Asset Management Status Report

1. Background

Asset management is the systematic and coordinated activities and practices of an organization to optimally and sustainably deliver on its service objectives through cost-effective life-cycle management of assets. In 2018, City Council approved an 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.

A State of the Infrastructure Report (SOIR) will be prepared at least once per term of Council as outlined in the Enterprise Asset Management Policy. The SOIR will provide comprehensive information regarding the major asset classes managed by the City. To complement the SOIR, staff will prepare an asset management status report annually.

The purpose of this document is to present the annual asset management status report. The report discusses asset management planning activities, progress, and information on the performance of asset classes. This is a follow up to the Asset Management Status Report presented to the Finance and Administration Committee on October 22nd, 2019.

The previous Asset Management Status Report provided definition of the key steps that the City must perform in-order to meet the Enterprise Asset Management Policy requirements. The key steps that where discussed include: defining level of service, failure prediction of an asset, risk management and assessment, asset life-cycle planning and optimization and financial strategy. The annual report will continue to evolve along with the dynamic asset management program with evaluation of the state of the City's infrastructure supported by asset data that will drive capital investment and long term asset management strategies.

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 of its infrastructure assets that comply with legislation. This includes describing the asset's expected service level and performance based on technical data. This information is required to comply with O. Reg. 588/17, and must be based on data from at most the two calendar years prior to 2021 or 2023, the legislated Phase 1 and 2 completion deadlines.

The asset condition information, financial need and associated risks that are discussed in this report reflect best available data and professional judgment. Work continues to refine data collection activities and manage the evolution of our asset management program.

2. The Asset Management Roadmap

Key steps that must be performed to develop and implement effective asset management plans are detailed in the Figure 1 below.

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. In the short term, activity is focused on data collection and analysis to identify existing level of service, quantifiable risk and infrastructure need. Over the next several years, activities are focused on the development of a sustainable financing strategy to achieve target level of service at an acceptable level of risk.

Figure 1: The Asset Management Roadmap

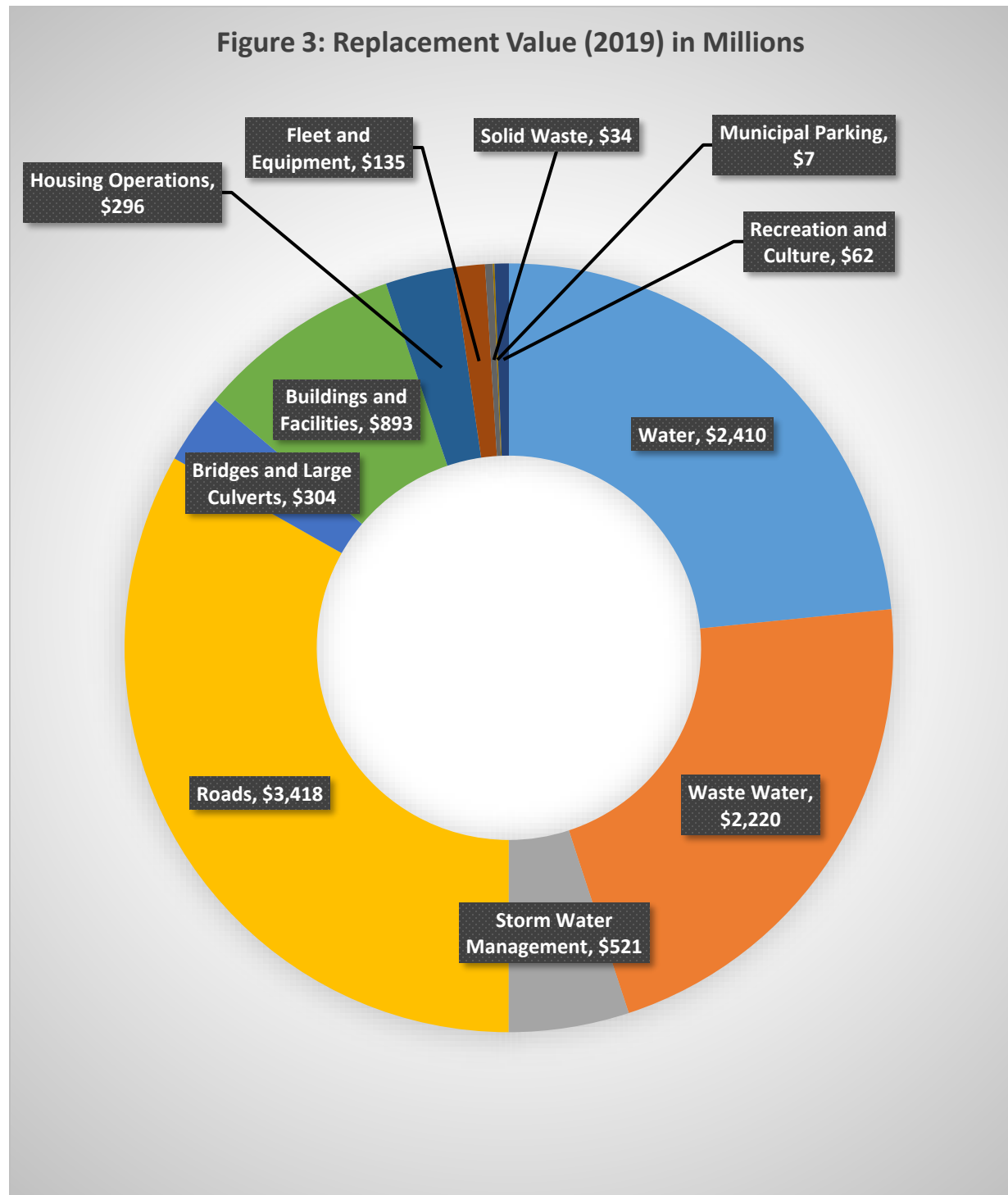| A) Assess →	B) Plan →	C) Implement
1. Framework • Asset Management Policy • Review Asset Management Practices • Develop Council Reporting	**4. Modeling** • Criticality • Failure Prediction • Climate Change Resiliency • Risk Management Framework	**7. Benchmark** • Target Level of Service Framework • Review Existing and Generate Additional Key Performance Indicators
2. Need and Gap Analysis • Data Availability • Data Collection Practices • Path to Improvement	**5. Prioritization** • Asset Lifecycle Planning and Optimization • Cost Benefit Analysis • Project Scheduling	**8. Sustainability Strategy** • Financing Strategy for Target Levels of Service • Plan to manage infrastructure within the City's capacity to renew and maintain assets, and accept the associated risk • Cost & Asset Tracking
3. Assessment • Data Analysis • Asset Performance • Legislative and Industry Standards • Levels of Service	**6. Financial Strategy** • Long-Term Needs • Capital expenditure and significant operating costs to maintain life cycle activities • Funding Gap • Future Demand	**9. Execution** • Monitor Performance of Asset Management Program

3. City of Greater Sudbury Asset Value

The corporation has a historical capital investment of $3.22B (2019) invested into infrastructure assets that is detailed in Figure 2. The expenditure data to develop Figure 2 is managed within the City's Tangible Capital Asset Database.

Figure 2: Asset Investment History (2019)
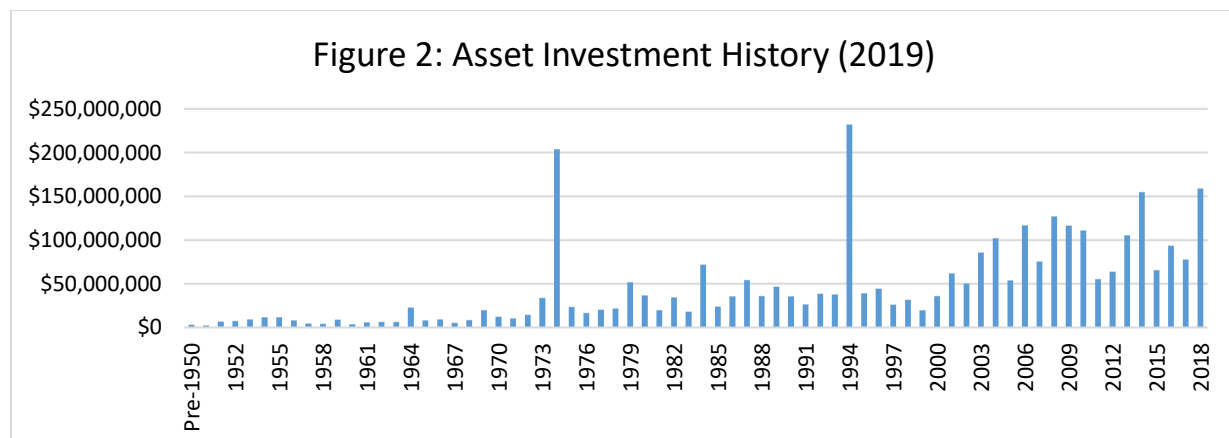
The historical investment of $3.22B (2019) invested into infrastructure assets spans across a large portfolio that translates into $10.3B of replacement value (2019). The replacement value is an increase to the value reported in October 2019. The primary reason for the increase is due to inflation.

