



Enterprise Asset Management Plan (2021)

July 2021

Executive Summary

In December 2016, City Council endorsed the City of Greater Sudbury Municipal Asset Management Plan produced by KPMG in-conjunction with City staff. The plan reflects an approximate level of the financial requirements associated with maintaining City assets in a state of good repair. Since 2017, the City has been collaboratively working to advance asset management planning. Asset information including data collection and analysis initiatives have been underway to increase knowledge of infrastructure condition, risk level, and level of service for a more comprehensive implementation of lifecycle asset management.

Maintaining existing assets in a state of good repair and building new infrastructure to meet current and future needs is necessary to provide required service levels to the community and achieve Council priorities.

The Enterprise Asset Management Plan (2021) is a strategic document that uses a risk-based approach to asset management planning. The plan meets and exceeds the first phase requirements of *O. Reg. 588/17: Asset Management Planning for Municipal Infrastructure* with a mandated completion date of July 1, 2022 (formerly 2021).

Asset classes included within this asset management plan are core infrastructure as defined by the Province: water, wastewater, stormwater management, roads, bridges and large culverts. Additionally the plan includes: fleet and equipment and municipal parking.

The asset class specific asset management plans describe the characteristics and condition of infrastructure assets along with action and investment plans, required to achieve the current level of service set out by Council.

The Enterprise Asset Management Plan is a consolidated and integrated document of core infrastructure asset management plans that provide a clear integrated and holistic picture of core infrastructure and their asset maturity level. Furthermore, this version of the plan includes non-core infrastructure: municipal parking, and fleet and equipment. The plan will serve as a roadmap for future action plans by defining the next steps which include the legislated milestones to further the maturity of asset management planning. A state of the infrastructure provides comprehensive information regarding the asset classes included within the plan. Buildings and facilities, parks, solid waste, housing and long-term care will be incorporated to the Enterprise Asset Management Plan once the respective plans by asset class are complete.

The Enterprise Asset Management Plan was developed in line with the updated Enterprise Asset Management Policy which provides the guiding principles for the plan and the Asset Management Strategy that provides the direction to put the policy into practice.

Unless otherwise stated, all financial values in this asset management plan are described in 2020 Canadian dollars. When an estimate was prepared within an asset class specific asset management plan in previous year dollars, the CanaData construction cost estimate published by Construct Connect was used to inflate to 2020 Canadian dollars.

Contents

- Executive Summary 2
- 1. Introduction 5
 - 1.1. Background and Legislation 5
 - 1.2. Maturity 6
 - 1.3. Roadmap 9
 - 1.4. Purpose of the Enterprise Asset Management Plan 10
- 2. State of the Infrastructure 12
 - 2.1. Asset Valuation 12
 - 2.2. Methodology and how to read the Infrastructure Report Card 14
 - 2.3. Summary of Replacement Valuation for Asset Classes within the Enterprise Asset Management Plan 16
 - 2.4. Summary of Average Condition 17
 - 2.5. Summary of Infrastructure Deficit over a 10-Year Period 18
 - 2.6. Infrastructure Report Cards 19
 - 2.7. Infrastructure Deficit and Annual Funding Gap 34
 - 2.8. Future Demand 36
 - 2.9. Climate Change 37
- A. Appendix A: Enterprise Asset Management Policy 38
- B. Appendix B: Asset Management Strategy 47
 - B.1 Purpose of the Asset Management Strategy 47
 - B.2 Asset Management Planning Activities 47
 - B.3 Asset Management Program and Framework 48
 - B.4 Level of Service (LoS) and Community Demand 49
 - B.4.1 Performance Measurement 50
 - B.4.2 Cost of Service Delivery for an Asset Class 50
 - B.5 Failure Prediction and Risk Management 50
 - B.5.1 Risk Exposure 50
 - B.6 Asset Lifecycle Planning and Optimization 51
 - B.7 Capital Prioritization 52
 - B.8 Finance and Sustainability Strategies 52
 - B.9 Maintenance and Operations Management 53
 - B.9.1 Maintenance Intervals 53
- C. Appendix C: Asset Management Plans by Asset Class 54

- Road Structure Asset Management Report (**Bridge** and **Large Culvert** Asset Management Plan)
- **Road** and Transportation Asset Management Plan
- **Stormwater** Asset Management Plan
- Asset Management Plan **Water** and **Wastewater**
- **Fleet** and Equipment Asset Management Plan
- Municipal **Parking** Asset Management Plan

Figures

Figure 1: Asset Management Maturity..... 8
 Figure 2: The Asset Management Roadmap..... 9
 Figure 3: Asset Investment History for ALL Infrastructure (2020)12
 Figure 4: Replacement Value (2020) in Millions for ALL City Infrastructure 13
 Figure 5: Capital Infrastructure Investment Requirement over the next 10-Years in Millions34

Tables

Table 1: Asset Management Roadmap Upcoming Milestones10
 Table 2: Quality of Asset Datasets 15
 Table 3: Total Annual Funding Gap (Capital)35

1. Introduction

Asset management is the systematic and coordinated activities and practices of an organization to realize value from an asset by optimally and sustainably delivering on its service objectives through cost-effective lifecycle management of assets.

Service delivery to the community is based on managing existing assets in an environmental, social, and economically sustainable manner to reduce cost and risks, while complying with regulation.

The majority of the City's assets have long service lives extending beyond a decade. These assets require significant ongoing investment in operation, maintenance and renewal activities to maintain a safe and reliable condition to support service delivery.

The City, like most Canadian municipalities, must overcome multiple challenges in managing assets including aging infrastructure; expectations of higher levels of service with minimal financial impact; increasingly demanding and complicated legislation with environmental requirements; and mitigation of the increased risk involved with the execution of service delivery. As a result, the City is moving to implement a focused and calculated approach to address these challenges of managing infrastructure assets with the development and implementation of the Enterprise Asset Management Plan.

In 2019, City Council approved the City of Greater Sudbury Strategic Plan 2019-2027 to define the City's strategic direction. There are six pillars that are defined within the strategic plan, the first of which is Asset Management and Service Excellence. The strategic pillar is intended to "maximize value of investment in physical infrastructure and initiatives that enable reliable service delivery and promote economic competitiveness."

The strategic plan is supported by a number of key documents including but not limited to: the City's annual budget and annual business plans, the City of Greater Sudbury Official Plan, enterprise risk management, master plans, by-laws, the core service review, state of the infrastructure reports, long-term financial plans and various policies and procedures.

1.1. Background and Legislation

In June of 2011, the province of Ontario released a long-term infrastructure plan for Ontario entitled *Building Together*. *Building Together* laid out a standardized and calculated approach to asset management planning. *Building Together* in conjunction with the *Infrastructure for Jobs and Prosperity Act, 2015* established a criteria and timeline for all municipalities to have an asset management plan in place by December 31, 2016. An asset management plan was required by this date in order to continue to be eligible for Federal and Provincial Government funding. In response, KPMG was retained to produce the City of Greater Sudbury Asset Management Plan (2016). The plan reflects an approximate level of the financial requirements associated with maintaining City assets in a state of good repair.

On December 13, 2017 the province approved *O. Reg. 588/17: Asset Management Planning for Municipal Infrastructure* under the *Infrastructure for Jobs and Prosperities Act, 2015*. The City has been working to develop asset management plans for all infrastructure assets that comply

with legislation. This includes describing the asset's expected performance level (that is, its "service level") based on technical data.

In 2018, City Council achieved the first requirement of *O. Reg. 588/17* with the approval of the Enterprise Asset Management Policy aimed at ensuring municipal infrastructure systems are supported by plans and financing decisions that demonstrate effective service support and appropriate regard for managing lifecycle costs.

On April 16 2021, the Province formally announced an amendment to *O. Reg. 588/17*. The amendment extends the legislative phase-in schedule by one year. Specifically, municipalities must have approved phase one asset management plans for core assets (roads, bridges and culverts, water, wastewater, and stormwater management systems) completed by July 1, 2022. The plans must identify current levels of service and the cost to maintain the current level of service. With the approval of the Enterprise Asset Management Plan (2021), Greater Sudbury meets and exceeds the first phase requirement of *O. Reg. 588/17*. The aforementioned extension to the phase-in schedule is further reflected in the asset management roadmap.

Asset management represents the management of infrastructure, using proven lifecycle strategies that have been evolving over a number of years. Throughout this time, the City has developed asset management planning knowledge that is formally defined as part of the strategies within the Enterprise Asset Management Plan. The plan will culminate with the establishment of an improved and evolving long-term strategy to address the City's investment in infrastructure.

1.2. Maturity

The Federation of Canadian Municipalities (FCM) has prepared an Asset Management Readiness Scale to help municipalities understand where they started, where they currently are, and where they would like to be in asset management maturity. The levels that Greater Sudbury has currently achieved and will strive to achieve in the FCM Asset Management Readiness Scale are provided in Figure 1, which follows the description of the tool itself and how the tool is applied.

The readiness scale measures and analyzes five competency areas, with each competency acting as a building block. The five building block competencies include the following descriptions as provided by the FCM.

Policy and Governance: By developing this competency, the City is putting in place policies and objectives related to asset management, bringing those policies to life through a strategy and roadmap, and then measuring progress and monitoring implementation over time.

This competency helps create the policy structure that lays out asset management goals and how they will be achieved, leading to organizational alignment and commitment.

People and Leadership: By developing this competency, the City is setting up cross-functional teams with clear accountability and ensuring adequate resourcing and commitment from senior management and elected officials to advance asset management.

Asset Management requires collaboration and integration from multiple perspectives. At a minimum, the asset management team should be a representation of people who understand

finance, decision-making, and the planning and operations of each relevant service area. This competency helps create and sustain connections across teams and build leadership in asset management.

Data and Information: By developing this competency, the City is collecting and using asset data, performance data and financial information to support effective asset management planning and decision-making.

This competency helps improve data management practices to ensure appropriate asset information is available as required.

Planning and Decision-Making: By developing this competency, the City is documenting and standardizing how the organization sets asset management priorities, conducts capital, operations and maintenance (O&M) planning, and develops budgets.

This competency helps implement asset management, by ensuring that asset management policies, objectives and information are consistently informing organizational plans.

Contribution to Asset Management Practice: By developing this competency, the City is supporting staff in asset management training, sharing knowledge internally to communicate the benefits of asset management, and participating in external knowledge sharing.

This competency helps build the organization's overall asset management practice by ensuring that internal stakeholders are well-informed and that the organization stays current with, and contributes to, leading practices, training and education.

Each of the five competency areas is organized on a progressive scale of five levels. Each level is further broken down into three outcome areas. The outcomes describe milestones in asset management from initial investigation of practices, to adoption, and eventually to full integration of asset management practices into daily routines. Each of these outcome areas need to be achieved by the entire organization before a level can be achieved. Examples of outcomes within the readiness scale are Policy and Objectives, Asset Data, Financial Information, Asset Management Plans, Training and Development, among others.

Various asset classes may progress in the competencies at different rates and be further along in some competencies than in others. Furthermore, some asset classes may be further along with asset management practices than others. **The entire organization must achieve each outcome prior to advancing a level, meaning the overall rating should reflect the less advanced asset classes.** The levels are useful in planning for improvement.

Once the City achieves a Level 4 in the Asset Management Readiness Scale, the City will be roughly aligned with the requirements of the ISO 55000 standard; which is a significant accomplishment. The ISO 55000 provides an overview of asset management, its principles and terminology, and the expected benefits from adopting asset management.

The City's asset management maturity has been measured in the readiness tool on several occasions during grant applications with the FCM. The maturity measures are discussed with various City personnel while preparing grant application. The latest maturity measurement and targets are provided in Figure 1. Please note, the readiness scale is intended for Greater Sudbury to measure progress and set goals, it is not intended to benchmark or compare progress of various municipalities. For further details on the readiness tool and the various

competency outcomes and levels please visit: <https://fcm.ca/en/resources/mamp/tool-asset-management-readiness-scale>.

Figure 1: Asset Management Maturity



Currently, the City’s asset management maturity score is a Level 2 (average is 2.5 out of 5). By 2024, the City will improve to a Level 3 (average of 3.2 out of 5) and will achieve a Level 4 (average of 4.1 out of 5) in 2025.

Per the FCMs scoring criteria, the Training and Development Level remains at a Level 3. To achieve a Level 4, an asset management training plan must be in place for **all** City staff, even staff whose job descriptions do not include the operation or management of infrastructure assets. At this time, the approach to training and development is to implement proactive development training and role appropriate training for staff. If the City were to develop a training plan and provide asset management training to all staff, the Training and Development score would move directly to a Level 5.

In the pursuit to develop asset management maturity across the organization, the City has previously implemented initiatives that include:

- Development of a Capital Prioritization Tool to link the annual capital budget to asset management initiatives. The tool prioritizes departmental priorities against each other determined by criteria such as: appropriate lifecycle interventions, risk management, health and safety, strategic priorities, financial return on investment, environmental impacts and service level directives;

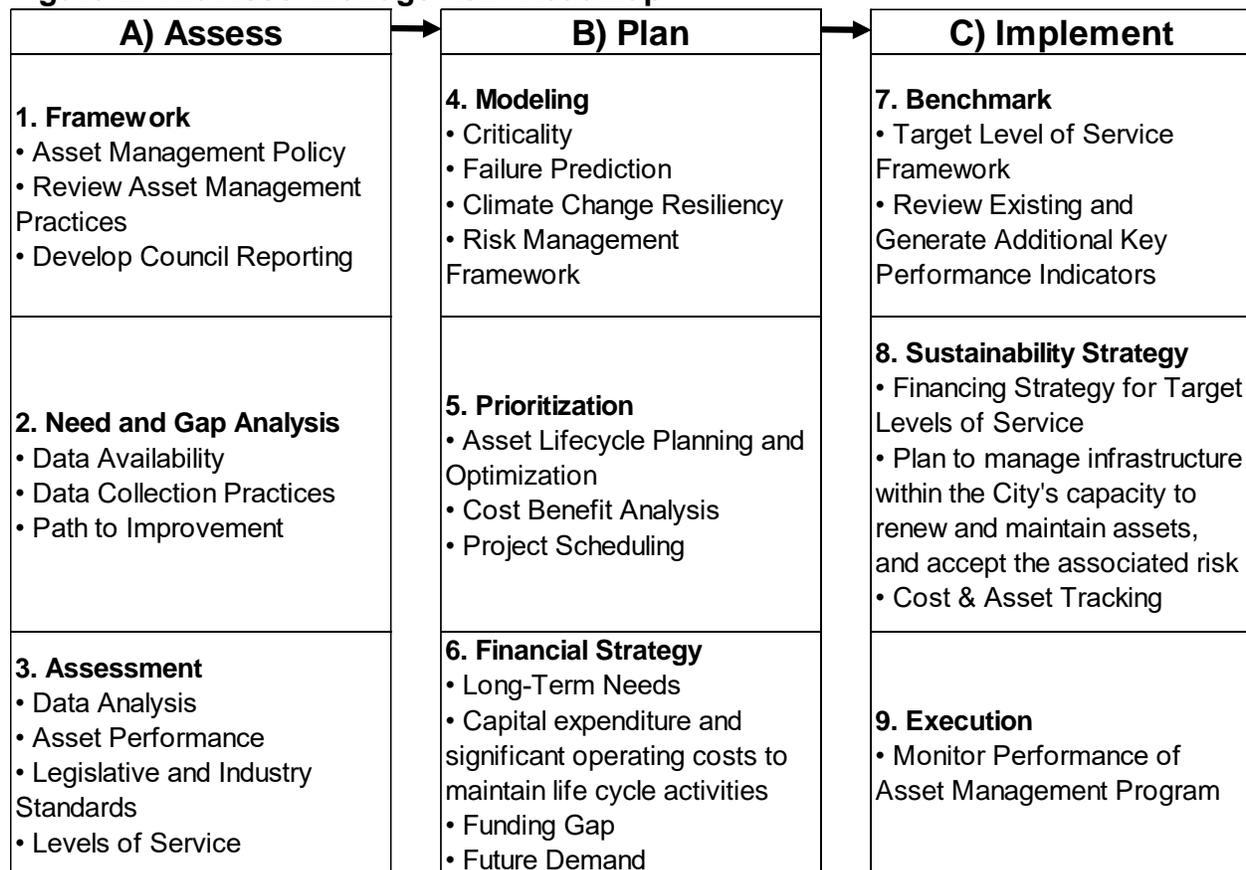
- Development of the Enterprise Asset Management Policy aimed at ensuring its municipal infrastructure systems are supported by plans and financing decisions that demonstrate effective service support and appropriate regard for managing lifecycle costs;
- Defined the roles of the individuals responsible for asset management planning;
- Development of data standards and completion of data collection and condition assessments; and
- Completion of a Core Service Review lead by the CAO's office.

