and assets required to support those services. Most of the drivers for Transit result in changes to operational requirements and assets required to support the service. The estimated significance of impact on service is summarized in Table 64.

Table 64: Transit demand drivers

Demand driver	Divisional significance
Population change	High
Legislation and higher government	Moderate
Social issues and trends	Moderate
Customer expectations	Low
Economic factors	Low
Pandemic	High
Other service provider changes	Moderate
Asset management	High

14.2.1 Planned asset portfolio growth and enhancements

The expected growth in the population of Niagara will place significant pressure on the capacity of existing assets and create demand for new assets. The Region has updated various master plans that outline current service levels and associated existing assets, recommend future service levels and associated assets, and identify the actions required to move from the current to future state including requirements for new, expanded and enhanced assets.

Asset portfolio growth is expected and will be managed through the Transit Commission. As part of the commission implementation, staff will be hired and assets will be procured as needed. The asset management of the new commission and its assets will be assessed more thoroughly in subsequent plans.

14.3 Transit levels of service

Table 65 summarizes information on customer and technical measure for levels of service (LOS) that relate to the operation, maintenance and renewal of assets for the sustainment of Transit's current LOS.

Table 65: Transit LOS summary

Customer LOS	Technical LOS	Performance
Accessible ridership	Number of boarding's	1,065,000

14.3.1 Legislated levels of service

Regulations govern many aspects of service delivery at the program level, and much of it is very technical in nature. Some examples of regulations and their impact on Transit are as follows:

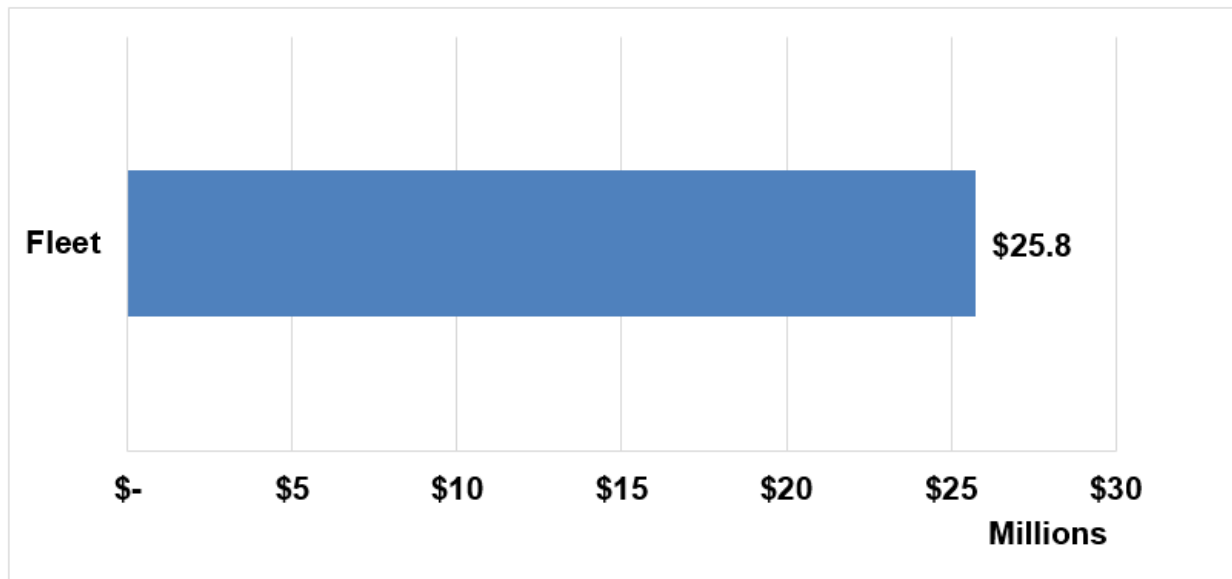
- Environmental Protection Act R.S.O 1990
 - The purpose of this Act is to provide for the protection and conservation of the natural environment. The Act makes provisions for the improved control of pollution to the air, water and land by regulating the management of waste and the control of emissions.
- Highway Traffic Act
 - This is an Ontario regulation describing the rules of operating vehicles on public roads including types of operators, drivers and loads.
- O. Reg. 424/97: Commercial motor vehicle operators' information
 - The Ministry of Transportation has developed an annual renewal program whereby Commercial Vehicles Operators Registration (CVOR) holders are required to update their operating information on an annual basis.

14.4 Transit state of infrastructure

14.4.1 Transit asset inventory and replacement cost

The assets required to support the services provided by Transit only include fleet assets purchased by the Region under the current management structure. The estimated cost to replace the assets is \$25.8 million, as summarized in Figure 25.

Figure 25: Transit inventory and replacement cost



14.4.2 Transit asset age distribution

Transit assets are approximately half way through useful expected life (UEL). The average age and estimated service life of Transit assets, weighted by replacement value, is summarized by asset category in Figure 26 and Table 66.

Figure 26: Transit average age by asset category

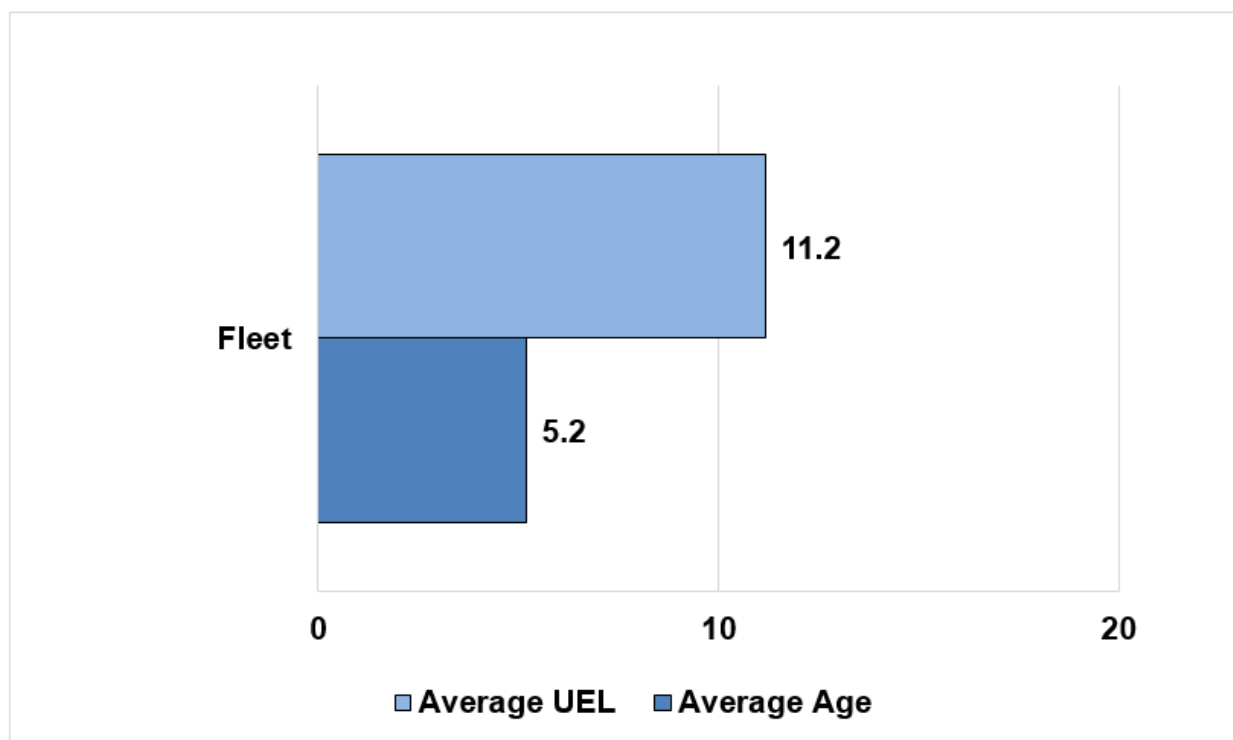


Table 66: Transit average age by asset category

Asset Category	Average Age	Average UEL	Average Remaining Life
Fleet	5.2	11.2	6.0

14.4.3 Transit asset condition

Condition for Transit assets is based on age or mileage. 'Very poor' assets for fleet based on age do not necessarily indicate an imminent failure, but are indicative of assets that are beyond their expected lifecycle and past the time-based renewal period. Transit assets are rated as very good, with 68% of assets rated as very good or better. Condition of Transit assets, weighted by replacement value, is summarized by asset category in Figure 27 and Table 67.

Figure 27: Transit asset condition as % of value

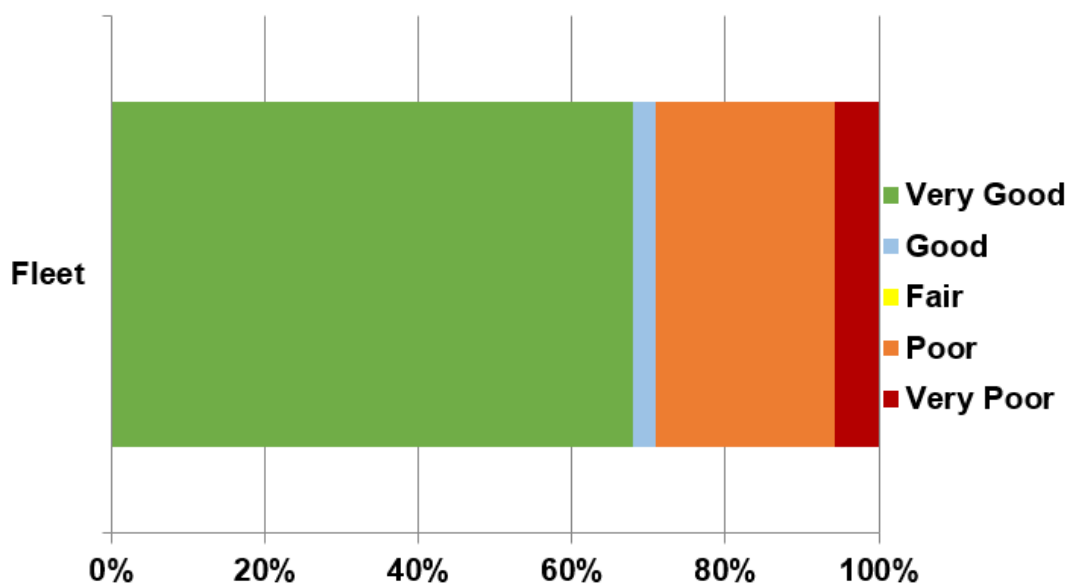


Table 67: Transit asset condition as % of value

Colour	Condition rating	Fleet	Total
	Very good	68.0%	68.0%
	Good	2.9%	2.9%
	Fair	0.0%	0.0%
	Poor	23.3%	23.3%
	Very poor	5.8%	5.8%

14.4.4 Transit risk

Table 68 is a standardized risk matrix that represents assets with their current replacement cost according to the risk of asset failure.

Table 68: Transit risk distribution

COF	Very low	Low	Moderate	High	Very high
POF					
Very high	\$-	\$-	\$-	\$-	\$-
High	\$-	\$-	\$-	\$-	\$-
Moderate	\$-	\$20	\$-	\$-	\$-
Low	\$-	\$-	\$-	\$-	\$-
Very low	\$-	\$6	\$-	\$-	\$-

POF = Probability of failure

COF = Consequence of failure

Table 69 represents the percentage of total asset replacement cost according to the risk of asset failure.

Table 69: Transit risk exposure summary

Colour	Risk category	Asset value (\$ million)	% of assets
VL	Very low (VL)	\$5.5	21.4%
L	Low (L)	\$0.0	0.0%
M	Moderate (M)	\$20.3	78.6%
H	High (H)	\$0.0	0.0%
VH	Very high (VH)	\$0.0	0.0%
	Total	\$25.8	100.0%

14.5 Lifecycle strategies

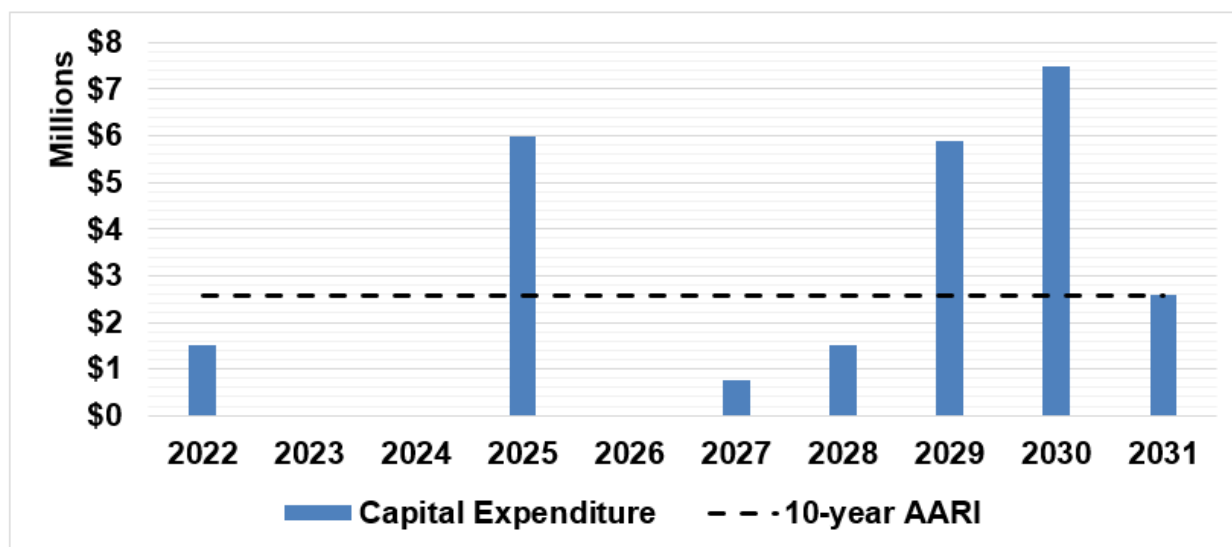
The LAS for Transit is to replace at the end of UEL, which is informed by manufacturer recommendations and studies when available. In some cases a major refurbishment is able to be completed on busses, which can extend the life for another several years. This strategy is still under development and has not yet been implemented for all busses.

14.6 Financial strategy

Figure 28 presents the AARI necessary to support existing assets and current levels of service for Transit of \$2.6 million in the 10-year forecast. This includes both annual requirements for the 10-year period, as well as addressing the identified capital

spending backlog of \$1.5 million during the same period. For comparison, the 50-year AARI is forecast at \$2.4 million.

Figure 28: Transit AARI and capital expenditure



14.6.1 Transit cost to deliver service

The cost of service delivery for Transit includes operating expenses, capital expenditures and revenues. A summary of the 2022 operating budget for Transit is presented in Table 70.

Table 70: Transit summary of costs to deliver services

Area of expenditure	2022 budget (in millions)
Staffing	\$0.4
Utilities	\$0.0
Operating & maintenance	\$0.8
Program specific	\$21.7
Capital reserve transfers	\$0.7
Debt charges	\$1.3

15 Fleet

15.1 Introduction

Fleet services include providing a full range of vehicle and equipment services for internal Regional divisions including maintenance and repair, marketing and disposal, and acquisition. Fleet manages fleet assets for all services with the exception of Emergency Medical Services and Niagara Regional Police Services.

Assets reported in this service include:

- 1 Fleet Service Centre
- 585 vehicles

Provincial objectives for other services, and related legislation, are primary drivers that guide and direct delivery of fleet services in Niagara Region. Council, through reporting updates and the Region's Corporate Strategy and Priorities, also provide direction for the delivery of service. Other legislation and documents that guide service delivery include the following:

- Environmental Protection Act R.S.O. 1990
- Highway Traffic Act
- O. Reg. 424/97: Commercial motor vehicle operators' information

15.2 Fleet demand drivers

Demand drivers are the underlying factors that direct change in the demand for the service. Drivers and their influence help define and measure the changing requirements for services, and the activities and assets required to support those services. Most of the drivers for Fleet result in changes to operational requirements rather than changes to the assets utilized, with the estimated significance of impact on service summarized in Table 71.

Table 71: Fleet demand drivers

Demand driver	Divisional significance
Legislation	High
Population change	Moderate-high
Socio-economic issues and trends	Moderate
Customer expectations	Low
Technology	Moderate

Demand driver	Divisional significance
Climate change	Low

15.2.1 Planned asset portfolio growth and enhancements

The expected growth in the population of Niagara will place significant pressure on the capacity of existing assets and create demand for new assets. The Region has updated various master plans that outline current service levels and associated existing assets, recommend future service levels and associated assets, and identify the actions required to move from the current to future state including requirements for new, expanded and enhanced assets.

15.3 Fleet levels of service

Table 72 summarizes information on customer and technical measure for levels of service (LOS) that relate to the operation, maintenance and renewal of assets for the sustainment of Fleet's current LOS.

Table 72: Fleet LOS summary

Customer LOS	Technical LOS	Performance
Facilities are maintained to an appropriate standard, are safe and accessible.	Facility condition index (% of deferred maintenance of overall facility replacement cost)	4.0%

15.3.1 Legislated levels of service

Regulations govern many aspects of service delivery at the program level, and much of it is very technical in nature. Some examples of regulations and their impact on Fleet are as follows:

- Environmental Protection Act R.S.O. 1990
 - The purpose of this Act is to provide for the protection and conservation of the natural environment. The Act makes provisions for the improved control of pollution to the air, water and land by regulating the management of waste and the control of emissions.
- Highway Traffic Act
 - This is an Ontario regulation describing the rules of operating vehicles on public roads including types of operators, drivers and loads.
- O. Reg. 424/97: Commercial motor vehicle operators' information

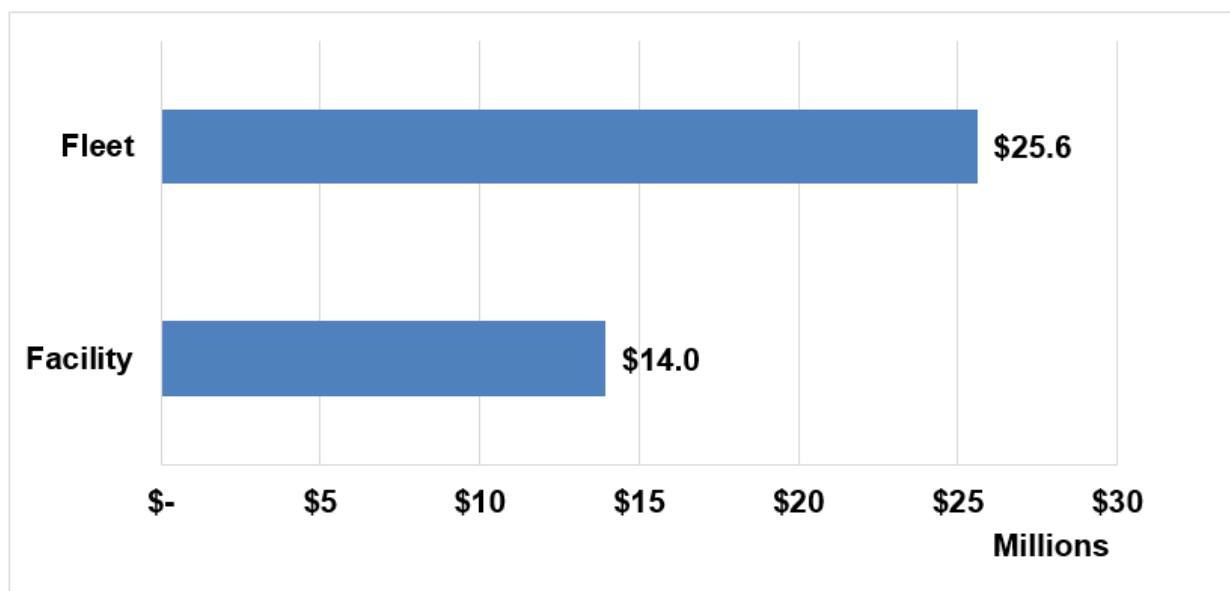
- The Ministry of Transportation has developed an annual renewal program whereby Commercial Vehicles Operators Registration (CVOR) holders are required to update their operating information on an annual basis.

15.4 Fleet state of infrastructure

15.4.1 Fleet asset inventory and replacement cost

The assets include facilities and fleet. The assets reported here are those required by fleet to manage the Region's fleet, as well as fleet assets that support individual services. The estimated cost to replace the assets is \$39.6 million, as summarized in Figure 29.

Figure 29: Fleet inventory and replacement cost



15.4.2 Fleet asset age distribution

Fleet assets on average are in the last half of their useful expected life (UEL). The average age and estimated service life of Fleet assets, weighted by replacement value, is summarized by asset category in Figure 30 and Table 73.

Figure 30: Fleet average age by asset category

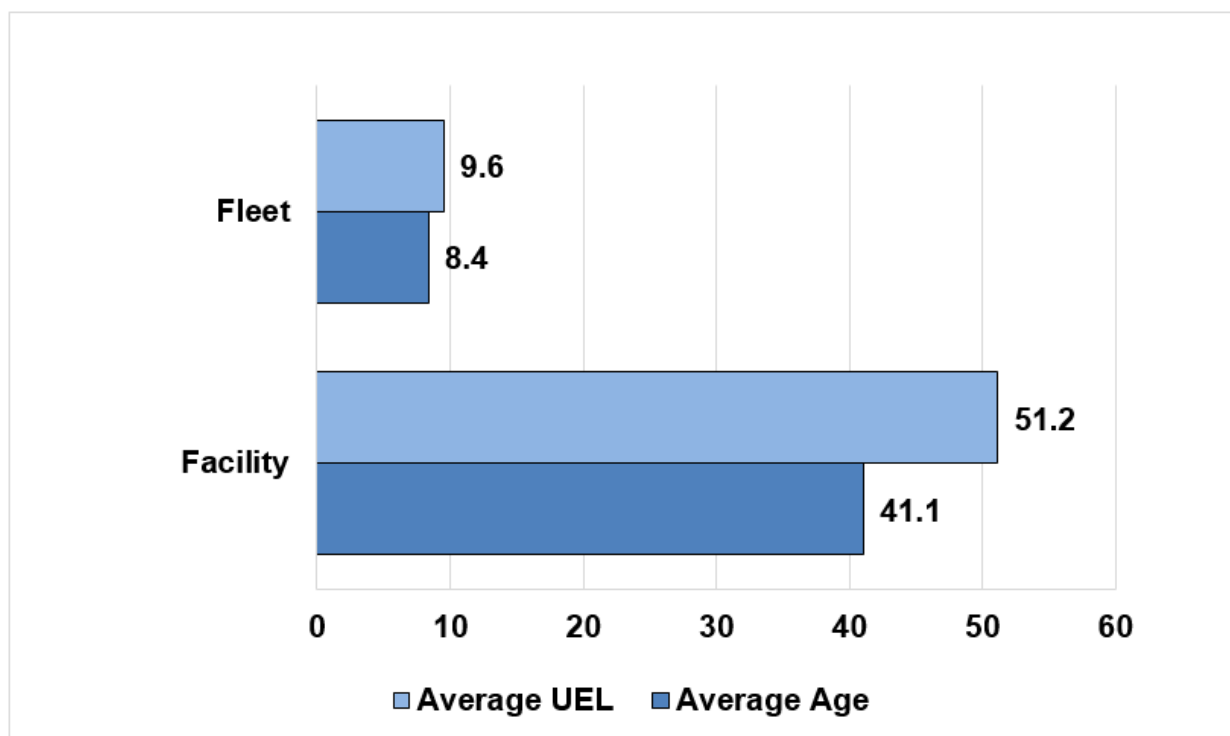


Table 73: Fleet average age by asset category

Asset Category	Average Age	Average UEL	Average Remaining Life
Facility	41.1	51.2	10.1
Fleet	8.4	9.6	1.2

15.4.3 Fleet asset condition

Condition for Fleet assets is based on age or mileage. ‘Very poor’ assets for fleet based on age do necessarily indicate an imminent failure, but are indicative of assets that are beyond their expected lifecycle and past the time-based worse period. Fleet assets are rated as poor, with 61% of assets rated as poor or better. Condition of Fleet assets, weighted by replacement value, is summarized by asset category in Figure 31 and Table 74.