Replacement values of infrastructure assets are presented in Figure 3.

Figure 3: Replacement Value (2019) in Millions

Housing Operations, $296

Fleet and Equipment, $135

Solid Waste, $34

Municipal Parking, $7

Recreation and Culture, $62

Buildings and Facilities, $893

Bridges and Large Culverts, $304

Water, $2,410

Roads, $3,418

Waste Water, $2,220

Storm Water Management, $521

4. City of Greater Sudbury Asset Portfolio

The following question and answer format has been identified to provide additional details of infrastructure and its performance. The performance of an asset is largely predicated on its condition. Infrastructure condition reporting involves both technical and professional judgement. The responses to questions and the asset condition information in this report reflects our best available data and professional judgement. Work continues to refine data collection activities and manage the evolution of our asset management program.

4.1. What infrastructure assets does the City own?

Table 1 provides a brief description of the infrastructure assets that the City owns.
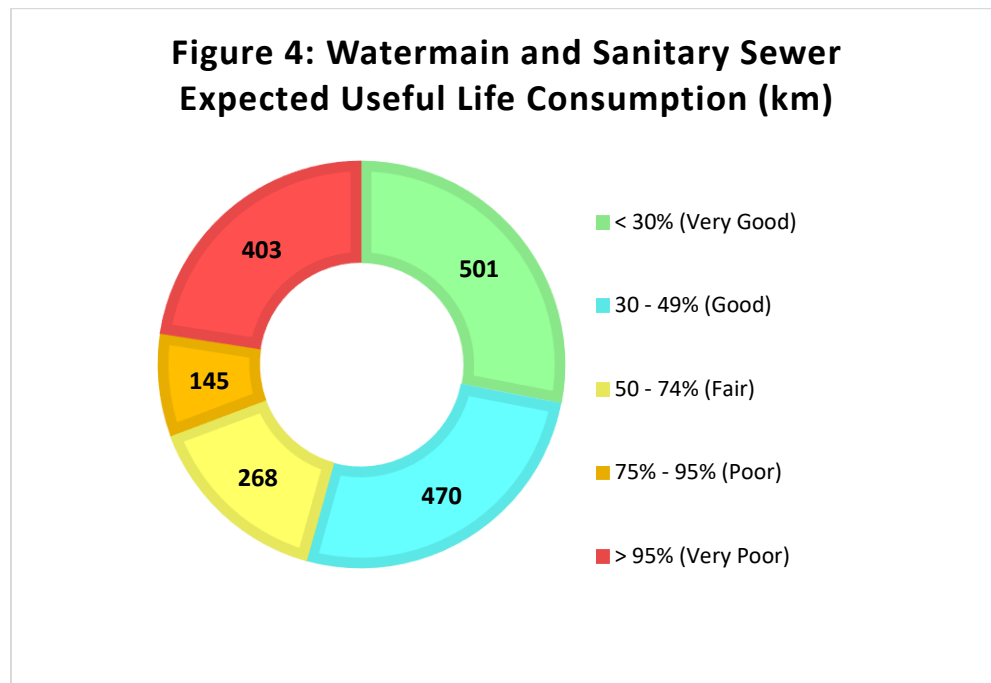
Table 1: Infrastructure Assets	
Asset Class	**Description**
Water and Wastewater (Core Infrastructure)	• The City owns and operates six water supply systems and thirteen wastewater collection systems. • Linear water mains, systems and control valves, valve chambers, hydrants, service connections, meter stations, water meters, pump houses, distribution facilities, storage facilities, treatment facilities and well facilities. • Rock tunnel, linear gravity and forcemain sanitary sewer, lateral connections, control valves, drop shafts, maintenance holes, lift stations, collection facilities and treatment facilities.
Storm Water Management (Core Infrastructure)	• The City's geographic area requires that the City must maintain a large storm water management system. • Linear gravity storm water mains, ditches, manholes, catch basins, discharges, inlets, ponds, and oil and grit separators.
Roads, Bridges and Large Culverts (Core Infrastructure)	• The City owns and operates a road network of 3,535 km of varying road classifications; namely primary arterial, secondary arterial, tertiary arterial, collector and local. • The City owns 185 structures; 94 bridges and 91 large culverts. A large culvert is characterized as a structure with a span greater than 3 meters.
Buildings and Facilities	• The City owns and operates over 400 buildings. • Arenas, pools, ski chalets, field houses, libraries, museums, community centers, municipal offices, depots, garages, long-term care facilities, fire and paramedic halls, etc.
Housing Operations	• Housing operations owns and operates a portfolio of 1,848 social housing units that accommodate approximately 4,300 community members. • High rise apartments, low rise apartments, townhouses, single family, duplex, and semi-detached homes.
Fleet and Equipment	• The City owns a fleet of 559 vehicles and 6,517 pieces of equipment. • 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
Solid Waste	• The City owns and operates 3 active landfills and 13 transfer stations. • Landfills, transfer stations, scales, monitoring wells, landfill access roads, storm water ponds, leachate management systems and ponds, and a landfill gas management system.
Municipal Parking	• The City owns 12 municipal parking lots, however maintains 13 municipal parking lots as one lot is leased. • Paved municipal parking lots, gravel lots, meters, pay machines, kiosks, ticketing system, light standards and 438 curbside parking spaces.
Parks	• The City owns and maintains over 300 outdoor sport playing surfaces, 1,400 hectares of parkland and 177 km of trails. • Playgrounds, soccer and baseball fields, basketball courts, tennis and pickleball courts, skating paths, outdoor rinks, ski hills, splash pads, and BMX and skate parks.

4.2. What is the condition of the City's infrastructure assets?

The following figures provide a description of infrastructure asset condition. For additional asset condition details and an explanation of condition scores, please see Appendix A.

4.2.1. Water and Wastewater (Core Infrastructure)

The asset condition framework for water and wastewater linear infrastructure is based on asset life expectancy and asset age for the development of the Asset Management Plan Water and Wastewater. However, a more detailed analysis is required to refine the available data to reflect existing conditions. The condition of watermain and sanitary sewer by consumption is provided in Figure 4.

Figure 4: Watermain and Sanitary Sewer Expected Useful Life Consumption (km)

- 403
- 501
- 145
- 268
- 470

- ■ < 30% (Very Good)
- ■ 30 - 49% (Good)
- ■ 50 - 74% (Fair)
- ■ 75% - 95% (Poor)
- ■ > 95% (Very Poor)