1.3. Roadmap

The asset management roadmap outlines the actions, and time frames needed to implement and deliver asset management objectives. The key steps that must be performed to develop and implement effective asset management plans are detailed in Figure 2.

Within the asset management roadmap, the legislated phase 1 and 2 asset management plans are developed in steps 1 through 6 (Assess and Plan). The implement column represents requirements of the phase 3 asset management plan. Recently, activity has been focused on data collection and analysis to identify existing level of service, quantifiable risk and infrastructure need. Over the next several years, activities will be focused on the development of a sustainable financing strategy to achieve target level of service at an acceptable level of risk.

Figure 2: The Asset Management Roadmap



The asset management roadmap will be guided by the principle of continuous improvement, industry best practices, and regulatory requirements. Asset management planning is dynamic and must be continuously evolving to leverage opportunities and address upcoming challenges.

Upcoming milestones that will be achieved within the asset management roadmap are provided in Table 1.

Table 1: Asset Management Roadmap Upcoming Milestones		
Year	Milestone	Actions
2021	1st Enterprise Asset Management Plan (Phase 1)	Include all core infrastructure, fleet and equipment and municipal parking
	Data Improvements	Technical Studies and Condition Assessments - annual requirements
	Asset Management Planning Process Improvements	Development of a building and facility asset management database
2024	2nd Enterprise Asset Management Plan (Phase 2)	Addition of buildings and facilities, housing, long-term care, parks and solid waste
	Define Target Levels of Service	Prepare Level of Service options for Council review and selection
	Prepare Sustainability Strategy	Prepare investment and financing plan to achieve the targets directed by Council
2025	3rd Enterprise Asset Management Plan (Phase 3)	Complete compliance with O. Reg. 588/17
2025	Continuous Improvement	Monitor the progress, achievements and needs of asset management planning Revise Enterprise Asset Management Plans, Strategies and Policy to reflect improvement objectives

1.4. Purpose of the Enterprise Asset Management Plan

The plan provides details to facilitate the best possible decisions regarding construction, operation, maintenance, renewal, replacement, expansion and disposal of infrastructure assets while minimizing risk and cost, and maximizing service delivery. The plan integrates a number of individual plans by asset class including: Water and Wastewater, Storm Water Management, Roads and Transportation, Bridges and Large Culverts, Fleet and Equipment and Municipal Parking. Future versions of the plan will include Buildings and Facilities, Housing, Long-Term Care, Parks and Recreation, and Solid Waste. Please note that the list above does not include asset classes that are managed by various Boards and Agencies that are funded by Greater Sudbury. There may be risks associated with asset failure in these areas and the City will do subsequent work to understand the potential risks.

The Enterprise Asset Management Plan is developed in accordance with Building Together – Guide for Municipal Asset Management Plans and *Ontario Regulation 588/17: Asset Management Planning for Municipal Infrastructure, 2017* and the principles included in Section 3 of the *Infrastructure for Jobs and Prosperity Act, 2015*.

Asset management plans provide a framework that functions along with annual budgets and long term financial plans to help understand the implications of budget and investment planning decisions on infrastructure. The 2021 Enterprise Asset Management Plan establishes a baseline of current asset management practices and establishes the infrastructure deficit and funding gap with greater accuracy for all asset classes included.

Asset class specific asset management plans are attached to the document in the appendices. The majority of asset class specific details such as current level of service, condition, risk exposure and financial need are provided in the appendices.

Also included within the appendices is the Enterprise Asset Management Policy and the Asset Management Strategy. The strategy builds upon the principles set out in the Enterprise Asset Management Policy. The strategy provides practices that can be applied consistently across Greater Sudbury aimed to improve asset management and support the objectives of the roadmap.

The Enterprise Asset Management Plan is dynamic and will be revised and updated regularly as a minimum per legislative schedule or as significant revisions become available. Revisions are expected as the City's maturity in asset management planning progresses.

2. State of the Infrastructure

The City of Greater Sudbury asset inventory serves various functions, but in all cases the assets are physical infrastructure assets that depreciate over time.

The State of the Infrastructure communicates the performance of infrastructure assets that are included in the Enterprise Asset Management Plan. A common tool to report on infrastructure is an Infrastructure Report Card to form the basis for further discussion and decision surrounding asset management and investment.

This is the City's first-ever Infrastructure Report Card and includes all "core" assets as defined in *O. Reg. 588/17* and the City's municipal parking, fleet and equipment asset classes. Additional asset classes will be added to the Infrastructure Report Card as their asset management plans progress.

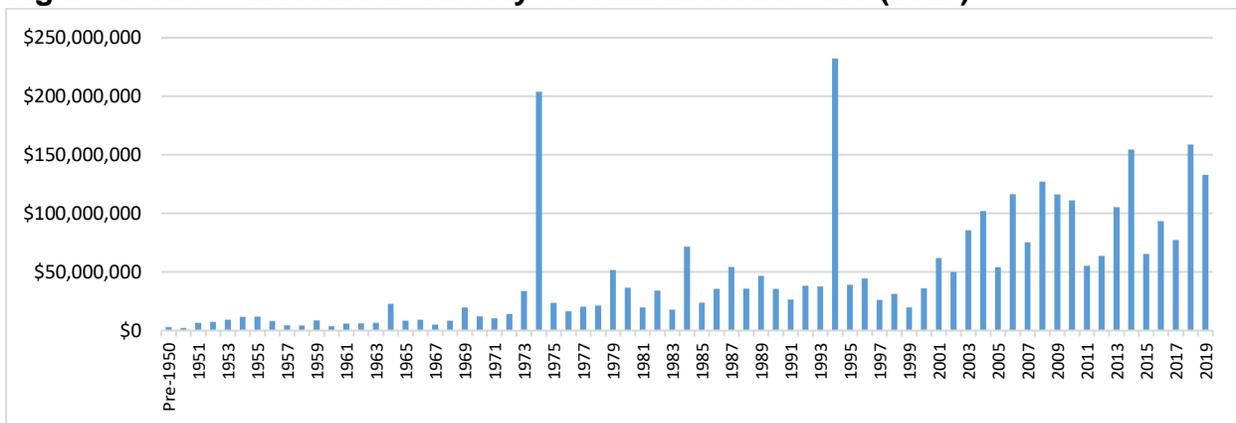
The State of the Infrastructure provides a baseline for discussion of infrastructure and is intended as a prologue to the asset management plans prepared for specific asset classes.

While the available asset data and information did not indicate that there are any major physical issues with the assets at the network level, normal degradation of assets will continue at the individual asset level and will require funding to address future needs. Leading up to 2021, the City has greatly increased the maturity and availability of datasets for the major asset classes included in the State of the Infrastructure.

2.1. Asset Valuation

The corporation has a historical capital investment of \$3.3B (2020) invested into infrastructure assets that is detailed in Figure 3. The expenditure data to develop Figure 3 is managed within the City's Tangible Capital Asset Database.

Figure 3: Asset Investment History for ALL Infrastructure (2020)

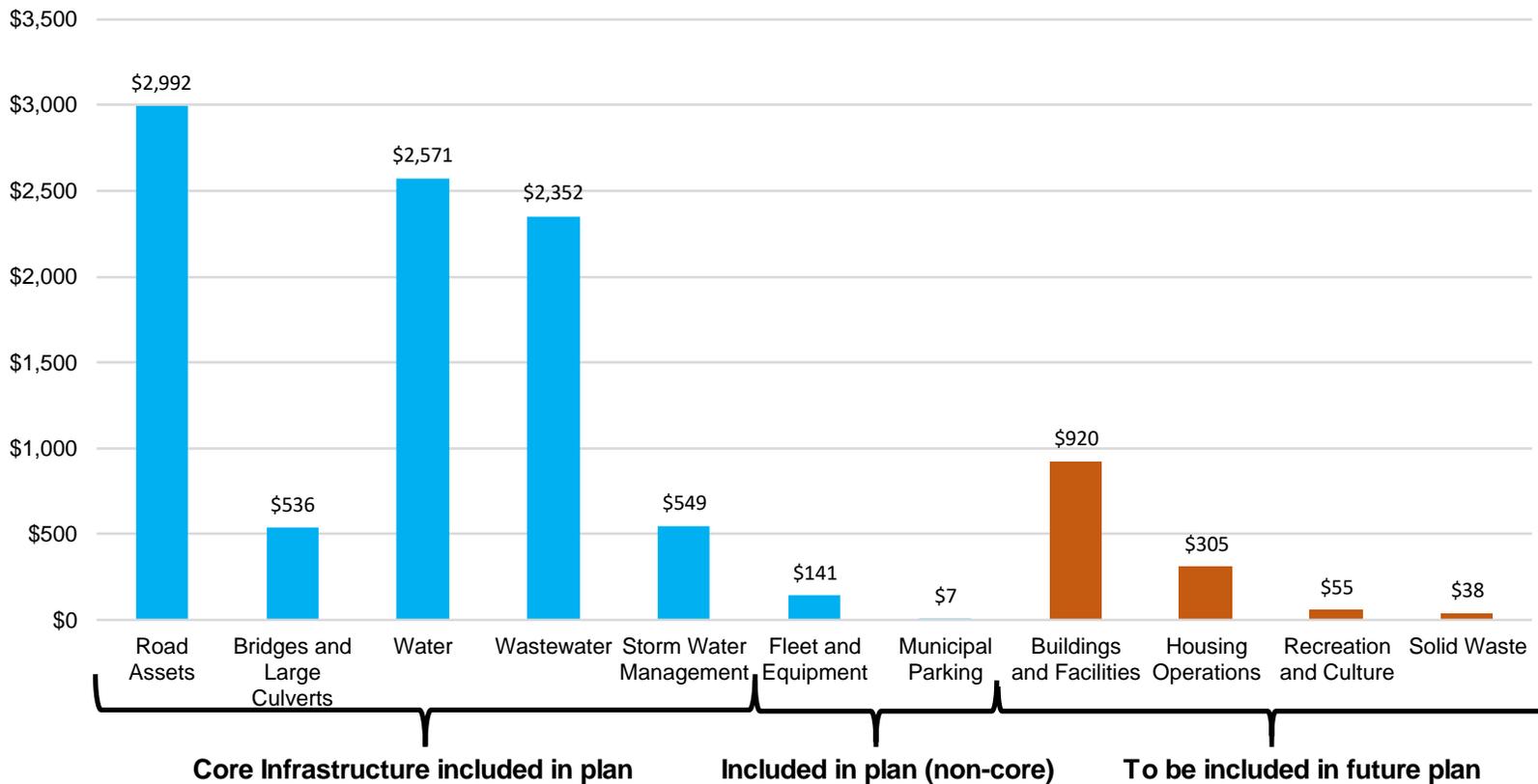


The historical investment of \$3.3B (2020) invested into all infrastructure assets spans across a large portfolio that translates into a \$10.5B (2020) replacement value for all infrastructure assets. All infrastructure assets refers to the entire Greater Sudbury infrastructure asset portfolio that includes asset classes not yet included in the Enterprise Asset Management Plan. For example, buildings and facilities, housing, parks, and solid waste. Replacement values (2020) for all infrastructure assets are presented in Figure 4.

Figure 4: Replacement Value (2020) in Millions for ALL City Infrastructure

The Replacement value for all City infrastructure is **\$10.5B**. This replacement valuation includes **ALL** City infrastructure, not only the infrastructure included in this asset management plan.

Going forward, there may be revisions beyond inflation to the replacement value of the infrastructure portfolio due to an influx of data within various asset classes. For example, building condition assessments have been completed for approximately half the building and facilities portfolio. The building and facility replacement cost provided below has been determined by past purchasing records indexed forward, as opposed to on site data. Water and wastewater plants and facilities are currently undergoing similar review.



2.2. Methodology and how to read the Infrastructure Report Card

Specifically, the Infrastructure Report Card will provide: quantity of infrastructure assets that the City owns, details of the infrastructure condition, and a summary of historical capital investment and infrastructure need. Asset class specific Infrastructure Report Cards are provided in Section 2.6 Infrastructure Report Cards.

Condition and Life Expectancy

All infrastructure has a finite life, however different assets and their components have varying useful life expectancies. Useful lives have been estimated for each asset type within an asset class. Estimated useful lives are based upon industry acceptable standards and local experience. The estimated useful life is helpful to monitor service life consumption.

Infrastructure condition reporting involves both technical data and professional judgment. For example an asset, according to its technical data, may be deemed to be reliable for only a limited period. However, professional judgment may suggest the asset could remain in service longer. Ideally, the condition is determined by evidence based data from inspection, testing and performance assessment. When this data is unavailable, service life consumption is used to generate condition rating.

A common condition rating system includes five categories: Very Good (A), Good (B), Fair (C), Poor (D), and Very Poor (E). The condition rating systems helps to identify where infrastructure is within its lifecycle.

Various data sources were integrated during the development of the asset management plans. Data sources include: modeling, asset management and capital planning tools, pavement management system, maintenance and work order management system, the GIS database, spreadsheets and the tangible capital asset inventory.

The asset condition information in this document reflects best available data and professional judgment. Work continues to refine data collection activities and manage the evolution of the asset management program.

Infrastructure Need and Expenditure

The Infrastructure Report Card is a snapshot in time. To add context to the condition ratings, infrastructure need and the historical investment averaged over a 5-year period are provided within the report card.

Further detailed information and forecasts regarding replacement of assets and lifecycle interventions are discussed in the individual asset management plans. However these details are reflected in the average annual capital reinvestment and maintenance need. It is also important to note, some infrastructure capital need is addressed through external funding sources and reserves, not all funding requirements are from the annual municipal or water/wastewater levies.

Key terms that describe infrastructure need and expenditure within the Infrastructure Report Card are defined as follows.

- The **Funding Gap** is the unfunded value of infrastructure renewal needs that require attention as of the current year.
- The **Infrastructure Deficit** is the projection of the funding gap at the current service requirement over a defined period.
- The **Average Annual Reinvestment Requirement (AAR)** is the mean capital investment required over a defined period. It is recognized that annual infrastructure capital investment requirement is not linear and varies annually; however the AAR is a linear average. The AAR is useful for defining the required rate of funding based on an investment profile. It is also recognized that actual investment spending will vary year to year and the AAR value provides a benchmark upon which to measure whether infrastructure is being renewed at a rate that is financially sustainable. To address the actual investment spending that varies year to year, the City has implemented an annual capital prioritization process and Council has the ultimate authority to determine capital spending priorities on existing or new assets.