Figure 31: Fleet asset condition as % of value

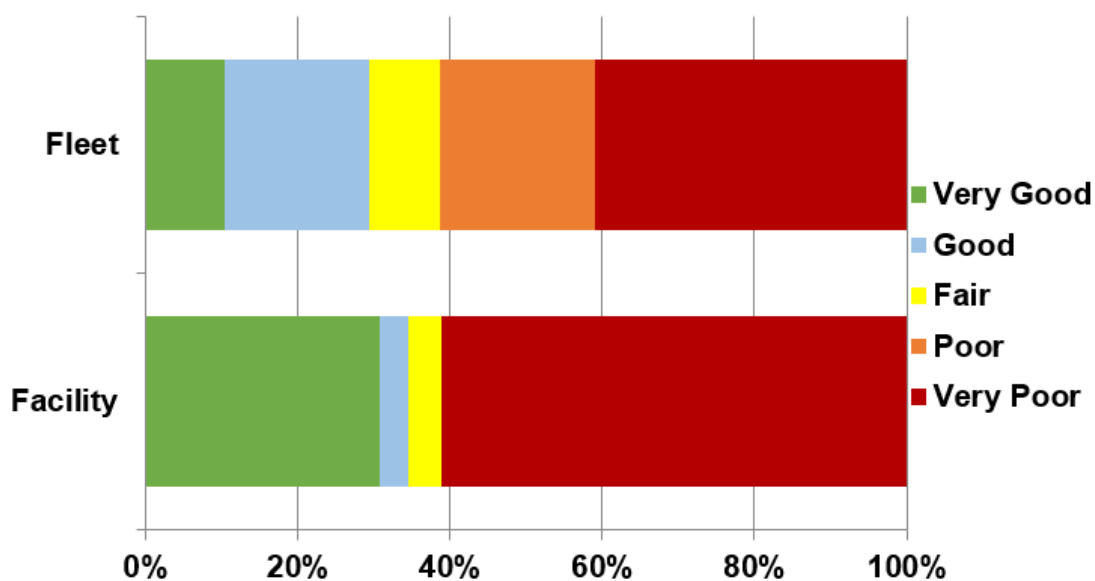


Table 74: Fleet asset condition as % of value

Colour	Condition rating	Facility	Fleet	Total
	Very good	30.8%	10.4%	17.6%
	Good	3.8%	18.9%	13.6%
	Fair	4.2%	9.4%	7.6%
	Poor	0.0%	20.3%	13.1%
	Very poor	61.2%	41.0%	48.1%

15.4.4 Fleet risk

Table 75 is a standardized risk matrix that represents assets with their current replacement cost according to the risk of asset failure.

Table 75: Fleet risk distribution

COF	Very low	Low	Moderate	High	Very high
POF					
Very high	\$2	\$10	\$-	\$-	\$-
High	\$22	\$-	\$-	\$-	\$-
Moderate	\$-	\$-	\$-	\$-	\$-
Low	\$-	\$-	\$-	\$-	\$-
Very low	\$-	\$5	\$-	\$-	\$-

POF = Probability of failure

COF = Consequence of failure

Table 76 represents the percentage of total asset replacement cost according to the risk of asset failure.

Table 76: Fleet risk exposure summary

Colour	Risk category	Asset value (\$ million)	% of assets
VL	Very low (VL)	\$4.8	12.2%
L	Low (L)	\$0.0	0.0%
M	Moderate (M)	\$24.4	61.8%
H	High (H)	\$10.3	26.0%
VH	Very high (VH)	\$0.0	0.0%
	Total	\$39.6	100.0%

15.5 Lifecycle strategies

The lifecycle asset strategy for Fleet is to replace at the end of UEL, which is informed by manufacturer recommendations and studies when available. Fleet aims to perform preventative maintenance on vehicles and equipment in order to ensure they perform well up until the end of their UEL.

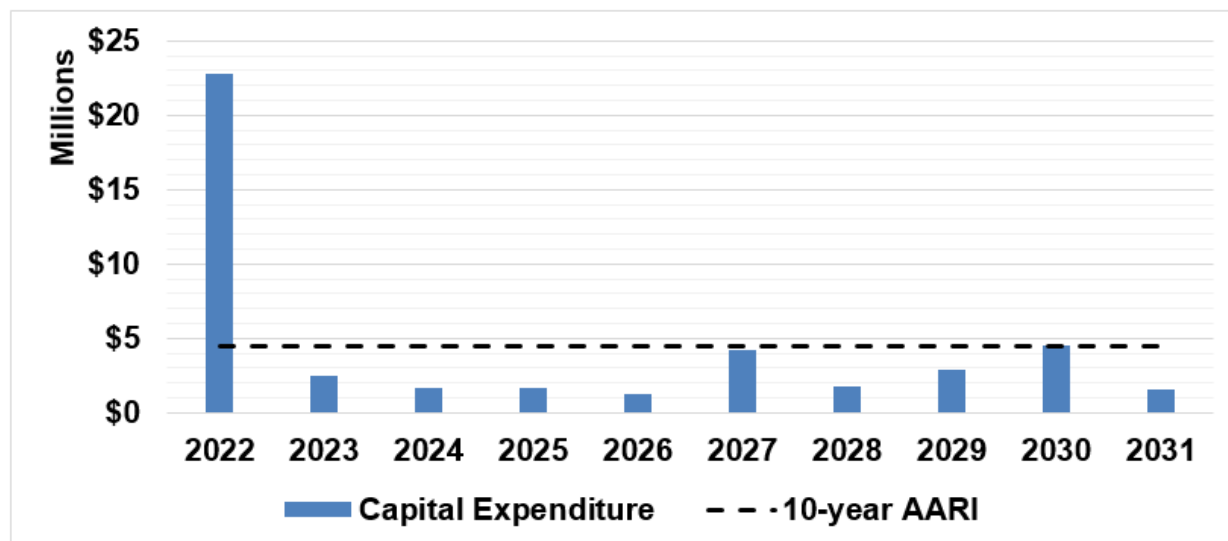
For facilities managed by the corporate Facilities service, risks relating to building infrastructure failure are mitigated through inspection and maintenance programs, which provide the necessary data to ensure that the work required to achieve the established

LOS is identified. Renewal of assets is driven by BCAs, facility operator review on site, annual site walk-through inspections, and input from program department.

15.6 Financial strategy

Figure 32 presents the AARI necessary to support existing assets and current levels of service for Fleet of \$4.5M in the 10-year forecast. This includes both annual requirements for the 10-year period, as well as addressing the identified capital spending backlog of \$20.3M during the same period. For comparison, the 50-year AARI is forecast at \$4.5 million as the backlog is spread over a longer period.

Figure 32: Fleet AARI and capital expenditure



15.6.1 Fleet cost to deliver service

The cost of service delivery for Fleet includes operating expenses, capital expenditures and revenues. A summary of the 2022 operating budget for Fleet is presented in Table 77.

Table 77: Fleet summary of costs to deliver services

Area of expenditure	2022 budget (in millions)
Staffing	\$1.9
Utilities	\$0.0
Operating & maintenance	\$2.3
Program specific	\$2.8

Area of expenditure	2022 budget (in millions)
Capital reserve transfers	\$2.6
Debt charges	\$0.0

16 Seniors Services

16.1 Introduction

Seniors Services provides a variety of long-term healthcare services for residents in the Region's long-term care homes and for clients with healthcare needs and/or functional limitations who still live in the community, as well as those who attend adult day programs delivered through one of the long-term care homes or supportive housing facilities. Seniors Services provides services to over 1,300 residents annually in the Region's long term care homes and through a variety of community-based programs.

Assets utilized to provide the services include:

- 9 Long-term Care facilities.
- 2043 equipment, including beds, resident care equipment and medical equipment.

Provincial objectives for Seniors Services, and related legislation, are primary drivers that guide and direct delivery of Seniors Services in Niagara Region. Council, through reporting updates and the Region's Corporate Strategy and Priorities, also provide direction for the delivery of service. Other legislation and documents that guide service delivery include the following:

- Seniors Services 2020-2023 Strategic Plan
- Long-term Care Home Renewal Strategy
- AD04-002 – Quality Improvement – Quality Improvement Program (which includes the Strategic plan, Operational Plan and Quality Improvement Plan)

16.2 Seniors Services demand drivers

Demand drivers are the underlying factors that direct change in the demand for the service. Drivers and their influence help define and measure the changing requirements for services, and the activities and assets required to support those services. The drivers for Seniors Services result in changes to operational requirements and the assets required to support the service. The estimated significance of impact on service summarized in Table 78.

Table 78: Seniors Services demand drivers

Demand driver	Divisional significance
Population and demographics	High
Legislation	High

Demand driver	Divisional significance
Organizational goals and objectives	High
Pandemic	High
Operational efficiency	Moderate-high
Customer expectations	High
Other service providers	Moderate

The demand for change in service is managed through several means, including demand studies and optimization exercise. Some of these business improvement studies are listed below:

- Collaboration on a Built Environment Research in LTC
- Seniors Facilities MMS Maintenance Care Project
- Dietary Department Efficiency Study
- Essential Laundry Continuous Improvement Review
- Region of Niagara Long-Term Care Home Redevelopment March 2018 (alternative service delivery)

16.2.1 Planned asset portfolio growth and enhancements

The expected growth in the population of Niagara will place significant pressure on the capacity of existing assets and create demand for new assets. The Region has updated various master plans that outline current service levels and associated existing assets, recommend future service levels and associated assets, and identify the actions required to move from the current to future state including requirements for new, expanded and enhanced assets.

Table 79 lists forecasted capital projects for Seniors Services that are required to address these growth or enhancement needs. For additional information on growth related projects, please see section 25.7.

Table 79: Seniors Services forecast asset portfolio growth and enhancement projects

Asset class	Growth or enhancement forecasted
Long-term care facilities	Three of the Region's long-term care homes (Linhaven, Gilmore Lodge and Upper Canada Lodge) have been identified for redevelopment under the Long-term Care Home Renewal Strategy in support of meeting the Ministry of Health and Long-Term Care current design standards by the end of December 2024. The framework for the redevelopment is based on input from a range of stakeholders, including other service providers (not-for-profit, for-profit providers as well as other municipal providers), government partners and residents of Niagara and includes a comprehensive review of alternative service delivery models.

16.3 Seniors Services levels of service

Table 80 summarizes information on customer and technical measure for levels of service (LOS) that relate to the operation, maintenance and renewal of assets for the sustainment of Seniors Services' current LOS.

Table 80: Seniors Services LOS summary

Customer LOS	Technical LOS	Performance
Facilities are maintained to an appropriate standard, are safe and accessible.	Facility condition index (% of deferred maintenance of overall facility replacement cost)	3.7%
Residents may live with dignity and in security, safety and comfort, and have their physical, psychological, social, spiritual and cultural needs adequately met	Accreditation Canada Program	Accreditation with Exemplary Standing
Residents may live with dignity and in security, safety and comfort, and have their physical, psychological, social, spiritual and cultural needs adequately met	Municipal Benchmarking Network Canada (MBNC)	92% Satisfaction (2020)

16.3.1 Legislated levels of service

Regulations govern many aspects of service delivery at the program level, and much of it is very technical in nature. Some examples of regulations and their impact on Seniors Services are as follows:

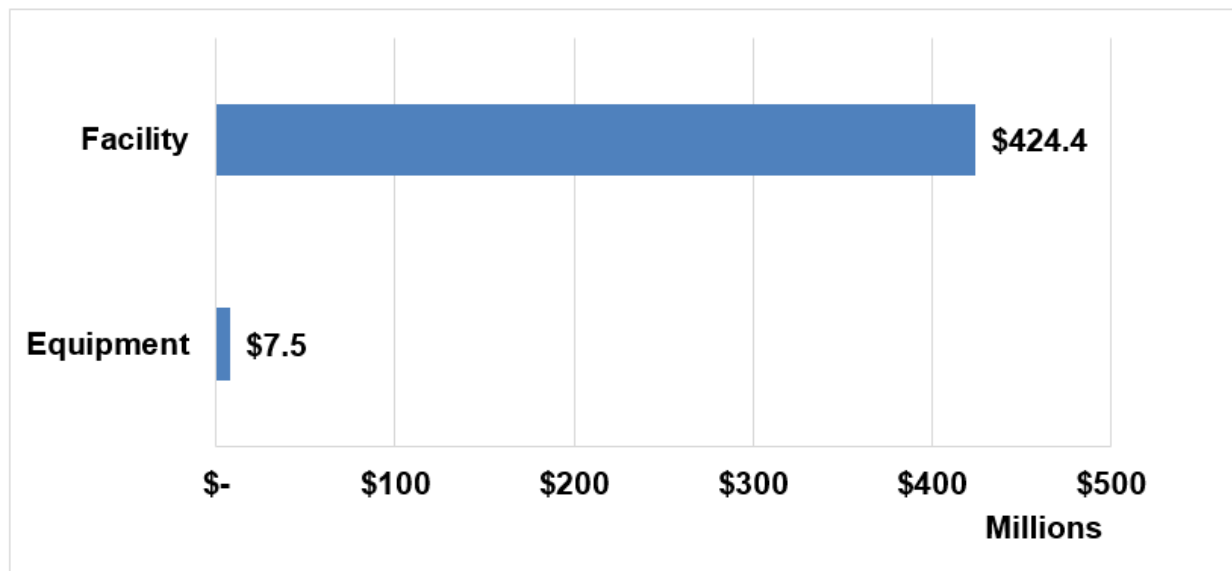
- O. Long-Term Care Homes Act, 2007, S.O. 2007, c. 8
 - Legislation describing the provision of Long Term Care Service and the characteristics of such a place, i.e., place where residents may live with dignity and in security, safety and comfort, and have their physical, psychological, social, spiritual and cultural needs adequately met.

16.4 Seniors Services state of infrastructure

16.4.1 Seniors Services asset inventory and replacement cost

The assets required to support the services provided by Seniors Services include facilities and equipment. The estimated cost to replace the assets is \$431.9 million, as summarized in Figure 33.

Figure 33: Seniors Services inventory and replacement cost



16.4.2 Seniors Services asset age distribution

Seniors Services assets on average are generally half way through of their useful expected life (UEL). Once the redevelopments of Lihaven and Gilmore Lodge and Upper Canada Lodge are complete a significant portion of the asset portfolio will be new. This will change overall portfolio age with respect to UEL, by making the average age a smaller portion of the average UEL. Equipment assets are generally closer to the end of their UEL than facility assets, but the relative small value of \$7.5 million does not affect the average significantly. The average age and estimated service life of Seniors Services assets, weighted by replacement value, is summarized by asset category in Figure 34 and Table 81.

Figure 34: Seniors Services average age by asset category

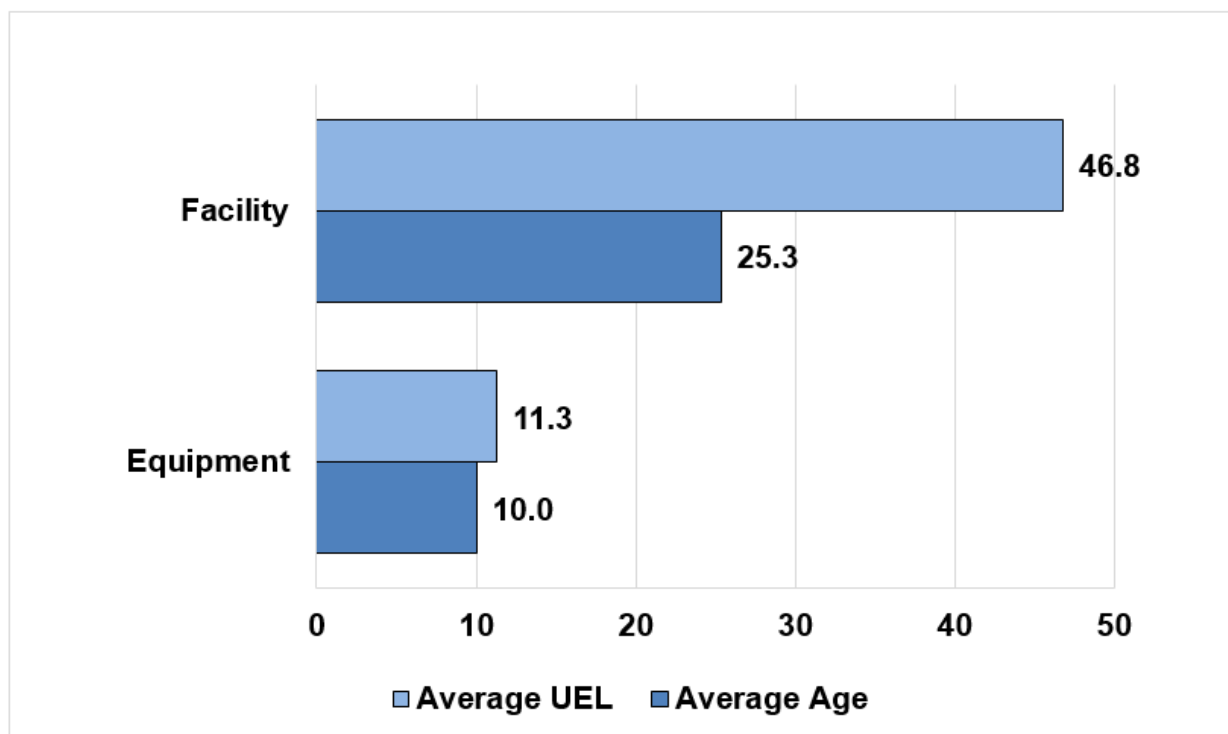


Table 81: Seniors Services average age by asset category

Asset Category	Average Age	Average UEL	Average Remaining Life
Equipment	10.0	11.3	1.3
Facility	25.3	46.8	21.5
All	25.1	46.2	21.1

16.4.3 Seniors Services asset condition

Condition for Seniors Services is based on an aged-based model to provide an estimate of current condition in the absence of condition information. The Seniors Services portfolio of assets is rated in fair condition, with 61% of the assets rated as fair or better. The condition of Seniors Services assets, weighted by replacement value, is summarized by asset category in Figure 35 and Table 82.

Figure 35: Seniors Services asset condition as % of value

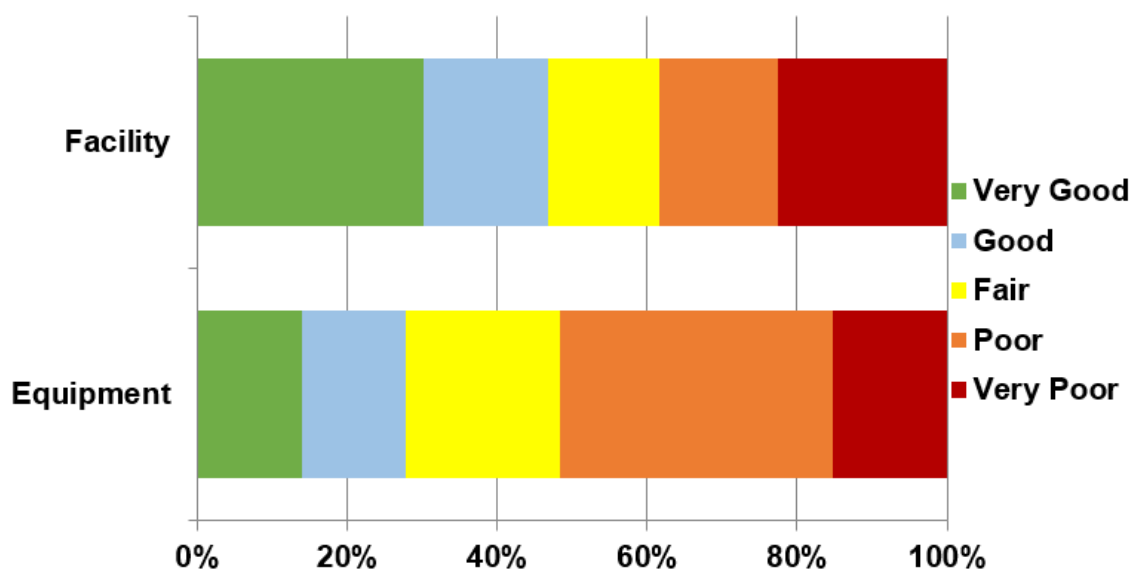


Table 82: Seniors Services asset condition as % of value

Colour	Condition rating	Facility	Equipment	Total
	Very good	30.2%	13.9%	29.9%
	Good	16.7%	13.8%	16.6%
	Fair	14.7%	20.7%	14.8%
	Poor	15.8%	36.3%	16.2%
	Very poor	22.6%	15.3%	22.5%

16.4.4 Seniors Services risk

Table 83 is a standardized risk matrix that represents assets with their current replacement cost according to the risk of asset failure.

Table 83: Seniors Services risk distribution

COF	Very low	Low	Moderate	High	Very high
POF					
Very high	\$-	\$-	\$-	\$-	\$-
High	\$86	\$143	\$8	\$-	\$-
Moderate	\$-	\$2	\$55	\$-	\$-
Low	\$-	\$0	\$138	\$-	\$-
Very low	\$-	\$-	\$-	\$-	\$-

POF = Probability of failure

COF = Consequence of failure

Table 84 represents the percentage of total asset replacement cost according to the risk of asset failure.

Table 84: Seniors Services risk exposure summary

Colour	Risk category	Asset value (\$ million)	% of assets
VL	Very low (VL)	\$0.0	0.0%
L	Low (L)	\$0.1	0.0%
M	Moderate (M)	\$368.8	85.4%
H	High (H)	\$63.0	14.6%
VH	Very high (VH)	\$0.0	0.0%
	Total	\$431.9	100.0%

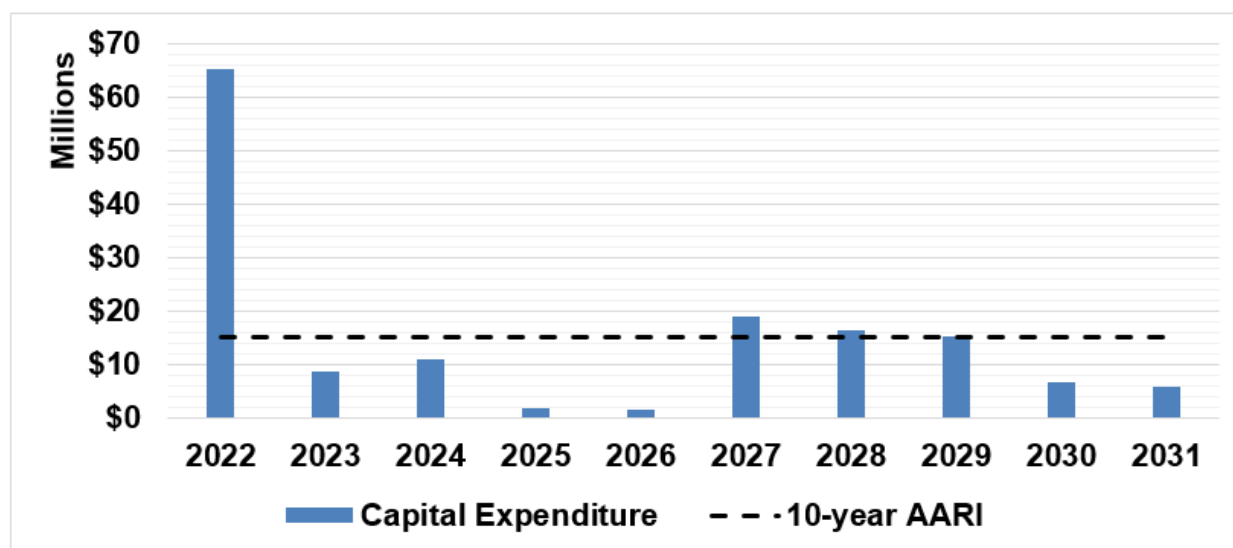
16.5 Lifecycle strategies

The LAS for Seniors Services is generally to replace components at end of UEL. Risks relating to building infrastructure failure are mitigated through inspection and maintenance programs, which provide the necessary data to ensure that the work required to achieve the established LOS is identified. Renewal of assets is driven by BCAs, facility operator review on site, annual site walk-through inspections, and input from staff.

16.6 Financial strategy

Figure 36 presents the AARI necessary to support existing assets and current levels of service for Seniors Services of \$15.1 M in the 10-year forecast. This includes both annual requirements for the 10-year period, as well as addressing the identified capital spending backlog of \$40.8M during the same period. For comparison, the 50-year AARI is forecast at \$14.5 million.

Figure 36: Seniors Services AARI and capital expenditure



16.6.1 Seniors Services financial indicators

The cost of service delivery for Seniors Services includes operating expenses, capital expenditures and revenues. A summary of the 2022 operating budget for Seniors Services is presented in Table 85.

Table 85: Seniors Services summary of costs to deliver services

Area of expenditure	2022 budget (in millions)
Staffing	\$89.8
Utilities	\$2.0
Operating & maintenance	\$3.5
Program specific	\$13.7
Capital reserve transfers	\$2.4
Debt charges	\$7.8

16.7 Seniors Services 2022 Development Charge Background Study projects

Table 86 is an extraction of the growth projects identified in the 2022 Development Charge Background Study (2022 DCBS).

Table 86: Seniors Services infrastructure costs in the DC calculation

Increased service needs attributable to anticipated development	Timing	Gross capital cost estimate (\$ million)	Net cost funded by Region (\$ million)	Other funding sources (\$ million)	Potential DC cost recovery (\$ million)
Provision for Future Long-term Care Home Redevelopment	2028-2031	\$27.5	\$0.0	\$0.0	\$27.5

17 Community Housing

17.1 Introduction

Niagara Housing Services (Community Housing) administers the Region's Community Housing program. Community Housing owns and operates approximately 3000 units and has legislative oversight of an additional 4,000 private sector or non-profit units. Community Housing strives to be a leader and promotes affordable housing opportunities in Niagara, is a community partner who works collaboratively with stakeholders, and ensures equitable and fair access to affordable housing. Community Housing customers are adults, seniors and families in lower income brackets seeking to rent affordable housing units throughout the Region.

Assets utilized to provide the services include:

- 9 high-rise residential buildings.
- 20 low-rise residential buildings.
- 12 townhouses.
- 20 single/semi houses.

