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Transportation
Asset Management Plan

March 2022

Version 1.1

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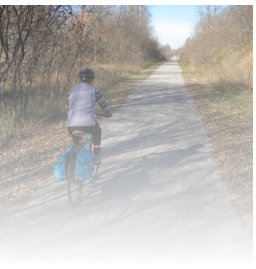
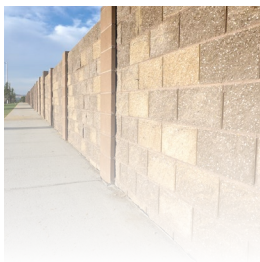






Introduction

Background

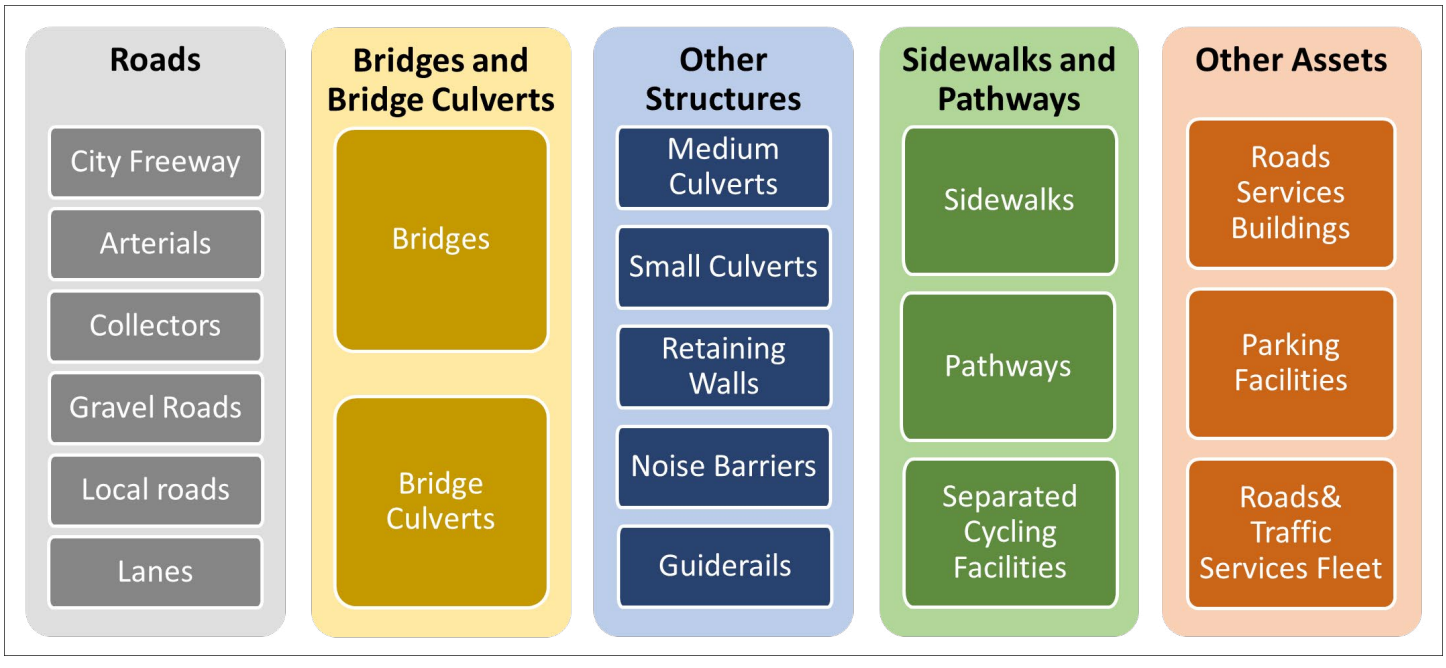
Ontario Regulation 588/17: Asset Management Planning for Municipal Infrastructure requires all municipalities to prepare baseline asset management plans for their core municipal infrastructure assets supporting the delivery of: drinking water, wastewater, stormwater, and transportation. The City of Ottawa has a well-developed Comprehensive Asset Management program that is well beyond the baseline; and over the past 20 years has established a clear picture of its infrastructure assets and maintained them responsibly, balancing affordability, risk, and service levels. The Provincial regulation requires the City shift its reporting slightly to present the cost of maintaining all core assets in their present state, with no changes to the service level, for the next 10 years.

To meet the Provincial requirements, the City has created this first version of its **Transportation Asset Management Plan (Transportation AMP)**. It reports the current state of the assets, levels of service provided, strategies and activities applied by the City, historical and forecasted financial details, and potential improvement actions. It is a strategic document that provides a snapshot of current conditions and establishes a basis for future asset management planning and decision making.