4.2.2. Storm Water Management (Core Infrastructure)

The asset management plan for storm water management identifies 30 and 100 year investment profiles included in Appendix A. The investment profiles indicate that, although the STM system is relatively new, capital investment and additional maintenance programs are required to ensure the STM system continues to serve the community. As a result CCTV condition data collection program for storm water infrastructure has been initiated. The stormwater gravity main by era of construction is provided in Figure 5.
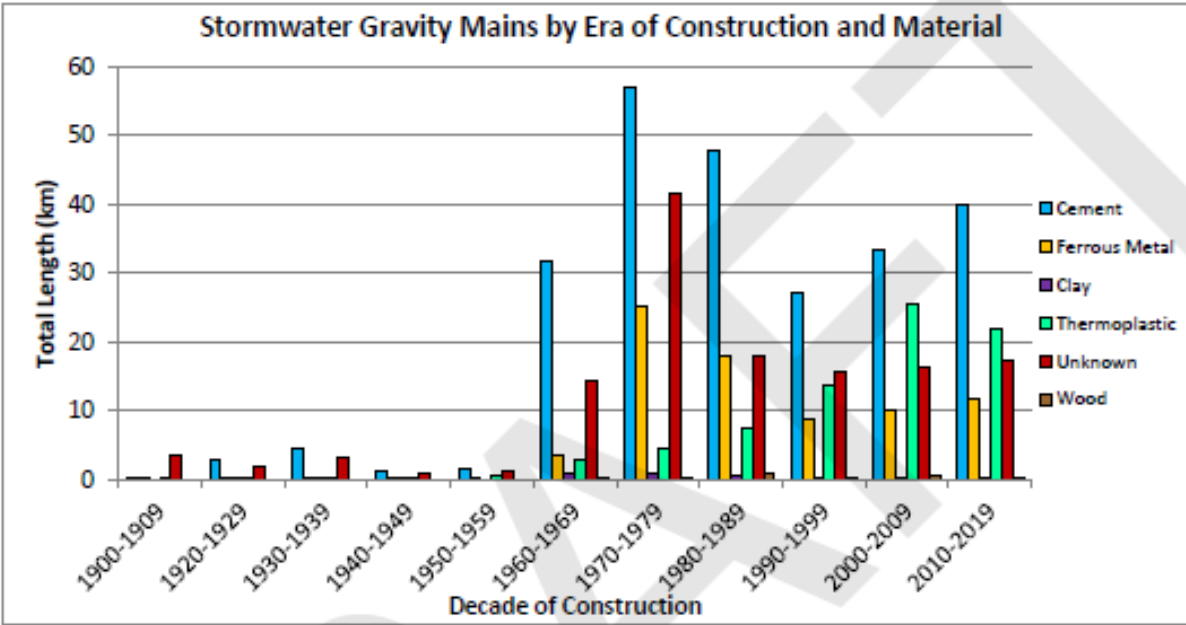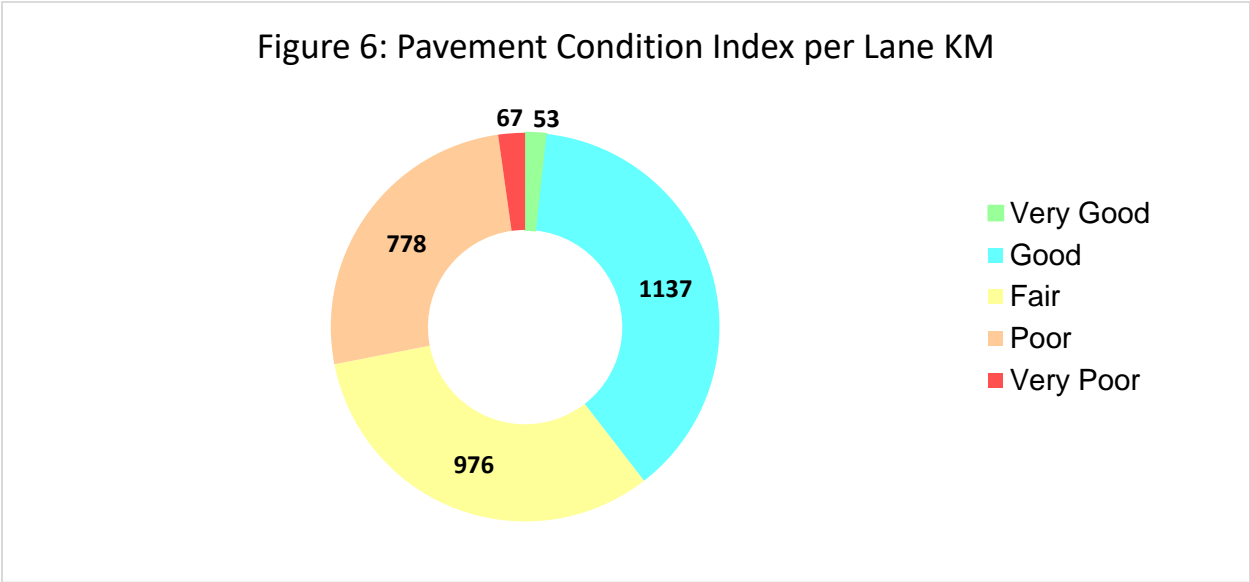
Figure 5: Stormwater Gravity Mains by Era of Construction and Material

4.2.3. Roads, Bridges and Large Culverts (Core Infrastructure)

The City's Pavement Condition Index by km of road is provided in Figure 6.

Figure 6: Pavement Condition Index per Lane KM

The Bridge Condition Index summarized in Figure 7 is from the 2018 Bridge and Large Culvert Structural Inspections. Currently the 2020 Bridge and Large Culvert Structural Inspection project is underway. Additional structures will be incorporated in the 2020 inspections due to the opening of the Maley Drive extension.

Figure 7: Bridge Condition Index
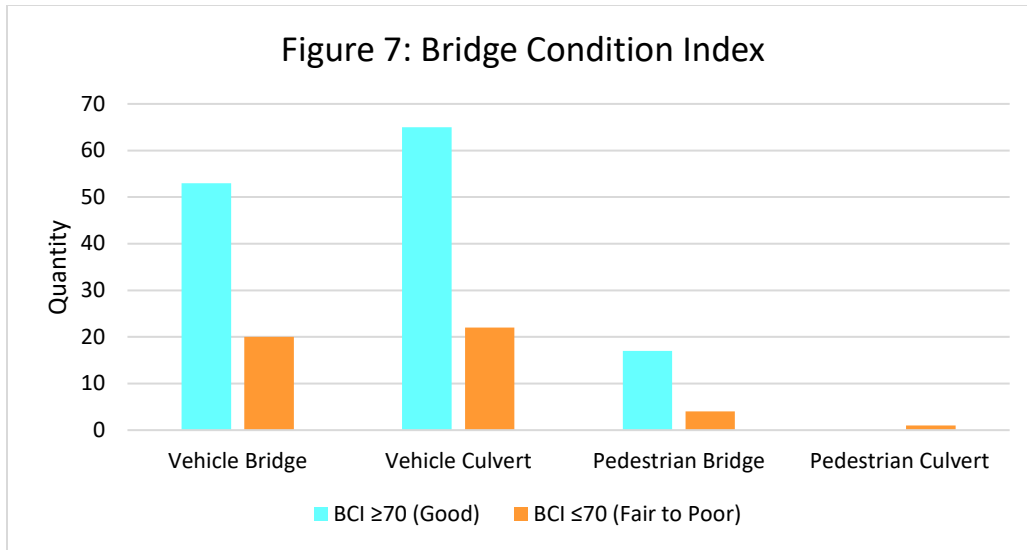
4.2.4. Buildings and Facilities

The City's inventory of buildings and facilities exceeds 400 buildings. Included in Table 2 are 160 of the building that have building condition assessment completed and have been uploaded in the building and facility asset management and capital planning tool. The asset repository is under development as the condition assessment program continues to move forward.

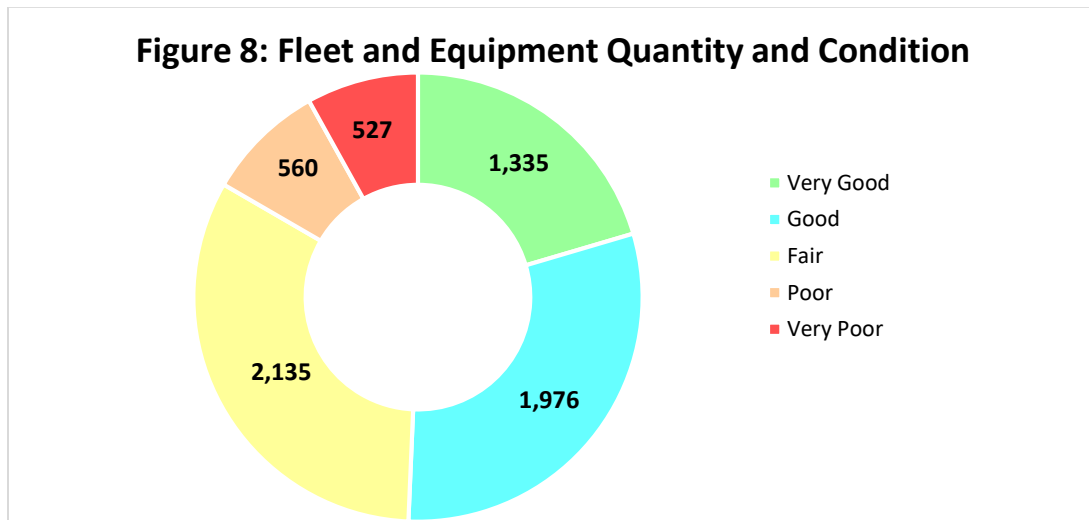| Table 2: Buildings and Facilities			
Service Area	Quantity of Buildings	Area (ft^2)	Average Condition
Asset Services	4	538,755	3.64% - Very Good
Citizen Services	24	196,979	6.53% - Good
Emergency Services	25	243,690	25.42% - Poor
Health Services	9	629,307	0.56% - Very Good
Parks & Recreation	98	968,461	6.48% - Good

4.2.5. Housing Operations

The housing operations asset repository is stored within an asset management and capital planning software. The Facility Condition Index output for the housing inventory is provided in Table 3.

| Table 3: Housing Operations Average Facility Condition Index			
Building Type	Quantity of Buildings	Area (ft^2)	Average Condition
High Rise	6	583,769	14.67% - Fair
Low Rise	6	233,476	8.49% - Good
Townhouse, Single Family, Duplex and Semi-Detached	325	1,689,621	17.03% - Fair

4.2.6. Fleet and Equipment

The condition of fleet and equipment provided in Figure 8 is determined by age and usage (mileage, engine hours).

Figure 8: Fleet and Equipment Quantity and Condition

527	
560	1,335
	Very Good
	Good
	Fair
2,135	Poor
	Very Poor
	1,976

4.3. Municipal Parking

The condition of municipal parking assets provided in Figure 9 is determined by condition inspections completed in the summer of 2020 and infrastructure age.