Provincial objectives for Community Housing services, and related legislation, are primary drivers that guide and direct delivery of Housing services in Niagara Region. Council, through reporting updates and the Region's Corporate Strategy and Priorities, also provide direction for the delivery of service. Other legislation and documents that guide service delivery include the following:

- Canada Mortgage and Housing Corporation (CMHC)
- Social Housing Agreement (SHA)
- Ministry of Municipal affairs and Housing – Community housing renewal strategy
- Niagara Region Housing and Homelessness action plan
- Housing Master Plan (HMP) 2021
- Housing Services Act (HSA) 2011
- Residential Tenancies Act 2006
- Social Housing Reform Act 2000
- Bill 204, Helping Tenants and Small Businesses Act, 2020. (2021 Rent Freeze)
- O. REG. 517/06: Maintenance Standards

17.2 Community Housing demand drivers

Demand drivers are the underlying factors that direct change in the demand for the service. Drivers and their influence help define and measure the changing requirements for services, and the activities and assets required to support those services. The drivers for Community Housing result in changes to operational requirements as well as changes to the assets utilized. The estimated significance of impact on service summarized in Table 87: Community Housing demand drivers.

Table 87: Community Housing demand drivers

Demand driver	Divisional significance
Population and demographics	Moderate
Legislation and higher government	Moderate
Social issues and trends	Low
Customer expectations	Low
Economic factors	Low
Pandemic	Moderate
Operational efficiency	Low
Other service provider changes	Moderate
Asset management	High

The demand for change in service is managed through several means, one of which is the 2013 Homelessness and Housing Action Plan (HHAP), another is the 2022 Community Housing Plan (CHMP). These documents identify demand for the service and project needs into the future. The plans identify operational improvements through collaborating with other stakeholders in the space, while ensuring alignment with the Regional strategic plan.

17.2.1 Planned asset portfolio growth and enhancements

The expected growth in the population of Niagara will place significant pressure on the capacity of existing assets and create demand for new assets. The Region has updated various master plans that outline current service levels and associated existing assets, recommend future service levels and associated assets, and identify the actions required to move from the current to future state including requirements for new, expanded and enhanced assets.

Table 88 lists forecasted capital projects for Community Housing that are required to address these growth or enhancement needs. For additional information on growth related projects, please see section 17.7.

Table 88: Community Housing forecast asset portfolio growth and enhancement projects

Asset class	Growth or enhancement forecasted
Facility – Low rise	43 unit new build in Welland. Four story building with a budget of \$13.6 M.
Facility – Low rise	18 unit new build in Fort Erie. Three story building with a budget of \$6.0 M.

17.3 Community Housing levels of service

Table 89 summarizes information on customer and technical measure for levels of service (LOS) that relate to the operation, maintenance and renewal of assets for the sustainment of Community Housing's current LOS.

Table 89: Community Housing LOS summary

Customer LOS	Technical LOS	Performance
Facilities are maintained to an appropriate standard, are safe and accessible.	Facility condition index (% of deferred maintenance of overall facility replacement cost)	5.8%
Accessible affordable housing	Number of social housing units per 1,000 households	In 2018 Niagara Region reported 36 versus the group median of 38
Accessible affordable housing	Percent of social housing waiting list placed annually	In 2018 Niagara Region reported 9.2%, down from 15.6% in 2016, versus the group median of 8.8%, down from 13.8% in 2016

17.3.1 Legislated levels of service

Regulations govern many aspects of service delivery at the program level, and much of it is very technical in nature. Some examples of regulations and their impact on Community Housing are as follows:

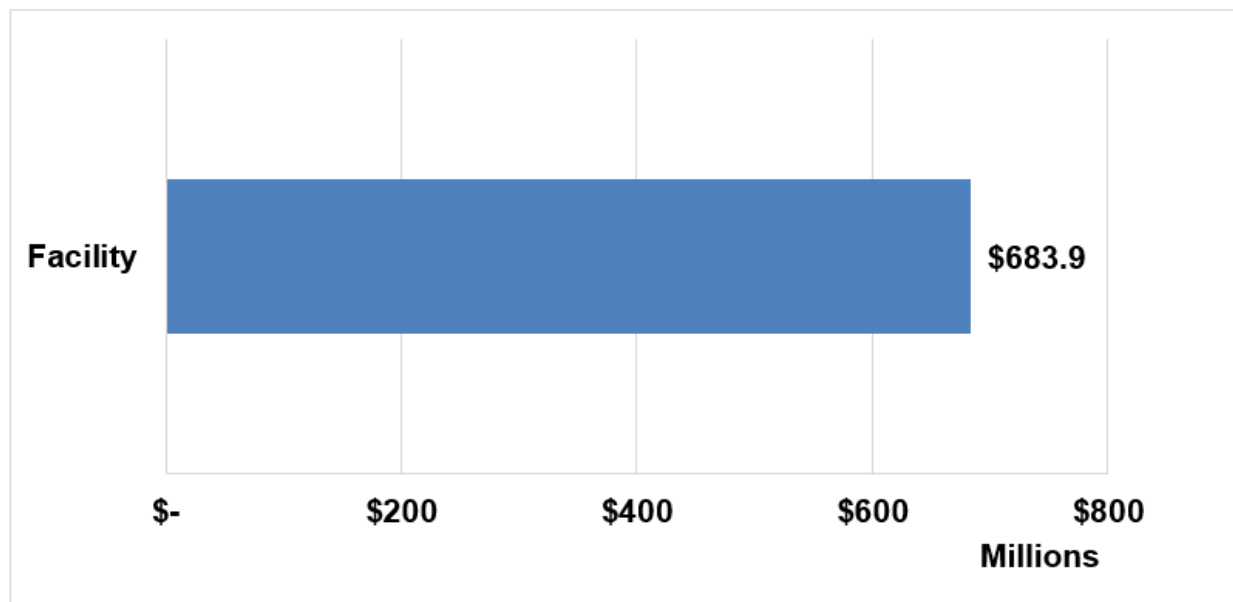
- O. Reg. 517/06: Maintenance Standards
 - Mandates the standard to which facilities are maintained i.e. the minimum condition.
- The Housing Services Act (HSA)
 - This is a Provincial legislation containing ten parts. The purpose of this Act is to provide for community based planning and delivery of housing and homelessness services with general provincial oversight and policy direction.
- Residential Tenancies Act 2006
 - Outlines roles and responsibilities of landlords and tenants, the act allows for the following. To provide protection for residential tenants from unlawful rent increases and unlawful evictions. To establish a framework for the regulation of residential rents. To balance the rights and responsibilities of residential landlords and tenants. To provide for the adjudication of disputes and for other processes to informally resolve disputes.
- Building code
 - The Building Code Act is an Ontario regulation that describes the requirements for built facilities.

17.4 Community Housing state of infrastructure

17.4.1 Community Housing asset inventory and replacement cost

The assets required to support the services provided by Community Housing include facilities categorized as high rise, low rise, townhouse and single/semi communities. The estimated cost to replace the assets is \$683.9 million, as summarized in Figure 37.

Figure 37: Community Housing inventory and replacement cost



17.4.2 Community Housing asset age distribution

Community Housing assets on average are in the first half of their useful expected life (UEL). The average age and estimated service life of Community Housing assets, weighted by replacement value, is summarized by asset category in Figure 38 and Table 90.

Figure 38: Community Housing average age by asset category

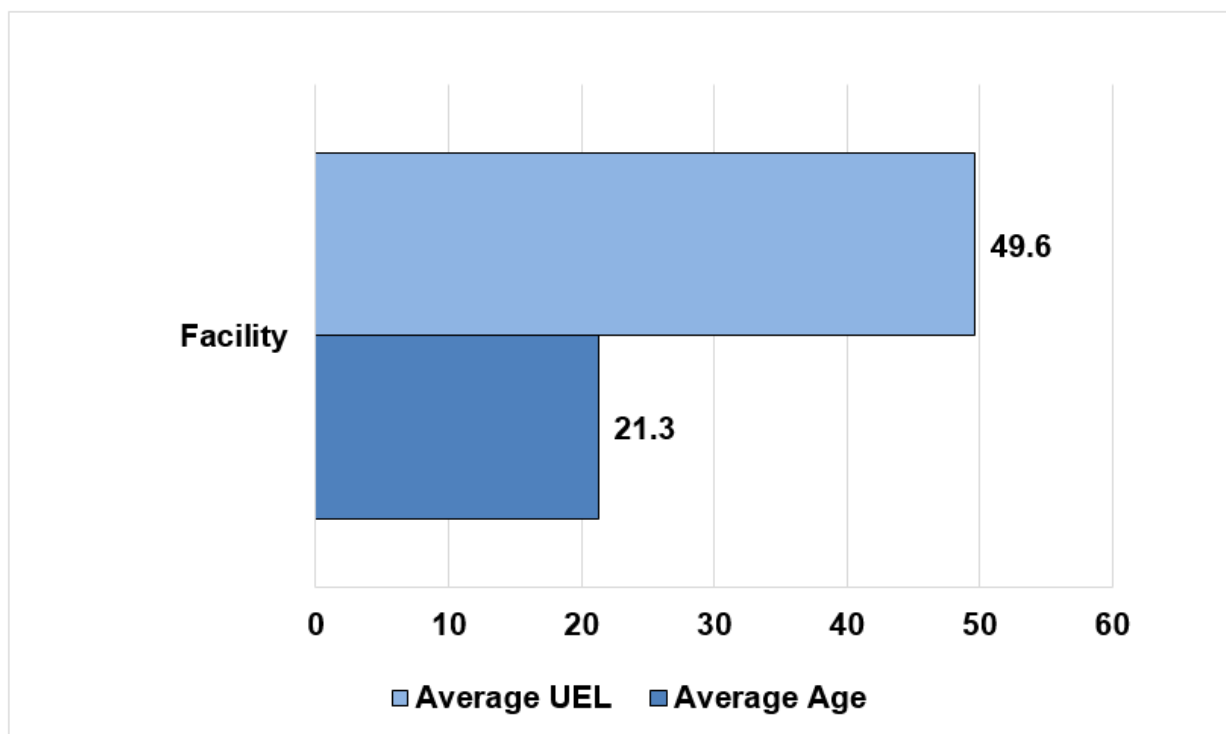


Table 90: Community Housing average age by asset category

Asset Category	Average Age	Average UEL	Average Remaining Life
Facility	21.3	49.6	28.4

17.4.3 Community Housing asset condition

Condition for Community Housing is based on an aged-based model to provide an estimate of current condition in the absence of condition information. The Community Housing portfolio of assets is rated in good condition, with 79% of the assets rated as good or better. The condition of Community Housing assets, weighted by replacement value, is summarized by asset category in Figure 39 and Table 91.

Figure 39: Community Housing asset condition as % of value

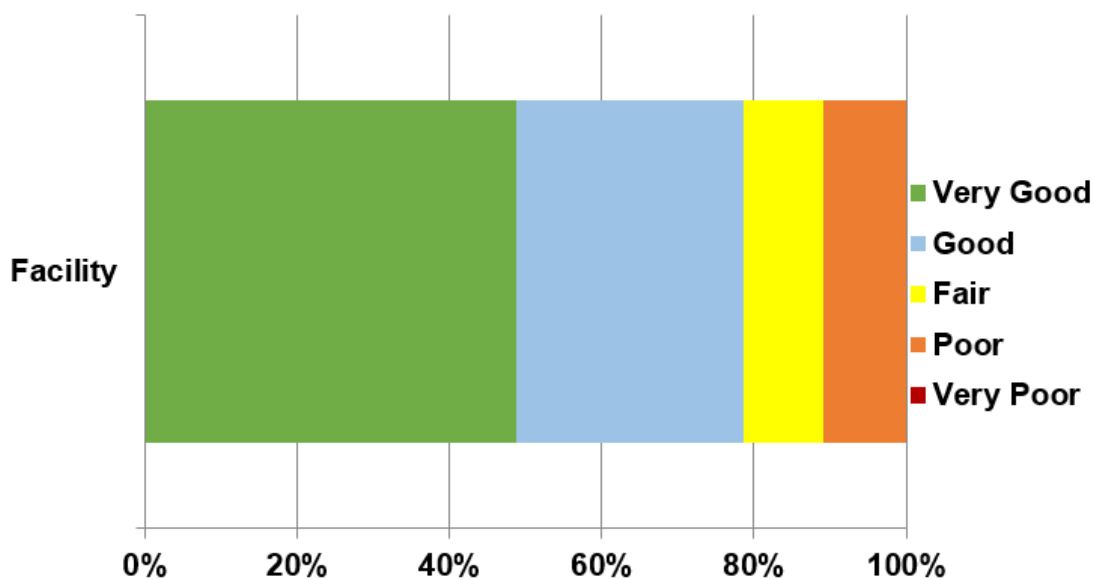


Table 91: Community Housing asset condition as % of value

Colour	Condition rating	Facility	Total
	Very good	48.7%	48.7%
	Good	29.9%	29.9%
	Fair	10.5%	10.5%
	Poor	10.9%	10.9%
	Very poor	0.0%	0.0%

17.4.4 Community Housing risk

Table 92 is a standardized risk matrix that represents assets with their current replacement cost according to the risk of asset failure.

Table 92: Community Housing risk distribution

COF	Very low	Low	Moderate	High	Very high
POF					
Very high	\$-	\$-	\$-	\$-	\$-
High	\$-	\$-	\$-	\$-	\$-
Moderate	\$-	\$173	\$28	\$-	\$-
Low	\$157	\$-	\$325	\$-	\$-
Very low	\$-	\$-	\$-	\$-	\$-

POF = Probability of failure

COF = Consequence of failure

Table 93 represents the percentage of total asset replacement cost according to the risk of asset failure.

Table 93: Community Housing risk exposure summary

Colour	Risk category	Asset value (\$ million)	% of assets
VL	Very low (VL)	\$157.3	23.0%
L	Low (L)	\$0.0	0.0%
M	Moderate (M)	\$498.1	72.8%
H	High (H)	\$28.5	4.2%
VH	Very high (VH)	\$0.0	0.0%
	Total	\$683.9	100.0%

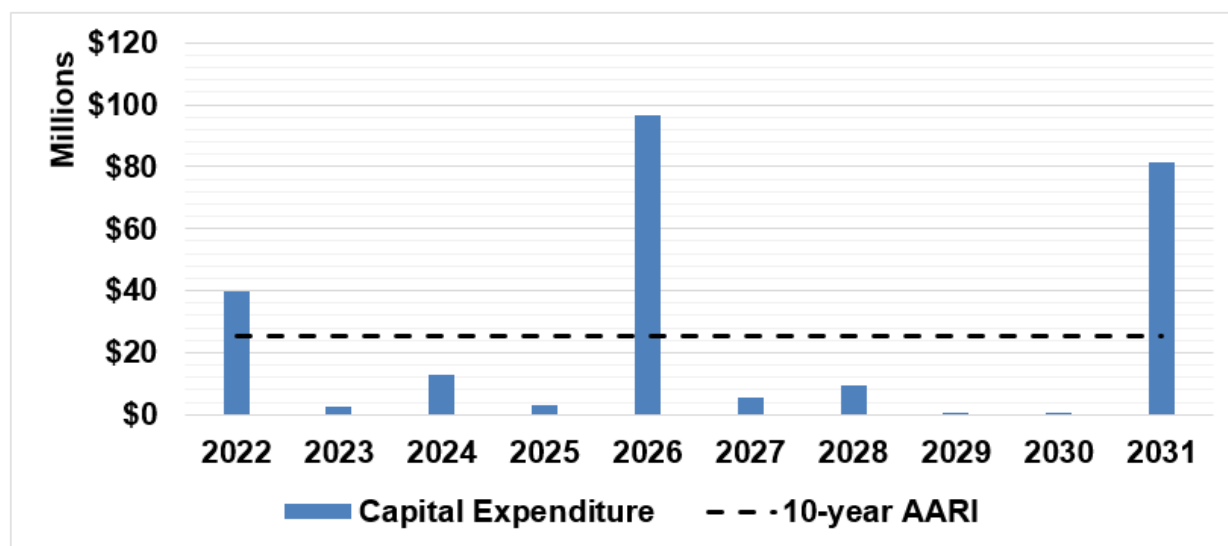
17.5 Lifecycle strategies

The LAS for Community Housing is generally to replace components at end of UEL. Risks relating to building infrastructure failure are mitigated through inspection and maintenance programs, which provide the necessary data to ensure that the work required to achieve the established LOS is identified. Renewal of assets is driven by BCAs, facility operator review on site, annual site walk-through inspections, and input from staff.

17.6 Financial strategy

Figure 40 presents the AARI necessary to support existing assets and current levels of service for Housing of \$25.2 M in the 10-year forecast. This includes both annual requirements for the 10-year period, as well as addressing the identified capital spending backlog of \$39.6 M during the same period. For comparison, the 50-year AARI is forecast at \$25.8 million.

Figure 40: Housing AARI and capital expenditure



17.6.1 Community Housing financial indicators

The cost of service delivery for Community Housing includes operating expenses, capital expenditures and revenues. A summary of the 2022 operating budget for Community Housing is presented in Table 94.

Table 94: Community Housing summary of costs to deliver services

Area of expenditure	2022 budget (in millions)
Staffing	\$5.8
Utilities	\$5.1
Operating & maintenance	\$6.3
Program specific	\$43.6
Capital reserve transfers	\$3.9
Debt charges	\$6.9

17.7 Community Housing 2022 Development Charge Background Study projects

Table 95 is an extraction of the growth projects identified in the 2022 Development Charge Background Study (2022 DCBS).

Table 95: Community Housing infrastructure costs in the DC calculation

Increased service needs attributable to anticipated development	Timing	Gross capital cost estimate (\$ million)	Net cost funded by Region (\$ million)	Other funding sources (\$ million)	Potential DC cost recovery (\$ million)
Provision for Additional Units	2022-2026	\$36.0	\$0.0	\$0.0	\$36.0
12 St. Davids & 52 Ormond	2022-2025	\$1.3	\$0.0	\$0.0	\$1.3
Niagara Falls Library Location (20 new bridge units)	2022	\$3.6	\$0.0	\$0.0	\$3.6
Apartments at POA Location (42 apartment units)	2022-2023	\$14.5	\$0.0	\$10.5	\$4.0
745 Crest Rd. Fort Erie	2022	\$6.5	\$0.0	\$0.0	\$6.5

18 Children's Services

18.1 Introduction

Children's Services provides for the overall planning and management of services to children from birth to 12 years of age and their families. The Ministry of Education, under the Child Care and Early Years Act, designated the Region as a Service System Manager for Children's Services.

Assets utilized to provide the services include:

- 4 Region-owned day-care facilities.

Provincial objectives, and related legislation are primary drivers that guide and direct planning and delivery of Children's Services in Niagara Region. Council, through reporting updates and the Region's Corporate Strategy and Priorities, also provide direction for the delivery of this service. Other legislation and documents that guide service delivery include the following:

- Ontario Works Act, 1997, S.O. 1997, c.25, Sched. A

18.2 Children's Services demand drivers

Demand drivers are the underlying factors that direct change in the demand for the service. Drivers and their influence help define and measure the changing requirements for services, and the activities and assets required to support those services. Most of the drivers for Children's Services result in changes to operational requirements rather than changes to the assets utilized, with the estimated significance of impact on service summarized in Table 96.

Table 96: Children's Services demand drivers

Demand driver	Divisional significance
Population and demographics	Moderate
Development trends	Moderate
Legislation and higher government	High
Customer expectations	Low
Economic factors	Low
Pandemic	High

18.2.1 Planned asset portfolio growth and enhancements

The expected growth in the population of Niagara will place significant pressure on the capacity of existing assets and create demand for new assets. The Region has updated various master plans that outline current service levels and associated existing assets, recommend future service levels and associated assets, and identify the actions required to move from the current to future state including requirements for new, expanded and enhanced assets. At this time, there is no specific growth planned for Children's Services.

18.3 Children's Services levels of service

Table 97 summarizes information on customer and technical measure for levels of service (LOS) that relate to the operation, maintenance and renewal of assets for the sustainment of Children's Services' current LOS.

Table 97: Children's Services LOS summary

Customer LOS	Technical LOS	Performance
Facilities are maintained to an appropriate standard, are safe and accessible.	Facility condition index (% of deferred maintenance of overall facility replacement cost)	5.4%

18.3.1 Legislated levels of service

Regulations govern many aspects of service delivery at the program level, and much of it is very technical in nature. Some examples of regulations and their impact on Children's Services are as follows:

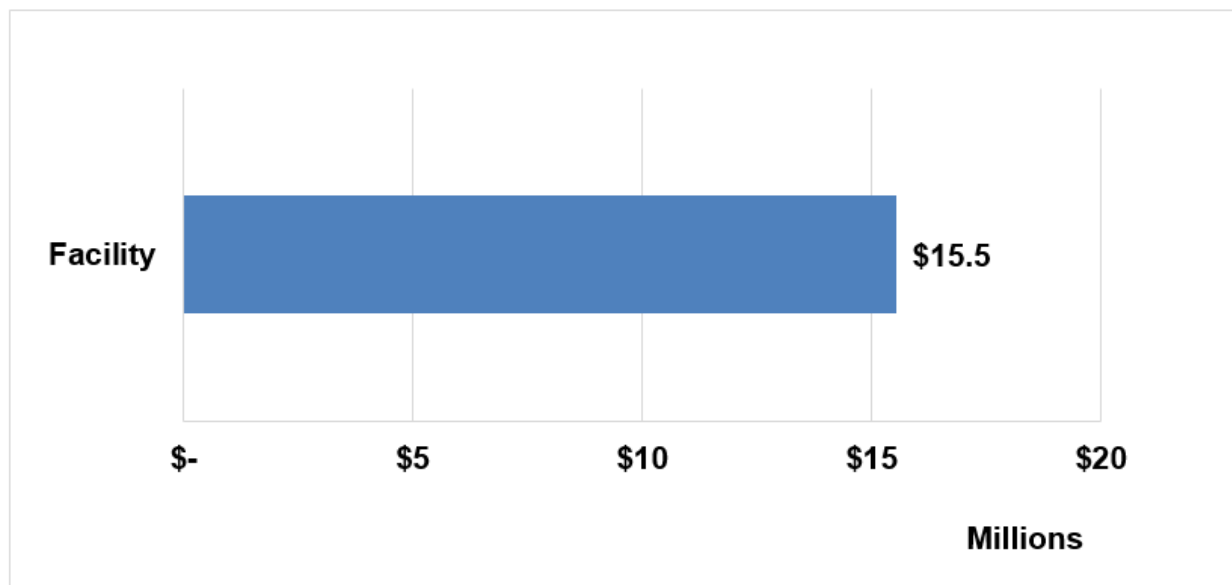
- The Child Care and Early Years Act, 2014 S.O. 2014 (the Act)
 - Focuses on requirements for operating or providing child care services. Beyond, the technical requirements the regulation and policies intends to strengthen the quality of child care programs and ensure positive outcomes in relation to children's learning, development, health and well-being.

18.4 Children's Services state of infrastructure

18.4.1 Children's Services asset inventory and replacement cost

The assets required to support the services provided by Children's Services include facilities. The estimated cost to replace the assets is \$15.5 million, as summarized in Figure 41.

Figure 41: Children's Services inventory and replacement cost



18.4.2 Children's Services asset age distribution

Children's Services assets on average are in the first half of their useful expected life (UEL). The average age and estimated service life of Children's Services assets, weighted by replacement value, is summarized by asset category in Figure 42 and Table 98.

Figure 42: Children's Services average age by asset category

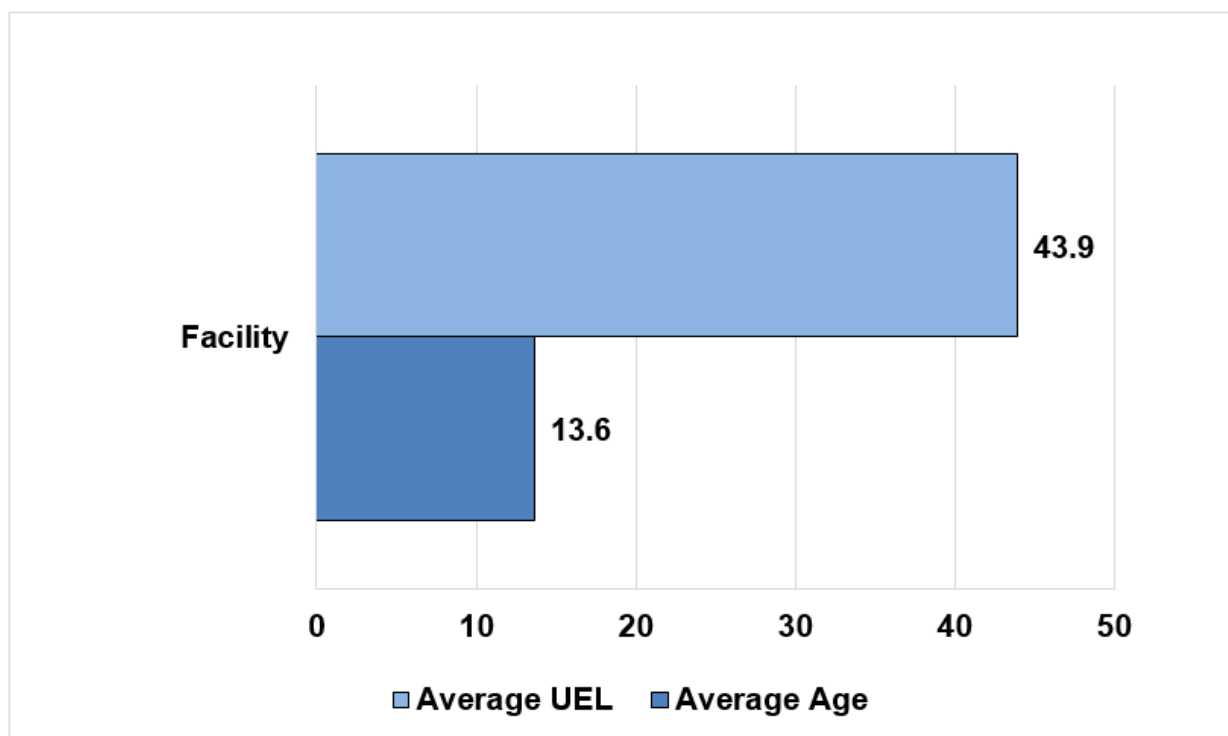


Table 98: Children's Services average age by asset category

Asset Category	Average Age	Average UEL	Average Remaining Life
Facility	13.6	43.9	30.3

18.4.3 Children's Services asset condition

Condition for Children's Services assets is based on an aged-based model to provide an estimate of current condition in the absence of condition information. The Children's Services portfolio of assets is rated in very good condition, with 70% of the assets rated as very good or better. The condition of Children's Services assets weighted by replacement value, is summarized by asset category in Figure 43 and Table 99.