Asset Categories and Types

The Transportation AMP satisfies the Provincial requirements for roads, bridges; and culverts; and also includes other assets that support transportation services. These assets enable and support the movement of people and goods across the entire city in both urban and rural areas. (Assets that support public transit will be covered in a separate, future asset management plan.)

Transportation Asset Categories and Types



State of Local Infrastructure

Inventory and Valuation

The assets covered in the Transportation AMP have a replacement value of approximately $21 billion. This includes an inventory of approximately 12,400 lane-km of roads, 534 bridges, 214 bridge culverts, more than 6,000 medium and small culverts, more than 2,400 kilometers of sidewalks and pathways, 13 parking facilities, 120 Roads Services buildings and more than 850 Roads & Traffic Services fleet vehicles.

	Roads	Bridges and Bridge Culverts
Inventory	6,043 km / 12,405 lane-km	• 534 Bridges • 214 Bridge Culverts
Replacement Costs	$16.02 Billion	$3.15 Billion

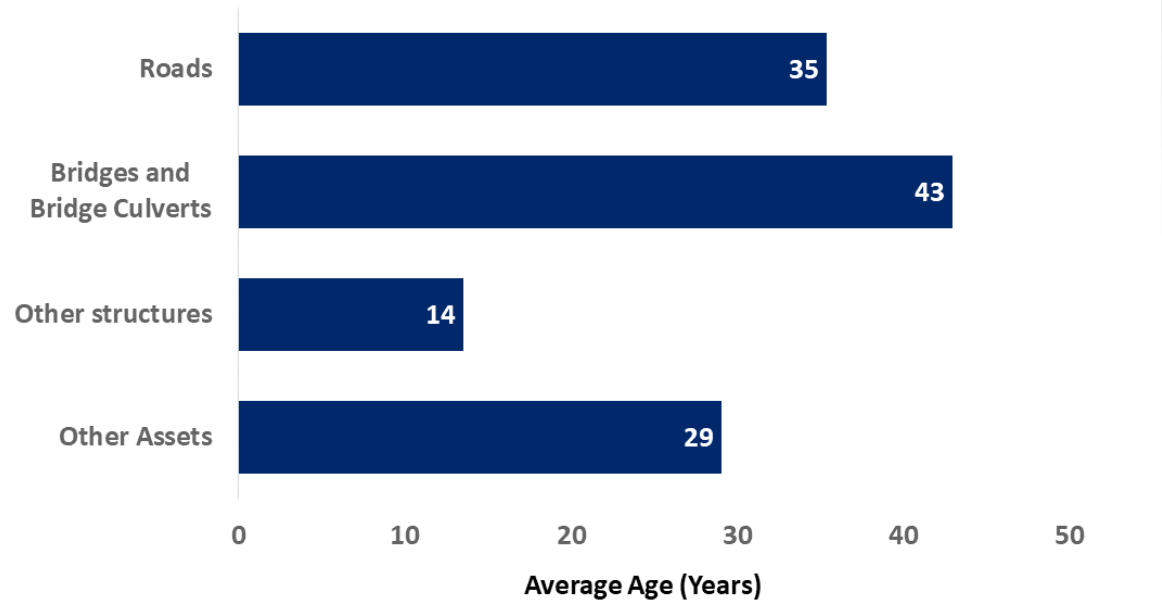
	Other Structures	Sidewalks and Pathways	Other Assets
Inventory	• 1,273 Medium Culverts • 4,913 Small Culverts	2,483 km	• 120 Roads Services Buildings • 13 Parking Facilities • 858 Roads and Traffic Services Fleet vehicles
Replacement Costs	$555.8 Million	$1.06 Billion	$520.9 Million

State of Local Infrastructure

Age and Condition

The age of an asset gives a sense of how close it is to the end of its service life and what renewal interventions may be appropriate. The average age of the City's transportation assets is shown in the figure below.

Average Age – All Assets



Note: Average age for sidewalks and pathways is not reported because of insufficient data.

State of Local Infrastructure

The City assesses the condition of its transportation assets on a regular basis using a variety of techniques, as summarized in the table below.

Asset Category	Condition data collection techniques	Frequency
Paved Roads	Automatic Road Analyzer	Every 2 to 5 years depending on road type
Gravel Roads	Visual inspection	Twice a year (spring and fall)
Bridges and Bridge Culverts	In compliance with Ontario Structure Inspection Manual requirements	Every 2 to 4 years
Medium and Small Culverts	Visual inspection	Every 10 years (typical)
Retaining Walls	In compliance with Ontario Structure Inspection Manual requirements	Varies (typically reactive)
Noise Barriers and Guiderails	On-site visual inspection	Varies (typically reactive)
Sidewalks and Pathways	High-level visual condition assessment ("windshield survey") and detailed hazard/maintenance assessment	High-level assessment: Every 5 years Detailed assessment: Every year
Roads Services Buildings	In compliance with varying regulatory bodies and standards	Every 10 years
Parking Facilities	In compliance with varying regulatory bodies and standards	Every 5 years
Roads & Traffic Fleet	In compliance with the formal City inspection program	Every year