Data Confidence Rating

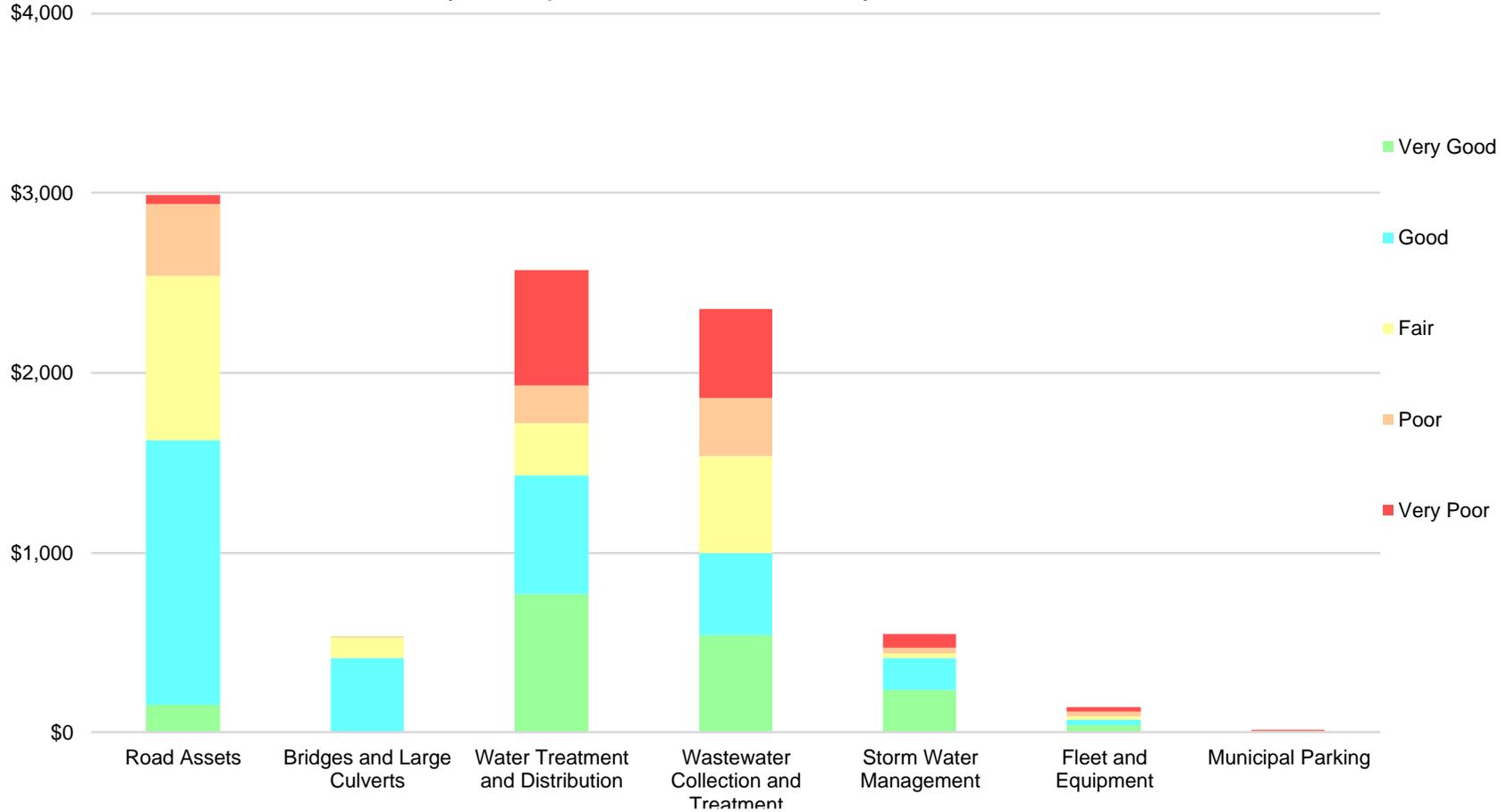
Asset management is a continuous improvement process. The City has several data collection and analysis projects underway to improve the data confidence within all asset classes. The data confidence rating is based in Table 2.

Data Confidence Rating	Description
A	<ul style="list-style-type: none"> • No Assumptions with condition and age data • Reliable data inventory and source • Examples: Closed Circuit Television Inspection, Building Condition Assessment, Pavement Condition Assessment, Bridge Condition Assessment, Structural Report
B	<ul style="list-style-type: none"> • Dataset contains less than 10% assumptions • Moderately reliable data inventory and source • Example: aging condition data or studies
C	<ul style="list-style-type: none"> • Data contains greater than 10% assumptions • Moderately reliable data inventory and source • Example: aging condition data or studies
D	<ul style="list-style-type: none"> • Data from unreliable or out of date documents • Many assumptions of condition, age and replacement values • Example: purchasing records, condition data or studies older than 5 years
E	<ul style="list-style-type: none"> • Moderately reliable data for age or value, but not both • Only 1 moderately reliable data source
F	<ul style="list-style-type: none"> • No data available

2.3. Summary of Replacement Valuation for Asset Classes within the Enterprise Asset Management Plan

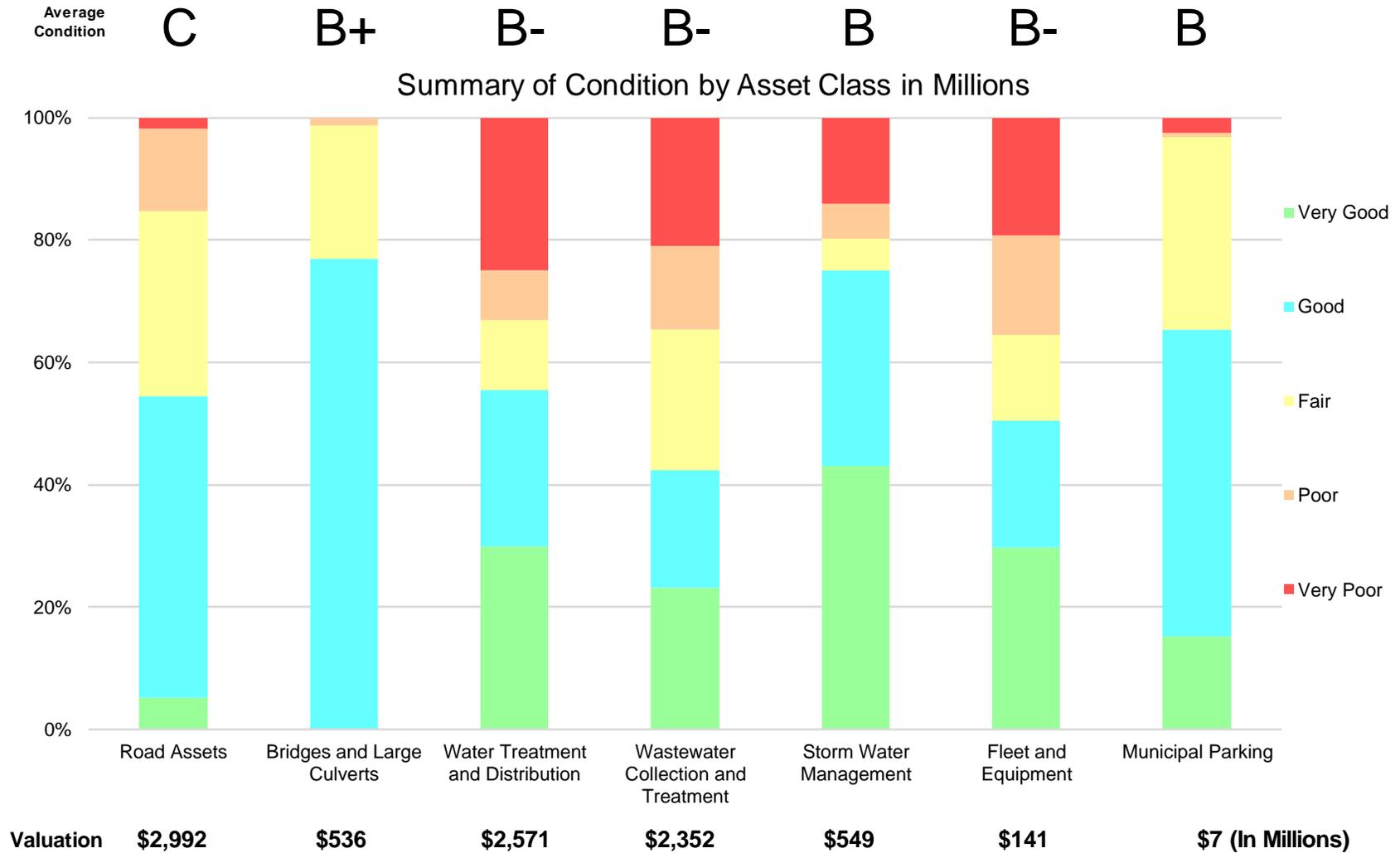
The replacement valuation of the City's infrastructure is \$10.5B. Elements related to roads comprises 28.6% of the City's total replacement valuation. The percentage is indicative of the fact that the road network consists of approximately 3,500 lane kms. Water and wastewater infrastructure represent the second and third highest value at approximately 47% combined. Together, these three asset classes represent 75.6% of the total replacement value of infrastructure within the Enterprise Asset Management Plan.

Summary of Replacement Valuation by Asset Class in Millions



2.4. Summary of Average Condition

The information on condition ratings presented in the figure below have been adapted from condition frameworks that vary by asset class. Areas with a high percentage of infrastructure with a Poor or Very Poor condition that are also deemed to be high risk or essential may require an increase or redistribution of funding to improve their condition. Often, however not in every situation, infrastructure condition is a major contributing factor to the probability of failure associated with service level delivery.

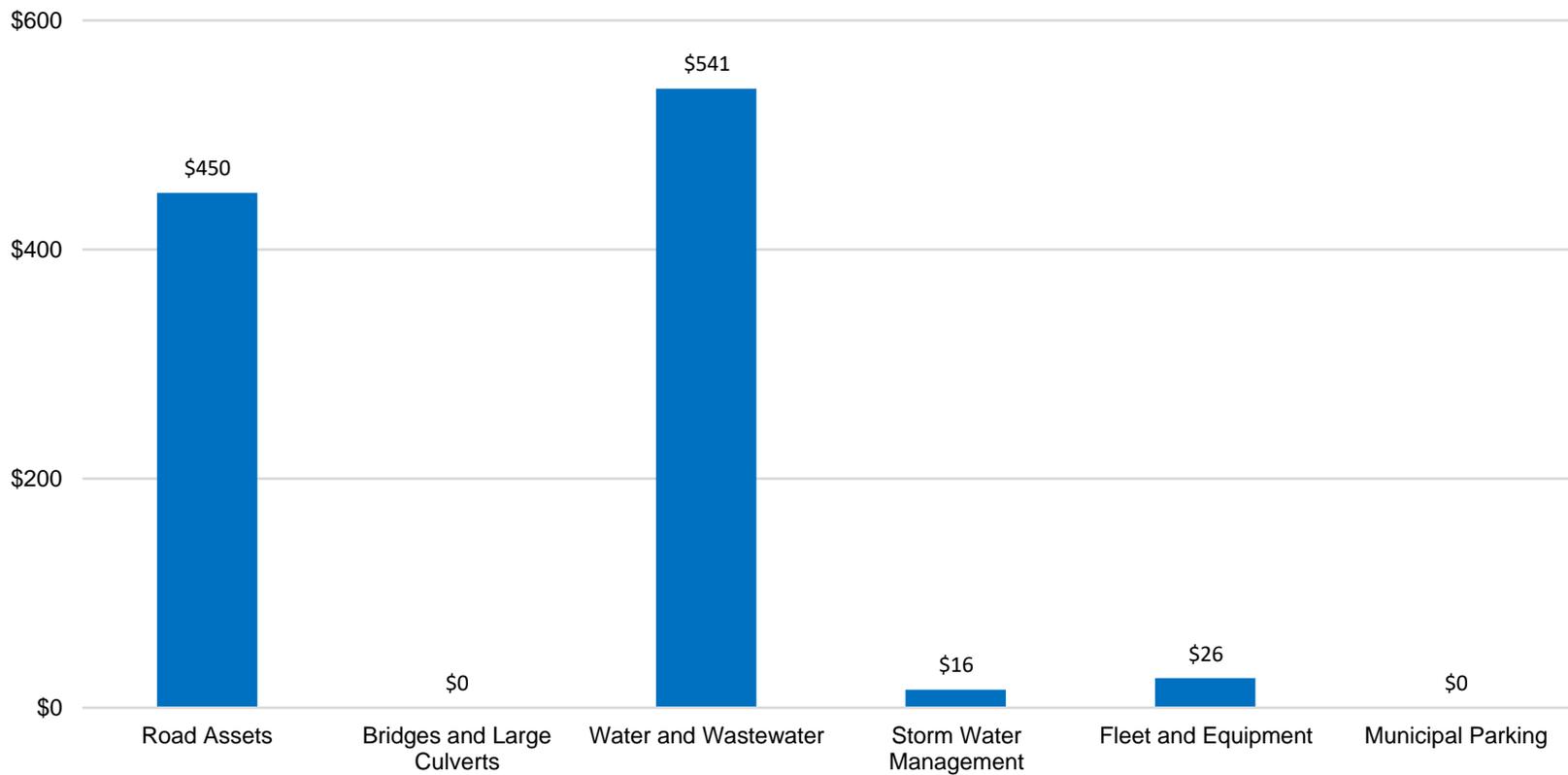


2.5. Summary of Infrastructure Deficit over a 10-Year Period

Following the identification of investment expected during the lifecycle of infrastructure, the average annual reinvestment requirement is compared to recent annual capital budgets to determine the adequacy of investment. The comparison yields the financial risk of asset ownership known as a funding gap. The funding gap is the unfunded value of infrastructure renewal needs that require attention as of the current year. The funding gap and service requirement can be projected over a defined period to provide a capital infrastructure deficit. The deficit is recommended investment in addition to current capital expenditure.

Currently, there is a 10-year capital infrastructure deficit of approximately **\$1,033M** to maintain current levels of service. **Council will have the opportunity to address the infrastructure deficit with the approval of Target Levels of Service.**

Capital Infrastructure Deficit over a 10-Year Period in Millions



2.6. Infrastructure Report Cards

Please see the following Infrastructure Report Cards by asset class.

Intentionally Blank

C Roads

Fair Condition
(49.8 out of 100)

A well-maintained transportation system promotes economic vitality and a positive image. Investing in a measurable approach in the maintenance of road infrastructure will ensure the continued economic and social vitality of the city.

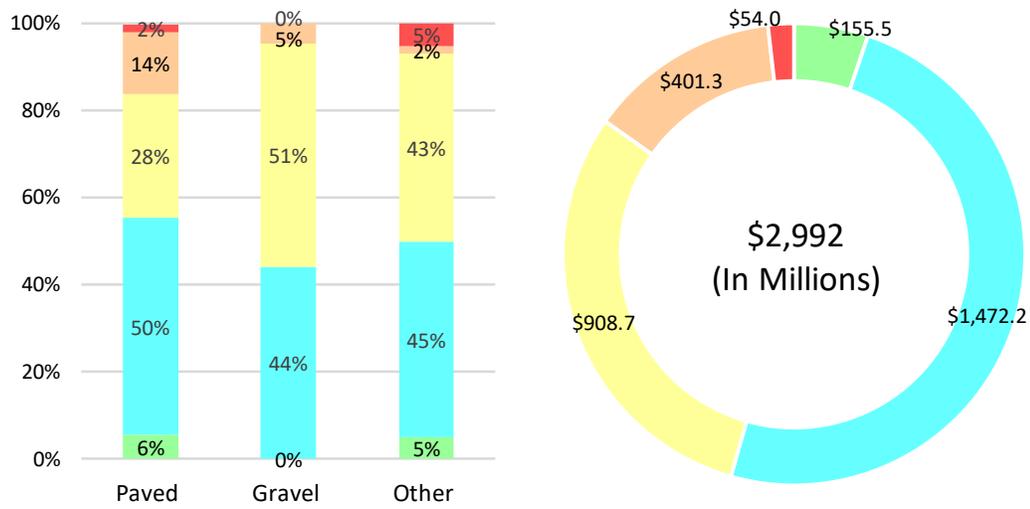
The City of Greater Sudbury road network strives for complete streets that accommodate multimodal transportations.

The City's road network transports people and goods safely and quickly. Roads are maintained to ensure safe and smooth transportation. One of the challenges facing the City is the need to balance competing needs between expanding the transportation network within the City's large geographic area and meeting the needs of existing and aging assets.

Overall, the assets in the road network are in **FAIR** condition.

Inventory: The City owns and operates a road network of 3,592 km of varying road classifications; namely arterial, collector and local. Other road inventory includes 441 km of sidewalk, 3,601 street light poles and 14,916 street light fixtures.