Figure 43: Children's Services asset condition as % of value

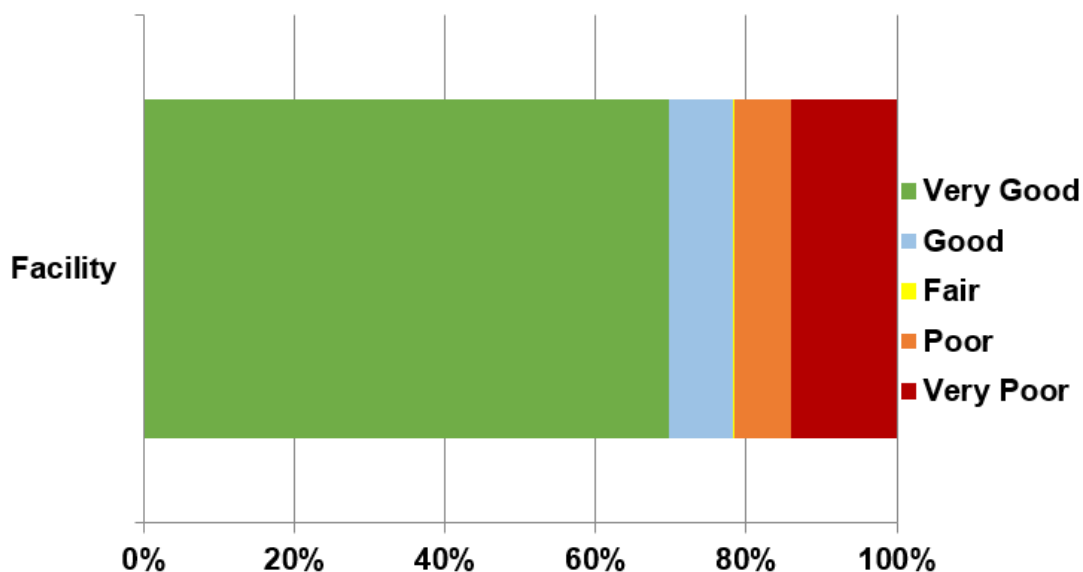


Table 99: Children's Services asset condition as % of value

Colour	Condition rating	Facility	Total
	Very good	69.7%	69.7%
	Good	8.6%	8.6%
	Fair	0.2%	0.2%
	Poor	7.5%	7.5%
	Very poor	14.0%	14.0%

18.4.4 Children's Services risk

Table 100 is a standardized risk matrix that represents assets with their current replacement cost according to the risk of asset failure.

Table 100: Children's Services risk distribution

COF	Very low	Low	Moderate	High	Very high
POF					
Very high	\$-	\$-	\$-	\$-	\$-
High	\$-	\$-	\$-	\$-	\$-
Moderate	\$3	\$9	\$-	\$-	\$-
Low	\$-	\$-	\$-	\$-	\$-
Very low	\$-	\$3	\$-	\$-	\$-

POF = Probability of failure

COF = Consequence of failure

Table 101 represents the percentage of total asset replacement cost according to the risk of asset failure.

Table 101: Children's Services risk exposure summary

Colour	Risk category	Asset value (\$ million)	% of assets
VL	Very low (VL)	\$3.4	21.6%
L	Low (L)	\$3.4	21.6%
M	Moderate (M)	\$8.8	56.8%
H	High (H)	\$0.0	0.0%
VH	Very high (VH)	\$0.0	0.0%
	Total	\$15.5	100.0%

18.5 Lifecycle strategies

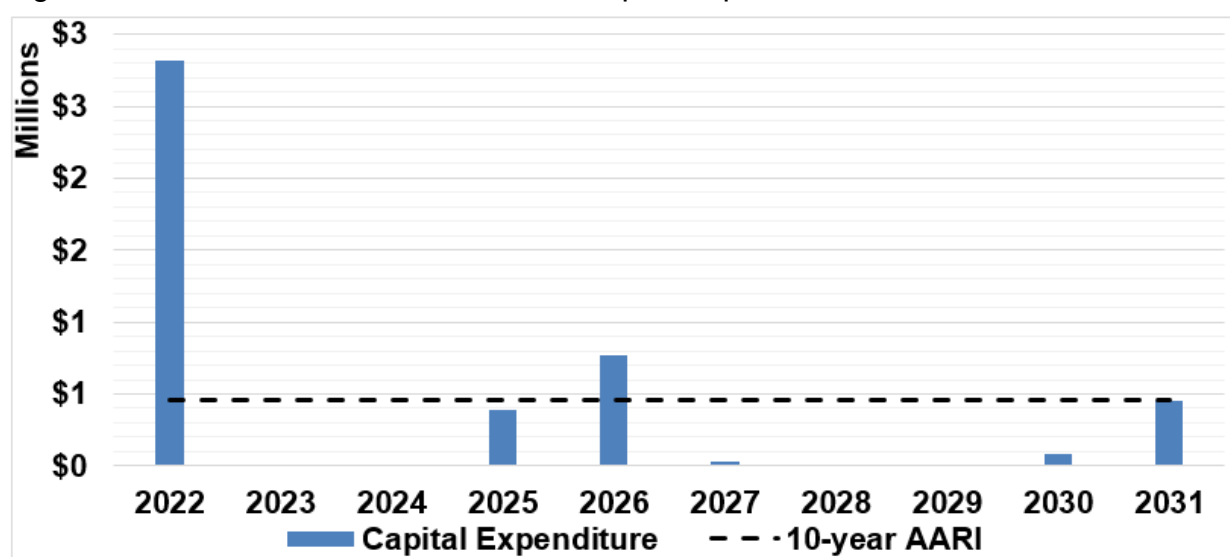
For facilities managed by the corporate Facilities service, risks relating to building infrastructure failure are mitigated through inspection and maintenance programs, which provide the necessary data to ensure that the work required to achieve the established LOS is identified. Renewal of assets is driven by BCAs, facility operator review on site, annual site walk-through inspections, and input from program department.

18.6 Financial strategy

Figure 44 presents the AARI necessary to support existing assets and current levels of service for Children's Services of \$0.5 M in the 10-year forecast. This includes both

annual requirements for the 10-year period, as well as addressing the identified capital spending backlog of \$2.7 M during the same period. For comparison, the 50-year AARI is forecast at \$0.6 million as the backlog is spread over a longer period.

Figure 44: Children's Services AARI and capital expenditure



18.6.1 Children's Services financial indicators

The cost of service delivery for Children's Services includes operating expenses, capital expenditures and revenues. A summary of the 2022 operating budget for Children's Services is presented in Table 102.

Table 102: Children's Services summary of costs to deliver services

Area of expenditure	2022 budget (in millions)
Staffing	\$8.5
Utilities	\$0.1
Operating & maintenance	\$0.1
Program specific	\$49.6
Capital reserve transfers	\$0.4
Debt charges	\$0.1

19 Social Assistance and Employment Opportunities

19.1 Introduction

Social Assistance and Employment Opportunities (SAEO) provides management and oversight of the Region's social assistance and employment opportunities services, Ontario Works, on behalf of the Province.

Assets utilized to provide the services include:

- 2 Social Assistance and Employment offices.

Provincial objectives, and related legislation are primary drivers that guide and direct planning and delivery of SAEO services in Niagara Region. Council, through reporting updates and the Region's Corporate Strategy and Priorities, also provide direction for the delivery of this service. Other legislation and documents that guide service delivery include the following:

- Ontario Works Act, 1997, S.O. 1997, c.25, Sched. A

19.2 SAEO demand drivers

Demand drivers are the underlying factors that direct change in the demand for the service. Drivers and their influence help define and measure the changing requirements for services, and the activities and assets required to support those services. Most of the drivers for SAEO result in changes to operational requirements rather than changes to the assets utilized, with the estimated significance of impact on service summarized in Table 103.

Table 103: SAEO demand drivers

Demand driver	Divisional significance
Legislation and higher government	Moderate
Social issues and trends	Low
Customer expectations	Low
Economic factors	Low
Pandemic	Moderate
Operational efficiency	Low
Other Service provider changes	Moderate

19.2.1 Planned asset portfolio growth and enhancements

The expected growth in the population of Niagara will place significant pressure on the capacity of existing assets and create demand for new assets. The Region has updated various master plans that outline current service levels and associated existing assets, recommend future service levels and associated assets, and identify the actions required to move from the current to future state including requirements for new, expanded and enhanced assets.

19.3 SAEO levels of service

Table 104 summarizes information on customer and technical measure for levels of service (LOS) that relate to the operation, maintenance and renewal of assets for the sustainment of SAEO's current LOS.

Table 104: SAEO LOS summary

Customer LOS	Technical LOS	Performance
Facilities are maintained to an appropriate standard, are safe and accessible.	Facility condition index (% of deferred maintenance of overall facility replacement cost)	3.4%

19.3.1 Legislated levels of service

Regulations govern many aspects of service delivery at the program level, and much of it is very technical in nature. Some examples of regulations and their impact on SAEO are as follows:

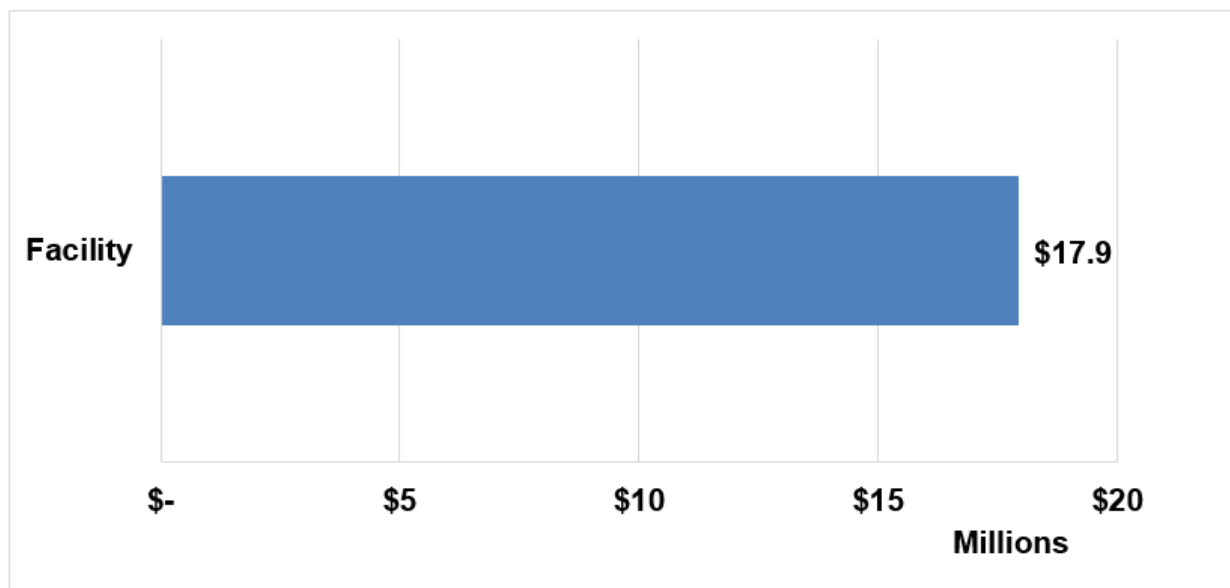
- Ontario Works Act, 1997, S.O. 1997, c.25, Sched. A
 - Regulatory requirements that dictate requirements of service provided. The guidelines established by the Province of Ontario determine the extent of services for the two components of income supports and other benefits to Ontario Works clients.

19.4 SAEO state of infrastructure

19.4.1 SAEO asset inventory and replacement cost

The assets required to support the services provided by SAEO include facilities. The estimated cost to replace the assets is \$17.9 million, as summarized in Figure 45.

Figure 45: SAEO inventory and replacement cost



19.4.2 SAEO asset age distribution

SAEO assets on average are generally half way through their useful expected life (UEL). The average age and estimated service life of SAEO assets, weighted by replacement value, is summarized by asset category in Figure 46 and Table 105.

Figure 46: SAEO average age by asset category

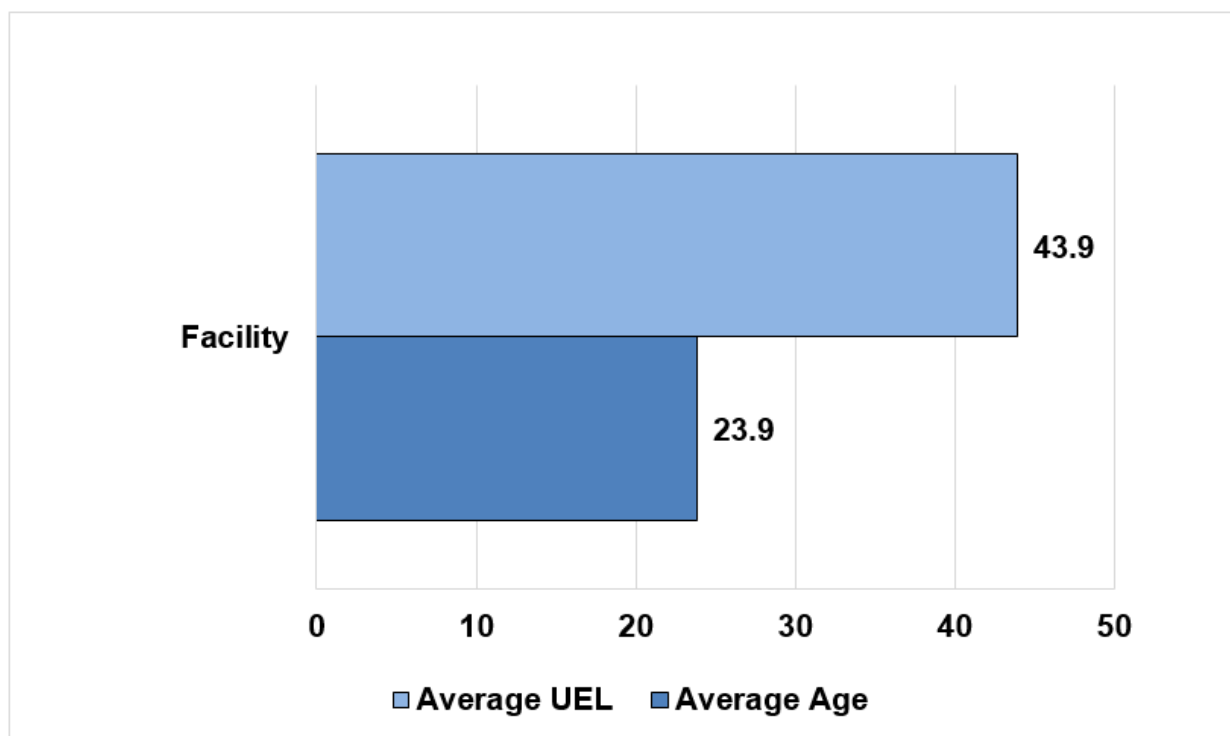


Table 105: SAEO average age by asset category

Asset Category	Average Age	Average UEL	Average Remaining Life
Facility	23.9	43.9	20.1

19.4.3 SAEO asset condition

Condition for SAEO assets is based on an aged-based model to provide an estimate of current condition in the absence of condition information. The condition of SAEO assets is rated as fair, with 56% of assets rated as fair or better. The condition of SAEO assets weighted by replacement value, is summarized by asset category in Figure 47 and Table 106.

Figure 47: SAEO asset condition as % of value

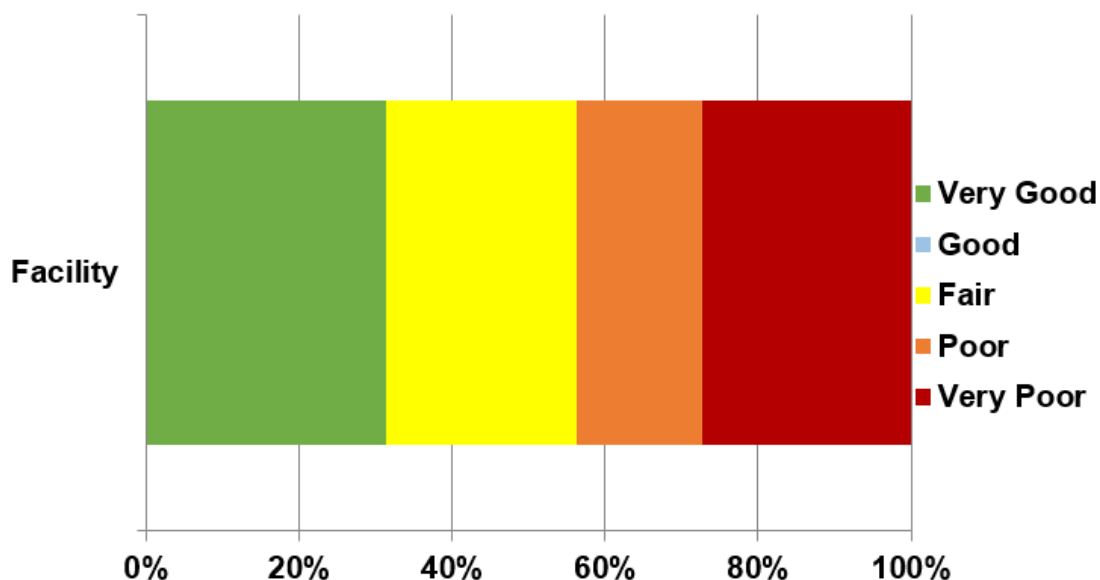


Table 106: SAEO asset condition as % of value

Colour	Condition rating	Facility	Total
	Very good	31.4%	31.4%
	Good	0.0%	0.0%
	Fair	25.0%	25.0%
	Poor	16.3%	16.3%
	Very poor	27.3%	27.3%

19.4.4 SAEO risk

Table 107 is a standardized risk matrix that represents assets with their current replacement cost according to the risk of asset failure.

Table 107: SAEO risk distribution

COF	Very low	Low	Moderate	High	Very high
POF					
Very high	\$-	\$-	\$-	\$-	\$-
High	\$4	\$8	\$-	\$-	\$-
Moderate	\$-	\$-	\$2	\$-	\$-
Low	\$-	\$-	\$-	\$-	\$-
Very low	\$-	\$-	\$4	\$-	\$-

POF = Probability of failure

COF = Consequence of failure

Table 108 represents the percentage of total asset replacement cost according to the risk of asset failure.

Table 108: SAEO risk exposure summary

Colour	Risk category	Asset value (\$ million)	% of assets
VL	Very low (VL)	\$0.0	0.0%
L	Low (L)	\$3.9	21.6%
M	Moderate (M)	\$12.1	67.6%
H	High (H)	\$1.9	10.9%
VH	Very high (VH)	\$0.0	0.0%
	Total	\$17.9	100.0%

19.5 Lifecycle strategies

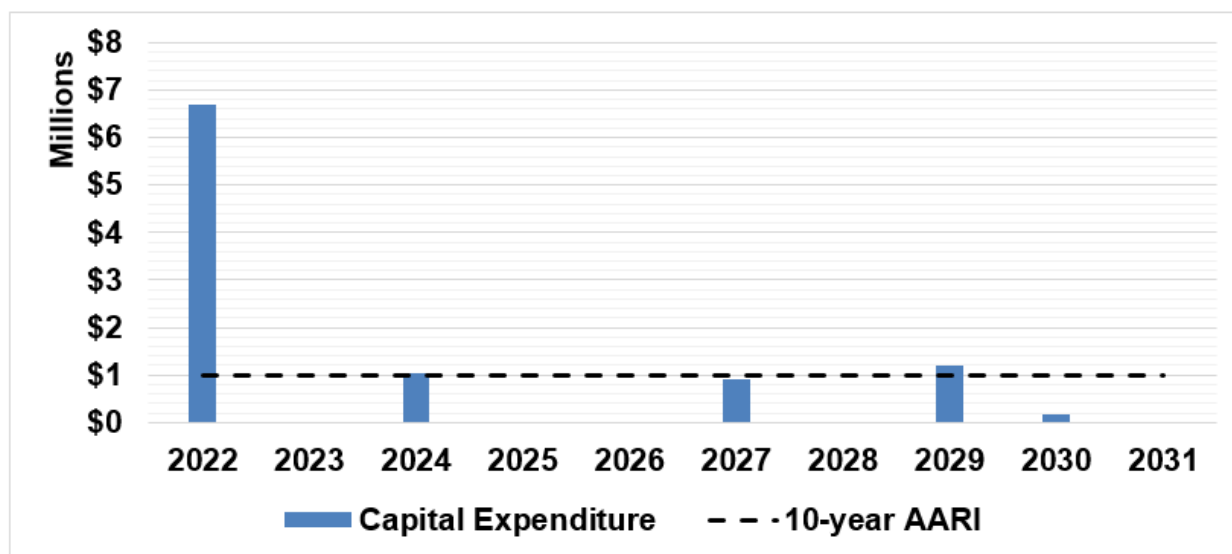
For facilities managed by the corporate Facilities service, risks relating to building infrastructure failure are mitigated through inspection and maintenance programs, which provide the necessary data to ensure that the work required to achieve the established LOS is identified. Renewal of assets is driven by BCAs, facility operator review on site, annual site walk-through inspections, and input from program department.

19.6 Financial strategy

Figure 48 presents the AARI necessary to support existing assets and current levels of service for SAEO of \$1.0 M in the 10-year forecast. This includes both annual

requirements for the 10-year period, as well as addressing the identified capital spending backlog of \$5.9 M during the same period. For comparison, the 50-year AARI is forecast at \$0.8 million as the backlog is spread over a longer period.

Figure 48: SAEO AARI and capital expenditure



19.6.1 SAEO financial indicators

The cost of service delivery for SAEO includes operating expenses, capital expenditures and revenues. A summary of the 2022 operating budget for SAEO is presented in Table 109.

Table 109: SAEO summary of costs to deliver services

Area of expenditure	2022 budget (in millions)
Staffing	\$17.2
Utilities	\$0.2
Operating & maintenance	\$6.3
Program specific	\$103.6
Capital reserve transfers	\$0.8
Debt charges	\$0.0

20 Public Health

20.1 Introduction

Public Health (PH) is responsible for the overall coordination and delivery of the Region's service requirements as a Board of Health in Ontario.

Assets utilized to provide the services include:

- 1 Public Health Satellite Office.

Provincial objectives for public health services and related legislation are primary drivers that guide and direct delivery of PH. Council, through reporting updates and the Region's Corporate Strategy and Priorities provide direction for the delivery of service.

Other legislation and documents that guide service delivery include the following:

- Niagara Region Public Health's Interim Strategic Plan 2022-2023
- Niagara Prosperity Initiative
- Niagara Region Public Health and Emergency Services – Health Equity Strategic Plan 2018
- Logic Models

20.2 PH demand drivers

Demand drivers are the underlying factors that direct change in the demand for the service. Drivers and their influence help define and measure the changing requirements for services, and the activities and assets required to support those services. Most of the drivers for PH result in changes to operational requirements rather than changes to the assets utilized, with the estimated significance of impact on service summarized in Table 110.

Table 110: PH demand drivers

Demand driver	Divisional significance
Demographics	Moderate-high
Legislation and higher government	Moderate-high
Socio-economic issues and trends	High
Pandemic (COVID-19)	Moderate
Technology	Moderate
Asset management	High

20.2.1 Planned asset portfolio growth and enhancements

The expected growth in the population of Niagara will place significant pressure on the capacity of existing assets and create demand for new assets. The Region has updated various master plans that outline current service levels and associated existing assets, recommend future service levels and associated assets, and identify the actions required to move from the current to future state including requirements for new, expanded and enhanced assets.

Table 111 lists forecasted capital projects for PH that are required to address these growth or enhancement needs. For additional information on growth related projects, please see section 20.7.