Figure 9: Municipal Parking Quantity and Condition

4	
8 5	37
	Very Good
	Good
	Fair
	Poor
	Very Poor
207	
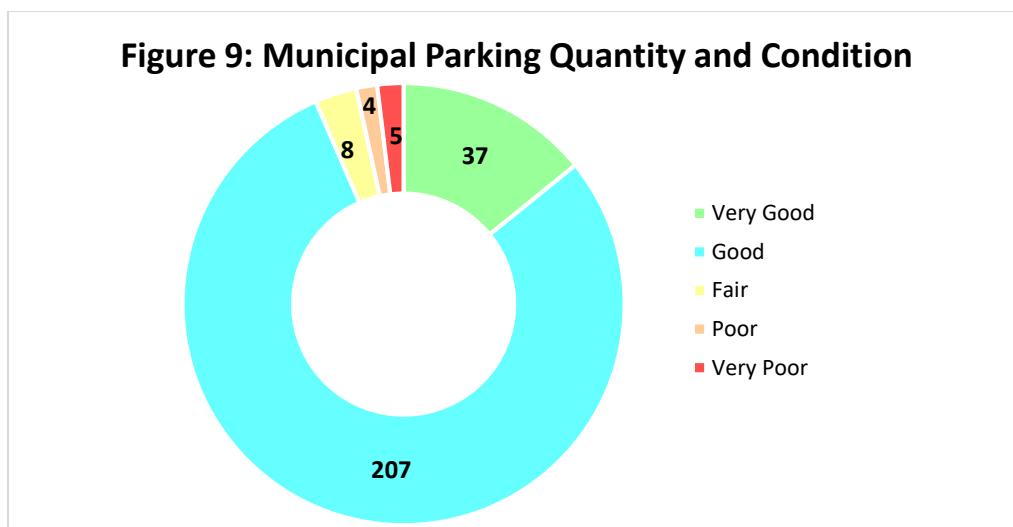
4.3.1. Parks

The condition of parks assets in Table 4 is determined by age or previous year inspection programs. Parks assets were inspected in the summer of 2020 and the condition data is under review.

Table 4: Parks and Recreation Asset Condition		
Service Area	**Asset Type**	**Condition**
Rec Space	Splash Park (ie. DJ Hancock Splash Park, Memorial Splash Park)	82 – Very Good
	Trails (ie. Junction Creek Trail, Bell Park Trail and Boardwalk)	57 – Fair
Parks	Regional Parks, Community Parks, Neighbourhood Parks, Playgrounds and Tot Lots (ie. Bell Park and Delki Dozzi)	2.1 - Satisfactory

4.4. What is the current status of asset management planning and what is our infrastructure need?

The City's Assets Section canvased various divisions and sections to compile the performance indicators that detail the current status of asset management planning summarized by asset class in the tables that follow.

The ALoS referred to in the following tables is Asset Level of Service which is the condition and performance expectations for a given asset in order to produce desired levels of service.

The estimated annual capital investment to maintain current asset level of service (ALoS) is incorporated from newly developed asset management plans in accordance with *O. Reg. 588/17* or the City of Greater Sudbury Municipal Asset Management Plan (2016) developed by KPMG. The estimated annual capital investment to maintain current ALoS source is provided under the notes section. For definition of the quality of financial estimate, please refer to Appendix B.

4.4.1. Water and Wastewater (Core Infrastructure)

Table 5: Water and Wastewater Asset Information		
Performance Indicator	**Current Status**	**Notes**
ALoS Definitions: Phase 1 - Existing ALoS Phase 3 - Target ALoS	**70% Complete**	• Existing Asset Level of Service complete • Target Asset Level of Service require additional data collection and analysis • Legislation drivers include but are not limited to: Safe Drinking Water Act (2002), Clean Water Act (2006), Ontario Water Resources Act (1990), Public Lands Act (1990), Conservation Authorities Act (1990), Lakes and Rivers Improvement Act (1990), Water Opportunities and Water Conservation Act (2010), Nutrient Management Act (2002), Sustainable Water and Sewage Systems Act (2002), Municipal Water and Sewage Transfer Act (1997), Canadian Environmental Protection Act (1999), Environmental Assessment Act (1990), Environmental Protection Act (1990), Canadian Water Quality Guidelines, Provincial Water Quality Objectives, Building Code Act (1992), National Fire Code, Occupational Health and Safety Act (1990), and O. Reg. 490/09: Designated Substances.
Data Standards	**75% Complete**	• Recommendations from the Asset Management Plan Water and Wastewater include identification of additional data performance measure reporting • Consequence of failure is established; however data for probability of failure to be improved for plants and linear assets • The current CCTV inspection program follows the Pipeline Assessment Certification Program (PCAP) • The CCTV program will bolster the probability of failure for linear assets • The Building Condition Assessment Project will bolster the probability of failure for Plants and Facilities • Building Condition Assessment submissions are being completed using industry standards
Data Availability	**75% Complete**	• Assets are known and documented • Data collection for water and wastewater assets are on going
Estimated Annual Capital Investment to Maintain Current ALoS	**$110,000,000**	• Annual capital investment requirement until 2021; followed by an annual capital investment requirement of $90,000,000 from 2022 - 2026 • Estimate is from the Asset Management Plan Water and Wastewater
Quality of Capital Investment Estimate	**B - Linear Pipe D - Plants & Facilities**	• Quality will improve with additional datasets. • Plants and facility building condition and process assessments have not yet been incorporated in the estimate. The data is being collected, analyzed and will be included in the next phase of the Asset Management Plan Water and Wastewater

4.4.2. Storm Water Management (Core Infrastructure)

Table 6: Storm Water Management Asset Information		
Performance Indicator	**Current Status**	**Notes**
ALoS Definitions: Phase 1 - Existing ALoS Phase 3 - Target ALoS	**65% Complete**	• Existing Asset Level of Service complete • Target Asset Level of Service require additional data collection and analysis • Legislation drivers include but are not limited to: Ontario Water Resources Act (1990)
Data Standards	**75% Complete**	• Consequence of failure is well established; however data for probability of failure to be improved • The Storm Water Asset Management Plan recommends additional data collection techniques such as CCTV camera inspection of linear pipe • Presently initiating a CCTV inspection program what will follow the Pipeline Assessment Certification Program (PCAP) • The CCTV program will bolster the probability of failure for linear assets
Data Availability	**75% Complete**	• Assets are known and documented • Data collection for storm water assets are on going
Estimated Annual Capital Investment to Maintain Current ALoS	**$9,559,000**	• The value represents the annual capital investment requirement over a 30-year period. • Annual capital investment taken from the Storm Water Asset Management Plan
Quality of Capital Investment Estimate	**C**	• Quality will improve with additional datasets and level of service targets • Estimate is based on local experiences unique to Greater Sudbury area; for example acidic soils.

4.4.3. Roads, Bridges and Large Culverts (Core Infrastructure)

Table 7: Roads, Bridges and Large Culverts Asset Information		
Performance Indicator	**Current Status**	**Notes**
ALoS Definitions: Phase 1 - Existing ALoS Phase 3 - Target ALoS	**80% Complete**	• Asset Level of Service framework for Phase 1 has been prepared and is being validated • Phase 3 to start after Phase 1 completed • A significant software upgrade is underway to perform data analysis • Legislation drivers include but are not limited to: Highway Traffic Act (1990), Minimum Maintenance Standards, O. Reg. 104/97: Standards for Bridges
Data Standards	**75% Complete**	• Pavement Condition Index (PCI) and Bridge Condition Index (BCI) well established • Potential for Safety Improvement is monitored with network screening • Risk Framework for roads under development • Risk Framework for bridges and large culverts under development
Data Availability	**85% Complete**	• Assets are known and documented • PCI data collected in 2019 and currently being assessed; Pavement Management System (PMS) is being upgraded • Biennial bridge and large culvert structural inspection program for 2020 is underway • Gravel road visual inspection underway
Estimated Annual Capital Investment to Maintain Current ALoS	**$169,800,000 for Roads** **$4,887,000 for Bridges and Large Culverts**	• Roads annual capital investment requirement provided by the CGS Municipal Asset Management Plan (2016) developed by KPMG • Bridge and large culvert annual capital investment requirement provided with the 2018 Bridge and Large Culvert Structural Inspection (2020 inspection program underway)
Quality of Capital Investment Estimate	**D - Roads** **B - Bridges**	• With the pavement management system upgrade, ongoing road estimates will be data driven • Quality will improve with additional datasets

4.4.4. Buildings and Facilities

Table 8: Buildings and Facilities Asset Information		
Performance Indicator	**Current Status**	**Notes**
ALoS Definitions: Phase 2 - Existing ALoS Phase 3 - Target ALoS	**35% Complete**	• Asset Level of Service framework has been prepared • Legislation drivers include but are not limited to: Environmental Protection Act (1990), Physical Activity and Sport Act (2003), Building Code Act (1992), National Fire Code, Accessibility for Ontarians with Disabilities Act (2005), Occupational Health and Safety Act (1990), and O. Reg. 490/09: Designated Substances.
Data Standards	**95% Complete**	• Building condition assessment data collection follows industry standards for example Uniformat II and adapted to meet City specific requirements • A risk based prioritization framework has been developed for prioritizing capital need • The risk framework considers probability of failure which is driven by actual asset condition and established consequences of failure • Facility condition index is designed to forecast facility need and consider future expenditure scenarios
Data Availability	**50% Complete**	• The building condition assessment program is well underway. • Originally, the building condition assessment program experienced delay due to COVID-19 resulting from building closures, however the City is working to make up the time
Estimated Annual Capital Investment to Maintain Current ALoS	**$32,500,000**	• Buildings and facilities annual capital investment requirement provided by the CGS Municipal Asset Management Plan (2016) developed by KPMG
Quality of Capital Investment Estimate	**D**	• Quality will improve with additional datasets • The building condition assessment program must be completed prior to implementing a condition data driven estimate of facility need