State of Local Infrastructure

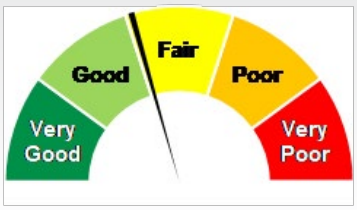
Based on condition data, supplemented by subject matter expert knowledge and professional judgment, the condition of assets is rated on a scale from "Very Good" to "Very Poor" as shown in the table below.

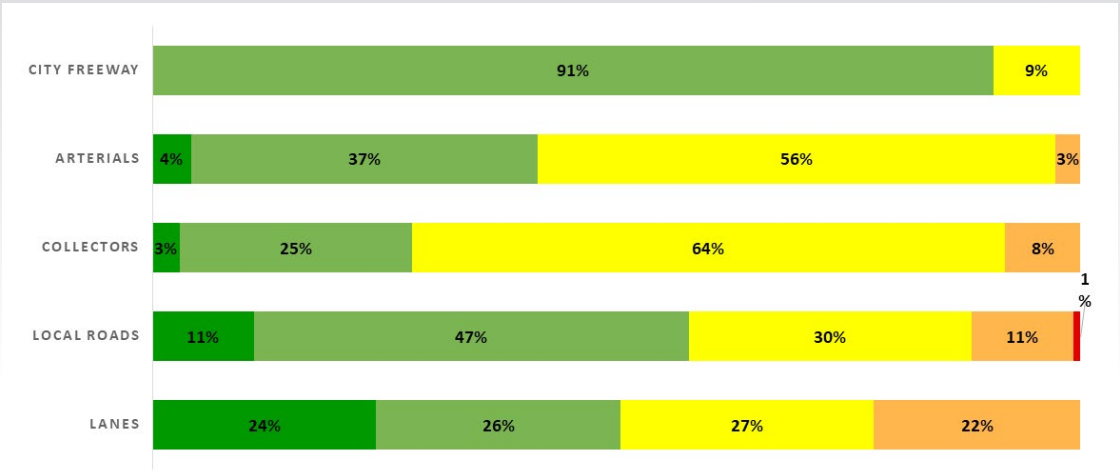
Rating	Rating Description	Asset Category / Type Metric (Condition Indices)					
		Roads (Pavement Quality Index)	Bridges & Bridge Culverts and Other Structures (Bridge Condition Index)	Side walks and Path ways (5 point scale)	Other Assets		
					Roads Services Buildings (Facility Condition Index)	Parking Facilities (Surface Distress Index)	Roads & Traffic Services Fleet (5-point scale)
Very Good	**Very Good – Fit for Future** Well maintained, good condition, new or recently rehabilitated	80 to 100	80 to 100	5	0 to 2.5%	80 to 100	5
Good	**Good – Adequate for Now** Acceptable, generally in mid stage of expected service life	60 to 80	70 to 80	4	2.5 to 5%	60 to 80	4
Fair	**Fair – Requires Attention** Signs of deterioration, requires attention, some elements exhibit deficiencies	40 to 60	60 to 70	3	5 to 10%	40 to 60	3
Poor	**Poor – Increasing potential of affecting service** Approaching end of service life, condition below standard, large portion of system exhibits significant deterioration	20 to 40	40 to 60	2	10 to 30%	20 to 40	2
Very Poor	**Very Poor – Unfit for Sustained Service** Near or beyond expected service life, widespread signs of advanced deterioration, some assets may be unusable.	20 or less	40 or less	1	30% or more	20 or less	1

State of Local Infrastructure

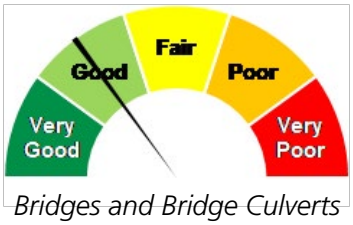
The overall condition of transportation assets is Good to Fair and a breakdown for the various asset types is shown in the figures below.