Table 111: PH forecast asset portfolio growth and enhancement projects

Asset class	Growth or enhancement forecasted
Facilities	Additional Public Health space

20.3 PH levels of service

Table 112 summarizes information on customer and technical measure for levels of service (LOS) that relate to the operation, maintenance and renewal of assets for the sustainment of PH's current LOS.

Table 112: PH LOS summary

Customer LOS	Technical LOS	Performance
Public Health services are accessible and provided in a clean and safe environment	Facility condition index (% of deferred maintenance of overall facility replacement cost)	0.4%

20.3.1 Legislated levels of service

Regulations govern many aspects of service delivery at the program level, and much of it is very technical in nature. Some examples of regulations and their impact on PH are as follows:

- Ontario Public Health Standard (OPHS)
 - Requirements for programs, services, and accountability for the provision of mandatory health programs and services by the Minister of Health and

Long-Term Care, pursuant to Section 7 of the Health Protection and Promotion Act.

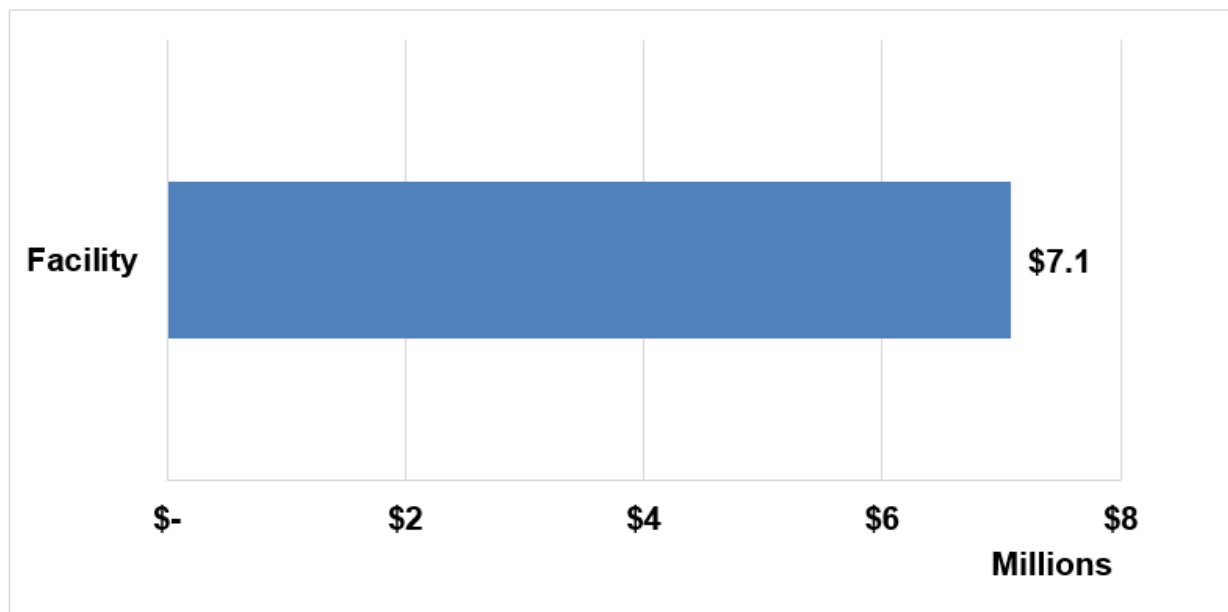
- Food Safety and Quality Act, 2001
 - Provincial statute to ensure food sold in Ontario is safe and suitable for human consumption and meets all standards set out in the Regulations.
- Health Protection and Promotion Act, R.S.O. 1990
 - Provincial statute that gives boards of health their legal mandate.
- Designation of Diseases, Reg. 135/18
 - Designates diseases of public health significance and classifies them into communicable or a virulent disease.

20.4 PH state of infrastructure

20.4.1 PH asset inventory and replacement cost

The assets required to support the services provided by PH include divisional facilities. The estimated cost to replace the assets is \$7.1 million, as summarized in Figure 49.

Figure 49: PH inventory and replacement cost



20.4.2 PH asset age distribution

The majority of PH assets are in the first half of their useful expected life (UEL). The average age and estimated service life of PH assets, weighted by replacement value, is summarized by asset category in Figure 50 and Table 113.

Figure 50: PH average age by asset category

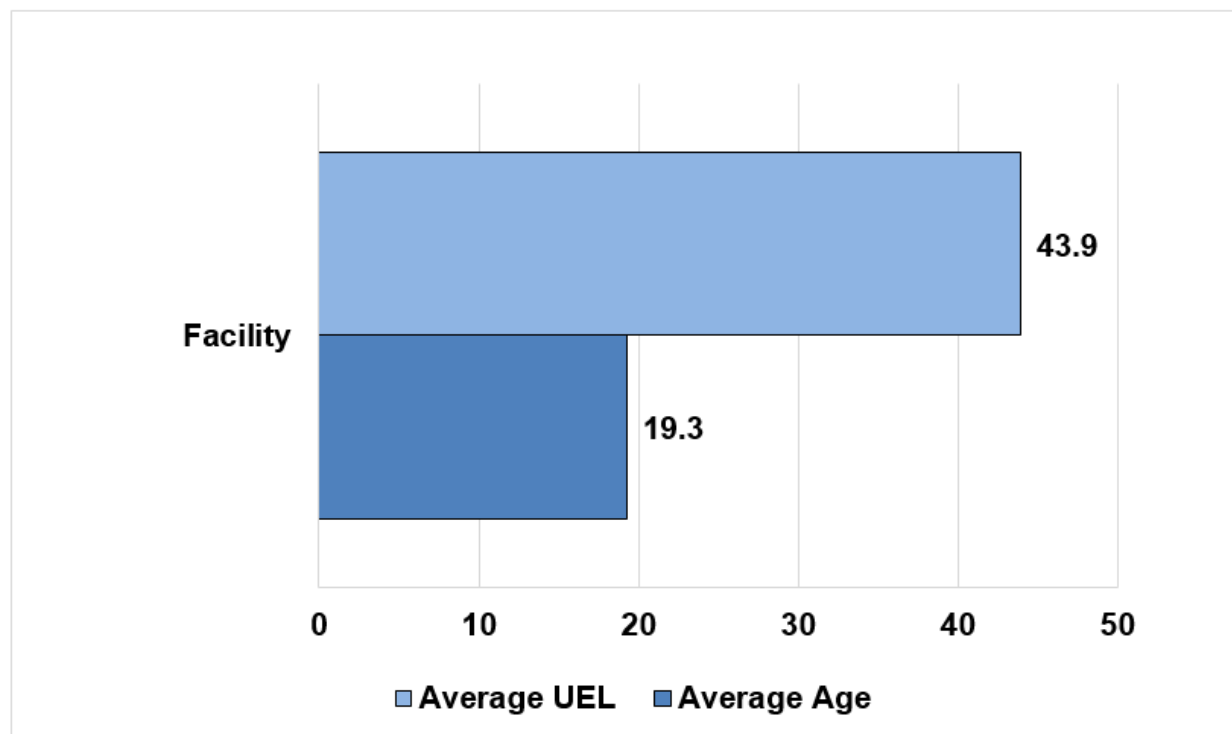


Table 113: PH average age by asset category

Asset Category	Average Age	Average UEL	Average Remaining Life
Facility	19.3	43.9	24.7

20.4.3 PH asset condition

The PH asset condition is based on an aged-based model to provide an estimate of current condition in the absence of condition information. The PH portfolio of assets is rated in very good condition, with 70% of the assets rated as very good. The condition of PH assets, weighted by replacement value, is summarized by asset category in Figure 51 and Table 114.

Figure 51: PH asset condition as % of value

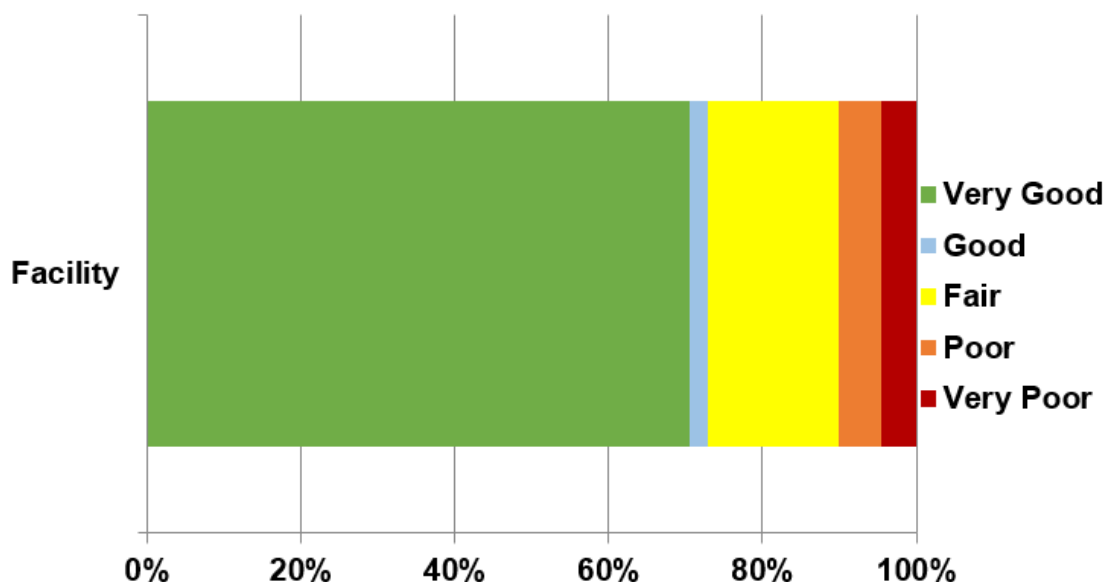


Table 114: PH asset condition as % of value

Colour	Condition rating	Facility	Total
	Very good	70.5%	70.5%
	Good	2.5%	2.5%
	Fair	16.9%	16.9%
	Poor	5.5%	5.5%
	Very poor	4.6%	4.6%

20.4.4 PH risk

Table 115 is a standardized risk matrix that represents assets with their current replacement cost according to the risk of asset failure.

Table 115: PH risk distribution

COF	Very low	Low	Moderate	High	Very high
POF					
Very high	\$-	\$-	\$-	\$-	\$-
High	\$-	\$-	\$-	\$-	\$-
Moderate	\$2	\$3	\$-	\$-	\$-
Low	\$-	\$-	\$-	\$-	\$-
Very low	\$-	\$3	\$-	\$-	\$-

POF = Probability of failure

COF = Consequence of failure

Table 116 represents the percentage of total asset replacement cost according to the risk of asset failure.

Table 116: PH risk exposure summary

Colour	Risk category	Asset value (\$ million)	% of assets
VL	Very low (VL)	\$2.7	37.4%
L	Low (L)	\$1.5	21.7%
M	Moderate (M)	\$2.9	40.9%
H	High (H)	\$0.0	0.0%
VH	Very high (VH)	\$0.0	0.0%
	Total	\$7.1	100.0%

20.5 Lifecycle strategies

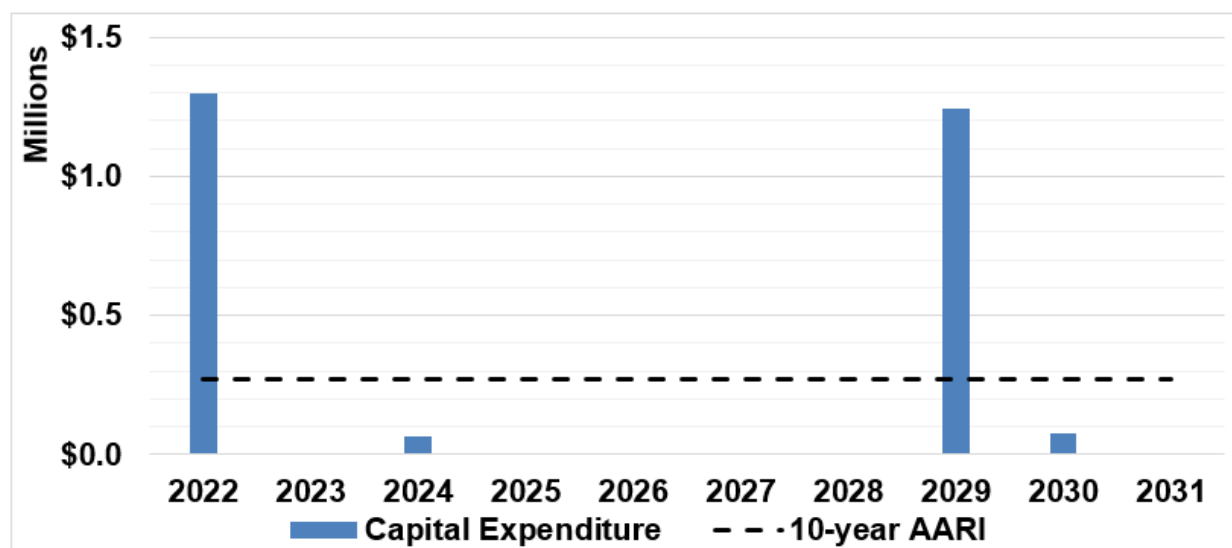
For facilities managed by the corporate Facilities service, risks relating to building infrastructure failure are mitigated through inspection and maintenance programs, which provide the necessary data to ensure that the work required to achieve the established LOS is identified. Renewal of assets is driven by BCAs, facility operator review on site, annual site walk-through inspections, and input from program department.

20.6 Financial strategy

Figure 52 presents the AARI necessary to support existing assets and current levels of service for PH of \$0.3 M in the 10-year forecast. This includes both annual requirements

for the 10-year period, as well as addressing the identified capital spending backlog of \$1.3M during the same period. For comparison, the 50-year AARI is forecast at \$.3 million.

Figure 52: PH AARI and capital expenditure



20.6.1 PH financial indicators

The cost of service delivery for PH includes operating expenses, capital expenditures and revenues. A summary of the 2022 operating budget for PH is presented in Table 117.

Table 117: PH summary of costs to deliver services

Area of expenditure	2022 budget (in millions)
Staffing	\$55.4
Utilities	\$0.1
Operating & maintenance	\$1.9
Program specific	\$7.1
Capital reserve transfers	\$1.3
Debt charges	\$1.2

20.7 PH 2022 Development Charge Background Study projects

Table 118 is an extraction of the growth projects identified in the 2022 Development Charge Background Study (2022 DCBS).

Table 118: PH infrastructure costs in the DC calculation

Increased service needs attributable to anticipated development	Timing	Gross capital cost estimate (\$ million)	Net cost funded by Region (\$ million)	Other funding sources (\$ million)	Potential DC cost recovery (\$ million)
Additional Public Health space	2022-2031	\$1.3	\$0.0	\$0.0	\$1.3

21 Emergency Medical Services

21.1 Introduction

Niagara Emergency Medical Services (EMS) provides 24-hour evidence based emergency pre-hospital medical care and transportation to individuals experiencing injury or illness. EMS customers include all residents and visitors of the Niagara Region

Assets utilized to provide the services include:

- 13 ambulance bases
- 82 vehicles.
- 368 emergency medical equipment.

Provincial objectives for public health services, and related legislation are primary drivers that guide and direct delivery of EMS. Council, through reporting updates and the Region's Corporate Strategy and Priorities, also provide direction for the delivery of service. Other EMS specific documents that guide service delivery include the following:

- Niagara Region Public Health's Strategic Plan
- Regional Municipality of Niagara Emergency Medical Services Master Plan, March 2017
- Niagara Region Public Health and Emergency Services – Health Equity Strategic Plan 2018

21.2 EMS demand drivers

Demand drivers are the underlying factors that direct change in the demand for the service. Drivers and their influence help define and measure the changing requirements for services, and the activities and assets required to support those services. Most of the drivers for EMS result in changes to operational requirements rather than changes to the assets utilized, with the estimated significance of impact on service summarized in Table 119.

Table 119: EMS demand drivers

Demand driver	Divisional significance
Demographics	Moderate
Legislation and higher government	Moderate-high
Socio-economic issues and trends	Moderate
Pandemic (COVID-19)	Moderate

Demand driver	Divisional significance
Operational efficiency	Moderate
Asset management	High

The forthcoming release of the EMS Master Plan underway will provide a 25-year projection of service demand, and identify the capital needs required to support those demands.

21.2.1 Planned asset portfolio growth and enhancements

The expected growth in the population of Niagara will place significant pressure on the capacity of existing assets and create demand for new assets. The Region has updated various master plans that outline current service levels and associated existing assets, recommend future service levels and associated assets, and identify the actions required to move from the current to future state including requirements for new, expanded and enhanced assets.

Table 120 lists forecasted capital projects for EMS that are required to address these growth or enhancement needs. For additional information on growth related projects, please see section 21.7.

Table 120: EMS forecast asset portfolio growth and enhancement projects

Asset class	Growth or enhancement forecasted
Facility	EMS central hub and training
Fleet	Additional ambulances and supporting equipment
Fleet	Additional response units and supporting equipment

21.3 EMS levels of service

Table 121 summarizes information on customer and technical measure for levels of service (LOS) that relate to the operation, maintenance and renewal of assets for the sustainment of EMS's current LOS.

Table 121: EMS LOS summary

Customer LOS	Technical LOS	Performance
Facilities are maintained to an appropriate standard, are safe and accessible.	Facility condition index (% of deferred maintenance of overall facility replacement cost)	4.3%
Service available broadly	Hours per day and days per week which service is available. Area in which service is available.	24 / 7 availability of service. 1,850 square kilometers covered across 12 municipalities between Lake Ontario and Lake

21.3.1 Legislated levels of service

Regulations govern many aspects of service delivery at the program level, and much of it is very technical in nature. Some examples of regulations and their impact on EMS are as follows:

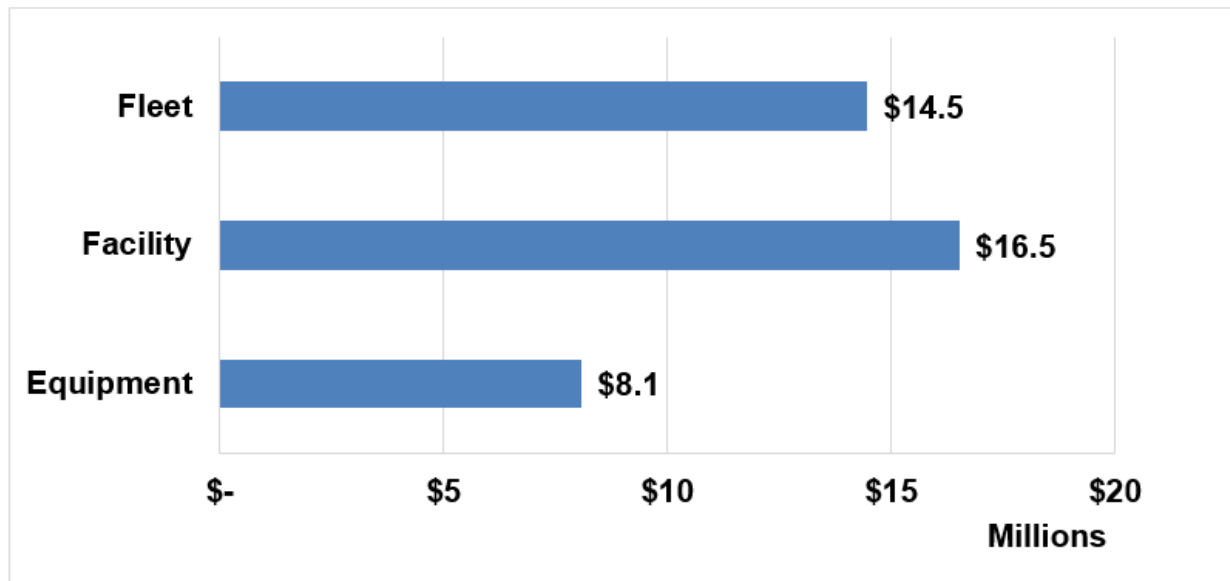
- Ambulance Act, R.S.O. 1990, c. A.19
 - Outlines the requirements for provision of ambulance service by the province and upper tier municipalities.

21.4 EMS state of infrastructure

21.4.1 EMS asset inventory and replacement cost

The assets required to support the services provided by EMS include divisional station facilities, fleet, and equipment. The estimated cost to replace the assets is \$39.1 million, as summarized in Figure 53.

Figure 53: EMS inventory and replacement cost



21.4.2 EMS asset age distribution

EMS assets on average are in the first half of their UEL. Generally, facility assets have used less of their UEL than fleet and equipment assets. This suggests that near term investment may be focused in fleet and equipment rather than facilities. The average age and estimated service life of EMS assets, weighted by replacement value, is summarized by asset category in Figure 54 and Table 122.

Figure 54: EMS average age by asset category

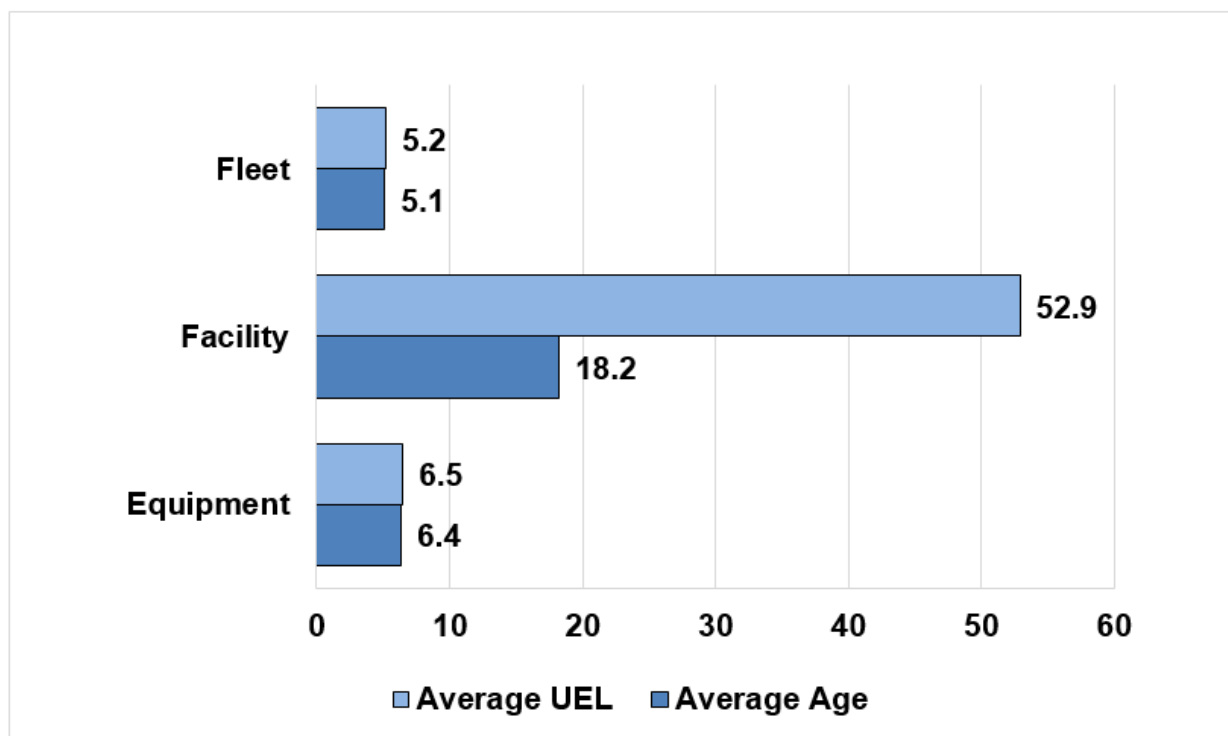


Table 122: EMS average age by asset category

Asset Category	Average Age	Average UEL	Average Remaining Life
Equipment	6.4	6.5	0.1
Facility	18.2	52.9	34.7
Fleet	5.1	5.2	0.1
All	10.9	25.7	14.7

21.4.3 EMS asset condition

Condition for EMS assets is primarily based on age or mileage. 'Very poor' assets based on age do necessarily indicate an imminent failure, but are indicative of assets that are beyond their expected lifecycle and past the time-based renewal period. The remaining asset condition is based on an aged-based model to provide an estimate of current condition in the absence of condition information. The condition of EMS assets is rated as fair, with 50% of EMS assets rated as fair or better. The condition of EMS assets, weighted by replacement value, is summarized by asset category in Figure 55 and Table 123.