4.4.5. Housing Operations

Table 9: Housing Operations Asset Information		
Performance Indicator	**Current Status**	**Notes**
ALoS Definitions: Phase 2 - Existing ALoS Phase 3 - Target ALoS	**50% Complete**	• Existing Asset Level of Service Complete • Target Asset Level of Service discussion will begin following the Council approval of the Housing Operations Asset Management Plan prepared to meet Phase 2. Target level of service will include the Housing Revitalization. • Legislation drivers include but are not limited to: Housing Services Act (2011), Promoting Affordable Housing Act (2016), Environmental Protection Act (1990), Building Code Act (1992), National Fire Code, Accessibility for Ontarians with Disabilities Act (2005), Occupational Health and Safety Act (1990), and O. Reg. 490/09: Designated Substances.
Data Standards	**95% Complete**	• Building condition assessment data collection follows industry standards for example Uniformat II and adapted to meet City specific requirements • The risk based prioritization framework developed with the City's buildings and facilities will also be applied to the housing operations database. The framework is an enhancement to the prioritization framework that housing has applied in recent years
Data Availability	**95% Complete**	• Housing operations has building condition assessments for the entire asset inventory. However, data collection is perpetual. As with buildings and facilities among other asset classes, condition data must be audited regularly. Industry standard is to perform an audit every 5 years
Estimated Annual Capital Investment to Maintain Current ALoS	**$5,178,540**	• Housing facility annual capital investment requirement developed with the housing operations asset management and capital planning tool database
Quality of Capital Investment Estimate	**C**	• Quality will improve with additional datasets. • Engaging in the revitalization program to replace buildings and sell buildings that are in low demand will improve the overall stock condition and financial estimates. Repair and upgrades to older units are subject to fluctuating contractor pricing in the market.

4.4.6. Fleet and Equipment

Table 10: Fleet and Equipment Asset Information		
Performance Indicator	**Current Status**	**Notes**
ALoS Definitions: Phase 2 - Existing ALoS Phase 3 - Target ALoS	**50% Complete**	• Existing Asset Level of Service Complete • Target Asset Level of Service discussion will begin following the Council approval of the Fleet and Equipment Asset Management Plan prepared to meet Phase 2. The AMP is close to completion. • Legislation drivers include but are not limited to: Ambulance Act (1990), Accessibility for Ontarians with Disabilities Act (2005), Occupational Health and Safety Act (1990), Public Vehicles Act (1990), O. Reg. 199/07: Commercial Motor Vehicle Inspections, O. Reg. 424/97: Commercial Motor Vehicle Operators Information, and MOECC Reg. 347: General - Waste Management (Hazardous Material Transport)
Data Standards	**95% Complete**	• Fleet data collection is well underway • The risk based prioritization framework has been developed for the fleet and equipment asset registry • Data is driven by asset age and collection of mileage or engine run-time hours
Data Availability	**95% Complete**	• Assets are known and documented • Data for fleet and equipment is available. However data storage and analysis has been challenging. Several databases must be amalgamated in spreadsheets
Estimated Annual Capital Investment to Maintain Current ALoS	**$9,906,124**	•Estimated annual capital investment requirement is from the Fleet and Equipment Asset Management Plan and based over a 20 year period. • Estimate includes all Fleet, Fire, Paramedic, Transit, Parks and Housing Operations assets included in the Fleet and Equipment Asset Management Plan
Quality of Capital Investment Estimate	**B**	• Reliable inventory and age data; minimal assumptions for fleet and equipment

4.4.7. Solid Waste

Table 11: Solid Waste Asset Information		
Performance Indicator	**Current Status**	**Notes**
ALoS Definitions: Phase 2 - Existing ALoS Phase 3 - Target ALoS	**5% Complete**	• Existing Asset Level of Service discussions have been preliminary. There was some delay experienced due to COVID-19. Discussions are resuming. • Legislation drivers include but are not limited to: Occupational Health and Safety Act (1990), MOECC Reg. 347: General - Waste Management (Hazardous Material Transport), and Ontario Regulation 542 and Waste Diversion Act (2002)
Data Standards	**10% Complete**	• The asset inventory is being reviewed to develop data and condition standards • A risk based prioritization framework will be developed
Data Availability	**25% Complete**	• Available data is being reviewed to determine if or what additional data collection is required
Estimated Annual Capital Investment to Maintain Current ALoS	**$1,500,000**	• Solid Waste - Landfills annual capital investment requirement provided by the CGS Municipal Asset Management Plan (2016) developed by KPMG
Quality of Capital Investment Estimate	**D**	• Quality will improve with additional datasets. • A risk based prioritization framework will improve the quality of financial estimate

4.4.8. Municipal Parking

Table 12: Municipal Parking Asset Information		
Performance Indicator	**Current Status**	**Notes**
ALoS Definitions: Phase 2 - Existing ALoS Phase 3 - Target ALoS	**50% Complete**	• Existing Asset Level of Service Complete • Target Asset Level of Service discussion will begin following the Council approval of the Municipal Parking Asset Management Plan prepared to meet Phase 2. The AMP is close to completion. • Legislation drivers include but are not limited to: O. Reg. 413/12: Integrated Accessibility Standards, Accessibility for Ontarians with Disabilities Act (2005)
Data Standards	**90% Complete**	• A municipal parking inspection program has been developed and implemented in 2020 • The risk based prioritization framework developed with the probability and consequence of failure
Data Availability	**95% Complete**	• The 2020 municipal parking inspection program has ensured data is available for the entire municipal parking inventory
Estimated Annual Capital Investment to Maintain Current ALoS	**$191,156**	•Estimated annual capital investment requirement is from the Municipal Parking Asset Management Plan and based over a 60 year period.
Quality of Capital Investment Estimate	**B**	• Reliable inventory of condition and age data; minimal assumptions for municipal parking assets

The municipal parking data is based on current conditions. The City's Downtown core is beginning a renewal due to significant construction projects. To address the post construction target municipal parking utilization of the Downtown area, there are a number of options that the City is considering to accommodate the increase in parking demand including: parking structure development, transportation demand management, shared parking agreements, surface parking expansion and periphery lot parking incentives.

4.5. What is the financial risk associated with asset ownership?

To demonstrate the financial risk associated with ownership of the City's Asset portfolio, please refer to Table No. 13. Table 13 demonstrates the sum of the estimated annual capital investment to maintain current ALoS discussed above, compared to the capital budget expenditure of the previous 5 years. It is important to note that additional expenditure from the operating budget helps to further reduce the funding gap. Maintenance dollars spent can contribute to extending the actual service life of infrastructure.

The funding gap or unfunded capital investment value provided in Table 13 represents an estimate based on data that is evolving. With the development of target levels of service, Council is provided the opportunity to select whether to proceed or not proceed with capital investment and determine what level of infrastructure need can be reasonably deferred.

Table 13: Funding Gap	
Budget Year	**Capital Expenditure**
2016	$109,729,400
2017	$225,332,024
2018	$266,125,363
2019	$123,265,540
2020	$172,546,126
Mean Capital Expenditure =	$179,399,691
Sum of Annual Capital Investment Requirement =	$343,521,820
Annual Funding Gap =	$164,122,129

Note: **1.** Sum of annual capital investment requirement is the sum of Estimated Annual Capital Investment to Maintain Current ALoS from Tables 5 to 12.

4.6. How are the City's assets performing?

The City's Tangible Capital Asset Database can perform straight-line asset depreciation which demonstrates, where the City's assets are in their **theoretical** useful lives. Straight-line depreciation is a conservative approach to allocating an asset's useful life over time. Many of the City's major assets have a more rapid depreciation curve. For illustrative purposes, the percentage of straight-line theoretical useful life consumption (conservative) compared to historical investment is detailed in Figure 10.