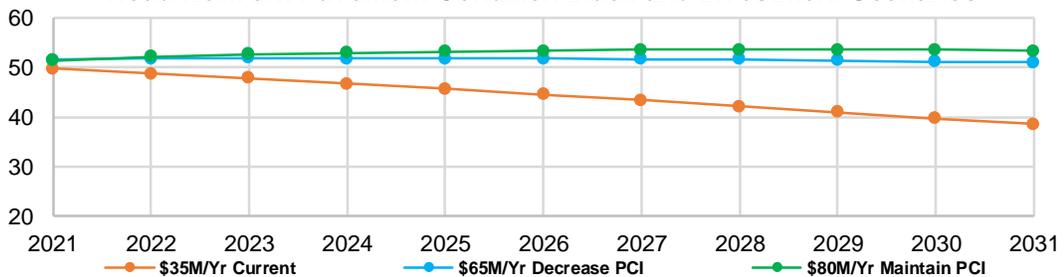
Condition of Inventory and Total Replacement Value



Legend:
 Very Good
 Good
 Fair
 Poor
 Very Poor

Road Network Pavement Condition Index and Investment Scenarios

Note: PCI averages include asphalt and surface treated roads.



Expenditure	
Historical Investment (5 Year Average)	\$35,000,000
Capital Funding Gap to Maintain PCI	\$45,000,000

The funding gap is the unfunded value of infrastructure renewal needs that require attention as of the current year.

Infrastructure Need	
Average Annual Reinvestment Need	\$80,000,000
Summer Maintenance Infrastructure Need	\$22,800,000

Data Confidence Rating	
C	Please refer to confidence rating provided in Methodology.

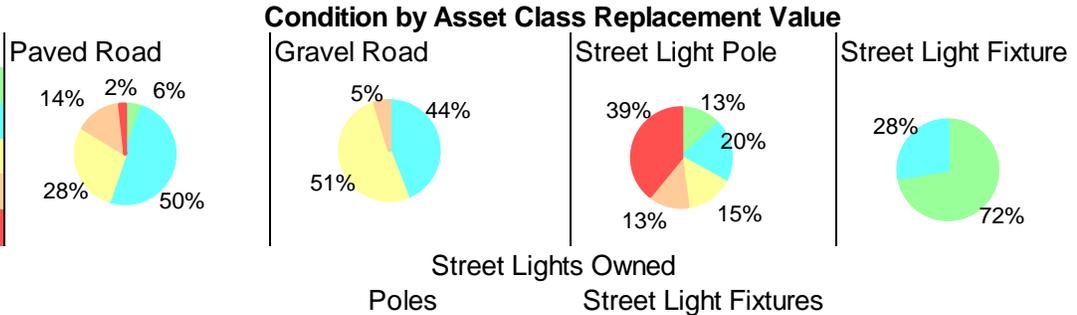
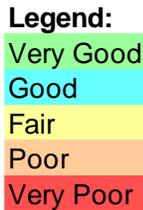
Roads and Transportation Network

Current Asset Level of Service

How is our infrastructure performing?

Current Performance

Plow Class 1 to 3 roads within 8 Hours	Plow Class 4 to 6 roads within 24 Hours	Clear snow from 80% of sidewalks within 24 Hours	Regulatory sign replacement 5% Annually
Remove winter sand within 9 Weeks	Pothole repair meets min. maint. standards 100%	Curb and sidewalk replacement 2.5% Annually	Road crossing culvert replacement 3% Annually



Street Lights Owned Poles
3601

Street Light Fixtures
14916

The remainder of poles are owned by utilities.

Expected Service Life (Examples)

Paved Road 60 Years	Gravel Road 75 Years	LED Light Fixture 100,000 Hours	Concrete Light Pole 60 Years
Aluminum Light Pole 20 Years	Anodized Al Light Pole 25 Years	Steel Light Pole 10 Years	Treated Wood Pole 40 Years

Community Energy and Emission Plan (CEEP) Applicable Goals

Goal 8: Achieve 35% active mobility transportation mode share by 2050.

Current Performance

Sidewalk (km) 441	Bike Lane (lane km) 32	Bike Lane Multi-Use Path (lane km) 4
Cycle Tracks (lane km) 10	Street Light Fixtures Retrofitted to LED 14916 (100% of Inventory)	

All street lights operate on photocell technology to ensure optimal usage during dark hours only.

B+ Bridges and Large Culverts

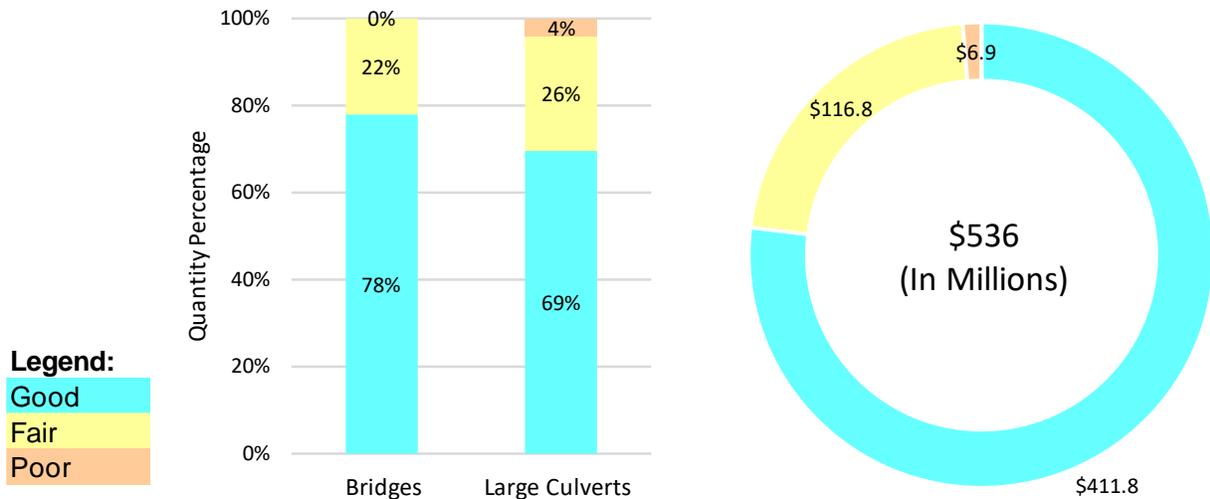
Good Condition
(77 out of 100)

The bridge and large culvert inventory supports the transportation and road network as well as storm water management. The inventory provides safe passage to vehicles, cyclists, and pedestrians. Each structure is inspected every two years as mandated by the Province of Ontario.

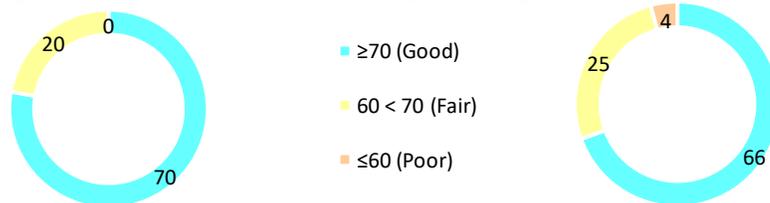
Any bridge or large culvert in the poor category is a high priority for reconstruction and/or renewal. Overall, bridge and large culvert are in **GOOD** condition.

Inventory: The City owns 185 structures; 90 bridges and 95 large culverts. With some exceptions, a large culvert is generally characterized as a culvert with a span greater than 3 meters.

Condition and Total Replacement Value



Bridge Condition Index and Quantity of Bridge and Culvert Inventory



Expenditure	
Historical Investment (5 Year Average)	\$7,500,000
Capital Funding Gap	\$0

The funding gap is the unfunded value of infrastructure renewal needs that require attention as of the current year.

Infrastructure Need	
Average Annual Reinvestment Need	\$6,900,000
Annual Maintenance Infrastructure Need	\$536,000

Data Confidence Rating	
A	Please refer to confidence rating provided in Methodology.

Bridges and Large Culverts

Current Asset Level of Service

How is our infrastructure performing?

Current Performance

Percentage of bridges with a BCI greater than or equal to 70 **78%**

Percentage of large culverts with a BCI greater than or equal to 70 **69%**

MTO Goal is to maintain **at least 80%** of structures with a BCI greater than or equal to 70

Structure Data

Structures with load restrictions 2 Each to be replaced in 2022	Structures with 1-lane dimensional restrictions 13 Dimensions are not inadequate	Structures with height restrictions* 2 CPR Subway and Brady Underpass	Single Span structures 130
Multi-span structures 55	Average age of structures 31.4 Years	Average age of bridges 42.8 Years	Average age of large culverts 25.4 Years

* The height of the CPR Subway on College Street is 3.8 m and the MTO height restriction on trucks is 4.15 m. The height of the Brady Street Underpass is 4.4 m; greater than the height restriction placed on trucks.

Structure Area in m²

Largest Structure 2381	Average Area 234	Total Area 43219	Area rate of renewal 0.83%
----------------------------------	----------------------------	----------------------------	--------------------------------------

The recommended area rate of renewal is 1.0%.

Community Energy and Emission Plan (CEEP) Applicable Goals

Goal 8: Achieve 35% active mobility transportation mode share by 2050.

Current Performance

Pedestrian Bridges

22

Pedestrian Culverts (Underpass)

5

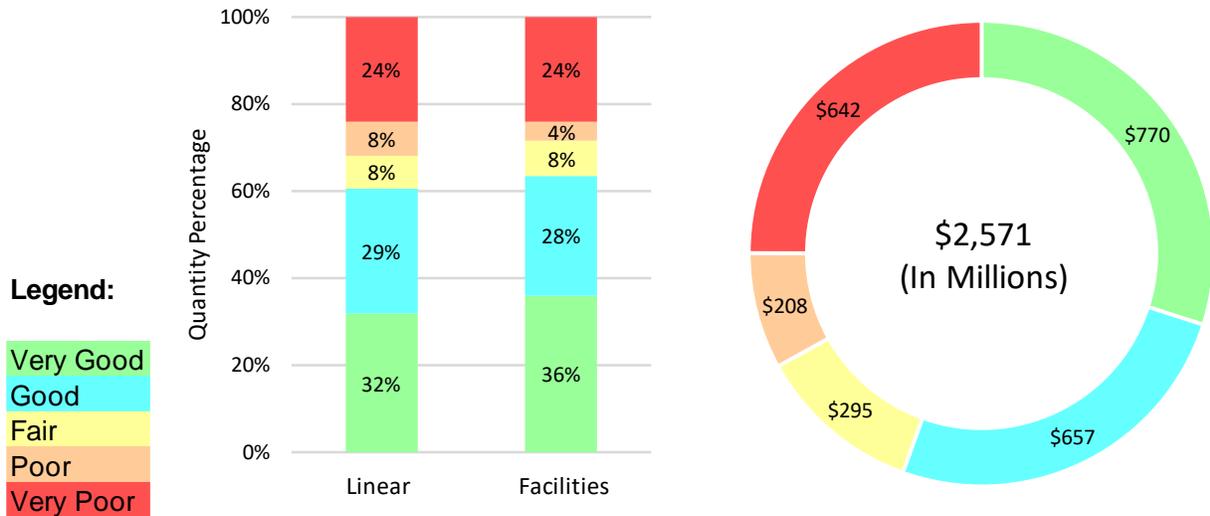
B Water Treatment and Distribution

Water treatment and distribution encompasses all aspects of supply, treatment, and distribution of water from the source to a community tap. The City owns and operates the infrastructure to support six water supply systems.

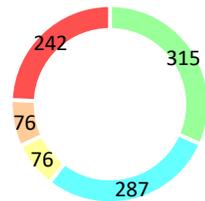
The water treatment and distribution infrastructure condition is based on a desktop study of infrastructure age and service life consumption. Overall, water treatment and distribution infrastructure is in **Fair to GOOD** condition. A new program of condition assessment is underway to determine the exact condition of the assets.

Inventory: The linear water infrastructure inventory consists of approximately 997km of water mains and appurtenances, including: 533 km of service connections, 8,950 system valves, 90 control valves, 5,699 hydrants, 6 meter stations, 2,792 valve chambers and 47,940 water meters. The vertical water infrastructure inventory consists of 57 water facilities including: 26 distribution facilities, 9 storage facilities, 2 treatment facilities and 20 water well facilities.

Condition and Total Replacement Value



Linear Condition and Quantity



Facility Condition and Value



Expenditure includes Wastewater	
Historical Investment (5 Year Average)	\$41,900,000
Capital Funding Gap	\$54,100,000

Infrastructure Need	
Average Annual Reinvestment Need	\$96,000,000
Annual Maintenance Infrastructure Need	\$3,000,000

Average annual reinvestment includes existing asset renewal and asset renewal driven by the W/WW Masterplan. Development projects with separate funding sources are not included. The Water and Wastewater Long-Range Financial Plan dated April 2019, defines the Council supported path to sustainability that is summarized in Section 2.7 of this plan.

Data Confidence Rating	
B & D (Linear & Facilities)	Confidence rating provided in Methodology.

Water Treatment and Distribution

Current Asset Level of Service

How is our infrastructure performing?

Current Performance

Taste, odour, or colour complaints 370 / Year	Cleaning and swabbing small dia. watermains 10% of network /Year	Water main breaks 72 / Year	Valves inspected and operated 5410 / Year
Length of watermain tested for leakage 99.25 km	Ministry of Environment, Conservation and Parks Inpection Score 99.1%	Quantity of water service repairs 94 / Year	Volume of water treated and supplied 19,744,331 m ³

Condition by Asset Class

Legend:	Watermain Material	Condition		Facility Type	Condition	
		Rating	Grade		Rating	Grade
Very Good	PVC	1.5	A	Water Well	2.6	B
Good	Concrete	2.3	B+	Small Water System	1.4	A
Fair	HDPE	1.1	A+	Booster Station	2.6	B
Poor	Cured in Place	2	B+	Storage Facility	2.5	B
Very Poor	Steel	1.4	A	Treatment Plant	3	C+
	Galvanized Pipe	4.7	D-	Small Treat Plant	2	B+
	Copper	4.4	D	Pump Station	1.4	A
	Cast Iron	4.2	D+	Pressure Control	1.1	A+
	PE	4.4	D			
	AC Cement	3.7	C			

Expected Service Life (Examples)

PVC Watermain 105 Years	Cast Iron Watermain 60 Years	Concrete Watermain 95 Years	HDPE Watermain 80 Years
Hydrants 60 Years	Maint. Hole & Chamber 70 Years	System Valve 40 Years	Service Connection 60 Years

Community Energy and Emission Plan (CEEP) Applicable Goals

Goal 5: Decrease energy usage in the potable water treatment and distribution system by up to 60% by 2050.

Current Performance

- Detailed energy studies have been completed for water treatment facilities and implementation of the recommendations are in progress. Recommendations include upgrades to energy consuming equipment. Efficiency has always been a top selection criteria for equipment. However, in many cases, equipment must also be sized up to accommodate required capacity.
- Implementation of 6 mobile district metered area sites to support water loss management.
- A water leak detection project is underway in the subdivision of Moonglo.
- A water efficiency strategy is under development for Greater Sudbury.
- A water transients project is underway to monitor for expected pressure within water systems.