Roads

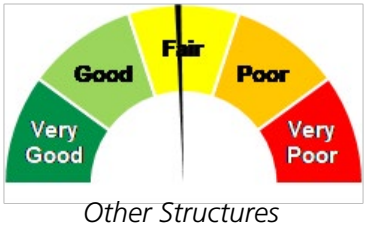




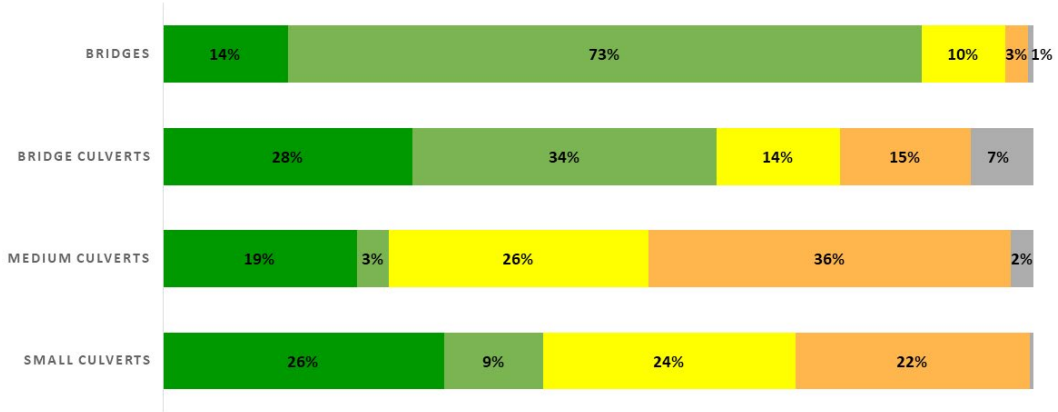
Bridges, Bridge Culverts and Other Structures



Bridges and Bridge Culverts



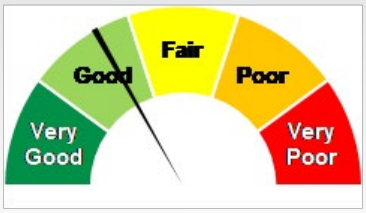
Other Structures

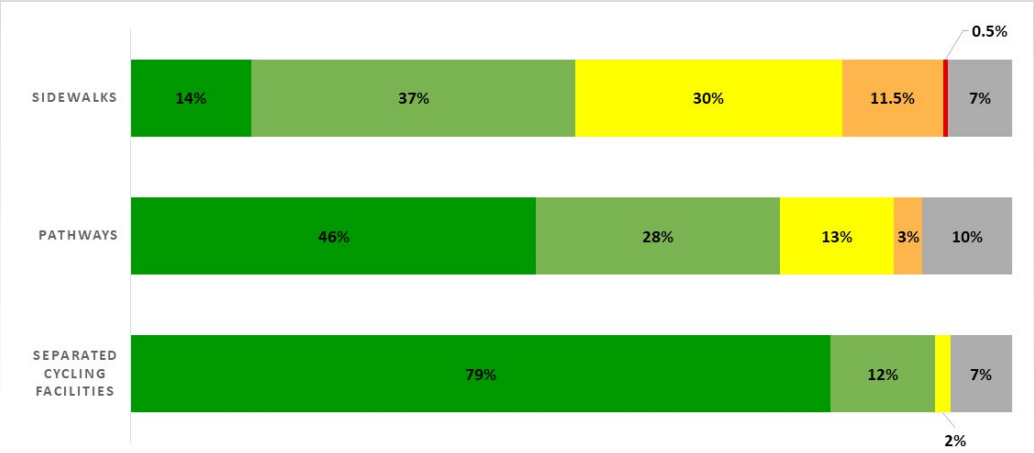


Note: Does not include condition of noise barriers, retaining walls, and guiderails because of insufficient data.

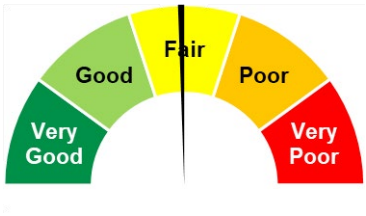
State of Local Infrastructure

Sidewalks and Pathways





Other Assets



Legend:

- Very Good
- Good
- Fair
- Poor
- Very Poor
- Condition Data not Available

Levels of Service

The City's assets exist to deliver service to customers. Levels of service measure the actual service delivered so that decisions can be made about the assets based on the service that they provide rather than simply on their condition.

The Transportation AMP establishes preliminary level of service measures and the current level of service being provided. The measures align with both City goals and Provincial requirements and recognize that transportation assets should provide:

- A road network that provides connectivity
- Bridges that support a wide range of users and vehicle types
- An active transportation network that is connected and accessible
- Adequate car and bicycle parking
- Streets, sidewalks, and pathways that offer safety, comfort and mobility for all users of the street regardless of their age, ability, or mode of transportation
- Roads, sidewalks and pathways that are clean and clear year round
- A low level of disruption to drivers, pedestrians and cyclists
- Roads, structures, sidewalks, pathways, and other assets that are kept in an acceptable state of repair
- Safe travel for all users
- A low level of greenhouse gas emissions

A future version of the Transportation AMP will go a step further and include City Council's target service levels for each measure.