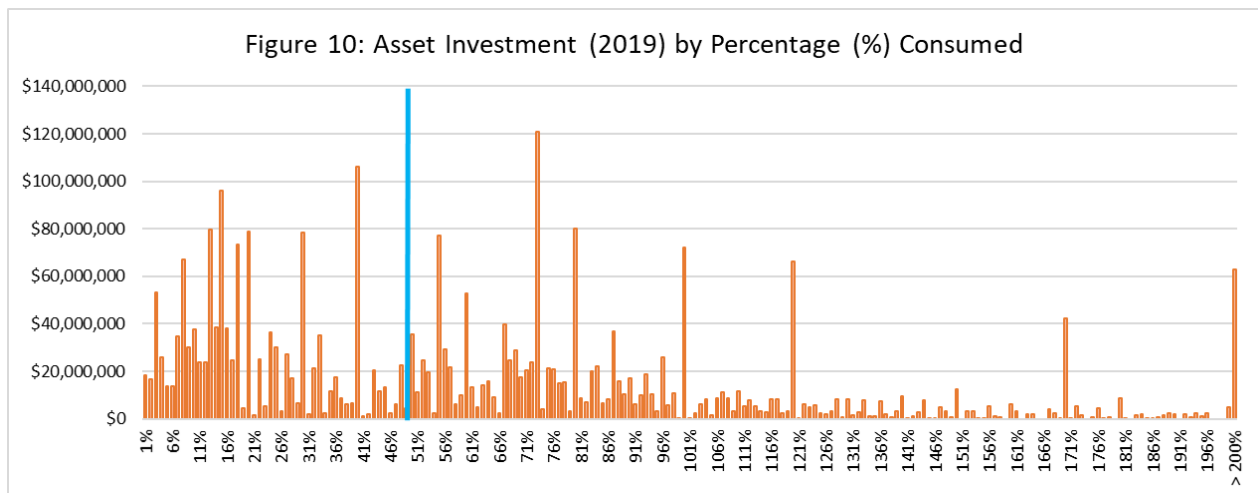Figure 10: Asset Investment (2019) by Percentage (%) Consumed

Figure 10 displays the amount of **theoretical** useful life that has been consumed in all asset classes. The blue line represents 50% of asset life consumed. The chart demonstrates that 46% of the City's infrastructure investment has consumed less than half its theoretical useful life. Meanwhile, 19% of infrastructure investment is beyond its theoretical useful life.

Through the development of levels of service and maintenance plans, the City is afforded the opportunity to address asset consumption.

5. Milestones and Next Steps in Asset Management Planning

The City's asset management plans are being prepared by asset class and the plans are in various stages of development. Table 14 provides a brief summary of asset management plans. The table identifies legislated completion dates, completion target date and the current status to identify areas of significant progress.

Table No. 14: Legislated Milestones and Current Status				
AM Plan Core Infrastructure	**Division or Section**	**Legislated Phase 1 Date**	**Current Status**	**Completion for Council Approval**
Water AM Plan	Infrastructure and Capital Planning Services	July 1, 2021	• Complete • A building condition assessment project is underway to bolster the quality of standardized data for the City's water plants and facilities. • Staff is working to address recommendations of the Asset Management Plan Water and Wastewater.	Complete
Wastewater AM Plan	Infrastructure and Capital Planning Services	July 1, 2021	• Complete • A building condition assessment project is underway to bolster the quality of standardized data for the City's wastewater plants and facilities. • Staff is working to address recommendations of the Asset Management Plan Water and Wastewater.	Complete
Storm Water Management AM Plan	Infrastructure and Capital Planning Services	July 1, 2021	• The final submission of the Storm Water Management Asset Management Plan (SAMP) has been prepared for stakeholder review. • Included with the SAMP are recommendations that have been accelerated for implementation. Staff have initiated and are diligently working on a sustainable storm water financing study. The purpose of the study is to develop funding models to achieve sustainability. • Council has requested a business case for enhanced catch basin cleaning, which is a recommendation of the SAMP, in advance of the sustainable financing study due to the importance of system maintenance for functionality and environmental protection. • The CCTV inspection program initiated by the SAMP is ongoing.	Complete
Roads and Transportation AM Plan	Infrastructure and Capital Planning Services	July 1, 2021	• The City's pavement management system (PMS) is receiving an upgrade in 2020. The PMS analyzes various parameters to allow for 270 treatment zones based on 18 different treatment types. Treatment thresholds for various scenarios and pavement types have been developed by City staff to meet specific needs. The lifecycle analysis output will calculate condition based replacement value and forecast financial need for existing and target level of service options. • A risk framework detailing the probability and consequences of failure is being developed to supplement the decision analysis of the PMS. The quantification of risk will analyze various data sources. • In 2019, pavement condition data was collected and is being uploaded to be analyzed with the PMS upgrade. • The combination of these projects aim to optimize the funding investment for roads infrastructure and strive for the longest useful life at the lowest total cost of ownership.	Second Quarter 2021
Bridge and Large Culvert AM Plan	Infrastructure and Capital Planning Services	July 1, 2021	• The 2020 Bridge and Large Culvert Structural Inspection is underway. The asset management plan is being developed concurrently with the condition and risk driven structural inspections.	Second Quarter 2021

Table No. 14: Legislated Milestones and Current Status				
AM Plan	**Division or Section**	**Legislated Phase 2 Date**	**Current Status**	**Completion for Council Approval**
Buildings and Facilities AM Plan	Assets and Fleet Services Leisure Services	July 1, 2023	• The 2020 Capital Budget approved the procurement of an asset management and capital planning tool for buildings and facilities. The tool analyzes building condition assessment data to determine and prioritize short and long term capital investment need. The project is progressing and already demonstrating a positive impact for the City's asset management capabilities for buildings and facilities. • A risk driven prioritization framework has been prepared specific to the City's building and facility infrastructure needs. The framework quantifies risk calculated within the asset management and capital planning tool from data collected on site. • The building condition assessment project did experience delay due to COVID-19; however the City is working to close the scheduling gap.	Fourth Quarter 2022
Housing Operations	Housing Services	July 1, 2023	• Housing operations has been actively involved with the development and implementation of the City's asset management and capital planning tool for buildings and facilities. Housing operations has been using the software for a number of years. The City's Assets Section has been working with housing operations to identify improvements for the development and implementation of the risk driven prioritization framework. The framework will be used for buildings and facilities and housing portfolios. • The 6 high rise buildings in the housing inventory are scheduled to receive updated building condition assessments.	Fourth Quarter 2022
Fleet and Equipment AM Plan	Assets and Fleet, Transit, Leisure, Cemetery, Paramedic, and Fire Services	July 1, 2023	• The Fleet and Equipment Asset Management Plan is close to completion. The plan is being developed in conjunction with all affected departments.	First Quarter 2022
Solid Waste (Landfill) AM Plan	Environmental Services	July 1, 2023	• The data that is available for asset inventory is under review. A minor delay was experienced due to COVID-19.	Fourth Quarter 2022
Municipal Parking AM Plan	Security and By-Law Services	July 1, 2023	• A condition inspection program for municipal parking assets was prepared and implemented in 2020. The inspection data is incorporated into a risk framework. • The Municipal Parking Asset Management Plan is close to completion.	First Quarter 2022
Parks AM Plan	Leisure Services	July 1, 2023	• An improved condition inspection program for parks assets was prepared and implemented in 2020. The data collected is under review.	First Quarter 2022
Long-Term Care AM Plan	Long-Term Care Services	July 1, 2023	• The Pioneer Manor building condition assessment was completed in 2019 and is being uploaded into the asset management and capital planning tool for buildings and facilities. • Discussion related to the building and long-term care equipment assets has been delayed by COVID-19.	Fourth Quarter 2022

Table No. 14: Legislated Milestones and Current Status				
AM Plan	Division or Section	Legislated Phase 3 Date	Current Status	Completion for Council Approval
All assets in Corporate Asset Management Plan	All departments and sections listed above	July 1, 2024	• To begin following the completion of Phase 1 for core infrastructure assets • To begin following the completion of Phase 2 for all other infrastructure assets	First Quarter 2024

Per legislation, the City will perform an annual review of asset management progress following the implementation of the Phase 3 asset management plan. The review will monitor asset management planning implementation and progress. The reviews will be completed annually for July 1st.

The regulation also states that asset management policy and plan updates are to be prepared every 5 years. To ensure internal and external transparency, policies and plans have or will be posted to the City's website and shared with ministries or any persons as requested.

6. Conclusion

This report provides information on the current state of asset management and the steps staff will be taking to implement an enterprise wide approach to evolving the asset management planning.

The timeline for development and implementation of the City's asset management program has been outlined by the Province under the Ontario Regulation 588/17. The success of the City's asset management program relies on the collaboration of all City departments. Staff within Corporate Services will work with individual departments to ensure the City meets and achieves the steps and milestones as outlined.

Asset management will continue to provide the City with a framework for consistent, calculated, reliable and transparent decision making. Staff will update Council regularly on the status of the City's asset management planning.

7. Legislative References

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 2018.

8. Appendix A: Condition Assessment and Need

Table A1, provides a description of the conditions that are assigned to infrastructure assets in Section 4.2. The tables and figures that follow provide additional detail not captured in Section 4.2.