Energy Consumption: (Plants, Tanks, Wells, and Booster Stations)	Electricity (kWh) 10,280,000	Natural Gas (m ³) 71,800
--	--	--

B Wastewater Collection and Treatment

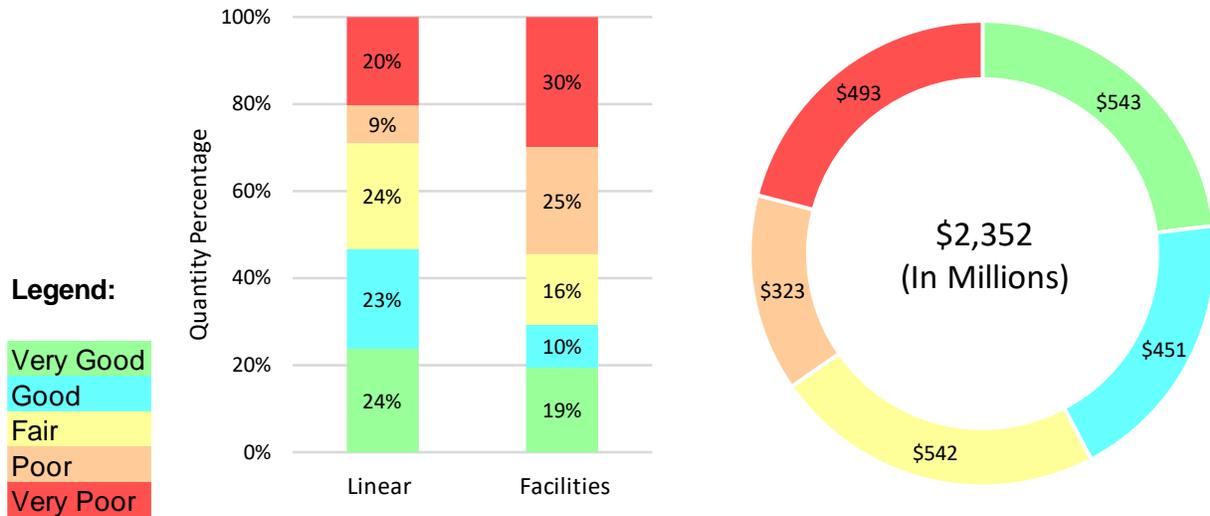
Wastewater collection refers to the infrastructure that conveys sewage from collection points to the sewage treatment plants.

Condition Fair to Good (2.9 out of 5)
The City owns and operates the infrastructure to support thirteen wastewater collection systems.

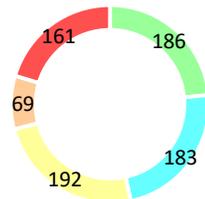
Inventory: The linear wastewater infrastructure inventory consists of approximately 791 km of wastewater mains, 381 km of lateral connections, 70 control valves, 21 drop shafts and 11,726 maintenance holes. The vertical wastewater infrastructure inventory consists of 83 wastewater facilities including: 69 collection facilities and 14 treatment facilities.

The wastewater collection and treatment infrastructure condition is based on a desktop study of infrastructure age and service life consumption. Overall, wastewater collection and treatment infrastructure is in **Fair to GOOD** condition. A new program of condition assessment is underway to determine the exact condition of the assets.

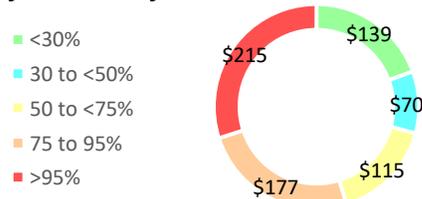
Condition and Total Replacement Value



Linear Condition and Quantity



Facility Condition and Value



Expenditure	
Historical Investment (5 Year Average)	Included with Water
Capital Funding Gap	Included with Water

The funding gap is the unfunded value of infrastructure renewal needs that require attention as of the current year.

Infrastructure Need	
Average Annual Reinvestment Need	Included with Water
Annual Maintenance Infrastructure Need	\$1,700,000

Data Confidence Rating	
B & D (Linear & Facilities)	Confidence rating provided in Methodology.

Wastewater Collection and Treatment

Current Asset Level of Service

How is our infrastructure performing?

Current Performance

Number of City-side sewer backups 138 / Year	Gravity Sewer blockage resulting in a back up 7.1 /100 km / Year	Volume of wastewater treated 30,570,484 m ³	Number of sewage bypass events 12 / Year
Total number of reported overflows 7 / Year	Quantity of maintenance hole (MH) inspections 1188 / Year	Flushing and cleaning program 27% of network	Quantity of MH structure rehab 69 / Year

Condition by Asset Class

Legend:	Sanitary Sewer		Facility		
	Material	Condition Rating	Grade	Condition Rating	Grade
Very Good	PVC	1.7	A-	Lift Stations	3.3 C+
Good	Concrete	2.3	B+	Wastewater Treatment Lagoons	4.8 D-
Fair	HDPE	1	A+		
Poor	Steel	3.3	C+	Wastewater Treatment Plants	3.9 C-
Very Poor	Cast Iron	3.7	C-		
	Polyethylene	1.2	A+		
	AC Cement	3.5	C		
	Vitrified Clay	3.8	C-		
	Ductile Iron	1.5	A		

Expected Service Life (Examples)

PVC Sewer 105 Years	AC Cement Sewer 55 Years	Concrete Sewer 90 Years	Cast Iron Sewer 60 Years
HDPE Sewer 80 Years	Steel Sewer 60 Years	Maintenance Hole 70 Years	Service Connection 60 Years

Community Energy and Emission Plan (CEEP) Applicable Goals

Goal 6: Achieve 90% solid waste diversion by 2050. An organics and biosolids anaerobic digestion facility is operational by 2030.

Current Performance

- Detailed energy studies have been completed for wastewater treatment facilities and implementation of the recommendations are in progress. Recommendations include upgrades to energy consuming equipment. Efficiency has always been a top selection criteria for equipment. However, in many cases, equipment must also be sized up to accommodate required capacity.
- I&I (Inflow and Infiltration projects underway for Lively, Chelmsford, Azilda, and Flour Mill
- New subsidy created to disconnect storm water connections from sanitary sewers

Energy Consumption: (Plants and Lift Stations)	Electricity (kWh) 14,170,000	Natural Gas (m ³) 295,600
--	--	---

B Storm Water Management

Good Condition
(2.5 out of 5)

Storm Water Management is comprised of two main asset types: land drainage and storm water management.

Land drainage infrastructure includes storm water collection and conveyance assets such as ditches, municipal drains, catch basins, manholes and gravity mains.

Storm water management infrastructure includes ponds and oil and grit separators to protect people, property and the environment.

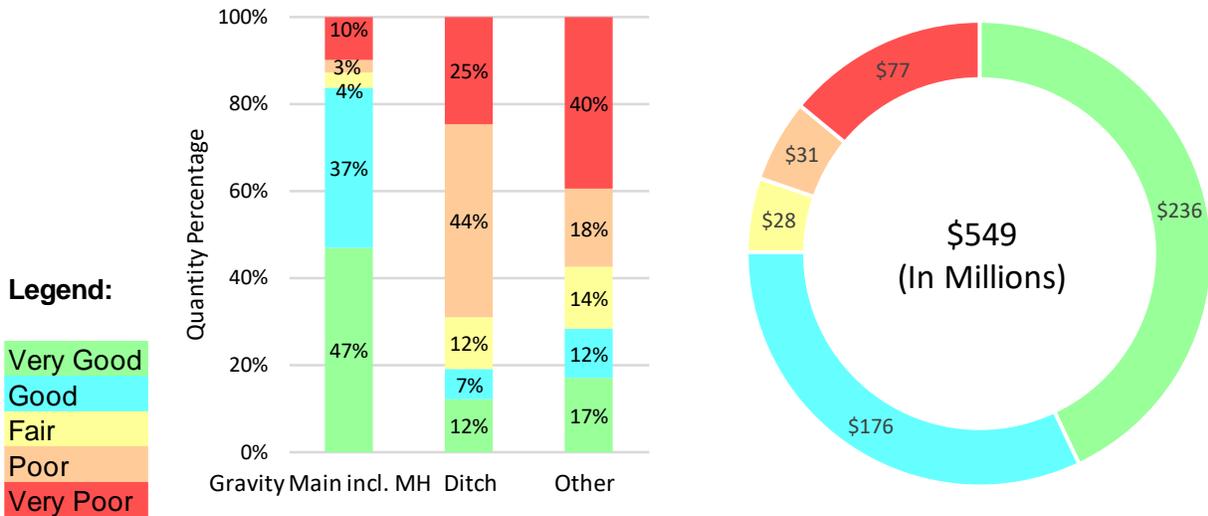
The City's geographic area ensures that the City must maintain a large storm water management system.

Overall, storm water management infrastructure is in **GOOD** condition.

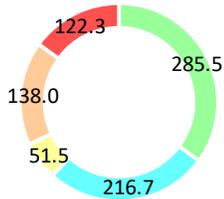
The storm water system is relatively new and this is reflected in the condition. However, investment including additional maintenance is required to ensure the system continues to serve the community.

Inventory: The Storm water Management System includes 537 km of storm water mains, 277 km of ditches (urban), 8,600 maintenance holes, 8,744 catch basins, 2,751 discharges/outlets, 3,372 inlets, 15 ponds and 24 oil and grit separators.

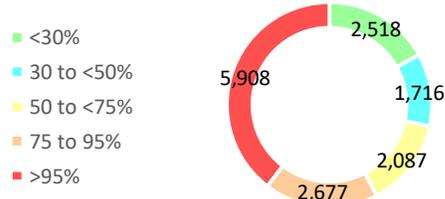
Condition and Total Replacement Value



Linear Condition and Quantity (km)



All Other Condition and Quantity (ea.)



Expenditure	
Historical Investment (5 Year Average)	\$2,500,000
Capital Funding Gap	\$1,600,000

The historical investment for Storm Water Management is contained within the Roads budget. The Drainage items in the Capital Budget are studies and new infrastructure.

Infrastructure Need	
Average Annual Reinvestment Need	\$4,100,000
Annual Maintenance Infrastructure Need	\$6,400,000

Data Confidence Rating	
C	Please refer to confidence rating provided in Methodology.

Storm Water Management

Current Asset Level of Service

How is our infrastructure performing?

Current Performance

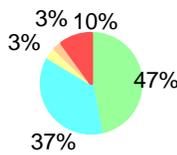
Annual culvert cleaning 4% of inventory	Annual catch basin & manhole cleaning 20% of combined inventory	Annual inspection & cleaning of OGS 100% of OGS inventory	Spring cleanup street sweeping 100% Annually
Spring cleanup sidewalk sweeping 100% Annually	Storm sewer flushing and CCTV inspection 1% Annually	Roadside ditching urban 4% Annually	Roadside ditching rural 4% Annually

Condition by Asset Class

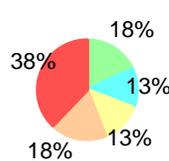
Legend:

Very Good
Good
Fair
Poor
Very Poor

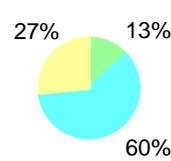
Storm Sewer & MH



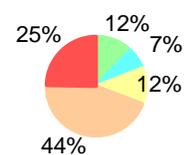
Catch Basins



Ponds



Ditches



Oil and Grit Separators (OGS)



Expected Conservative Service Life (Examples)

HDPE Storm Sewer 80 Years	CSP Storm Sewer 30 Years	Concrete Sewer 90 Years	AC Sewer 55 Years
Catch Basin 70 Years	Oil and Grit Separators 50 Years	Maintenance Hole 70 Years	Ponds 25 Years

Community Energy and Emission Plan (CEEP) Applicable Goals

Goal 8: Achieve 35% active mobility transportation mode share by 2050.

Current Performance

Street Bike Lane Sweeping 100%	Spring Cleanup Sidewalk Sweeping 100%
--	--

B Fleet and Equipment

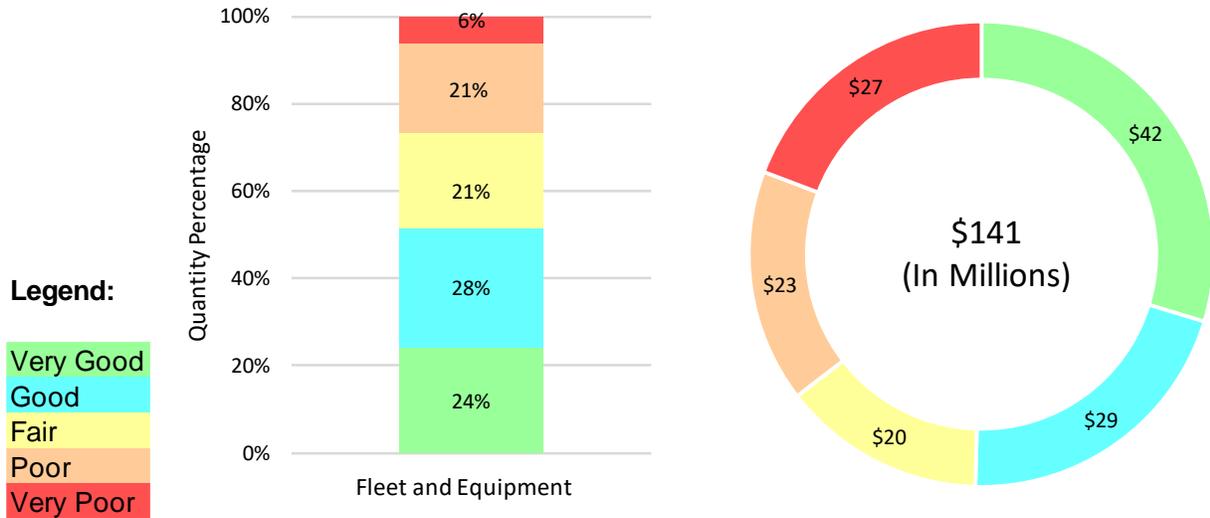
B - Fleet and equipment includes assets that support services such as: employee transportation; the GOVA transit system; parks and recreation facility management; emergency services; and municipal road, sewer and water maintenance.

Good Condition
(60 out of 100)

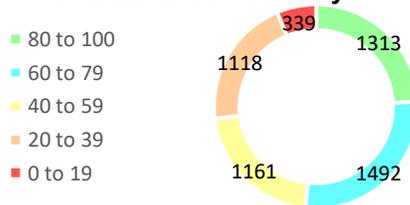
Furthermore, fleet and equipment includes: fuel and oil supply and fill station infrastructure. Overall, Fleet and Equipment infrastructure is in **GOOD** condition.

Inventory: The City owns a fleet of 570 vehicles, 4,738 pieces of equipment and 115 bus shelters. The inventory includes: heavy, medium and light duty vehicles, ambulances, fire trucks, GOVA bus, heavy equipment, municipal tractors and light diesel equipment, paramedic equipment, fire equipment, bus stop shelters, park maintenance equipment and various operating equipment

Condition and Total Replacement Value



Condition and Quantity



Expenditure	
Historical Investment (5 Year Average)	\$8,000,000
Capital Funding Gap	\$2,600,000

The funding gap is the unfunded value of infrastructure renewal needs that require attention as of the current year.

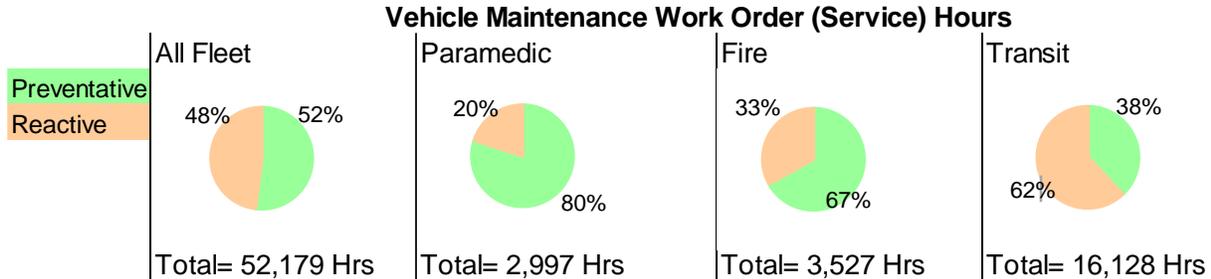
Infrastructure Need	
Average Annual Reinvestment Need	\$10,600,000
Annual Maintenance Infrastructure Need	\$12,700,000

Data Confidence Rating	
B	Please refer to confidence rating provided in Methodology.

Fleet and Equipment

Current Asset Level of Service

How is our infrastructure performing?