Levels of Service

Preliminary Transportation Level of Service Measures

Service Attribute	Community Levels of Service	Technical Levels of Service	Current
Scope	The road network in the municipality and its level of connectivity[(1)]*	Number of lane-kilometres of each of arterial roads, collector roads and local roads as a proportion of square kilometres of land area of the municipality*	Arterial: 1.19 Collector: 1.38 Local: 1.89
	Bridges support a wide range of users and vehicle types*	Percentage of bridges with loading or dimensional restrictions*	3%
Accessibility	The active transportation network and its level of connectivity and accessibility	Number of kilometres of sidewalks, pathways and separated cycling facilities	Sidewalks: 2,135 Pathways: 325 Cycling: 23
	The provision of car and bicycle parking	Inventory of parking (parking lots and bicycle parking)	Car: Future measure Bicycle: Future measure
Reliability	Provide streets, sidewalks and pathways that offer safety, comfort and mobility for all users of the street regardless of their age, ability, or mode of transportation		Future measure
	Keep roads, sidewalks and pathways clean and clear year round	Compliance with Maintenance Quality Standards	Future measure
		Percent of pathways and separated cycle facilities that are winter maintained	Future measure
	A low level of disruption to drivers, pedestrians and cyclists	Number of road closure permits issued	532
		Number of reactive culvert replacements	37

Levels of Service

Service Attribute	Community Levels of Service	Technical Levels of Service	Current
Quality	Roads, structures, sidewalks and pathways will be kept in good working condition[2]*	For paved roads, the average pavement condition index value (on a scale of 0 to 100)*	59
		For unpaved roads, the average surface condition (Very Good to Very Poor on a 5-point scale)*	Good
		For bridges, the average bridge condition index value (on a scale of 0 to 100)*	74
		For structural culverts, the average bridge condition index value (on a scale of 0 to 100)*	67
		For sidewalks and pathways, the average condition (Very Good to Very Poor on a 5-point scale)	Good
	Other assets will be kept in good working condition	The average condition of other assets	See "Age and Condition" section
Safety	Safe travel for all users	Number of fatal and major injury collisions per 100,000 population (5 year rolling average)	15.3
		Percentage of walking and cycling infrastructure that provides Low Traffic Stress	Future measure
Sustainability	A low level of greenhouse gas emissions	Percent of eligible Roads and Traffic Services fleet that are greened vehicles (hybrid or zero-emission)	Future measure
		Community greenhouse gas emissions from transportation (kt CO2e)	1,948

** Required by Ontario Regulation 588/17.*
(1) Maps of the City's Urban and Rural road networks can be found in the 2013 Transportation Master Plan Map 6 and Map 8.
(2) See Appendix 1 for different levels of road pavement, bridge, and culvert conditions.

Climate change is a significant factor affecting the City's long-term ability to deliver levels of service, and each of the level of service measures were considered against the impacts of a changing climate. The most significant risks that were identified relate to increases in freeze thaw cycles, as well as increased risk of precipitation and extreme events.

Asset Management Strategy

Practices, Procedures and Tools

The City has well-established overall principles, framework and decision-making approaches for asset management and these are presented in the 2017 Strategic Asset Management Plan. They provide a holistic approach to asset management as demonstrated by the capital investment prioritization process that drives the decision-making towards meeting the desired levels of service at the lowest lifecycle cost.

Future Demand and Service Enhancement

Ottawa's population is expected to increase to 1.4 million people by 2046 a significant increase of 40% over the next 25 years. The City's Official Plan sets the goal for the majority of trips in the city to be made by sustainable transportation (walking, cycling, transit or carpool) by 2046, and this will be reflected in the City's updated Transportation Master Plan and Active Transportation Plan.

	2046 Projection	Growth since 2018
Population	1,409,650	402,150
Private Households	590,600	194,800
Jobs	827,000	189,500

Source: New Official Plan report to Council (ACS2021-PIE-EDP-0036), October 2021

In addition to the growth and enhancement objectives of the City's master plans, asset management planning also needs to consider the Climate Change Master Plan goals for both resiliency to changing climate and reduction of greenhouse gas emissions. Existing assets must be maintained and new assets brought into service, to meet these various growth and service enhancement objectives.

Asset Management Strategy

Lifecycle Management and Risk

Lifecyle management activities refer to the set of planned activities and actions undertaken to maintain the current levels of service and achieve good economic life of the assets. The activities undertaken range from operations and maintenance activities, including planned and reactive maintenance, renewal activities (such as condition assessments and rehabilitations), disposal activities and non-infrastructure solutions (such as policies and processes that reduce costs, mitigate risks or maintain/enhance service delivery).