Figure 55: EMS asset condition as % of value

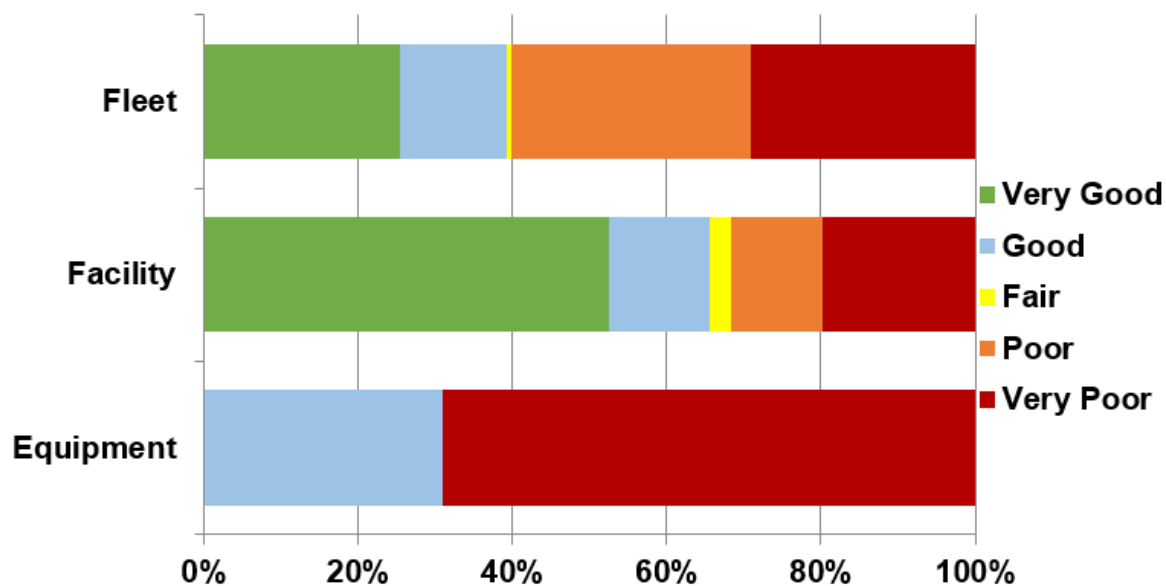


Table 123: EMS asset condition as % of value

Colour	Condition rating	Total	Facility	Fleet	Equipment
	Very good	31.6%	52.5%	25.4%	0.0%
	Good	17.1%	13.1%	13.9%	31.1%
	Fair	1.4%	2.8%	0.5%	0.0%
	Poor	16.5%	11.8%	31.1%	0.0%
	Very poor	33.4%	19.8%	29.1%	68.9%

21.4.4 EMS risk

Table 124 is a standardized risk matrix that represents assets with their current replacement cost according to the risk of asset failure.

Table 124: EMS risk distribution

COF	Very low	Low	Moderate	High	Very high
POF					
Very high	\$1	\$-	\$6	\$-	\$-
High	\$2	\$6	\$12	\$-	\$-
Moderate	\$-	\$3	\$-	\$-	\$-
Low	\$-	\$-	\$3	\$-	\$-
Very low	\$-	\$6	\$-	\$-	\$-

POF = Probability of failure

COF = Consequence of failure

Table 125 represents the percentage of total asset replacement cost according to the risk of asset failure.

Table 125: EMS risk exposure summary

Colour	Risk category	Asset value (\$ million)	% of assets
VL	Very low (VL)	\$6.1	15.6%
L	Low (L)	\$0.0	0.0%
M	Moderate (M)	\$14.5	37.0%
H	High (H)	\$18.5	47.3%
VH	Very high (VH)	\$0.0	0.0%
	Total	\$39.1	100.0%

21.5 Lifecycle strategies

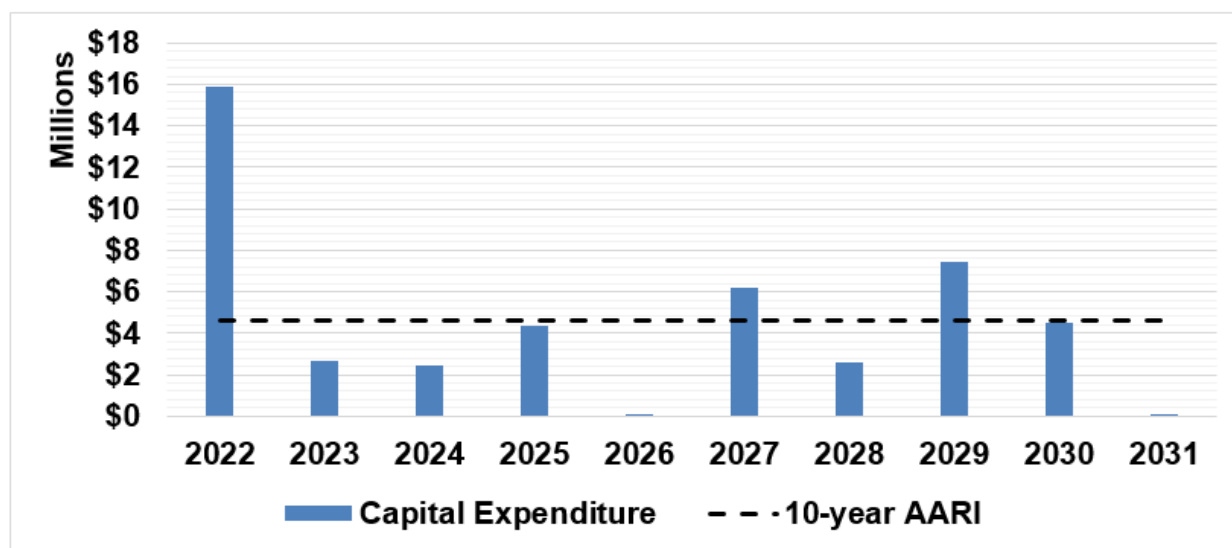
The LAS for EMS is to replace at the end of UEL for fleet and equipment assets which is informed by manufacturer recommendations and studies when available.

For facilities managed by the corporate Facilities service, risks relating to building infrastructure failure are mitigated through inspection and maintenance programs, which provide the necessary data to ensure that the work required to achieve the established LOS is identified. Renewal of assets is driven by BCAs, facility operator review on site, annual site walk-through inspections, and input from program department.

21.6 Financial strategy

Figure 56 presents the AARI necessary to support existing assets and current levels of service for EMS of \$4.6 M in the 10-year forecast. This includes both annual requirements for the 10-year period, as well as addressing the identified capital spending backlog of \$13.2M during the same period. For comparison, the 50-year AARI is forecast at \$6.6 million.

Figure 56: EMS AARI and capital expenditure



21.6.1 EMS financial indicators

The cost of service delivery for EMS includes operating expenses, capital expenditures and revenues. A summary of the 2022 operating budget for EMS is presented in Table 126.

Table 126: EMS summary of costs to deliver services

Area of expenditure	2022 budget (in millions)
Staffing	\$52.7
Utilities	\$0.2
Operating & maintenance	\$4.0
Program specific	\$8.5
Capital reserve transfers	\$4.3
Debt charges	\$1.0

21.7 EMS 2022 Development Charge Background Study projects

Table 127 is an extraction of the growth projects identified in the 2022 Development Charge Background Study (2022 DCBS).

Table 127: EMS infrastructure costs in the DC calculation

Increased service needs attributable to anticipated development	Timing	Gross capital cost estimate (\$ million)	Net cost funded by Region (\$ million)	Other funding sources (\$ million)	Potential DC cost recovery (\$ million)
Central hub and training facility (includes financing)	2023-2027	\$100.2	\$93.0	\$0.0	\$7.2
Ambulances (10)	2022-2031	\$3.2	\$0.0	\$0.0	\$3.2
Response units (8)	2022-2031	\$0.8	\$0.0	\$0.0	\$0.8

22 Information Technology

22.1 Introduction

Information Technology includes activities to plan, build, sustain and secures the enterprise architecture, software applications, computer equipment and telecommunications networks used by the Region in support of municipal service delivery.

Assets include:

- 7515 IT devices, including computers, monitors and mobile devices.
- 579 IT Infrastructure devices and equipment.
- 333 software and applications.

Specific to IT, provincial objectives, related legislation, digital modernization and cyber threats are drivers that guide and direct planning and delivery of IT services in Niagara Region. Council, through reporting updates and the Region's Corporate Strategy and Priorities, also provide direction for the delivery of this service. Some examples of these planning documents are:

- Governance of IT Services
- IT Asset Replacement Policy
- Information Technology Strategic Plan

22.2 IT demand drivers

Demand drivers are the underlying factors that direct change in the demand for the service. Drivers and their influence help define and measure the changing requirements for services, and the activities and assets required to support those services. Most of the drivers for IT result in changes to operational requirements rather than changes to the assets utilized, with the estimated significance of impact on service summarized in Table 128.

Table 128: IT demand drivers

Demand driver	Divisional significance
Legislation and higher government	Moderate
Social issues and trends	Low
Customer expectations	Low
Economic factors	Low
Pandemic	Moderate
Operational efficiency	Low
Asset management	High

22.2.1 Planned asset portfolio growth and enhancements

The expected growth in the population of Niagara will place significant pressure on the capacity of existing assets and create demand for new assets. The Region has updated various master plans that outline current service levels and associated existing assets, recommend future service levels and associated assets, and identify the actions required to move from the current to future state including requirements for new, expanded and enhanced assets.

The direct impact of growth will impact other Region services areas that IT supports. Explicit impacts on IT have not been forecasted at this time.

22.3 IT levels of service

Table 129 summarizes information on customer and technical measure for levels of service (LOS) that relate to the operation, maintenance and renewal of assets for the sustainment of IT's current LOS.

Table 129: IT LOS summary

Customer LOS	Technical LOS	Performance
Access municipal information and services when, where and how it is convenient to them	Number of visitor sessions to municipal website per capita	4.4
Reliable communication systems and networks	Percent satisfaction with reliability of communication systems and networks	82%

22.3.1 Legislated levels of service

Regulations govern many aspects of service delivery at the program level, and much of it is very technical in nature. Some examples of regulations and their impact on IT are as follows:

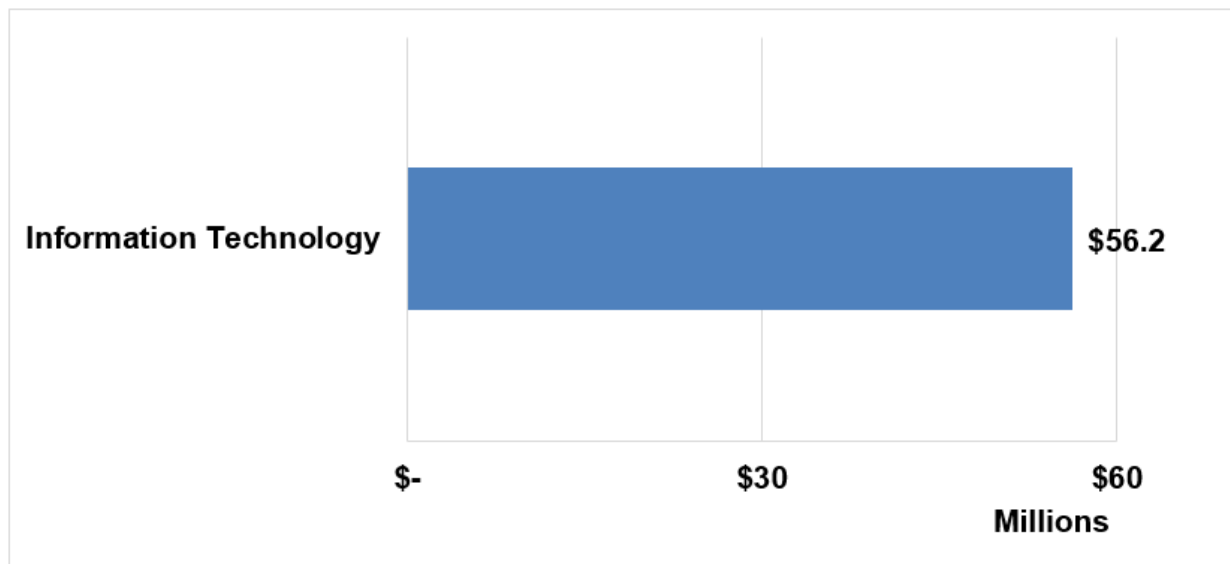
- O. Reg. 429/07: Accessibility standards for customer service
 - This Regulation establishes accessibility standards for customer service and it applies to every designated public sector organization and to every other person or organization that provides goods or services to members of the public or other third parties and that has at least one employee in Ontario.

22.4 IT state of infrastructure

22.4.1 IT asset inventory and replacement cost

The assets required to support the services provided by IT include information technology such as hardware and software. The estimated cost to replace the assets is \$56.16 million, as summarized in Figure 57.

Figure 57: IT inventory and replacement cost



22.4.2 IT asset age distribution

IT assets on average are in the last half of their UEL. The average age and estimated service life of IT assets, weighted by replacement value, is summarized by asset category in Figure 58 and Table 130.

Figure 58: IT average age by asset category

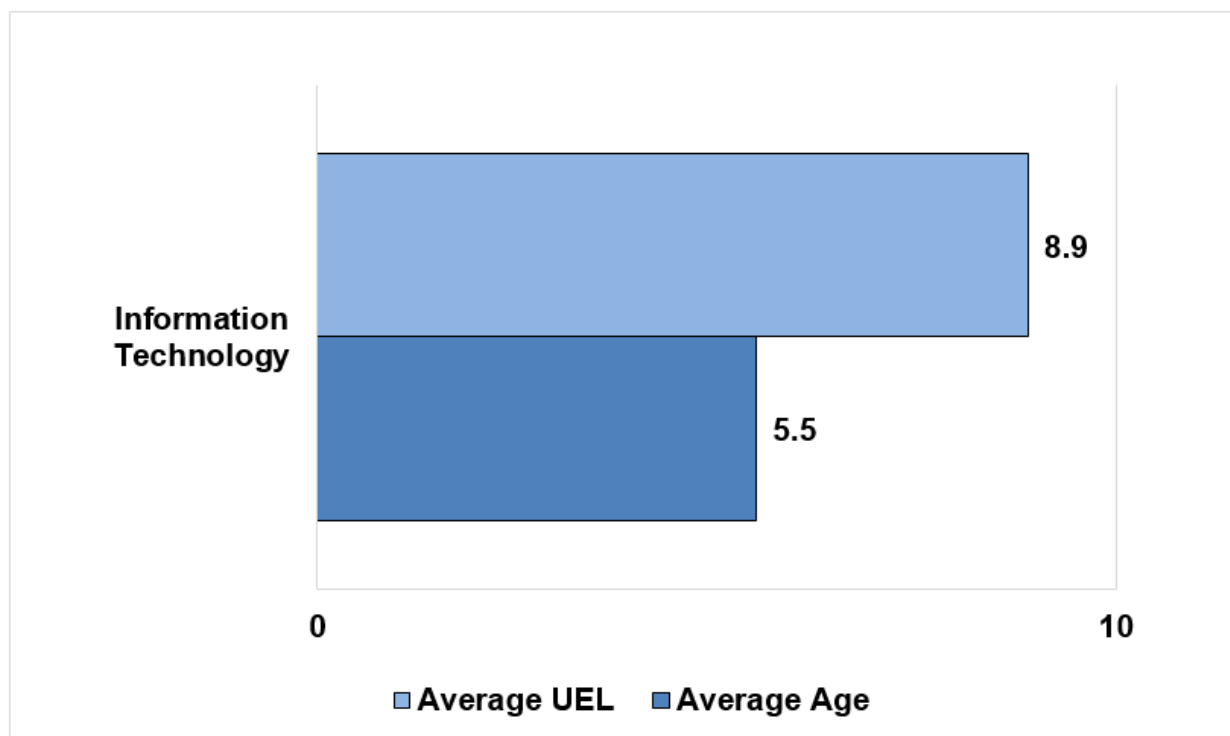


Table 130: IT average age by asset category

Asset Category	Average Age	Average UEL	Average Remaining Life
Information Technology	5.5	8.9	3.4

22.4.3 IT asset condition

Condition for IT assets are based on an aged-based model to provide an estimate of current condition in the absence of condition information. The condition of IT assets is rated as good, with 87% of assets rated as good or better. The condition of IT assets, weighted by replacement value, is summarized by asset category in Figure 59 and Table 131.

Figure 59: IT asset condition as % of value

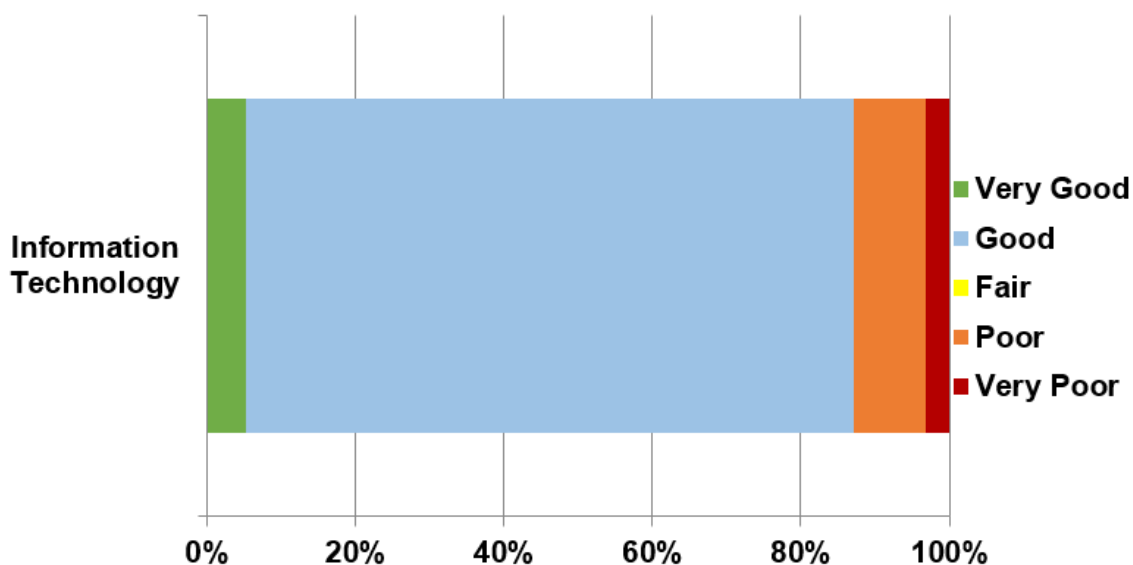


Table 131: IT asset condition as % of value

Colour	Condition rating	Information Technology	Total
	Very good	5.3%	5.3%
	Good	81.8%	81.8%
	Fair	0.0%	0.0%
	Poor	9.8%	9.8%
	Very poor	3.1%	3.1%

22.4.4 IT risk

Table 132 is a standardized risk matrix that represents assets with their current replacement cost according to the risk of asset failure.

Table 132: IT risk distribution

COF	Very low	Low	Moderate	High	Very high
POF					
Very high	\$0	\$-	\$-	\$-	\$-
High	\$8	\$2	\$-	\$-	\$-
Moderate	\$1	\$-	\$1	\$-	\$-
Low	\$44	\$-	\$-	\$-	\$-
Very low	\$0	\$-	\$-	\$-	\$-

POF = Probability of failure

COF = Consequence of failure

Table 133 represents the percentage of total asset replacement cost according to the risk of asset failure.

Table 133: IT risk exposure summary

Colour	Risk category	Asset value (\$ million)	% of assets
VL	Very low (VL)	\$44.6	79.3%
L	Low (L)	\$0.8	1.4%
M	Moderate (M)	\$9.5	17.0%
H	High (H)	\$1.3	2.3%
VH	Very high (VH)	\$0.0	0.0%
	Total	\$56.2	100.0%

22.5 Lifecycle strategies

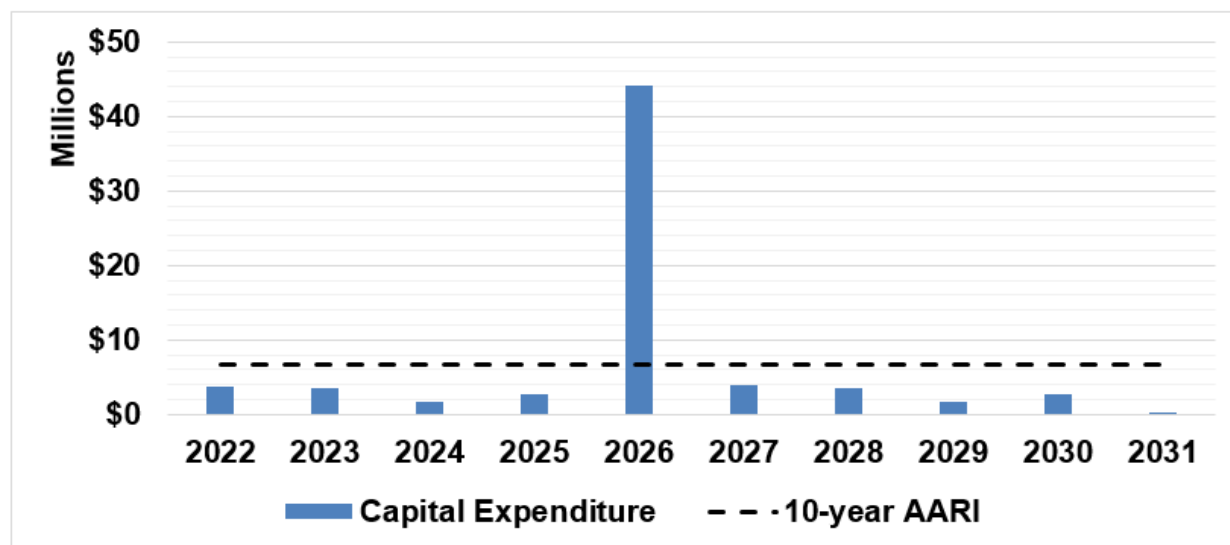
The LAS for hardware and software is to replace at the end of UEL. Some software assets are being replaced with subscription services which results in operating costs in lieu of capital costs.

22.6 Financial strategy

Figure 60 presents the AARI necessary to support existing assets and current levels of service for IT of \$6.8 M in the 10-year forecast. This includes both annual requirements for the 10-year period, as well as addressing the identified capital spending backlog of

\$1.7M during the same period. For comparison, the 50-year AARI is forecast at \$6.8 million.

Figure 60: IT AARI and capital expenditure



22.6.1 IT financial indicators

The cost of service delivery for IT includes operating expenses, capital expenditures and revenues. A summary of the 2022 operating budget for IT is presented in Table 134.

Table 134: IT summary of costs to deliver services

Area of expenditure	2022 budget (in millions)
Staffing	\$5.7
Utilities	\$0.0
Operating & maintenance	\$0.9
Program specific	\$4.0
Capital reserve transfers	\$0.0
Debt charges	\$0.0

23 Facilities

23.1 Introduction

Facilities includes centrally managed buildings not included with other service areas. Management includes providing professional project management, facilities operations and energy management services to ensure a safe, secure, functional and aesthetically pleasing environment for Region staff, Council and members of the public. Facilities supports the clients' functional requirements while meeting broader organizational objectives, ensuring efficient and cost effective use of staff and building resources, and maximizing the useful life of the Regions' building portfolio.

Assets reported under Facilities include:

- Niagara Region Headquarter
- The Environmental Centre
- Niagara Falls Public Health Satellite Office

Provincial objectives and related legislation are primary drivers that guide and direct planning and delivery of Facilities services in Niagara Region. Council, through reporting updates and the Region's Corporate Strategy and Priorities, also provide direction for the delivery of this service. Other legislation and documents that guide service delivery include the following:

- 2019-2023 Energy Conservation and Demand Management Plan, 2019
- Niagara Region Accessibility Plan, 2018-2023
- OBC (Ontario Building Code)
- Ontario Fire code
- AODA (Accessibility for Ontarians with Disabilities Act)
- EPA (Environmental Protection Act)
- MOE (Ministry of the Environment)
- TSSA (Technical Standards and Safety Authority)
- ESA (Electrical Safety Authority)
- OSHA (Occupational Health and Safety Act)

23.2 Facilities demand drivers

Demand drivers are the underlying factors that direct change in the demand for the service. Drivers and their influence help define and measure the changing requirements for services, and the activities and assets required to support those services. Most of the drivers for Facilities result in changes to operational requirements rather than

changes to the assets utilized, with the estimated significance of impact on service summarized in Table 135.

Table 135: Facilities demand drivers

Demand driver	Divisional significance
Legislation and higher government	Moderate
Organizational goals and objectives	Moderate
Social issues and trends	Low
Customer expectations	Low
Pandemic	Moderate
Climate change	Low
Technology	Low
Asset management	High

23.2.1 Planned asset portfolio growth and enhancements

The expected growth in the population of Niagara will place significant pressure on the capacity of existing assets and create demand for new assets. The Region has updated various master plans that outline current service levels and associated existing assets, recommend future service levels and associated assets, and identify the actions required to move from the current to future state including requirements for new, expanded and enhanced assets.

23.3 Facilities levels of service

Table 136 summarizes information on customer and technical measure for levels of service (LOS) that relate to the operation, maintenance and renewal of assets for the sustainment of Facilities current LOS.