Table A1: Condition Scores Explained							
Rating	Description	Watermain/Sanitary Sewer	Roads	Bridges	Buildings	Parking	Parks
		Life Consumed	PCI	BCI	FCI	Condition Index	Condition Index
Very Good	Well maintained, new or recently rehabilitated	0 to 30%	>85	-	0 to 5%	>80	>80
Good	Acceptable, generally in mid stage of expected service life	30 to 50%	56 - 85	≥70	6 to 10%	60 to 79	60 to 79
Fair	Signs of deterioration, requires attention, some deficiencies	50 to 75%	41 - 55	60 - 70	11 to 20%	40 to 59	40 to 59
Poor	Approaching end of life, condition below standard, exhibits deterioration	75 to 95%	26 - 40	≤60	21 to 30%	20 to 39	20 to 39
Very Poor	Near or beyond service life, widespread deterioration	>95%	<25	-	>30%	0 to 19	0 to 19

Table A1: Condition Scores Explained Continued

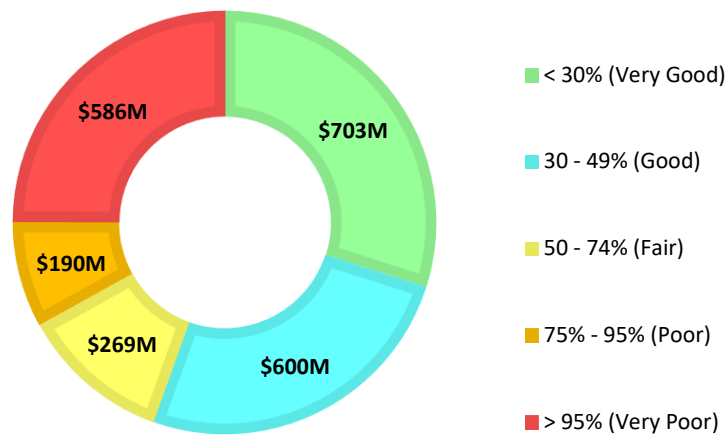| Rating	Description	Fleet Light and Medium		Fleet Heavy Duty		Ambulance		Fire Truck	
		Mileage	Life Consumed	Mileage	Life Consumed	Mileage	Life Consumed	Mileage	Life Consumed
Very Good	Well maintained, new or recently rehabilitated	0 to 50,000	0 to 50%	0 to 50,000	0 to 50%	0 to 75,000	0 to 50%	0 to 75,000	0 to 20%
Good	Acceptable, generally in mid stage of expected service life	50,001 to 100,000	51 to 100%	50,001 to 100,000	51 to 100%	75,001 to 150,000	51 to 100%	75,001 to 150,000	21 to 40%
Fair	Signs of deterioration, requires attention, some deficiencies	100,001 to 150,000	101 to 125%	100,001 to 150,000	101 to 125%	150,001 to 200,000	101 to 125%	150,001 to 200,000	41 to 60%
Poor	Approaching end of life, condition below standard, exhibits deterioration	150,001 to 200,000	126 to 150%	150,001 to 225,000	126 to 150%	200,001 to 250,000	126 to 150%	200,001 to 250,000	61 to 80%
Very Poor	Near or beyond service life, widespread deterioration	>200,000	>150%	>225,000	>150%	>250,000	>150%	>250,000	>80%

Table A1: Condition Scores Explained Continued

Rating	Description	GOVA Bus		M&E Heavy		M&E Light		M&E General
		Mileage	Life Consumed	Runtime	Life Consumed	Runtime	Life Consumed	Life Consumed
Very Good	Well maintained, new or recently rehabilitated	0 to 240,000	0 to 20%	0 to 5,000	0 to 20%	0 to 3,000	0 to 20%	0 to 20%
Good	Acceptable, generally in mid stage of expected service life	240,001 to 480,000	21 to 40%	5,001 to 9,000	21 to 40%	3,001 to 6,000	21 to 40%	21 to 40%
Fair	Signs of deterioration, requires attention, some deficiencies	480,001 to 720,000	41 to 60%	9,001 to 13,000	41 to 60%	6,001 to 9,000	41 to 60%	41 to 60%
Poor	Approaching end of life, condition below standard, exhibits deterioration	720,001 to 960,000	61 to 80%	13,001 to 16,000	61 to 80%	9,001 to 12,000	61 to 80%	61 to 80%
Very Poor	Near or beyond service life, widespread deterioration	>960,000	>80%	>16,000	>80%	>12,000	>80%	>80%

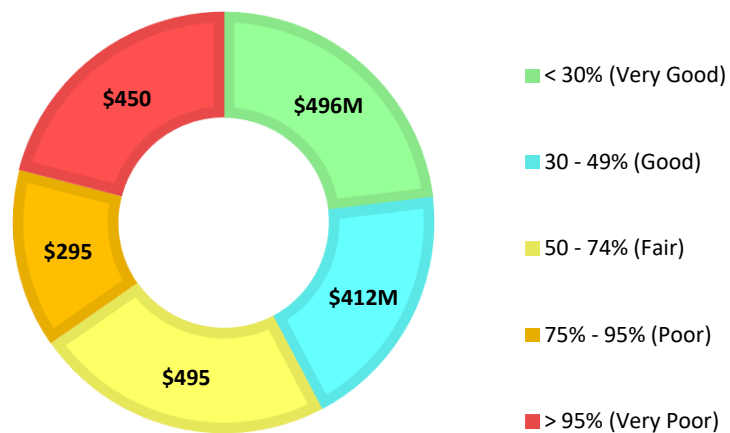### 8.1. Water and Wastewater (Core Infrastructure)

The replacement value of water infrastructure by percent expended service life is provided in Figure A1. Figure A1 is incorporated from the Asset Management Plan Water Wastewater.

Figure A1: Percent Expended Service Life of Water Infrastructure by total Replacement Value (2017)

- $586M > 95% (Very Poor)
- $703M < 30% (Very Good)
- $190M 75% - 95% (Poor)
- $269M 50 - 74% (Fair)
- $600M 30 - 49% (Good)

Legend:
- < 30% (Very Good)
- 30 - 49% (Good)
- 50 - 74% (Fair)
- 75% - 95% (Poor)
- > 95% (Very Poor)

The replacement value of wastewater infrastructure by percent expended service life is provided in Figure A2. Figure A2 is incorporated from the Asset Management Plan Water Wastewater.

Figure A2: Percent Expended Service Life of Wastewater Infrastructure by Replacement Value (2017)

- $450 > 95% (Very Poor)
- $496M < 30% (Very Good)
- $295 75% - 95% (Poor)
- $495 50 - 74% (Fair)
- $412M 30 - 49% (Good)

Legend:
- < 30% (Very Good)
- 30 - 49% (Good)
- 50 - 74% (Fair)
- 75% - 95% (Poor)
- > 95% (Very Poor)

8.2. Storm Water Management (Core Infrastructure)

A Weibull Continuous Probability Distribution is used to analyze reliability, asset service life and model asset failure. To consider the premature failure of assets due to improper installation, severe soil and environmental conditions and assets that function beyond their estimated useful lives, the Weibull failure rate and reliability functions were analyzed to develop condition driven investment profiles. The investment profiles are featured below in Figure A3 and A4.
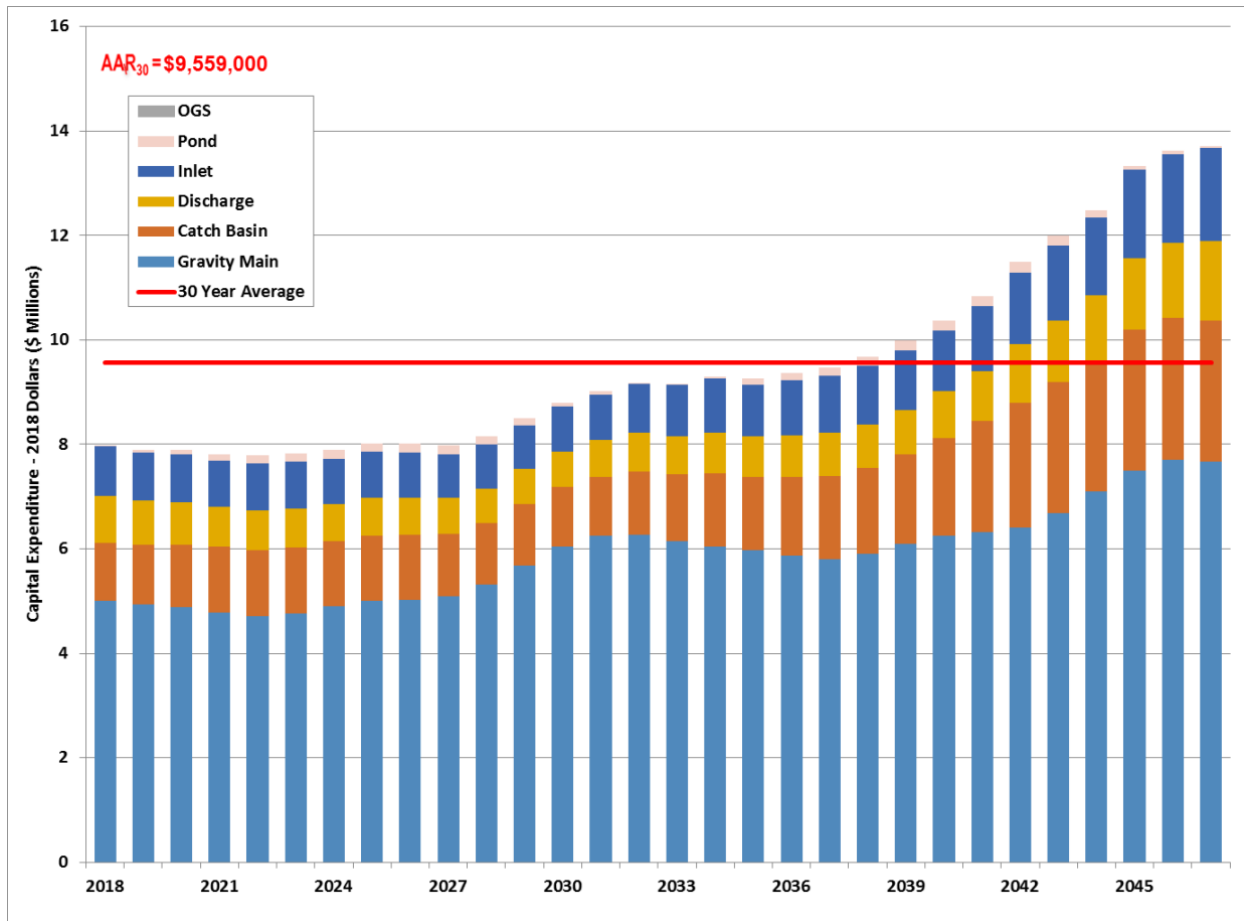