In developing the Transportation AMP, a preliminary estimate was prepared of the cost of maintaining all of the assets that support the City's transportation service at their current level of service (see "Renewal Funding Difference" section). The estimate is based on deterioration models and lifecycle behaviour of the assets, as well as the estimated costs of renewal. The lifecycle activities that will be required over the 10-year period are based on the asset management strategies detailed in Chapter 4 of the City's Strategic Asset Management Plan. For transportation assets, this includes operational and maintenance strategies, asset management decision making, intervention strategies, lifecycle cost and value optimisation, options analysis, ageing assets strategy, non-infrastructure solutions, capital investment planning, condition assessment programs, shutdowns/outage strategy and optimisation, as well as consideration of mobility impacts, facility shutdowns, and impacts to other services.

The City applies a risk-based approach to prioritizing asset renewals. The risk assessment frameworks and methods vary across the different types of assets, but are generally based on the importance of each asset in terms of service delivery/continuity and the number of users who could be impacted.

"The City applies a risk-based approach to prioritizing asset renewals."

Financing Strategy

The City continues to invest responsibly in maintaining infrastructure and has been increasing its capital investments to align with long-range financial plans. The City's existing funding model keeps the City on track to maintain critical infrastructure in a state of good repair. There is no need to change the current funding model until new service levels are defined in the next version of the asset management plans, which are due in 2025.

Expenditure History

The City has made significant investments on all types of infrastructure and has put a priority on investing in critical infrastructure.

	Expenditure/Budget (millions)				
	2016	2017	2018	2019	2020
Operating Expenditures	$177.0	$179.2	$182.3	$206.1	$190.0
Capital Budget - Renewal	$104.7	$127.6	$139.4	$139.6	$161.1
Capital Budget - Growth & Enhancement	$40.7	$54.9	$48.1	$41.3	$103.1

Expenditure Forecast

Over the next 10 years, the City will continue investing in infrastructure to support operational expenses, respond to renewal needs, serve growth, and provide enhancements.

	Expenditure/Budget Forecast (millions)										
	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
Operating Expenditure	$202.8	$208.1	$213.4	$218.7	$224.0	$229.3	$234.6	$239.9	$245.2	$250.2	$2,266.1
Capital Budget – Renewal	$144.1	$162.2	$156.4	$166.1	$176.8	$185.7	$194.8	$198.9	$219.9	$222.2	$1,827.1
Capital Budget – Growth & Enhancement	$69.5	$73.4	$70.5	$70.7	$59.6	$54.5	$55.2	$67.4	$52.4	$64.5	$637.7

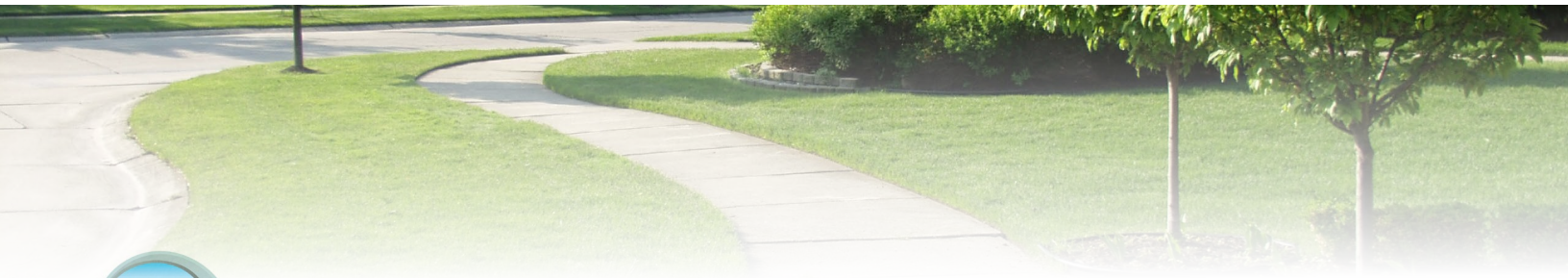
Financing Strategy

Renewal Funding Difference

The City's current asset management investment strategy, based on the 2017 Long Range Financial Plan, focuses on the cost of keeping critical infrastructure assets (such as arterial roads, bridges, trunk sewers, primary watermains, and key facilities) in a state of good repair. By contrast, as required by Provincial legislation, the Transportation AMP forecasts the cost to keep all transportation infrastructure assets in their present state for the next 10 years. This Transportation AMP forecast for all transportation infrastructure assets is compared against current budget forecasts to determine the 10 Year Renewal Funding Difference.