Total Annual Mileage

All Fleet	Paramedic	Fire	Transit
≈11,700,000 kms	≈1,400,000 kms	≈1,300,000 kms	≈3,700,000 kms

Average Annual Engine Hours

Municipal Tractors and Light Diesel	Heavy Equipment
381 Hours	621 Hours

Expected Service Life (Examples)

Light Duty Vehicle	Medium Duty Vehicle	Snowplow	Solid Waste Packer
10 Years	10 years	10 Years	10 Years
Ambulance	Fire Truck	Transit Bus	Transit Shelter
7 Years	20 years	15 Years	15 Years
Municipal Tractor	Heavy Equipment	Difibrillators	Power Stretcher
12 Years	15 years	7 Years	6 Years
Structural Hose	Fire Bunker Gear	Zero-Turn Mower	Ice Edger
20 Years	10 Years	15 Years	20 Years

Community Energy and Emission Plan (CEEP) Applicable Goals

Goal 7: Enhance Transit Service to increase transit mode share to 25% by 2050

Goal 9: Electrify 100% of transit and City fleet (vehicles) by 2035

Current Performance

# of Hybrid Vehicles	# of Electric Vehicles	Rate of Fleet Electrification
31	0	0
GOVA Ridership	GOVA Service Hours	Fuel Consumption (litres/year)
4,605,502	>180k/yr	4,570,000
(Pre-COVID)		

As mandated within the CEEP, Greater Sudbury will begin to electrify its fleet in the coming years. Electric vehicle charging stations will be installed as required as part of the fleet electrification.

B Municipal Parking

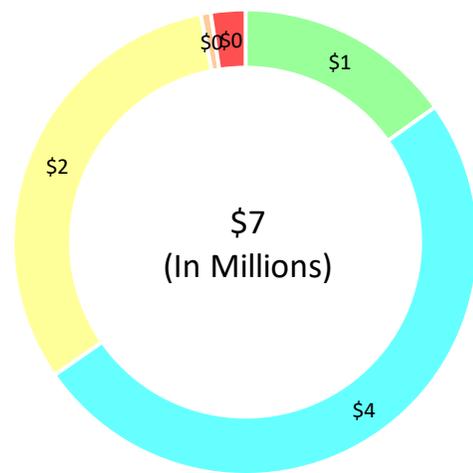
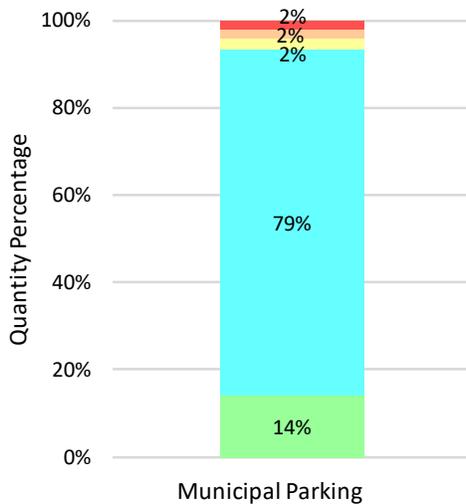
Good Condition
(67 out of 100)

The City of Greater Sudbury recognizes the need to ensure that downtown land uses remain supported by an effective transportation infrastructure network. The Downtown Master Plan anticipates that the planned intensification of the downtown will be supported through incremental investments in active transportation infrastructure and parking.

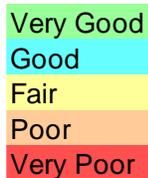
The downtown parking system provides two types of parking opportunities, permit and pay parking. Permit parking allows users to purchase monthly passes, while pay parking allows users to purchase parking time on demand on an hourly or shorter period. Overall, the municipal parking infrastructure is in **GOOD** condition.

Inventory: The City owns 12 municipal parking lots, however maintains 13 municipal parking lots as one lot is leased. Of the 12 municipal parking lots, 10 are paved and 2 are gravel. Other parking inventory includes: 230 meters, pay machines, kiosks and ticketing equipment, light standards and signs.

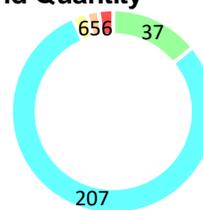
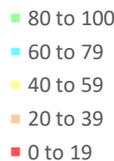
Condition and Total Replacement Value



Legend:



Condition and Quantity



Expenditure	
Historical Investment (5 Year Average)	\$107,000
Capital Funding Gap	\$0

The average annual reinvestment need is elevated when compared to the 5-year historical investment. However, existing parking revenue will permit additional expenditure as required.

Infrastructure Need	
Average Annual Reinvestment Need	\$195,000
Annual Maintenance Infrastructure Need	\$110,000

Data Confidence Rating	
B	Please refer to confidence rating provided in Methodology.

Municipal Parking

Current Asset Level of Service

How is our infrastructure performing?

Current Performance			
Quantity of on-street spaces 438 Spaces	Quantity of spaces in municipal lots 1721 Spaces	Quantity of Lots with illumination 6 Lots	Average hourly rate for on-street parking \$1.30 /hour (2019)
Parking tickets per 100k population 10949 /100k (2019)	Parking revenue per space managed (2019) \$1,238.27	Operating Cost per space managed \$657 /space (2019)	Revenue to cost ratio for spaces managed 1.88 (2019)

Expected Service Life (Examples)			
Paved Lot <u>60 Years</u>	Gravel Lot <u>60 Years</u>	LED Light Fixture <u>100,000 Hours</u>	Light Pole <u>40 Years</u>
Parking Meters <u>20 Years</u>	Parking Ticket System <u>5 Years</u>	Pay Machines <u>10 Years</u>	Light pole ESL will be monitored. Lot poles are not exposed to the same quantity of salts as on-street light poles.

Community Energy and Emission Plan (CEEP) Applicable Goals

Goal 8: Achieve 35% active mobility transportation mode share by 2050.

Current Performance

- All municipal parking lots and spaces are located in or around the downtown core.
- Parking in the municipal lots on the downtown perimeter are lower cost than parking within the downtown core. All parking lots are connected to the downtown by sidewalk promoting walking into the downtown area.
- Solar Panels are installed with all new pay-by-plate technology.
- All new or retrofitted lighting fixtures receive LED lights and photocell technology to ensure optimal usage during dark hours only.

2.7. Infrastructure Deficit and Annual Funding Gap

Greater Sudbury must balance a multitude of competing spending priorities with limited resources. As the City's infrastructure ages, the need to make sustainable, well-timed infrastructure investments is essential to continue to deliver high-quality services to the community.

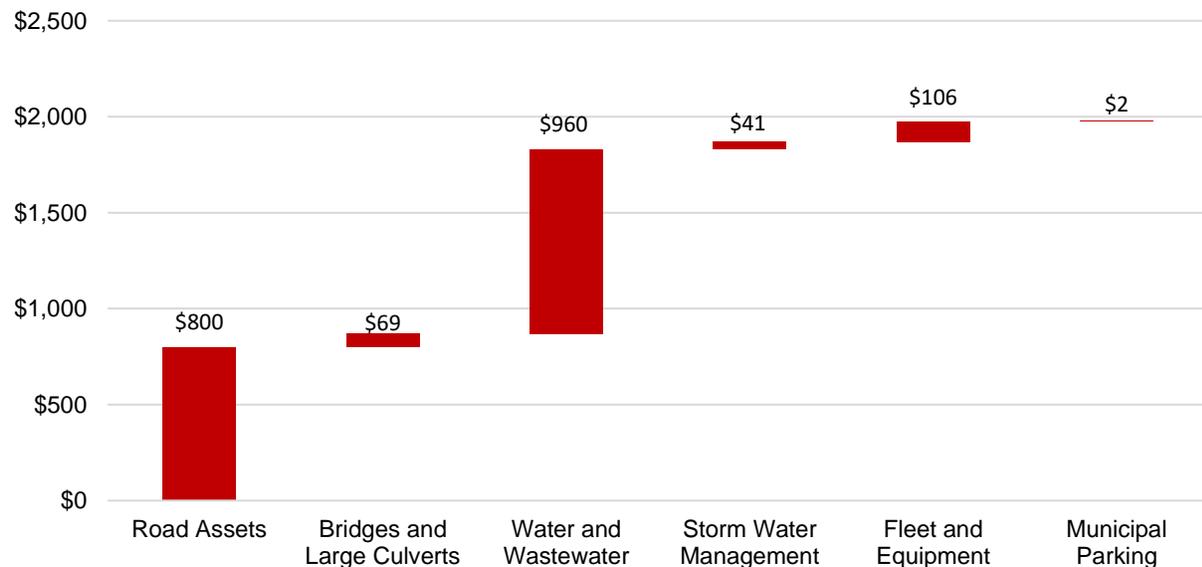
A combination of department-specific and city-wide financial strategies are required to effectively address the infrastructure deficit.

The infrastructure need detailed in the asset management plans are prepared for appropriate periods of time that were determined by the service life duration of the asset class. For example, a road or a sanitary sewer will have different service lives while also having significantly longer service lives than fleet or equipment. The capital need is based upon lifecycle management strategies required for the selected period of time.

As defined in Section 2.2: Methodology and How to Read the Infrastructure Report Card, the average annual reinvestment requirement (AAR) is the mean investment required for a selected period of time. The AAR is useful for defining the required rate of funding based on the investment profiles prepared for various asset classes. With the average annual reinvestment requirement, the City may either benchmark infrastructure investment against the AAR metric while monitoring the variability year to year, or contribute to reserves in years where the annual investment is short of the average annual reinvestment value.

The average annual reinvestment requirement over a 10-year period (AAR_{10}) of various asset classes are provided in Figure 4. This demonstrates the capital infrastructure investment requirement during the next ten year period which is equal to \$1,978M.

Figure 5: Capital Infrastructure Investment Requirement over the next 10-Years in Millions



Following the identification of the average annual capital requirement by asset class, the capital reinvestment needs are compared to the recent annual capital budget to determine the

adequacy of the funding for the sustainability of the infrastructure. The comparison yields the financial risk associated with asset ownership known as a funding gap as defined in Section 2.2: Methodology and How to Read the Infrastructure Report Card. The annual funding gap is provided in Table 3.

Asset Class	Average Annual Reinvestment Requirement	Mean (5-Year) Capital Investment	Annual Funding Gap
Road Assets	\$80,000,000	\$35,000,000	\$45,000,000
Bridges and Large Culverts	\$6,900,000	\$7,500,000	\$0
Water and Wastewater	\$96,000,000	\$41,900,000	\$54,100,000
Storm Water Management	\$4,100,000	\$2,500,000	\$1,600,000
Fleet and Equipment	\$10,600,000	\$8,000,000	\$2,600,000
Municipal Parking	\$195,000	\$107,000	\$0
		Total =	\$103,300,000

With an annual funding gap of \$103.3M, the City has not yet reached the sustainable funding levels required to stop the backlog from growing. It should be noted that assets included in the backlog are not necessarily performing poorly, they will soon be in need of replacement or rehabilitation in order to ensure continued service delivery.

Addressing the Capital Funding Gap

In recent years, Greater Sudbury has taken many steps to increase capital funding and maintain infrastructure asset level of service. Most notably, Council has approved a 4.8% annual increase to the water and wastewater rates for 2020 and 2021 and the annual increase is proposed-over a 20-year period as recommended in the City of Greater Sudbury Water and Wastewater Long-Range Financial Plan revision dated April 2019. Prior to this revision, Council had approved annual rate increases of 7.4% from 2016 through 2019, in an effort to address the capital funding gap. The annual increase to the water rate steers the City on the path to sustainability for water and wastewater service delivery.

This Council direction will allow the City to increase water and wastewater annual reinvestment expenditure up to \$117M by the year 2039; effectively narrowing the funding gap. The latest Water and Wastewater Long-Range Financial Plan is subject to a revision every 5 years, with the next revision scheduled for the year 2024.

Within the City of Greater Sudbury Municipal Asset Management Plan (2016) prepared by KPMG, it was recommended that the City pursue a municipal levy increase of 2% per year in order to fund capital expenditures. Within the 2020 Capital Budget, Council approved a 1.5% special capital levy for investment into existing infrastructure renewal.

With the relatively newer capital prioritization model implemented by City staff, Greater Sudbury has addressed the recommendation from the previous asset management plan to fund projects that:

- Provide the greatest impact to residents and focus on core services;
- Address the greatest risks;

- Align with the City’s strategic direction and priorities.

An additional recommendation from the previous asset management plan is to make use of borrowing for infrastructure investments. Historically, borrowing as a means of funding infrastructure investment has not been commonplace for Greater Sudbury. However, recent decisions by the current Council have been more accepting of borrowing. Additionally, the City does look for opportunity to periodically debt finance infrastructure investment as per the recommended criteria provided below; conditional upon one or more of the following:

- The principles of debt financing are in accordance with the City of Greater Sudbury Debt Management Policy; **and**
- The infrastructure investment will provide a stream of non-taxation revenues that can be used to fund some or all of the associated debt servicing costs; and/or
- The City requires debt financing to fund its portion of infrastructure projects that are cost shared with senior government; and/or
- The infrastructure investment is unavoidable as a result of regulatory changes or concerns over public health and safety and cannot be funded through other means; and/or
- The associated debt servicing costs would not jeopardize the City’s financial sustainability or result in the City exceeding its annual debt repayment limit.

Furthermore, as asset management planning progresses, Council will have the ability to set target levels of service to mitigate the financial risks of infrastructure ownership. Provincial Regulation requires that Greater Sudbury not only identify target levels of service, but provide an explanation of why the targets are appropriate and why they are achievable. The City must demonstrate the ability to fund the targets by providing financial plans that will lead the path to sustainability.

To effectively achieve this requirement, the upcoming target level of service discussion will focus not only on the finances available to fund service delivery, but also the risk associated with service delivery. In some cases, the risk of a declining asset condition may be acceptable to a certain degree. At the appropriate time, detailed service level scenarios will be prepared for Council’s review and discussion.

2.8. Future Demand

The entirety of the City’s infrastructure assets are monitored and benchmarked against future demand. The most significant future demand drivers are growth, the aging population and population health. Greater Sudbury has implemented preventative measures in anticipation of the demand drivers. In some cases, the preventative measures are linked through accompanying documents; for example, the Transportation Master Plan, the Water/Wastewater Master Plan, and policy initiatives that have been initiated by various departments. Preventative measures may include:

- An increase in capacity to accommodate additional traffic volume or diverting traffic from high traffic zones;
- An increase in capacity of water treatment and distribution along with sanitary sewer collection and treatment;
- Realignment of the City’s public transit route system and scheduling;
- Review of fleet and equipment usage and service requirements prior to replacement;

- A Health Promotion service with Paramedic Services in collaboration with health care stakeholders in the northeast.

2.9. Climate Change

In September 2020, Council approved the Community Energy Emissions Plan (CEEP) that is the long-term plan to reduce carbon emissions and pollution in Greater Sudbury. The CEEP is a response to the City of Greater Sudbury Council's Climate Emergency declaration in May 2019. The CEEP outlines 18 goals that need to be met to attain the City's target of becoming a net-zero greenhouse gas (GHG) emission community by 2050. For further information with respect to the Community Energy Emissions Plan, please visit:

<https://www.greatersudbury.ca/live/environment-and-sustainability1/net-zero-2050/>.

Global climate models for the City of Greater Sudbury geographic area are available through various online resources, namely:

- [Climatedata.ca](https://climatedata.ca/), undertaken with the support of Environment and Climate Change Canada;
- [Climateatlas.ca](https://climateatlas.ca/), undertaken with the support of Environment and Climate Change Canada, Public Health Agency of Canada, and Health Canada.

The City is beginning to monitor the effects of climate change on its infrastructure assets. The data provided in the aforementioned websites suggest that it is a possibility that there will be an increase in precipitation and an overall increase in mean temperature for the municipality. The climate projection scenarios from climateatlas.ca suggest that the increase in mean temperature within the Greater Sudbury area may result in the possibility of a decrease of freeze-thaw days, additional summer days, more very hot days and additional tropical nights. In a tropical night scenario, temperatures do not drop below 20°C.