Table 136: Facilities LOS summary

Customer LOS	Technical LOS	Performance
Facilities are maintained to an appropriate standard, are safe and accessible.	Facility condition index (% of deferred maintenance of overall facility replacement cost)	7.8%

23.3.1 Legislated levels of service

Regulations govern many aspects of service delivery at the program level, and much of it is very technical in nature. Some examples of regulations and their impact on Facilities are as follows:

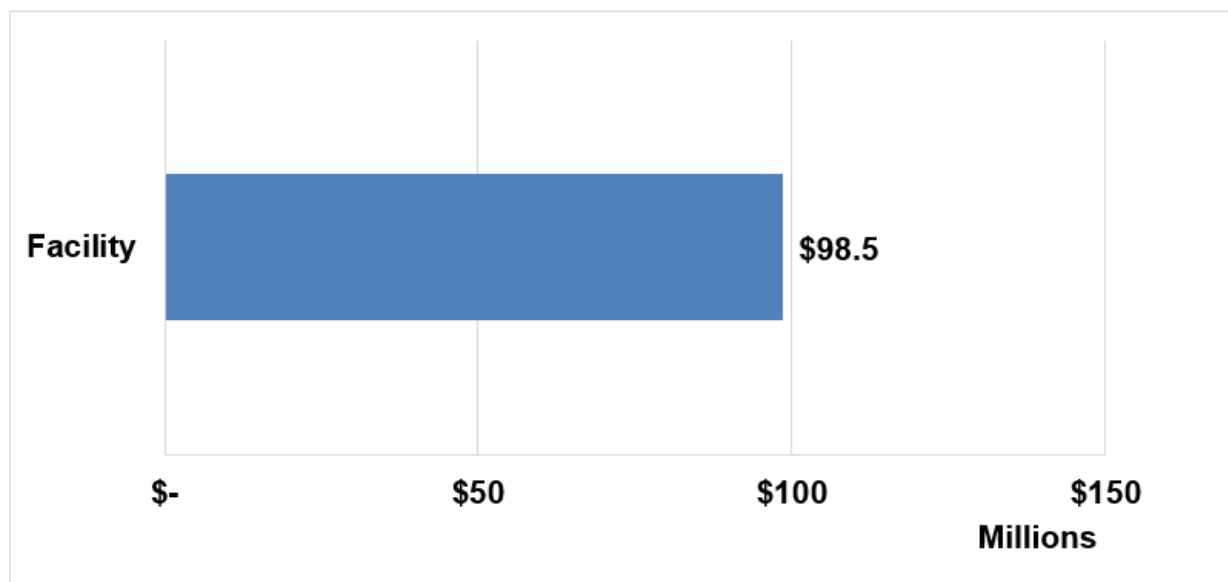
- Building Code Act, 1992, S.O. 1992, c. 23
 - The Building Code Act is an Ontario regulation that describes the requirements for built facilities.
- O. Reg. 191/11: Integrated accessibility standards
 - This regulation established the accessibility standards for: information and communications, employment, transportation, the design of public spaces and customer service.

23.4 Facilities state of infrastructure

23.4.1 Facilities asset inventory and replacement cost

Assets supporting Facilities included in the 2021 CAMP include shared services facilities such as regional headquarters and the environmental center. Facilities that are utilized directly in the provision of a specific service have been presented within the service summary. The estimated cost to replace the assets is \$98.5 million, as summarized in Figure 61.

Figure 61: Facilities inventory and replacement cost



23.4.2 Facilities asset age distribution

Facilities assets on average are in the last half of their UEL. The average age and estimated service life of Facilities assets, weighted by replacement value, is summarized by asset category in Figure 62 and Table 137.

Figure 62: Facilities average age by asset category

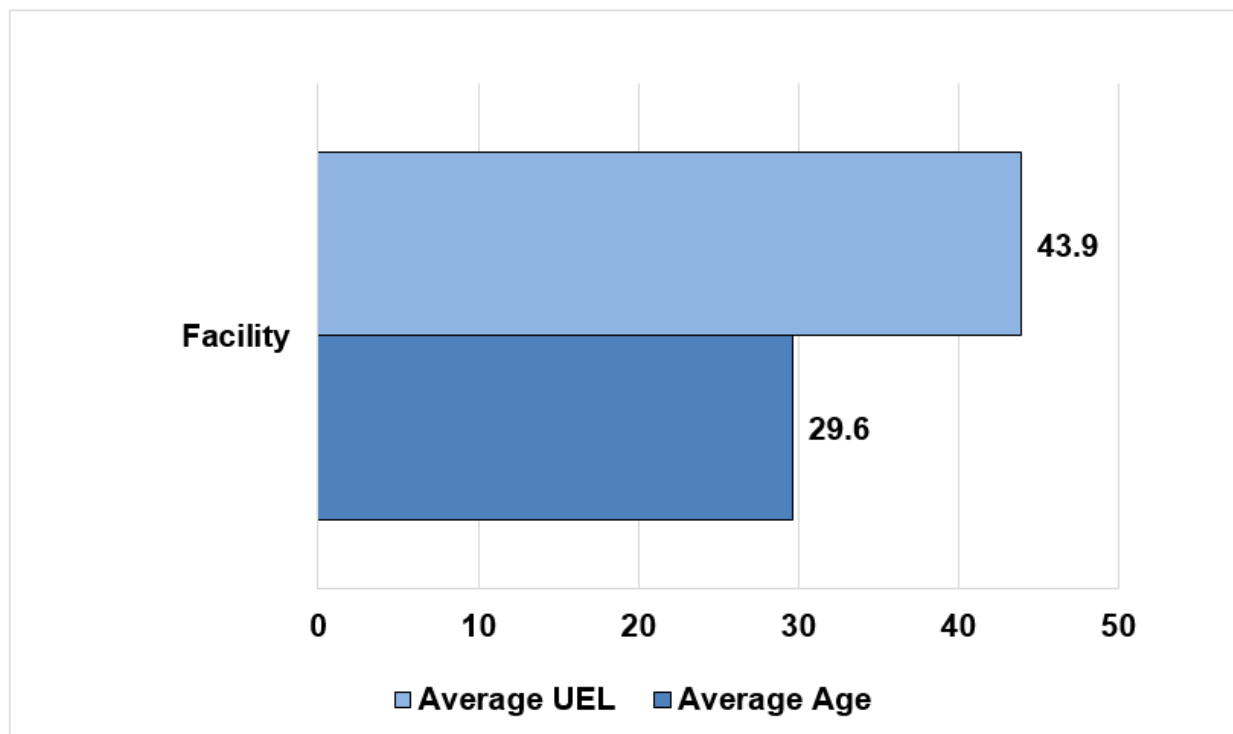


Table 137: Facilities average age by asset category

Asset Category	Average Age	Average UEL	Average Remaining Life
Facility	29.6	43.9	14.3

23.4.3 Facilities asset condition

Condition for Facilities assets is based on an aged-based model to provide an estimate of current condition in the absence of other information. The Facilities asset portfolio is rated as fair, with 51% of the assets rated as fair or better. Estimated condition of Facilities assets, weighted by replacement value, is summarized by asset category in Figure 63 and Table 138.

Figure 63: Facilities asset condition as % of value

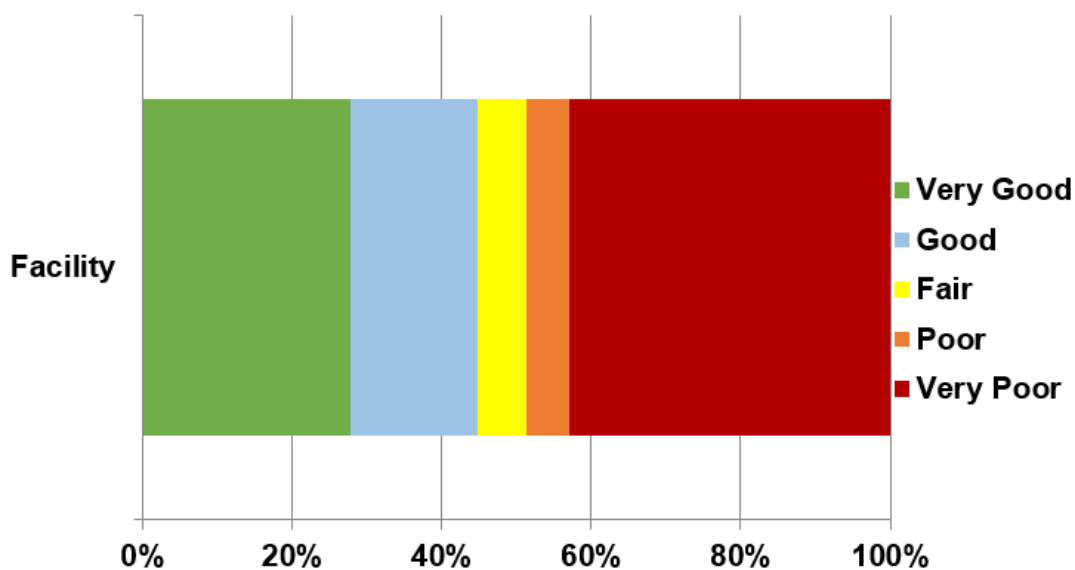


Table 138: Facilities asset condition as % of value

Colour	Condition rating	Facility	Total
	Very good	27.7%	27.7%
	Good	17.1%	17.1%
	Fair	6.4%	6.4%
	Poor	5.9%	5.9%
	Very poor	42.9%	42.9%

23.4.4 Facilities risk

Table 139 is a standardized risk matrix that represents assets with their current replacement cost according to the risk of asset failure.

Table 139: Facilities risk distribution

COF	Very low	Low	Moderate	High	Very high
POF					
Very high	\$-	\$-	\$40	\$-	\$-
High	\$-	\$26	\$11	\$-	\$-
Moderate	\$-	\$-	\$-	\$-	\$-
Low	\$-	\$-	\$-	\$-	\$-
Very low	\$-	\$-	\$21	\$-	\$-

POF = Probability of failure

COF = Consequence of failure

Table 140 represents the percentage of total asset replacement cost according to the risk of asset failure.

Table 140: Facilities risk exposure summary

Colour	Risk category	Asset value (\$ million)	% of assets
VL	Very low (VL)	\$0.0	0.0%
L	Low (L)	\$21.2	21.6%
M	Moderate (M)	\$26.3	26.7%
H	High (H)	\$51.0	51.8%
VH	Very high (VH)	\$0.0	0.0%
	Total	\$98.5	100.0%

23.5 Lifecycle strategies

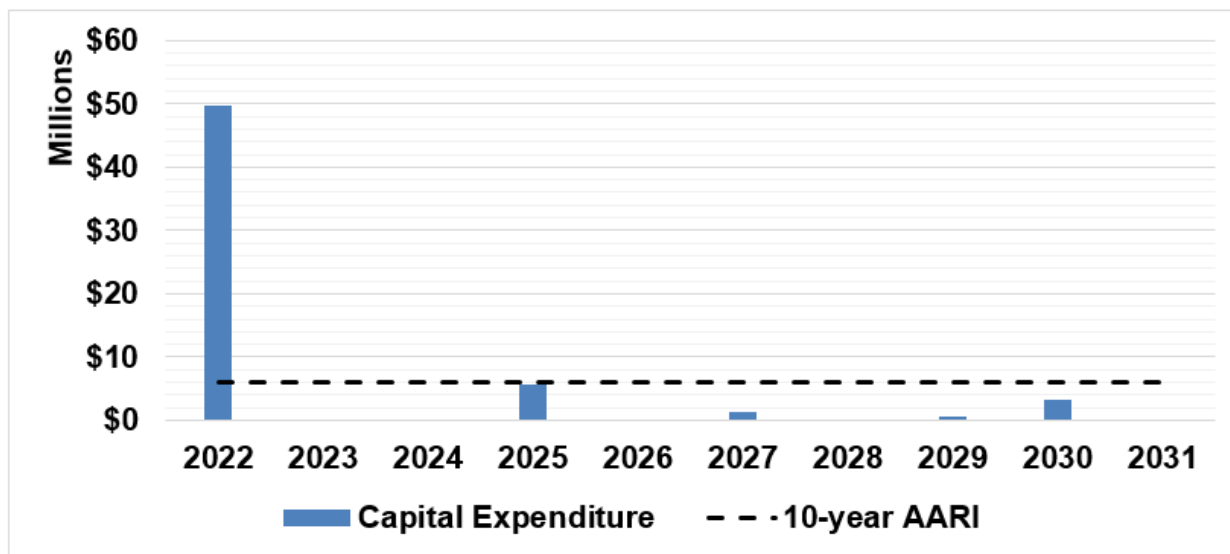
For facilities managed by the corporate Facilities service, risks relating to building infrastructure failure are mitigated through inspection and maintenance programs, which provide the necessary data to ensure that the work required to achieve the established LOS is identified. Renewal of assets is driven by BCAs, facility operator review on site, annual site walk-through inspections, and input from program department.

23.6 Financial strategy

Figure 64 presents the AARI necessary to support existing assets and current levels of service for Facilities of \$6.0 M in the 10-year forecast. This includes both annual

requirements for the 10-year period, as well as addressing the identified capital spending backlog of \$48.3M during the same period. For comparison, the 50-year AARI is forecast at \$4.2 million as the backlog is spread over a longer period.

Figure 64: Facilities AARI and capital expenditure



23.6.1 Facilities financial indicators

The cost of service delivery for Facilities includes operating expenses, capital expenditures and revenues. A summary of the 2022 operating budget for Facilities is presented in Table 141.

Table 141: Facilities summary of costs to deliver services

Area of expenditure	2022 budget (in millions)
Staffing	\$3.9
Utilities	\$0.6
Operating & maintenance	\$1.2
Program specific	\$0.7
Capital reserve transfers	\$0.0
Debt charges	\$0.2

24 Court Services

24.1 Introduction

Court Services provides administration of the Provincial Offences Courts in the Region and the prosecution of certain provincial offence matters and fine processing and collection services.

Assets utilized to provide the services include:

- 1 provincial offences court.

Provincial objectives for court services, and related legislation are primary drivers that guide and direct services delivery of Courts. Council, through reporting updates and the Region's Corporate Strategy and Priorities, also provide direction for the delivery of service. Other legislation and documents that guide service delivery include the following:

- Provincial Offences Act R.S.O. 1990
- Charter of Rights and Freedoms

24.2 Court Services demand drivers

Demand drivers are the underlying factors that direct change in the demand for the service. Drivers and their influence help define and measure the changing requirements for services, and the activities and assets required to support those services. Most of the drivers for Court Services result in changes to operational requirements rather than changes to the assets utilized, with the estimated significance of impact on service summarized in Table 142.

Table 142: Court Services demand drivers

Demand driver	Divisional significance
Legislation and higher government	Moderate
Social issues and trends	Moderate
Development trends/unique geographic factors	Low
Customer expectations	Low
Economic factors	Low
Pandemic	Moderate
Operational efficiency	Low

Demand driver	Divisional significance
Asset management	High

24.2.1 Planned asset portfolio growth and enhancements

The expected growth in the population of Niagara will place significant pressure on the capacity of existing assets and create demand for new assets. The Region has updated various master plans that outline current service levels and associated existing assets, recommend future service levels and associated assets, and identify the actions required to move from the current to future state including requirements for new, expanded and enhanced assets.

Table 143 lists forecasted capital projects for Court Services that are required to address these growth or enhancement needs. For additional information on growth related projects, please see section 24.7.

Table 143: Court Services forecast asset portfolio growth and enhancement projects

Asset class	Growth or enhancement forecasted
Facility	Provision for additional Court space

24.3 Court Services levels of service

Table 144 summarizes information on customer and technical measure for levels of service (LOS) that relate to the operation, maintenance and renewal of assets for the sustainment of Court Services current LOS.

Table 144: Court Services LOS summary

Customer LOS	Technical LOS	Performance
Facilities are clean and presentable, and maintained in an appropriate state of repair	Facility condition index (% of deferred maintenance of overall facility replacement cost)	0.0%

24.3.1 Legislated levels of service

Regulations govern many aspects of service delivery at the program level, and much of it is very technical in nature. Some examples of regulations and their impact on Court Services are as follows:

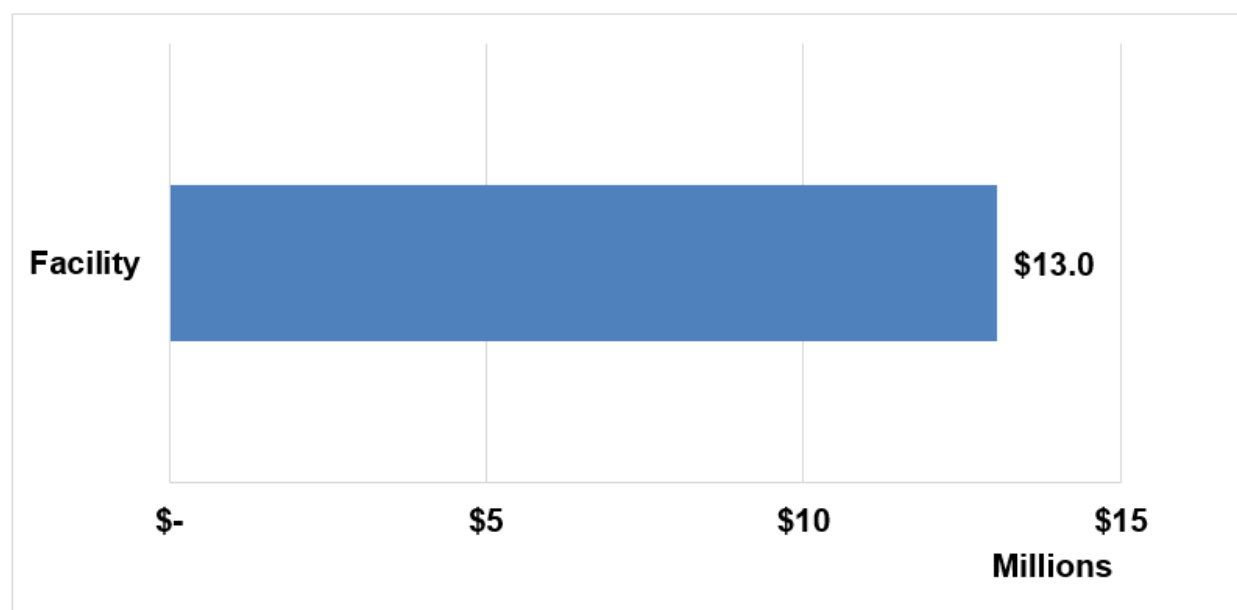
- Provincial Offences Act R.S.O 1990
 - Establishes standards for court services and summarizes the conviction procedure for the prosecution of provincial offenses.
- Charter of Rights and Freedoms
 - Protects a number of rights and freedoms, including freedom of expression and the right to equality.

24.4 Court Services state of infrastructure

24.4.1 Court Services asset inventory and replacement cost

The assets required to support the services provided by Court Services include the courthouse. The estimated cost to replace the assets is \$13.0 million, as summarized in Figure 65.

Figure 65: Court Services inventory and replacement cost



24.4.2 Court Services asset age distribution

All of Courts assets are in the first quarter of their UEL, as the Provincial Offence Court facility completed construction in 2017 which is the only asset reported in this AMP. The average age and estimated remaining UEL of Courts assets, weighted by replacement value, is summarized by asset category in Figure 66 and Table 145.

Figure 66: Court Services average age by asset category

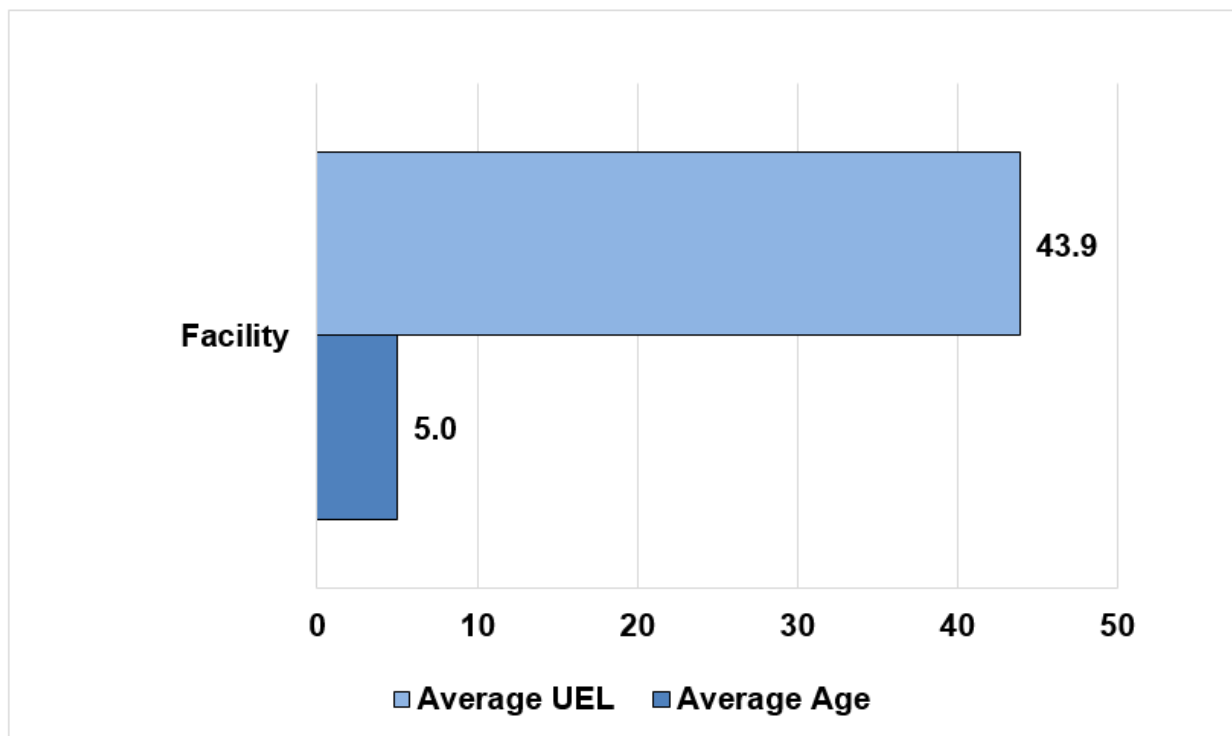


Table 145: Court Services average age by asset category

Asset Category	Average Age	Average UEL	Average Remaining Life
Facility	5.0	43.9	38.9

24.4.3 Court Services asset condition

The asset condition is based on an aged-based model to provide an estimate of current condition in the absence of condition information. The Courts portfolio of assets is rated in very good condition, with 95% of the assets rated as very good or better. Estimated condition of Courts assets, weighted by replacement value, is summarized by asset category in Figure 67 and Table 146.

Figure 67: Court Services asset condition as % of value

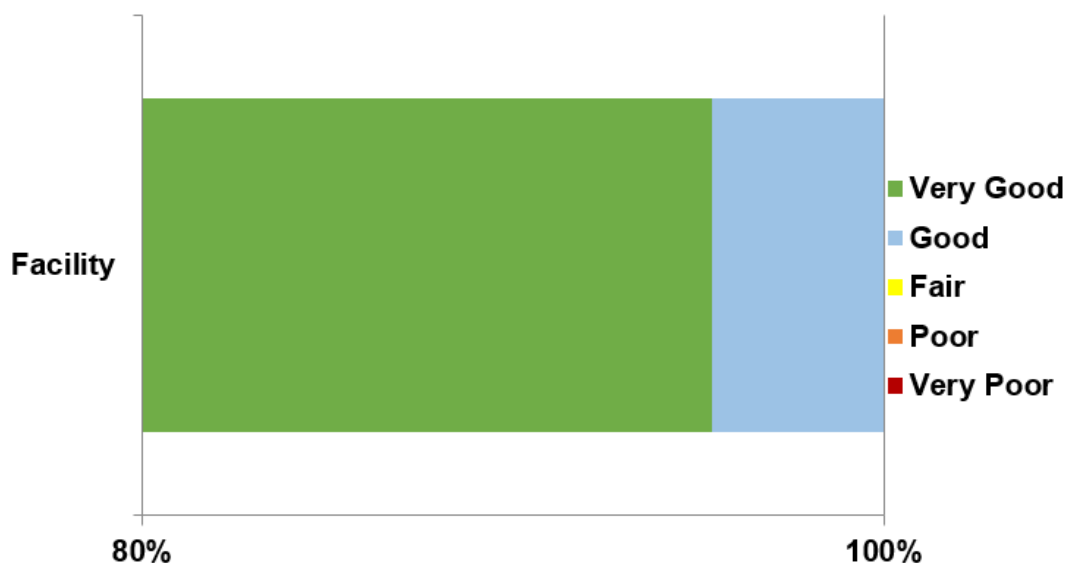


Table 146: Court Services asset condition as % of value

Colour	Condition rating	Facility	Total
	Very good	95.4%	95.4%
	Good	4.6%	4.6%
	Fair	0.0%	0.0%
	Poor	0.0%	0.0%
	Very poor	0.0%	0.0%

24.4.4 Court Services risk

Table 147 is a standardized risk matrix that represents assets with their current replacement cost according to the risk of asset failure.

Table 147: Court Services risk distribution

COF	Very low	Low	Moderate	High	Very high
POF					
Very high	\$-	\$-	\$-	\$-	\$-
High	\$-	\$-	\$-	\$-	\$-
Moderate	\$-	\$-	\$-	\$-	\$-
Low	\$-	\$-	\$-	\$-	\$-
Very low	\$3	\$6	\$4	\$-	\$-

POF = Probability of failure

COF = Consequence of failure

Table 148 represents the percentage of total asset replacement cost according to the risk of asset failure.