Ten Year Planned Investments and Estimated Preliminary Costs for Transportation Assets

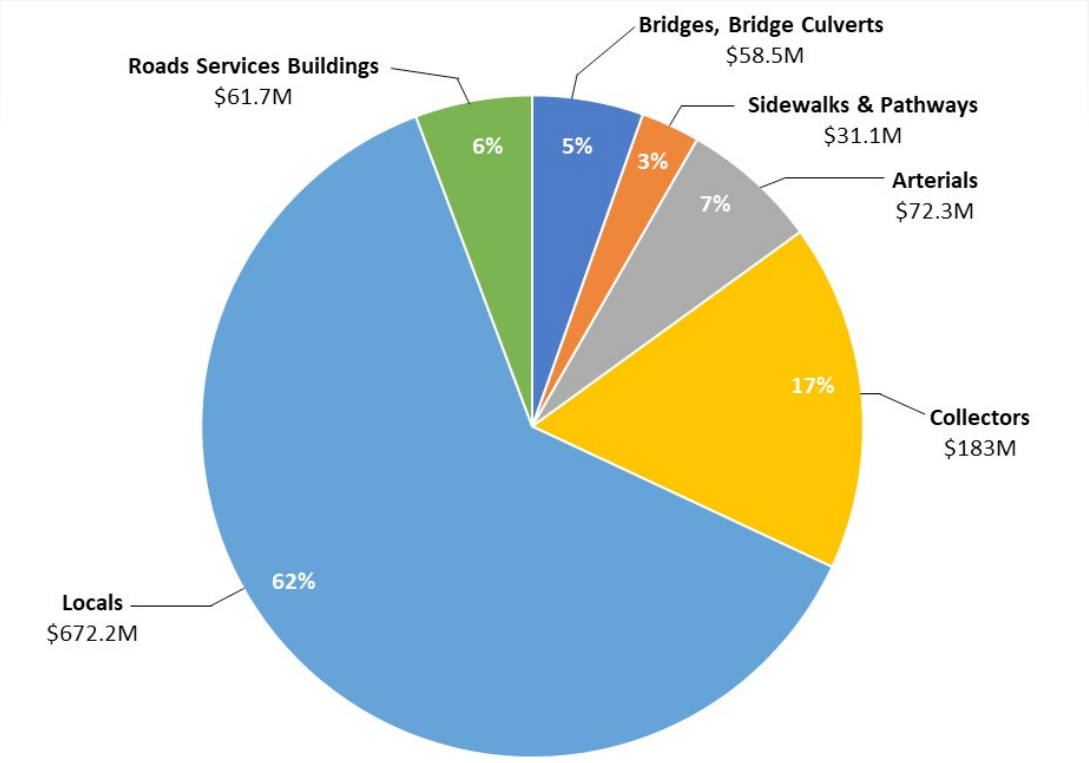
Asset Category / Type		Planned Investment to Maintain State of Good Repair on Critical Infrastructure (per Long Range Financial Plan)	Estimated Preliminary Costs to Maintain All Infrastructure at Current Level of Service (per Provincial requirement)	10 Year Renewal Funding Difference
Roads (integrated program)		$510.9 M	$510.9 M	-
Roads (resurfacing and preservation)	City Freeway	$607.5 M	$1,535.0 M	-
	Arterials			$72.3 M
	Collectors			$183.0 M
	Local Roads and Lanes			$672.2 M
Bridges & Bridge Culverts		$266.6 M	$327.0 M	$60.4 M
Medium and Small Culverts		$137.7 M	$134.0 M	-
Sidewalks and Pathways		$105.9 M	$137.0 M	$31.1 M
Roads Services Buildings		$17.2 M	$79.0 M	$61.8 M
Roads & Traffic Services Fleet		$102.4 M	$119.7 M	$17.3 M
Parking Facilities		$36.5 M	$29.0 M	-



Financing Strategy

The estimated preliminary cost to maintain all infrastructure assets in their current state is greater than the need identified in the 2017 Long Range Financial Plan forecast. A key difference is that the Transportation AMP includes the cost to renew Local roads, whereas the 2017 Long Range Financial Plan uses a risk-based approach to prioritize investment in critical assets. For example, investments in road renewal are prioritized for higher volume, more critical roads such as Freeway and Arterial roads, whereas Local roads by comparison receive lower investment. This is reflected by the breakdown of the Transportation AMP renewal funding difference shown below.

10-Year Renewal Funding Difference Breakdown



Climate change will bring additional future funding pressures. The increase in lifecycle expenditures is likely to be experienced in the longer term, outside the 10-year horizon of this Transportation AMP, but individual adaptation measures such as flood protection may end up programmed within the 10-year horizon once further planning studies have been completed. Both growth and renewal costs may increase should design standards be amended to ensure performance in future climate conditions.