Figure A3: 30 Year Investment Profile for Storm Water Assets (Optimistic Scenario)
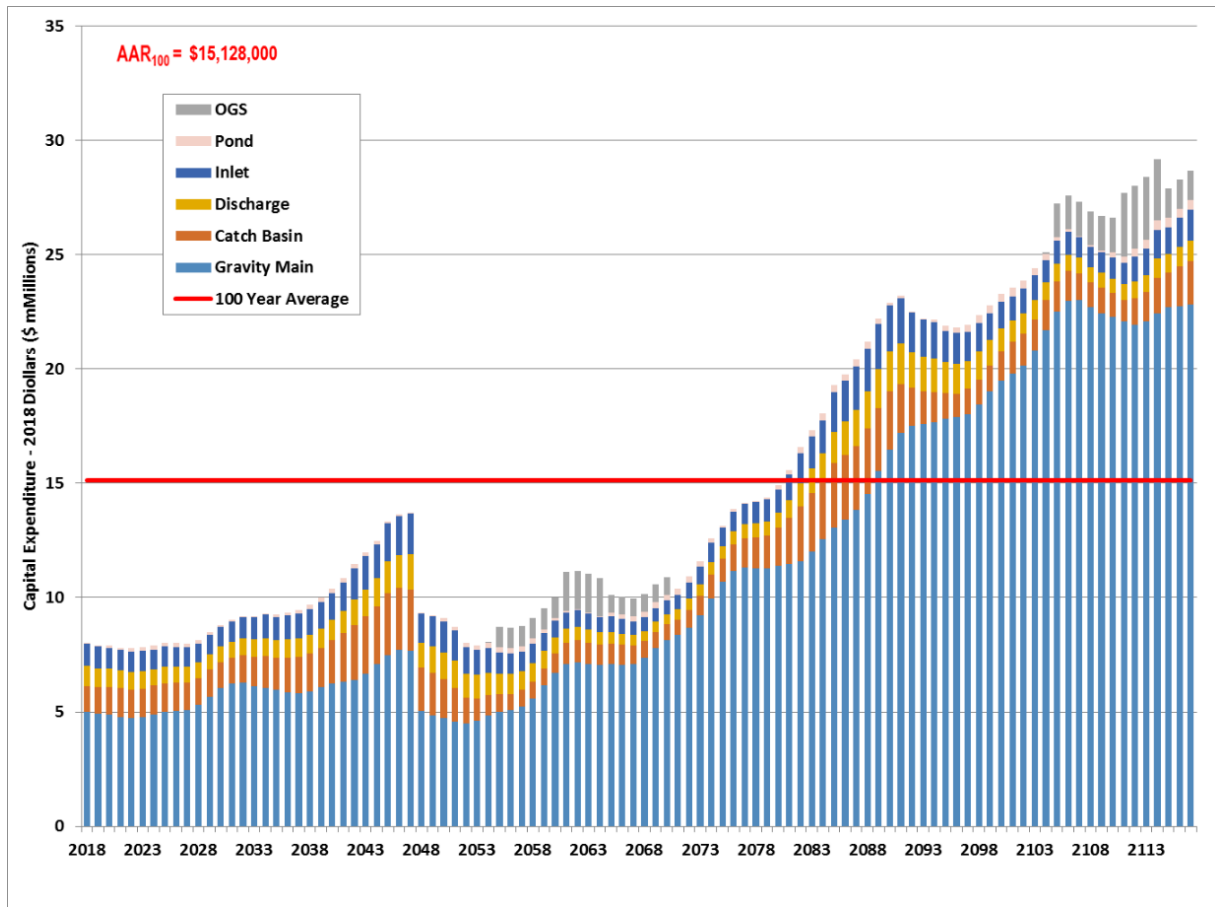
Figure A4: 100 Year Investment Profile for Storm Water Assets (Optimistic Scenario)

The 30 and 100 year investment profiles indicate that, although the STM system is relatively new, capital investment and additional maintenance programs are required to ensure the STM system continues to serve the community.

8.3. Roads, Bridges and Large Culverts (Core Infrastructure)

Table A2 provides a summary of the pavement condition index by road classification.

Table A2: Network Pavement Condition Index	
Asset Type	**Weighted Average PCI**
Arterial Roads	57.0 - Good
Collector Roads	49.1 - Fair
Local Roads	49.4 - Fair

Table A3 provides a summary of the bridge condition index identified with the 2018 structural inspections.

Table A3: Bridge Condition Index		
Asset Type	**BCI ≥70**	**BCI ≤70**
Vehicle Bridge	53	20
Vehicle Culvert	65	22
Pedestrian Bridge	17	4
Pedestrian Culvert	0	1

8.4. Buildings and Facilities

Table A4: Buildings and Facilities Facility Condition Index Projections							
Existing Conditions				**Projections**			
Service Area	**Quantity of Buildings**	**Area (ft²)**	**2020**	**2021**	**2022**	**2023**	**2024**
Asset Services	4	538,755	3.64%	7.00%	12.25%	15.07%	16.08%
Citizen Services	24	196,979	6.53%	9.19%	13.04%	13.40%	14.11%
Emergency Services	25	243,690	25.42%	28.99%	30.93%	39.49%	40.08%
Health Services	9	629,307	0.56%	1.09%	1.95%	2.00%	2.30%
Parks & Recreation	98	968,461	6.48%	8.75%	10.38%	12.15%	13.88%

8.5. Housing Operations

Table A5: Housing Operations Facility Condition Index Projections							
Existing Conditions				**Projections**			
Building Type	**Quantity of Buildings**	**Area (ft²)**	**2020**	**2021**	**2022**	**2023**	**2024**
Highrise	6	583,769	14.67%	17.29%	18.25%	20.43%	21.43%
Low Rise	6	233,476	8.49%	9.50%	11.05%	13.21%	16.48%
Townhouse, Single Family, Duplex and Semi-Detached	325	1,689,621	17.03%	18.02%	20.51%	22.28%	23.38%

8.6. Fleet and Equipment

Table A6: Fleet and Equipment Average Condition

Service Area	Asset Type	Average Condition
Corporate Fleet	Vehicles - Heavy Duty	62 - Good
	Vehicles - Medium Duty	55 - Fair
	Vehicles - Light Duty	56 - Fair
	Machinery and Equipment General	37 - Poor
	Machinery and Equipment Heavy	50 - Fair
	Machinery and Equipment MTs and Light Diesel	52 - Fair
	Parks and Recreation Equipment	54 - Fair
Paramedic Services	Ambulance	71 - Good
	Licensed Vehicles	68 - Good
	Conveyance Equipment	66 - Good
	Defibrillators	41 - Fair
	Kit Bags	70 - Good
	Operating Equipment	70 - Good
Fire Services	Fire Trucks	66 - Good
	Fire Trucks – Bush/Support/Spare and Training	52 - Fair
	Vehicles – Fire Licensed Light and Medium	61 - Good
	Auto Extrication	63 - Good
	Hoses	60 - Good
	SCBA and PPE Bunker Gear	58 - Fair
	Operating Equipment	54 - Fair
Transit	Transit Bus	42 - Fair
	Bus Stop Shelters	78 - Good

8.7. Municipal Parking

Table A7: Municipal Parking Average Condition

Asset Type	Average Condition
Paved Municipal Parking Lots	68 - Good
Gravel Municipal Parking Lots	50 - Fair
Meters, Pay Machines, Kiosks and Ticketing	66 - Good
Light Standards	83 - Very Good

9. Appendix B: Data Quality Rating

Table B1: Quality of Asset Datasets	
Data Quality Rating	**Description**
A	• 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	• Dataset contains less than 10% assumptions • Moderately reliable data inventory and source • Example: aging condition data or studies
C	• Data contains greater than 10% assumptions • Moderately reliable data inventory and source • Example: aging condition data or studies
D	• 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	• Moderately reliable data for age or value, but not both • Only 1 moderately reliable data source
F	• No data available