Table 148: Court Services risk exposure summary

Colour	Risk category	Asset value (\$ million)	% of assets
VL	Very low (VL)	\$8.8	67.6%
L	Low (L)	\$4.2	32.4%
M	Moderate (M)	\$0.0	0.0%
H	High (H)	\$0.0	0.0%
VH	Very high (VH)	\$0.0	0.0%
	Total	\$13.0	100.0%

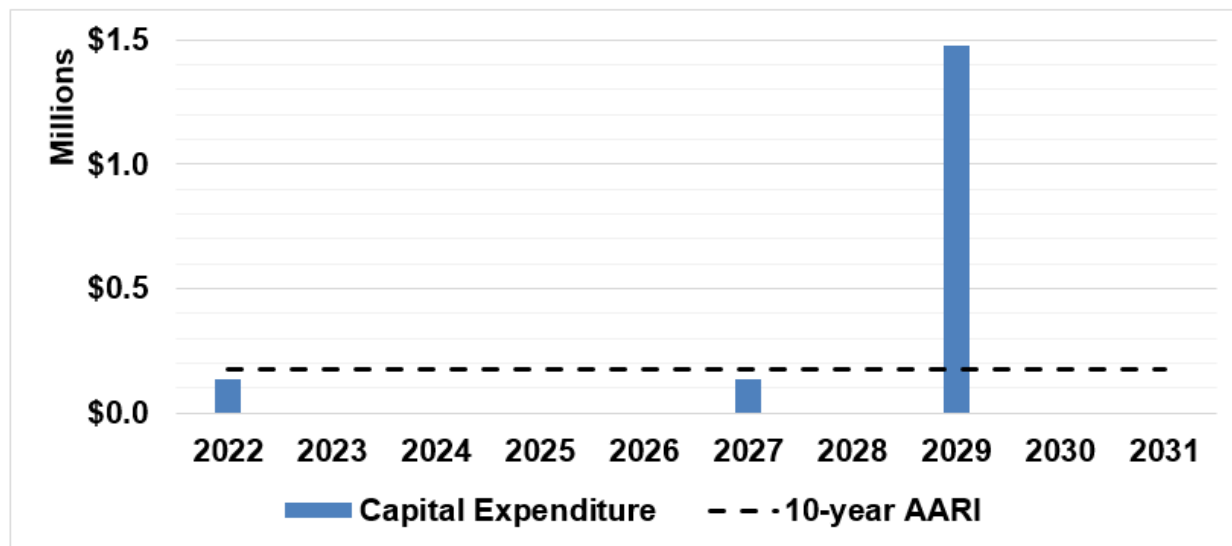
24.5 Lifecycle strategies

For facilities managed by the corporate Facilities service, risks relating to building infrastructure failure are mitigated through inspection and maintenance programs, which provide the necessary data to ensure that the work required to achieve the established LOS is identified. Renewal of assets is driven by BCAs, facility operator review on site, annual site walk-through inspections, and input from program department.

24.6 Financial strategy

Figure 68 presents the AARI necessary to support existing assets and current levels of service for Court of \$0.2 M in the 10-year forecast. This includes annual requirements for the 10-year period. For comparison, the 50-year AARI is forecast at \$0.5 million.

Figure 68: Courts AARI and capital expenditure



24.6.1 Court Services financial indicators

The cost of service delivery for Court Services includes operating expenses, capital expenditures and revenues. A summary of the 2022 operating budget for Court Services is presented in Table 149.

Table 149: Court Services summary of costs to deliver services

Area of expenditure	2022 budget (in millions)
Staffing	\$2.8
Utilities	\$0.0
Operating & maintenance	\$0.2
Program specific	\$8.9
Capital reserve transfers	\$0.3
Debt charges	\$0.5

24.7 Court Services 2022 Development Charge Background Study projects

Table 150 is an extraction of the growth projects identified in the 2022 Development Charge Background Study (2022 DCBS).

Table 150: Courts infrastructure costs covered in the DC calculation

Increased service needs attributable to anticipated development	Timing	Gross capital cost estimate (\$ million)	Net cost funded by Region (\$ million)	Other funding sources (\$ million)	Potential DC cost recovery (\$ million)
Provision for additional space	2022-2031	\$2.3	\$0.0	\$0.0	\$2.3

25 Police Services

25.1 Introduction

Niagara Regional Police Services (NRPS) provide police services including Crime prevention, Law enforcement, Assistance to victims of crime, Public order maintenance, and Emergency response.

NRPS, established on January 1st, 1971, is the oldest regional police service in Ontario. NRPS serves one of Ontario's largest geographic regions by patrolling an area over 1,800 square kilometers, covering 12 municipalities. NRPS customers include all residents and visitors of the Niagara Region.

Assets utilized to provide the services include:

- 1 NRPS Headquarter.
- 6 NRPS divisional districts.
- 1 NRPS tactical unit
- 1 NRPS training centre.
- 1 NRPS fleet service centre.
- 98 equipment for patrol, investigation and specialty.
- 103 IT related devices.
- 340 vehicles.

Provincial objectives for police services, and related legislation, are primary drivers that guide and direct delivery of police services in Niagara Region. Council, through reporting updates and the Region's Corporate Strategy and Priorities, also provide direction for the delivery of service. Other legislation and documents that guide service delivery include the following:

- Niagara Regional Polices Service Strategic Plan 2022-2025
- Provincial Adequacy Standards O. Reg. 3/99: adequacy and effectiveness of police services
- Policing Standards Manual Ontario 2019

25.2 NRPS demand drivers

Demand drivers are the underlying factors that direct change in the demand for the service. Drivers and their influence help define and measure the changing requirements for services, and the activities and assets required to support those services. Most of the drivers for NRPS result in changes to operational requirements rather than changes

to the assets utilized, with the estimated significance of impact on service summarized in Table 151.

Table 151: NRPS demand drivers

Demand driver	Divisional significance
Demographics	Moderate-high
Legislation and higher government	Moderate-high
Socio-economic issues and trends	High
Pandemic (COVID-19)	Moderate
Technology	Moderate
Asset management	High

NRPS conducts trend analysis on calls for service levels as well as degree of severity (i.e. priority 1, 2 and 3). In addition, NRPS analyzes changes in call categories (i.e. welfare check, domestic dispute, etc.) to project future resource requirements for service delivery.

25.2.1 Planned asset portfolio growth and enhancements

The expected growth in the population of Niagara will place significant pressure on the capacity of existing assets and create demand for new assets. The Region has updated various master plans that outline current service levels and associated existing assets, recommend future service levels and associated assets, and identify the actions required to move from the current to future state including requirements for new, expanded and enhanced assets.

Table 152 lists forecasted capital projects for NRPS that are required to address these growth or enhancement needs. For additional information on growth related projects, please see section 25.7.

Table 152: NRPS forecast asset portfolio growth and enhancement projects

Asset class	Growth or enhancement forecasted
Fleet	Additional patrol, non-patrol and other vehicles
Equipment	Additional miscellaneous gear

25.3 NRPS levels of service

Table 153 summarizes information on customer and technical measure for levels of service (LOS) that relate to the operation, maintenance and renewal of assets for the sustainment of NRPS's current LOS.

Table 153: NRPS LOS summary

Customer LOS	Technical LOS	Performance
Facilities are maintained to an appropriate standard, are safe and accessible.	Facility condition index (% of deferred maintenance of overall facility replacement cost)	7.4%

25.3.1 Legislated levels of service

Regulations govern many aspects of service delivery at the program level, and much of it is very technical in nature. Some examples of regulations and their impact on NRPS are as follows:

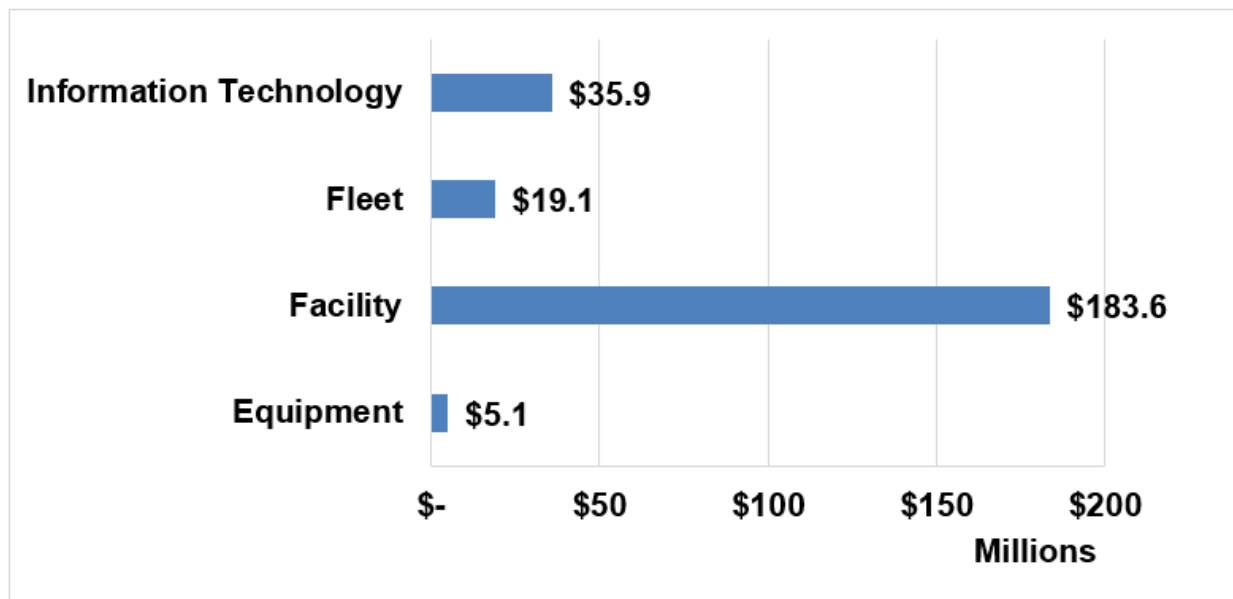
- Police Services Act R.S.O. 1990
 - Outlines a number of principles with which the provision of police services are to follow, such as ensuring the safety and security of all persons and property in Ontario and the importance of safeguarding the fundamental rights guaranteed by the Canadian Charter of Rights and Freedoms and the Human Rights Code.

25.4 NRPS state of infrastructure

25.4.1 NRPS asset inventory and replacement cost

The assets required to support the services provided by NRPS include headquarters and divisional station facilities, fleet, use of force tools, investigative equipment and information technology. The estimated cost to replace the assets is \$243.7 million, as summarized in Figure 69.

Figure 69: NRPS inventory and replacement cost



25.4.2 NRPS asset age distribution

NRPS assets on average are in the last half of their useful expected life (UEL), with the exception of facilities. This is primarily a result of the recent construction of Headquarters and District 2 in 2019, which is valued at \$96 million of the total NRPS asset inventory value. The average age and estimated service life of NRPS assets, weighted by replacement value, is summarized by asset category in Figure 70 and Table 154.

Figure 70: NRPS average age by asset category

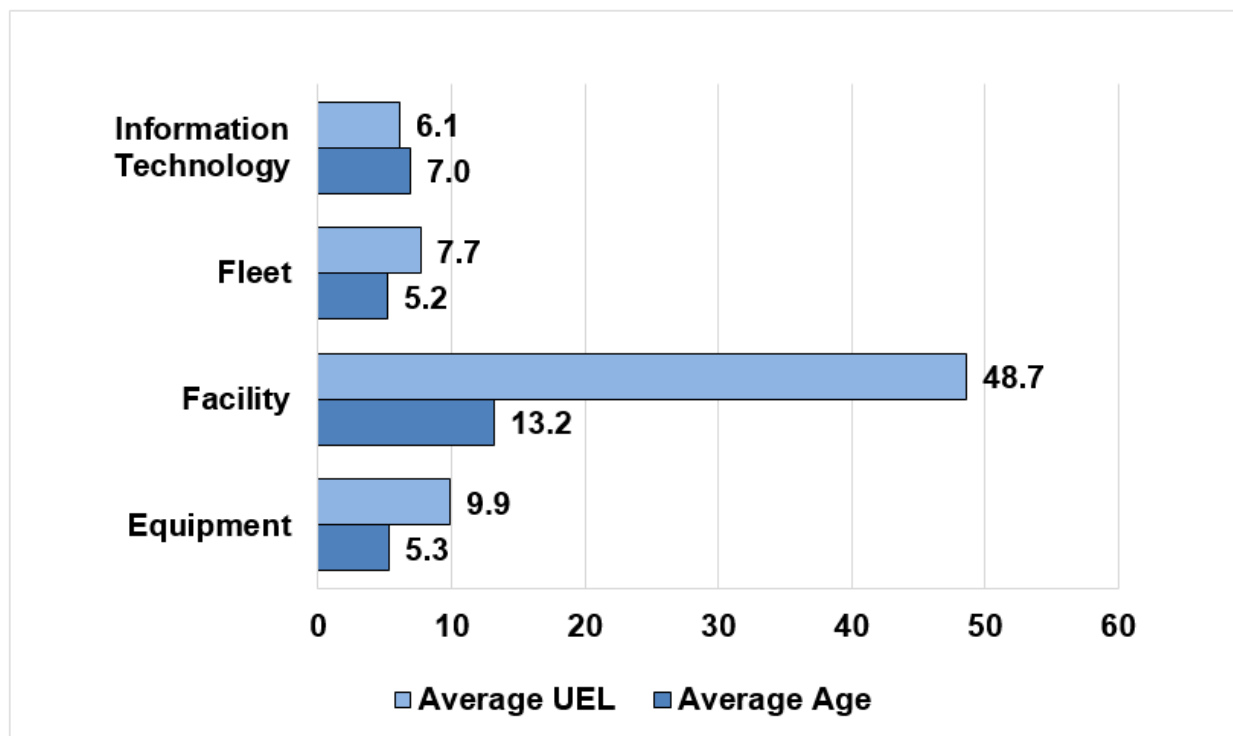


Table 154: NRPS average age by asset category

Asset Category	Average Age	Average UEL	Average Remaining Life
Equipment	5.3	9.9	4.6
Facility	13.2	48.7	35.4
Fleet	5.2	7.7	2.5
Information Technology	7.0	6.1	(0.8)
Total	11.5	38.4	26.9

25.4.3 NRPS asset condition

Condition for NRPS fleet assets is primarily based on age or mileage. 'Very poor' assets for fleet based on age do not necessarily indicate an imminent failure, but are indicative of assets that are beyond their expected lifecycle and past the time-based renewal period. NRPS assets are rated as very good, with 66% of assets rated as very good or better. The remaining asset condition is based on an aged-based model to provide an estimate of current condition in the absence of condition information. Estimated condition of

Courts assets, weighted by replacement value, is summarized by asset category in Figure 71 and Table 155.

Figure 71: NRPS asset condition as % of value

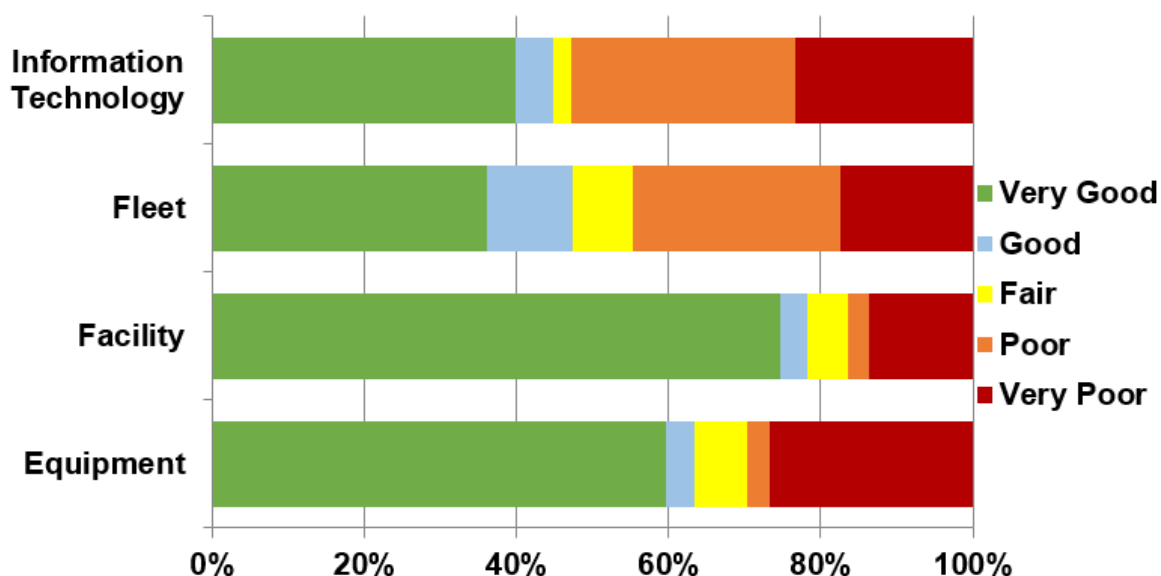


Table 155: NRPS asset condition as % of value

Colour	Condition rating	Facility	Fleet	Information Technology	Equipment	Total
	Very good	74.6%	36.2%	39.9%	59.6%	66.4%
	Good	3.6%	11.3%	4.8%	3.9%	4.3%
	Fair	5.4%	7.8%	2.4%	6.9%	5.1%
	Poor	2.7%	27.4%	29.5%	2.9%	8.5%
	Very poor	13.8%	17.4%	23.4%	26.7%	15.7%

25.4.4 NRPS risk

Table 156 is a standardized risk matrix that represents assets with their current replacement cost according to the risk of asset failure.

Table 156: NRPS risk distribution

COF	Very low	Low	Moderate	High	Very high
POF					
Very high	\$-	\$7	\$-	\$-	\$-
High	\$14	\$-	\$-	\$-	\$-
Moderate	\$37	\$133	\$-	\$-	\$-
Low	\$-	\$-	\$-	\$-	\$-
Very low	\$0	\$52	\$-	\$-	\$-

POF = Probability of failure

COF = Consequence of failure

Table 157 represents the percentage of total asset replacement cost according to the risk of asset failure.

Table 157: NRPS risk exposure summary

Colour	Risk category	Asset value (\$ million)	% of assets
VL	Very low (VL)	\$52.4	21.5%
L	Low (L)	\$37.5	15.4%
M	Moderate (M)	\$146.9	60.3%
H	High (H)	\$6.9	2.8%
VH	Very high (VH)	\$0.0	0.0%
	Total	\$243.7	100.0%

25.5 Lifecycle strategies

The LAS for NRPS for fleet and equipment is to replace at the end of UEL, which is informed by manufacturer recommendations when available (i.e. conductive energy weapons).

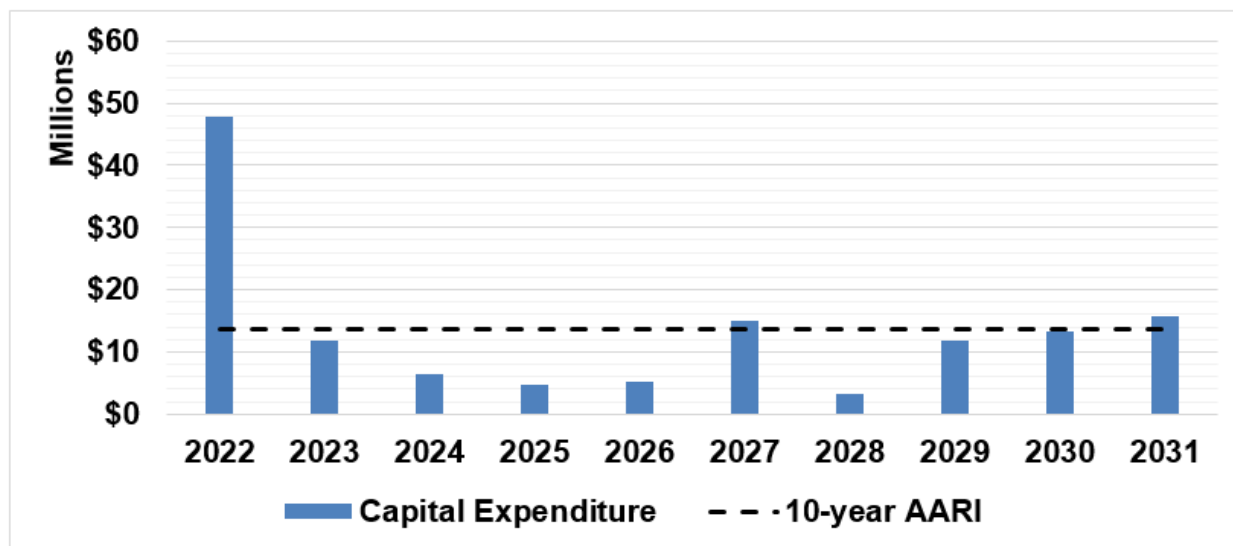
For facilities managed by the corporate Facilities service, risks relating to building infrastructure failure are mitigated through inspection and maintenance programs, which provide the necessary data to ensure that the work required to achieve the established LOS is identified. Renewal of assets is driven by BCAs, facility operator review on site, annual site walk-through inspections, and input from program department. Additional

details on the lifecycle strategies employed by Facilities are presented in the Facilities section of the AMP.

25.6 Financial strategy

Figure 72 presents the AARI necessary to support existing assets and current levels of service for NRPS of \$13.6 million in the 10-year forecast. This includes both annual requirements for the 10-year period, as well as addressing the identified capital spending backlog of \$41.5 million during the same period. For comparison, the 50-year AARI is forecast at \$14.7 million.

Figure 72: NRPS AARI and capital expenditure



25.6.1 NRPS financial indicators

The cost of service delivery for NRPS includes operating expenses, capital expenditures and revenues. A summary of the 2022 operating budget for NRPS is presented in Table 158.

Table 158: NRPS summary of costs to deliver services

Area of expenditure	2022 budget (in millions)
Staffing	\$171.0
Utilities	\$1.1
Operating & maintenance	\$7.2
Program specific	\$13.7

Area of expenditure	2022 budget (in millions)
Capital reserve transfers	\$4.1
Debt charges	\$9.3

25.7 NRPS 2022 Development Charge Background Study projects

Table 159 is an extraction of the growth projects identified in the 2022 Development Charge Background Study (2022 DCBS).

Table 159: NRPS infrastructure costs in the DC calculation

Increased service needs attributable to anticipated development	Timing	Gross capital cost estimate (\$ million)	Net cost funded by Region (\$ million)	Other funding sources (\$ million)	Potential DC cost recovery (\$ million)
Patrol and non-patrol vehicles	2022-2041	\$1.9	\$0.0	\$0.0	\$1.9
Other police vehicles	2022-2041	\$1.5	\$0.0	\$0.0	\$1.5
Equipment and gear	2022-2041	\$2.1	\$0.0	\$0.0	\$2.1

2021 Corporate Asset Management Plan – Ontario Regulation 588/17 Requirements

The Province of Ontario released Ontario Regulation 588/17 under the Infrastructure for Jobs and Prosperity Act, 2015. Under the legislation, every municipality is required to prepare a strategic asset management policy, a plan to maintain municipal infrastructure assets, a level of service proposal and a series of publicly accessible asset management plans over three different years.

The Region's 2021 plan reports on all services and almost all assets. The regulation, O. Reg. 588/17, requires municipalities to report on core municipal infrastructure assets by July 1, 2022, which the regulation defines as Road, Bridge, Culvert, Water, Wastewater and Stormwater Management.

In addition to covering a broader scope of assets, this plan also identifies investment needs and supports long-term financial sustainability planning. This includes identifying potential funding gaps in advance of 2025 requirements.

Table 1: Ontario Regulation 588/17 deadlines, requirements and status

Deadline	Requirement	Status
July 1, 2019	Establish an asset management policy including detailed principles and commitments for investment decision-making and responsibilities	Completed.
July 1, 2022	Council approved asset management plan including current levels of service and costs for core assets.	Council approval of this report CSD 7-2022 completes this requirement.
July 1, 2024	Council approved asset management plan including current levels of service and costs for all assets.	Complete with CSD 7-2022 except the new Niagara Transit Commission and select assets.

Deadline	Requirement	Status
July 1, 2025	Council approved asset management plan for all assets including desired levels of service, costs to sustain those service levels and the financial strategy to fund them.	Foundation to achieve requirement is in CSD 7-2022 and will follow implementation of identified improvements.

Completion of continuous improvement initiatives will satisfy all requirements of the July 1, 2025 milestone.

2021 Corporate Asset Management Plan Service Areas by Department

The 2021 CAMP includes 16 service areas within four of the Region's Departments and the Regional Niagara Police Service as shown below:

Department	Service
Public Works	Water
	Wastewater
	Waste Management
	Transportation
	Transit
	Fleet
Community Services	Seniors Services
	Community Housing
	Children's Services
	Social Assistance and Employment Opportunities
Public Health and Emergency Services	Public Health
	Emergency Medical Services
Corporate Services	Information Technology
	Facilities
	Court Services
Niagara Regional Police Service	Police Services

Notes on the reporting in the 2021 Corporate Asset Management Plan.

1. Transit reporting includes only information on vehicle assets that the Region originally purchased under the 2021 management structure. It does not include all the assets that the new Niagara Transit Commission (NTC) will assume. That information is not available at the time of preparing the 2021 CAMP. To meet legislative requirements, NTC assets will be in an asset management plan prepared in 2024.

2. Almost all the Region's assets are in the 2021 CAMP. The only significant exception is furnishings for the Region's offices, which is not included because of insufficient data. Other assets not reported are Land, Forestry and miscellaneous equipment.