A. Appendix A: Enterprise Asset Management Policy

A.1. Introduction

Asset management planning is the process of making the best possible decisions regarding the acquisition, operating, maintaining, renewing, replacing and disposing of infrastructure assets and is regarded as best practice for long-term financial planning. The objective of the City of Greater Sudbury Enterprise Asset Management Policy is long-term sustainability through principles which target a coordinated and consistent asset management approach for all asset classes in accordance with *O. Reg. 588/17: Asset Management Planning for Municipal Infrastructure*.

The City of Greater Sudbury (the City) strives to ensure a high quality of life is provided to the public through municipally funded services including water and wastewater services, stormwater management, intricate transportation networks, public transit, emergency services, sport and recreation, cultural services and solid waste management.

Many of the assets belonging to the City have long-term lifecycles spanning over decades such as roads networks and buildings, while other asset lifecycles are short in comparison such as advancing technology and security or capacity requirements. Long-term lifecycles require operational maintenance and rehabilitation or renewal activities to ensure the established levels of service are delivered.

Over time the City has addressed the development and implementation of asset management strategies to manage asset lifecycles. The City has proactively examined and implemented long-term rehabilitation and replacement strategies through condition assessments and reporting on the state of the infrastructure.

As of the year end 2020, the City has a total historical infrastructure investment of \$3.3 billion; for which an estimated total replacement cost of over \$10.5 billion has been determined. These tangible capital assets contribute to the high quality of life enjoyed by city residents and are essential to deliver the necessary levels of service. The total historical infrastructure investment detailed by year of expenditure is detailed below.

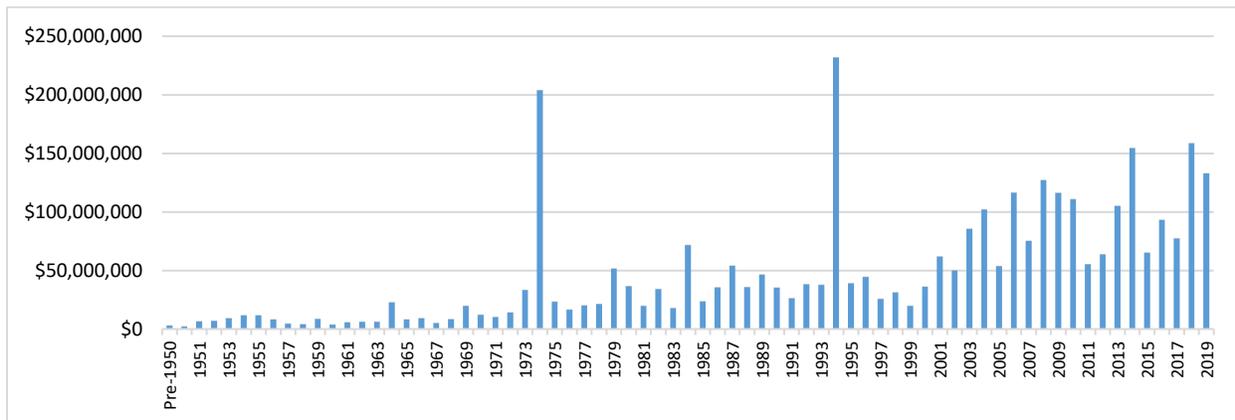


Figure 1: Asset Investment History for ALL Infrastructure (2020)

The Enterprise Asset Management program strives to achieve sustainability through established levels of service, asset level of service, cost effective life cycle management and risk assessment. This policy will play a critical role in guiding the development of consistent asset management practices across the City.

A.2. Policy Statement

The City of Greater Sudbury ensures its municipal infrastructure systems are supported by plans and financing decisions that demonstrate effective service support and appropriate regard for managing lifecycle costs.

A.3. Application

This policy applies to the lifecycle management activities of physical assets that are owned and operated by the City of Greater Sudbury. This policy sets out the organization's commitments and expectations for decisions and activities concerning asset management.

A.4. Purpose

This policy provides guidance applicable to the whole organization and all of its services to minimize the risk of service interruption or increased cost due to asset failure while supporting the consistent delivery of expected service levels.

A.5. Terms and Definitions

Asset: a) are held for use in the production or supply of goods and services, for rental to others, for administrative purposes or for the development, construction, maintenance or repair of other tangible capital assets;
b) have useful economic lives extending beyond an accounting period;
c) are used on a continuing basis; and
d) are not for resale in the ordinary course of operations.

Asset Level of Service (ALoS): The condition and performance expectation for a given asset in order to produce desired levels of service.

Asset Management: The systematic and coordinated activities and practices of an organization to optimally and sustainably deliver on its objectives through cost-effective life cycle management of assets.

Asset Management Plan: Long-term plans that outline the asset activities and programs for each service area and resources applied to provide a defined level of service in the most cost-effective way.

Enterprise Asset Management Program: The application of asset management principles and practices on an enterprise level to ensure a consistent, coordinated, cost effective and sustainable approach across all City departments to achieve the enterprise asset management goals.

Fiscal Stewardship: The representation of planning, attention, conservancy, care and management of the City's financial resources.

Life-Cycle: The time interval stages involved in the management of an asset beginning with the identification of the need for the asset, through design, construction and commissioning, maintenance and rehabilitation of the asset and concluding with the decommissioning and disposal of the asset.

Life-Cycle Costs: The total cost of an asset through its life including planning, design, construction, acquisition, operation, maintenance and rehabilitation and disposal costs.

Levels of Service (LoS): describes the outputs or objectives an organization or activity intends to deliver to customers via the respective asset class.

Risk Management: Coordinated activities to direct and control an organization with regard to risk.

Strategic Plan: A plan containing the long-term goals and strategies of an organization. Strategic plans have a strong external focus, cover major portions of the organization and identify major targets, actions and resource allocations relating to the long-term survival, value and growth of the organization.

A.6. Enterprise Asset Management Goals

To provide a framework and principles for asset management strategies that:

- Ensure legislative requirements are achieved;
- Create understanding about and optimize asset life-cycle costs while maintaining acceptable levels of service;
- Ensure existing and future asset needs are prioritized;
- Link investment decisions to service outcomes;
- Demonstrate financial sustainability through full life-cycle cost planning;
- Focus on long-term considerations and decision making.

A.7. Principles

The City owns, operates and maintains a wide variety of assets. The objective of the Enterprise Asset Management Policy is to ensure acceptable levels of service over the long term are satisfied by appropriate asset management practices throughout an asset's service life.

Asset Management guiding principles and practices will help to achieve the City's goals to provide the required services to support community needs by:

- Establishing full life-cycle costing principles aligned with asset management strategies that minimize ownership costs over the asset's service life;
- Maintaining assets in order to deliver defined levels of service that meet legislative requirements and customer expectations;

- Reducing reactive maintenance by emphasizing a planned asset maintenance approach;
- Risk management strategies to support service delivery at expected levels of service;
- Clear and continuous connections to the corporation's long-term financial plan and related financial policies;
- A system of performance monitoring and reporting on asset level of service and the impacts of potential changes in policy, levels of service or risk;
- Desired asset level of service will inform choices about appropriate maintenance strategies;
- Coordinate asset management planning to provide connection with multiple interrelated assets;
- Development and evolution of asset management knowledge, messaging and competencies across the corporation and with the public to ensure participation, feedback and appropriate use of the Enterprise Asset Management Program;
- Capital assets that the City does not require to meet its current or future program or operational needs are disposed;
- Align Infrastructure planning and priorities with the principles outlined in Section 3 of the Infrastructure for Jobs and Prosperity Act, 2015 including:
 - alignment with Ontario's land-use planning framework;
 - promote economic competitiveness and innovation;
 - continued provision of core public services such as health care and education;
 - protect the health and safety of workers involved in the construction and maintenance of infrastructure assets.
- Minimize the impact of infrastructure on the environment and design infrastructure to be resilient to the effects of climate change. Monitor vulnerabilities caused by climate change and anticipate costs to manage vulnerabilities.
- Maintain assets to protect the safety of the public and health & safety of our employees.

A.8. Key Documents in the Asset Management Framework



Figure 2: Key Documents in the City's Asset Management Framework

A.8.1 Corporate Strategic Planning Documents

The mission of the City of Greater Sudbury as detailed in strategic planning documents provides the overall direction and requirement for Asset Management Policy and Planning. The annual work planning process drives the production of the budget which is the authoritative source of levels of service. These levels of service place a demand on assets.

A.8.2 Enterprise Asset Management Policy

The Asset Management Policy will establish the goals and outline the key principles for the enterprise asset management program. This policy is intended to provide clear asset management direction.

A.8.3 Enterprise Asset Management Plan

The Asset Management Plan will be developed in accordance with Building Together – Guide for Municipal Asset Management Plans, the International Infrastructure Management Manual, 2015, O.Reg. 588/17: Asset Management Planning for Municipal Infrastructure, 2017 and the principles included in Section 3 of the Infrastructure for Jobs and Prosperity Act, 2015.

Information collected and analyzed shall include:

- Sustainable financial planning with an understanding of impacts on the level of service delivered;
- Changing demographics and economic trends;
- AODA accessibility standards, Water Opportunities Act, Safe Drinking Water Act, Occupational Health and Safety Act, Ontario's land-use planning framework, Planning Act, and other applicable legislation and standards;
- An understanding of current asset inventories and condition, as well as projected performance, remaining service life, future needs and costs;
- A clear understanding of risks related to assets and the City's ability to mitigate the risks including consequences of failure and contingency planning;
- The feasibility of acquiring or constructing new assets.

The service rendered will be the determining factor of whether or not to include an asset in asset management plans. An asset with a role in service delivery that requires deliberate management will be included. The capital threshold outlined in the Tangible Capital Asset Policy and professional judgment will be used to determine which assets are to be included in the asset management plans.

A.8.4 Asset Management Strategy

The Asset Management Strategy requires collaboration between all personnel listed within section 9 Roles and Responsibilities.

The strategy will reflect levels of service expectations and the department's planned outcomes. Asset maintenance practices will continue to be developed and implemented with the objective of maximizing asset life-cycle and reliability by carrying out interventions at the right place and the right time considering budgetary and resource constraints.

The strategy will also include prioritization of required maintenance, rehabilitation and construction projects combined with budget requirements to be incorporated in the City's budget planning.

A.9. Roles and Responsibilities

Council

- Establish levels of service expectations.
- Approve the enterprise asset management plans.
- Approve asset investment and service delivery requirements for capital and operations through the annual budget process.

Executive Leadership Team

- The General Manager of Corporate Services is the executive lead for the Asset Management Program.
- Endorse asset management plans and strategies.
- Create an asset management governance structure.
- Develop administrative plans to address Council's level of service expectations.
- Demonstrate support for and encourage application of the Asset Management Principles.
- Produce a "State of the infrastructure" report to Council at least once per term.
- Ensure alignment of Asset Management Plans and Strategies with organizational objectives and strategies.
- Recommend asset investment and service delivery required for capital and operating through the annual budget process.

Asset Management Coordinator

- Establish policies and practices to ensure consistency across the corporation.
- Encourage information sharing throughout the departments.
- Provide input and guidance or assistance for development of asset class specific asset management plans following a standardized and consistent methodology.
- Provide support during the development of levels of service.

- Review, develop, recommend and implement asset management policies, guiding principles, plans and strategies.
- Review and monitor the performance of Asset Management Plan and Strategies for continuous improvement.
- Coordinate financial planning, strategic planning and information technology requirements.
- Produce reporting of asset class data.
- Ensure compliance with provincial asset management legislation and standards.
- Ensure accountability for implementation of goals and objectives.
- Lead the implementation of asset management initiatives.

Divisional and Sectional Leaders

- Ensure project, operations and maintenance work is consistent with enterprise asset management objectives.
- Liaise with all stakeholders with respect to asset management objectives and levels of service.
- Provide input and direction for development of divisional asset management plans.
- Responsible for the development and implementation of asset management plans and strategies.
- Coordinate sectional asset management reporting.
- Development of asset inventories, condition assessments and risk assessments.
- Develop and implement data collection requirements to meet asset management objectives.
- Lead the implementation of asset management initiatives.

Financial Services

- Provide financial business partnerships to departments.
- Ensure the financial stewardship of financial assets and records.
- Ensure consistent and pertinent financial reporting.

Asset Users and Operators

- Provide input on current levels of service.
- Provide input on current status of asset function and life-cycle.
- Provide input on asset needs to meet approved levels of service.
- Participate in the development and implementation of divisional asset management plans.
- Regularly review asset documentation, data collection requirements, data inputs/outputs and asset measurement tools for relevance with existing policies and practices.
- Respect assets under their care and responsibility including implementing any preventative maintenance programs, and operating in accordance with defined operating limits, guidelines, and regulatory limitations.

A.10. Legislation and Reference Materials

KPMG (2016) City of Greater Sudbury Municipal Asset Management Plan. KPMG, Sudbury, Ontario. (Online:

<https://agendasonline.greatersudbury.ca/?pg=agenda&action=navigator&lang=en&id=1034&itemid=11966>). November 28th, 2016.

Ministry of Infrastructure Ontario (2011) Building Together – Guide for municipal asset management plans. (Online: <https://www.ontario.ca/page/building-together-guide-municipal-asset-management-plans>). Queen’s Printer for Ontario, 2012.

Infrastructure for Jobs and Prosperity Act, 2015. (Online: <https://www.ontario.ca/laws/statute/15i15>). Queen’s Printer for Ontario, 2015.

Ontario Regulation 588/17: Asset Management Planning for Municipal Infrastructure. (Online: <https://www.ontario.ca/laws/regulation/r17588>). Queen’s Printer for Ontario, 2017.

City of Greater Sudbury Strategic Plan, 2019 - 2027. (Online: <https://www.greatersudbury.ca/city-hall/reports-studies-policies-and-plans/>)

The City of Greater Sudbury Official Plan, 2019. (Online: <https://www.greatersudbury.ca/city-hall/reports-studies-policies-and-plans/official-plan/>)

The City of Greater Sudbury 2021 Budget. (Online: <https://www.greatersudbury.ca/city-hall/budget-and-finance/2021-budget/>)

KPMG (2017) City of Greater Sudbury Municipal Long-Term Financial Plan. KPMG, Sudbury, Ontario. April 13, 2017. (Online: <https://www.greatersudbury.ca/city-hall/budget-and-finance/financial-reports-and-plans/>)

BMA (2019) City of Greater Sudbury Water and Wastewater Long-Range Financial Plan. BMA, Sudbury, Ontario. April 2019. (Online: <https://www.greatersudbury.ca/live/water-and-wastewater-services/projects-plans-reports-and-presentations/water-wastewater-financial-plan/wwwgreater-sudbury-final-report-april-2019-v2-pdf/>)

Various City of Greater Sudbury Plans for example the Transportation and Water and Wastewater Master Plans. (Online: <https://www.greatersudbury.ca/city-hall/reports-studies-policies-and-plans/>)

City of Greater Sudbury By-Laws. (Online: <https://www.greatersudbury.ca/city-hall/by-laws/>)

Fiscal Transparency and Accountability Act, 2004. (Online: <https://www.ontario.ca/laws/statute/04f27>). Queens Printer for Ontario, 2012 – 18.

Municipal Act, 2001. (Online: <https://www.ontario.ca/laws/statute/01m25>). Queen’s Printer for Ontario, 2012 – 18.

Water Opportunities Act, 2010. (Online: <https://www.ontario.ca/laws/statute/10w19>). Queen’s Printer for Ontario, 2012 – 18.

Accessibility for Ontarians with Disabilities Act, 2005. (Online: <https://www.ontario.ca/laws/statute/05a11>). Queen’s Printer for Ontario, 2012 – 18.

Safe Drinking Water Act, 2002. (Online: <https://www.ontario.ca/laws/statute/02s32>). Queen's Printer for Ontario, 2012 – 18.

Occupational Health and Safety Act, 1990. (Online: <https://www.ontario.ca/laws/statute/90o01>). Queen's Printer for Ontario, 2012 – 18.