Improvement and Monitoring Plan

Based on the snapshot of current conditions and existing plans presented in the Transportation AMP, areas of potential improvement include:

- Data gaps, data management, and record keeping
- Cost estimating
- Level of service measures and targets
- Inspection, condition assessment, corrective maintenance, and risk assessment
- Asset management practices for facilities
- Climate change resiliency
- Equity and inclusion

The Transportation AMP will be reviewed and updated on a regular basis and over time these improvements will be reflected in future versions of the plan.

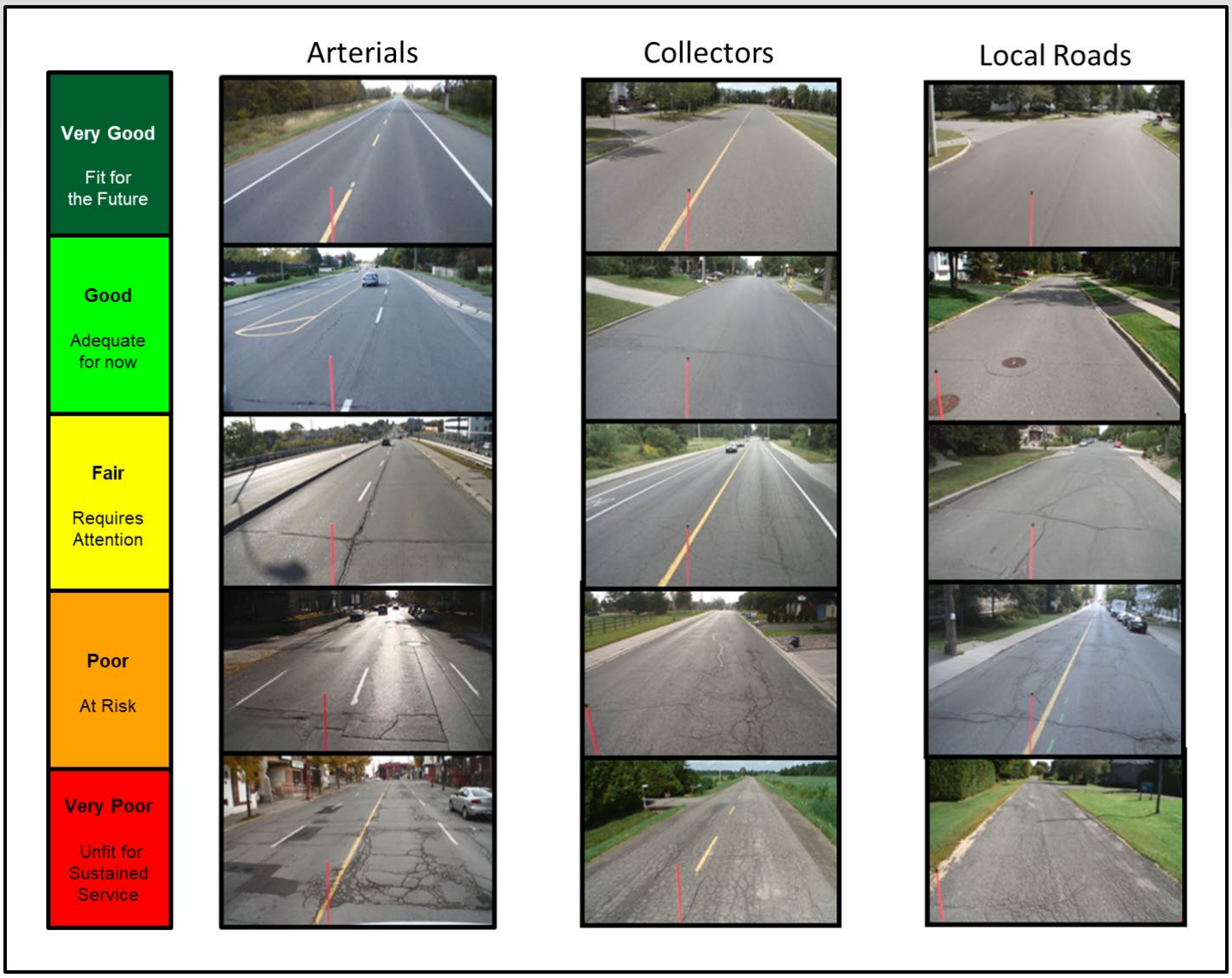
More Information

For more information about comprehensive asset management, or to learn more about the City's Comprehensive Asset Management Program, please visit Ottawa.ca.

Appendix 1:

Community Level of Service Condition Ratings

Images of Condition for Roads:



Appendix 1:

Community Level of Service Condition Ratings

Images of Condition for Structures:

	Bridges	Culverts (3 m and greater)
Very Good Fit for the Future	 Good to Very Good	 Good to Very Good
Good Adequate for now	 Fair	 Fair
Fair Requires Attention		
Poor At Risk	 Poor to Very Poor	 Poor to Very Poor
Very Poor Unfit for Sustained Service		