Purchasing By-Law 2014-01 and amendment 2017-158. (Online: <https://www.greatersudbury.ca/city-hall/open-government/statutes-and-policies/>)

Greater Sudbury Community Energy and Emissions Plan (Online: <https://www.greatersudbury.ca/live/environment-and-sustainability1/net-zero-2050/>)

B. Appendix B: Asset Management Strategy

The intention of the City's asset management program is to effectively manage the lifecycle of infrastructure assets that deliver services to the community. Implementation of this program involves guidance provided by the Executive Leadership Team delivered to well-trained employees.

The asset management strategy outlines management's commitment to implementation of the Enterprise Asset Management Policy.

B.1 Purpose of the Asset Management Strategy

The purpose of the strategy is to support the Enterprise Asset Management Policy and Plan, which in turn supports delivery of the City's strategic goals and provides oversight for the lifecycle activities required to maintain the City's infrastructure assets.

Objectives for this strategy include:

- Develop practices aimed at improving sustainability and asset management across the City;
- Ensure that these asset management practices are applied consistently across the City;
- Provide guidance for the City to maintain its assets in appropriate condition to achieve the delivery of Council approved service levels through proper lifecycle interventions.

The asset management strategy is an integral component of the asset management plan; this strategy will be reviewed and updated with asset management plans as per legislative requirements. It is expected that this strategy will evolve in response to City and Community needs and challenges faced over time.

B.2 Asset Management Planning Activities

For the City to successfully adopt and implement principles that support sustainability through lifecycle and asset management, the City must consider:

- **Fit with strategic goals and asset needs:** Asset management must form a connection between strategic planning and daily operational activities.
- **Clear goals and objectives:** Clear and consistent communication of levels of service, asset management objectives and strategies to achieve service delivery across the organization and community.
- **Organization wide commitment:** A commitment from City staff is required to implement and develop asset management competencies.
- **Allocation of appropriate resources:** Required resources must be identified so they may be devoted to the implementation of asset management guiding principles.

The City will prepare four key documents to detail asset management planning activities. Table B1 provides an explanation of the four key documents.

	AM Policy	AM Strategy	AM Plans	State of the Infrastructure
What is it?	Outlines why and how asset management will be undertaken by the City.	Outlines the actions the City will implement to enhance and improve AM capability and achieve strategic goals and objective.	Long-term plans that outline the asset activities across the City that will enable delivery of the approved levels of service.	Reporting to Council on the existing state of the City's infrastructure.
Objective	Sets the broad framework for planning and implementing asset management in a coordinated way.	Provide structure of the actions that will enable the City to implement the asset management program.	Outlines the actions that must be implemented to deliver the defined levels of service in a cost effective way.	Outline to Council the condition of our existing infrastructure and the progress of the asset management program.

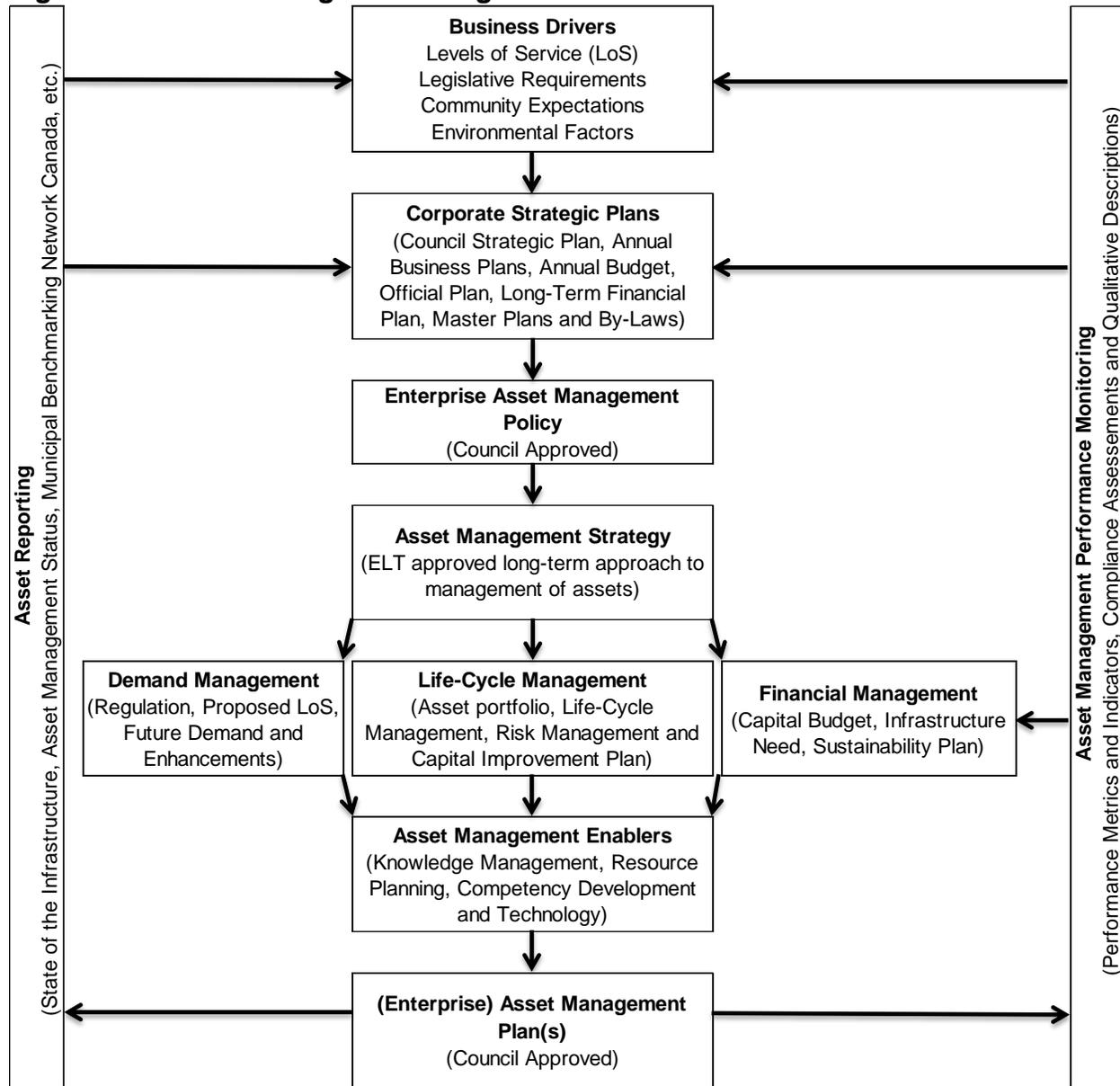
B.3 Asset Management Program and Framework

There are two requirements that form the foundation for the development of an asset management business framework that will support and improve the delivery of service levels. These requirements include:

- **Asset Management Process:** Asset management is a process that will influence City business practices including planning, service delivery and performance monitoring for improvement. Asset management will provide clarity for decision making through analysis of levels of service and the associated risk of service delivery. This analysis will outline alternatives that are aligned with performance and policy to determine appropriate allocation of resources.
- **Asset Management Principles:** Asset management is defined by a set of principles that address lifecycle management and costing; defined levels of service; demand management; risk management; asset level of service knowledge and management; inventory condition data and performance assessment and monitoring; and financial planning to sustainably delivery services.

The Asset Management Program framework is represented within Figure B1.

Figure B1: Asset Management Program Framework



The asset management program framework is the basis for all asset management activities within Greater Sudbury. Clearly defined and documented procedures within this framework will greatly enhance the City’s asset management ability to achieve service delivery objectives. These procedures should encompass the entire lifecycle of an asset and the expected asset level of service.

B.4 Level of Service (LoS) and Community Demand

A service level is a direction or requirement for a particular service area which performance may be measured. Asset (technical) levels of service will provide data that can be quantitatively and objectively measured to identify if service levels have been met.

There are 3 tiers of service level that are discussed in asset management planning, namely:

- **Community:** Qualitative descriptions that define the community, stakeholder and individual expectations.
- **Strategic:** Qualitative and quantitative measures that describe what is being provided to the community. Examples of how this can be defined can include reliability, legislative compliance, quantity, quality and safety.
- **Asset (Technical):** Quantitative measure that defines the performance expectations for a given asset in order to produce the desired levels of service. These services are measurable and can include asset condition, responsiveness, expenditure, and asset value.

The identification of existing and the development of target levels of service establish the foundation for the development of the City's asset management planning. Council will have the opportunity to define target levels of service as asset management planning evolves.

Current level of service performance will be monitored against target level of service to enable the City to identify 'if' and 'where' it is failing to meet service objectives. Consideration will include the consequence and cost of not achieving the target levels of service.

B.4.1 Performance Measurement

Performance measurement defines 'what', 'how much', 'how well' and the impact of what is being done in the community. Performance management utilizes key performance indicators to define, implement and maintain target levels of service.

B.4.2 Cost of Service Delivery for an Asset Class

The cost of service delivery provides valuable information to engage the community and stakeholders in meaningful discussion with respect to target level of service. Cost will influence the community appetite for what level of service should be provided, what changes to level of service are acceptable, and provides a basis for comparison with historic service levels and other service providers. Understanding the cost of service delivery can alter the community's perception of the value of services provided by Greater Sudbury acting as a very effective communication tool.

B.5 Failure Prediction and Risk Management

Failure prediction is performed to assess the potential for an asset to deliver an expected level of service over time. Current and historical condition performance data is analyzed to determine the current position of an asset within its lifecycle. This information informs a judgement about how much remaining service life is available.

Appropriate failure prediction will allow for maintenance and renewal strategies to be created with a greater degree of accuracy. These predictions provide the City time to consider all viable options for delivering levels of service and to manage pending failure in a timely and cost effective manner with an acceptable level of risk.

B.5.1 Risk Exposure

Risk management is a significant activity to support the lifecycle of an asset. The City's risk management goals involve identifying, understanding and managing the potential for

infrastructure assets to meet planned service objectives. Adopting best practices for managing and maintaining assets increase the potential for achieving planned service objectives.

Risk assessment helps to prioritize and optimize capital spending and decision making. Greater Sudbury evaluates both the Probability of Failure (PoF) and the Consequence of Failure (CoF) when prioritizing capital budget choices. This helps clarify and build a shared understanding about the risk associated with a decision to not invest in a project.

The PoF is an estimate of how likely an asset is to not meet its service expectations. The CoF is an estimate of the effects on outcomes if an asset actually fails. The consequences of failure could range from a service interruption to a catastrophic result depending on asset class. Where these assessments indicate an unacceptably high risk, a capital project is deemed to be a relatively higher priority as the cost of the project is often less than the element of risk or consequence.

Overall, the probability and consequence of failure allow decision makers to focus on assets that have the greatest impact on service delivery. The two attributes form the calculation of the total risk exposure to either proceed or not proceed with a specific project. Risk exposure is calculated as the product of the probability and consequence of failure, which aligns with the requirements set out in the City's Enterprise Risk Management Policy.

B.6 Asset Lifecycle Planning and Optimization

The majority of Greater Sudbury's assets have lifecycles that span several decades. For this reason, capital investments needs to examine the entire lifecycle cost associated with the decision to make the investment. Lifecycle management supports decision making that will optimize capital planning by considering the investment value of planning, design, construction, acquisition, commissioning, operation, maintenance and rehabilitation, decommissioning and disposal. Furthermore, reducing or disposing of assets the City does not require to meet its current or future operational needs is one of the asset management guiding principles.

Managing infrastructure assets presents the opportunity for a large range of intervention options that are detailed below. These intervention options may also be considered in combination with each other.

- **Do Nothing:** The option may reduce service delivery. There is minimal investment on planned maintenance or renewal. The option may increase the City's risk exposure, reactive maintenance and premature asset replacement.
- **Status Quo:** This option maintains the current and operational trend of an asset.
- **Non-Infrastructure:** Actions or policies that can lower costs or extend asset life. For example integrated infrastructure and land use planning, as well as demand and failure management.
- **Revised Operations:** Variations in operation could offer financial benefits through economies of scale or be necessary to achieve evolving service mandates.
- **Revised Maintenance:** Variations in maintenance could offer financial benefits through economies of scale or be necessary to achieve evolving service mandates. Variations in

maintenance strategies include preventative versus reactive maintenance which may allow an asset to run to failure.

- **Rehabilitation and Renewal:** Replace or reconstruct substantial elements or equipment extending the lifecycle of the asset. These timely interventions require extensive analysis on lifecycle longevity, existing condition and costs.
- **Decommission:** Remove the asset from service.
- **Replacement:** Replacement includes a complete reconstruction of an existing asset in the same or an altered geographic location. Rehabilitation and renewal is no longer a viable option.
- **Disposal:** Dispose of an existing asset due to a reduction in service delivery or an elimination of demand. Disposal may also include replacement with a new asset.
- **Expansion:** Expansion activities required to extend service delivery to previously un-serviced areas or to expand services to meet increased demand from growth.

Prior to proceeding with lifecycle intervention options, Greater Sudbury will analyze the existing and predicted risks involved with various scenarios. These risks will be compared with existing and predicted benefits involved with the same scenarios. Following analysis, the City will develop lifecycle management strategies for inclusion in asset management plans.

B.7 Capital Prioritization

Upon completing a lifecycle intervention analysis, Greater Sudbury must determine the availability of financing to achieve the recommended lifecycle investment program. In many cases, the optimal lifecycle interventions will exceed the capital and operational budget availability. This common scenario results in budget constraints that emphasize the requirement to implement citywide capital prioritization of projects.

To begin the process of capital prioritization, technical experts within City departments will prioritize projects using an enterprise-wide tool with consideration of cost, benefit, and risk management for the community. Once a project has been selected for potential funding as evaluated by a committee of peers within the City's organizational structure, the project will seek Council approval and may proceed on a one-time or multi-year funding program.

The balance of projects that do not proceed in a given year will be placed in a capital backlog program that will be revised annually.

Once annual prioritization peer review is complete, the Executive Leadership Team may endorse the capital budget on the basis of this prioritization.

B.8 Finance and Sustainability Strategies

In accordance with legislation, at a minimum the City will be planning for lifecycle activities that maintain existing or target levels of service for a 10-year period. Planning will include the asset level of service, risk, lifecycle interventions, as well as forecast to accommodate potential increases in service demand.

As part of each budget cycle, these asset level of service and lifecycle interventions will be taken into account when recommending the priority capital investments that will make their way into the capital budget. Council retains the ultimate authority to decide which investments are made.

Furthermore, in following the asset management roadmap, Council will be provided with the opportunity to determine level of service targets to manage infrastructure within the City's capacity to renew and maintain assets, and accept the associated risk. A sustainability strategy that identifies funding sources for each asset class will be prepared to achieve all Council approved target levels of service.

B.9 Maintenance and Operations Management

Greater Sudbury will strive to maintain its assets with the objective of minimizing the risk and the total cost of ownership. Improvement of efficiency and effectiveness through a structured proactive maintenance approach is the key component of this objective.

The goal of proactive maintenance is to improve reliability while reducing the probability of failure. This goal directly translates into lower levels of risk and lower lifecycle costs.

Reactive maintenance is completed in response to a high probability or an actual failure event. Often reactive maintenance is a response to assets that have run to failure. Despite the negative connotation with respect to allowing an asset to run to failure, at times this scenario is the optimal option in an asset's lifecycle. This is acceptable when the failure prevention costs become higher than the costs and consequences arising from failure.

B.9.1 Maintenance Intervals

Maintenance intervals for many assets are determined on a fixed interval basis. Fixed intervals can be a period of time within service life consumption, operating hours, distance traveled, among other measurement parameters. Often these parameters are determined within technical or manufacturer's specifications. In situations where maintenance intervals are not predetermined the City will consider:

- Consequences of failure;
- Level of service delivery required;
- Appropriate performance measurement parameters;
- Frequency or usage measurement parameters.

Condition may also be a determinant for maintenance intervals for many assets. A predetermined condition may trigger an increased monitoring program, inspection, or servicing.

C. Appendix C: Asset Management Plans by Asset Class

Intentionally Blank